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Landscape planning and design for energy transition in France and the Netherlands. Principles, practices, recommendations

Roberta Pistoni

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Agriculture, alimentation, biologie, environnement et santé (ABIES)

par

Roberta PISTONI

**Landscape planning and design for energy transition
in France and the Netherlands.**

Principles, practices, recommendations

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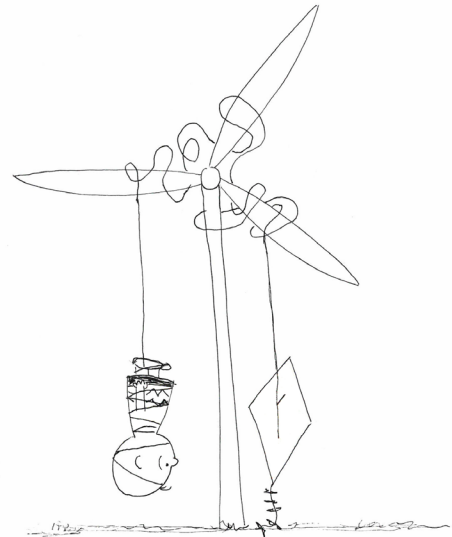
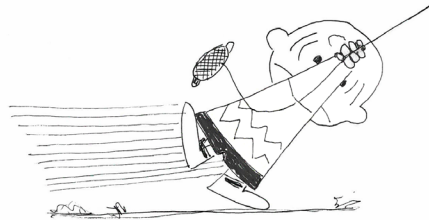
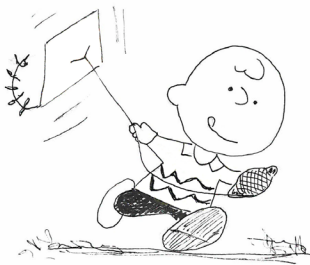
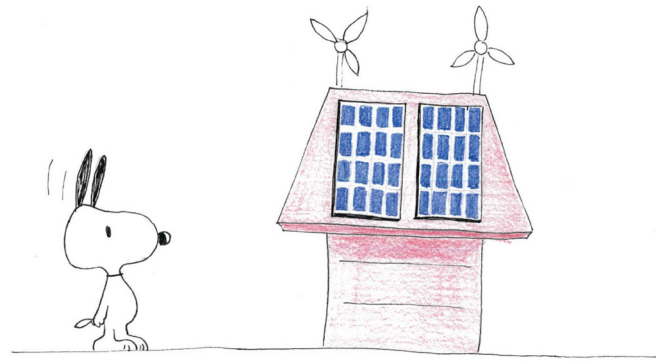
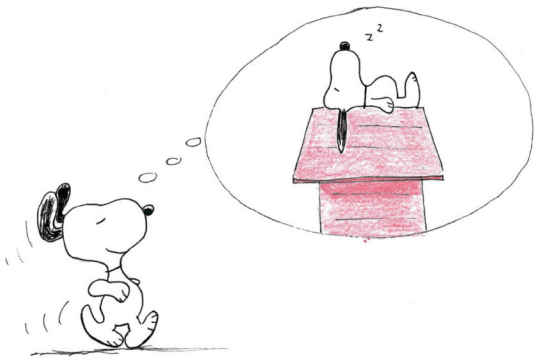
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FOREWORD

I am not a chess player but I am a great reader and it occurred to me during the development of this research to read the book of an Italian author Andrea Camilleri “La mossa del cavallo” [the knight move] a crime book where it exemplarily explained how this chess move is peculiar because somehow outside existing scheme and unexpected. Thanks to its “L” shaped way of moving the knight could move both horizontally and vertically and jumping over other pieces, somehow this abrupt deviation of the knight trajectory allows to add a new piece to look at things from two perspectives while remaining part of the rules of the games.

My goal is to explore new insights and perspectives and supports overcoming pieces of existing problems, doing my research a sort of a “knight move” in the biggest chess game that is the implementation of energy transition in our landscapes.

¹ CAMILLERI Andrea. 2017. *La mossa del cavallo*, Sellerio editore, Palermo.



Rx

Rp

Source: author

Acknowledgements

How I read in a book “Writing a dissertation is very much like being in a long-term relationship there are likely to be some very good terms and some perfectly dreadful ones.”¹

After this thesis writing I greatly agree with that. It is for these reasons that I think is even more important to thank people that supported me, enjoying and sharing the good moments and helping and supporting in the worse one.

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E grazie alla mia famiglia che nonostante tutte le difficoltà passate in questi anni mi ha sempre sostenuta e mi è sempre stata vicina.

¹ BOLKER Joan. 1998. *Writing your dissertation in fifteen minutes a day*. H. Holt and C. New York, p.9

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INTRODUCTION

1. Problem description

“We are addicted to electricity” (Pasqualetti 2011, 201) states the geographer Martin Pasqualetti, assertion that could be generalized as “we are addicted to energy”, if we consider also fuels for transports, heating or other activities that imply a constant need of energy for developing our daily activities. And this “addiction” very much based on fossil fuels is recognized since long to contribute to global warming and climate change and all the effects that these phenomena imply such as the loss of biodiversity and human health problems. This also because energy consumption has followed a growing line that is the object of questioning and discussion (Illich 1974; Meadows, Meadows, and Randers 1992). Since Kyoto in 1997 protocol the importance of less polluting and less consuming energy systems were put forward in public policies and reconfirmed in the Paris agreement in 2016. Recently, in 2018, the Intergovernmental Panel on Climate Change (IPCC) published a “Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty”. Among the responses to global warming are pointed out the need for lowering energy demand (associated with improvements in energy efficiency and behavior change) and decarbonisation of energy supply systems. The need to transit to a more sustainable energy system is now considered a necessity at international level and it has entered national policies.

Energy transition is an ambiguous term that has had different meanings and different content through time (Solomon and Krishna 2011). Literally the noun “transition” from the Oxford dictionary means “the process or a period of changing from one state or condition to another” (Stevenson and Oxford dictionary of English 2010). Associated with energy it refers to the process of changing from an energy source or energy system to another, not necessarily more sustainable. Nowadays the term energy transition is mainly employed to designate the passing from fossil fuels centered to carbon free energy systems (Solomon and Krishna 2011) but this energy transition motto has not yet been erected as a consensual project (Araújo 2014). However its implementation is based on three main strategies as summed up by the trias energetica (Lysen 1996) and adapted recently (Tillie, Rotterdam Climate Initiative, and Project Group Hart van Zuid 2009; Vandevyvere and Stremke 2012): (1) reduce demand, (2) optimize energy streams (3) use renewable energy sources. Strategies are also shared by public institutions such as the French ADEME (ADEME 2016).

Energy itself is an ambiguous term. Just by looking at its definition in the Oxford dictionary (Stevenson and Oxford dictionary of English 2010) three different meanings can be found: (1) the strength and vitality required for sustained physical or mental activity, (2) power derived from the utilization of physical or chemical resources, especially to provide light and heat or to work machines, (3) (*Physics*) the property of matter and radiation which is manifest as a capacity to perform work. These three definitions have in common to refer to something that has a dynamic and changing nature and that could have multiple ways of manifestation. The definition of energy from the “Dictionary of Energy Science” (Jelley 2017) focuses on the third definition above, enumerating the different types of energy able to perform work, a movement or any other dynamic act: kinetic energy, thermal energy, electromagnetic, potential energy. These are definitions that make the energy notion difficult to grasp in the material and phenomenological sense.

The notion of “energy” was defined in the 17th century by physics referring to mechanical work, and has been extended to include heat in the 19th century through thermodynamics (Smil 1994), linking the notion of energy to technical and engineering processes of production and transformation (Debeir, Deléage, and Hémerly 2013). Only recently, the spatial and landscape connotation of energy has been recognized. “Energy needs space”, affirm Rania Ghosn in the introduction to *Landscapes of energy* and “It exploits space as a resource, a site of production, a transportation channel, an environment for consumption, and a place for capital accumulation” (Ghosn 2010). This relation between spatial organization and energy development could be identified all along human history (De Pascali 2008; de Jong and Stremke 2020) and landscapes have transformed as well on the basis of the use of different energy resources (M. J. Pasqualetti 2012). The period we are living in makes no exception: energy transition is considered a main driving force for landscape transformation (Bridge et al. 2013; Nadaï and van der Horst 2010). The landscape definition itself is elusive and changing through history and through disciplines (Toublanc 2004). In this research I refer to the landscape according to the European Landscape Convention, as “cadre de vie”, as perceived and conceived by the people and whose character is the result of the action and interaction of natural and/or human factors (Council of Europe 2000). Landscape has both material and immaterial components (Antrop 2006). Indeed landscape consists of physical elements, natural or man-built, such as mountains, rivers, houses, streets, etc. It also carries immaterial components, which exist in the perception of people and in a regulatory framework of maps, norms, planning systems as a social entity (Nadaï and Labussière 2015). This latter dimension may have repercussions on the material part of landscape and vice versa. For example, landscapes that are recognized for their immaterial cultural and heritage value may be protected with a legislation limiting wind turbines implementation (immaterial versus material). At the same time the implementation of wind turbines inserting a new material visible element in the landscape could induce changes in the value and perception of it, altering the immaterial component (material versus immaterial).

Landscape is also attached to a project category through the action of planning and design (see e.g. Stremke 2010) that leads intentional changes in the physical environment, and that could also affect socio-cultural values.

Design has an impact on the material/physical changing of a place, but it has also immaterial social repercussions, that have to deal with the relational component that persons have with their

living environment. These repercussions could be direct or indirect. At the same time designers have to take into account the material and immaterial component of landscape, its physical characteristics, such as geological structure, land use, etc. but also personal values, behavior and regulations.

Landscape transformations could result from a very broad range of causes, some intentional and others just resulting in unconscious landscape changes. And landscape changes are led by a wide range of people: not only planning and design professionals (e.g. landscape architects, architects, urban planners, etc.) but also farmers, engineers, institutional bodies and many others. Landscape architecture is among the disciplines that contribute to conscious transforming of landscape and it is able to develop sustainable landscapes (Antrop 2006). Moreover, landscape architecture contributes to the energy transition process (see e.g. Stremke 2010; Schöbel and Dittrich 2010). As affirmed by (then) professor and landscape architect Dirk Sijmons “Technical infrastructure such as solar PV fields, wind turbines, high voltage DC transmission lines and intermittency infrastructure might be the single most important agency of change to the landscape of the 21st century and thus a new working field for landscape architects” (Sijmons 2015, 35).

For sure the landscape link is well recognized and established with the renewable energy (RE) technologies, such as wind turbine and photovoltaic panels (Apostol et al. 2016); they need physical space to be implemented, and require sites having specific characteristics such as windy places or well exposed to sun ones. RE technologies are clearly visible in the landscape, and they depend also to the infrastructures for electricity transmission. The landscape link of the other two energy transition strategies is less immediate, but both *energy consumption reduction* and *energy stream optimization* are strongly related to landscape. For example, dense mixed areas are lower energy consuming for transports than low-density and mono-functional ones. And concerning *energy stream optimization*, for example the development of cascading of energy re-using waste energy, coming from industrial process for lower energy demanding purpose (e.g. heating houses) could lead to a spatial re-organization of industrial and residential areas.

Figure 1 (next page), illustrates the relation between energy development and landscape in an energy transition framework. Where it is illustrated how the changing of the energy system transitioning towards a reduction of energy consumption, energy stream optimization and RE production transform landscape. At the same time landscape could determine energy strategy choices, thanks to its constructs, as defined by Pasqualetti (2013): inherent (e.g. solid liquid), functional (transportation, use, etc.), natural (e.g. topography, climate) and cultural (economy, perception, etc.). This relation could be addressed through planning and design, orientating consciously the energy transformation of landscape, and the possible and expected role of landscape characteristics as determining energy choices.

The interest for the relation between landscape and energy is rising in importance at international level, also from planning and design perspectives and this development can be seen in different initiatives and researches. In 2012, the NRGLab – acronym for eNeRGy Landscape And Beyond - opened at Wageningen University attached to the Landscape architecture group, focusing on research projects on sustainable energy landscapes.

In April 2015, the *École Nationale Supérieure de Paysage de Versailles-Marseille* [National School

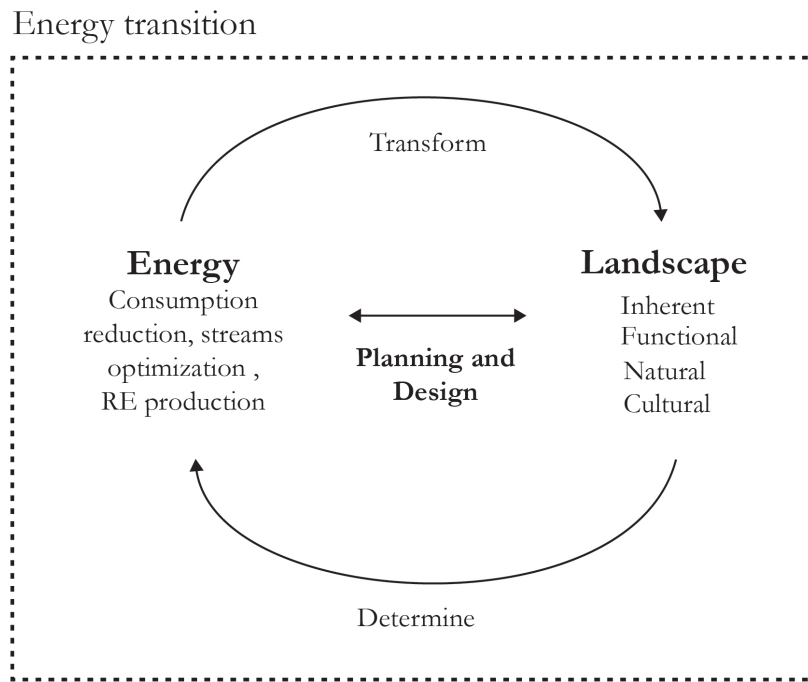


Figure 1. Schema illustrating relationship between energy and landscape in energy transition framework. Source: author

of Landscape Architecture of Versailles-Marseille] installed the “Chaire d’entreprise paysage et énergie” [Landscape and energy Chair] supported by the “Ministère de l’écologie, du développement durable et de l’énergie” [Minister of ecology, sustainable development and energy] and the “Réseaux transport d’électricité” (RTE) [Electricity transport network] as funding partner in order to develop research and practice and teach students in landscape architecture linking landscape and energy transition.

In September 2015, the European conference of the Landscape Research group was devoted to “Energy Landscapes: Perception, Planning, Participation and Power” and took place in Dresden. It questioned the new challenge of European landscapes that are being reshaped by the growth in renewable energies and the ongoing exploitation of fossil resources.

The project “COST action TU 1401 RELY- Renewable Energy and Landscape Quality” supported by the EU Framework Programme Horizon 2020, was launched in 2014 until 2018. Its goal was to support cross-national cooperation among researchers, engineers and scholars across Europe, in order to exchange scientific knowledge and practical experiences of how to appropriately address landscape-energy conflicts that occur due to the rollout of renewable energy installations.

Furthermore, the French research program (2011-2013) “Ignis Mutat Res¹. Looking at Architecture, the City, and the Landscape through the prism of energy”, launched by the French Ministry of Culture and Communication in partnership with at the time named *Ministère*

1 <http://www.culturecommunication.gouv.fr/Politiques-ministerielles/Architecture/Formations-Recherche-Metiers/La-recherche-architecturale-urbaine-et-paysagere/L-organisation-de-la-recherche/La-politique-incitative-a-la-recherche/Ignis-Mutat-Res-IMR>

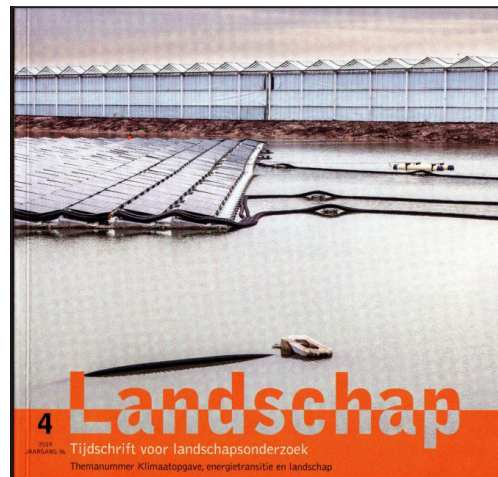


Figure 2. Covers of journals focused on the connection between energy and landscape in different European Countries (Italy, Germany, France, Netherlands). Source: journals

de l'écologie du développement durable et de l'énergie [Ministry of ecology, sustainable development and energy], had the objectives to explore and question how the spatial planning and design disciplines (mainly architecture, landscape architecture, urban and regional planning), had and could interact with energy development.

Also looking through the international literature, many journals have addressed the energy and landscape relationship. Amongst others could be mentioned the “New Geographies 2: Landscapes of Energy” published in 2010 by Harvard University Graduate School of Design, or the scientific journal *Landscape Research* that in 2010 published a special issue “Landscape of energy” and in 2018 developed a special issue named “Governance of Energy Landscapes-Exploring Recent Developments and Perspectives”. But also many national journals across Europe such

as the German “Garten + Landschaft” that in 2009 and subsequently in 2012 dedicated an issue to energy landscape; the Italian journal “Architettura del paesaggio” developed two issues on the topic, in 2009 and 2012. In France a monographic issue of *Projet de paysage* was dedicated in 2014 to “Le paysage à l’épreuve de la transition énergétique” [The landscape put to test of energy transition] and more recently the journal *Urbanisme* elaborated a special issue about “Les nouveaux paysages de la transition énergétique” [The new landscapes of energy transition] in 2018. Moreover, in 2019 the Dutch journal *Landschap* published a “special issue Climate challenge, energy transition and landscape” [Thema-nummer Klimaatopgave, energietransitie en landschap] (see figure 2).

The spatial turn in energy transition began to raise of importance also in other disciplines and in 2018 the international review “Energy Research & Social Science”, that examines the relationship between energy system and society encouraging submissions from many disciplinary fields, dedicated a special issue (n.36) to the spatial dimension of energy, where the editorial states that “*This special issue departs from the assumption that spatially-engaged energy research can make step-change contributions to understand the global energy challenge*” (Castán Broto and Baker 2018, 1).

Moreover, beyond a scientific and academic debate the topic rise in importance also in professional worlds that do not belong only to spatial and landscape disciplines. This is the case of the association “Collectif paysages de l’après-pétrole” [after-fuel landscape], which grouping together many professionals coming from different disciplines (e.g. agronomist, philosopher, landscape architect, urban planners etc.) advocate the idea to give to landscape a central role in energy transition context, starting from landscape approaches including the active participation of citizens.

However, despite the attention that it is receiving, and the recent developments in technologies and knowledge, “Making energy transitions will be one of humanity’s great challenges for the twenty-first century.” (Miller, Iles, and Jones 2013, 144).

2. Knowledge gaps

Although the dialectic of landscape and energy has been discussed (e.g. Nadaï and van der Horst 2010; Leibenath and Lintz 2018) also exploring the connection from a planning and design point of view (e.g. Stremke and van den Dobbelen 2013; Oudes and Stremke 2020; Schöbel and Dittrich 2010; Folléa 2019), this latter perspective has not been investigated to the same extent. A survey in landscape journals mentions that researches about energy are not a prominent topic addressed yet (Cushing and Renata 2015). Moreover, at the same time an inquiry in energy related journals shows that spatial science (such as landscape architecture), are barely addressed (Sovacool 2014).

The first knowledge gap consists to further understand the relation between landscape planning and design and energy development in an energy transition framework, and the subsequent identification of concepts that could support the development of this relation.

In this field of energy transition, research about landscape planning and design focus mainly on renewable energy production (Picchi et al. 2019; Minichino 2014; Frolova, Prados, and Nadaï 2015). Knowledge about connection to landscape with all three main strategies of energy

transition (reduction of energy consumption, energy stream optimization, and RE production) are still insufficiently studied. To consider this point is even more important as European and national laws are encouraging to address simultaneously all of them.

In connection with that general direction of research, two other knowledge gaps have been identified. The first refers to the territorial scale, for which research on the energy transition implementation are still lacking (Hoppe et al 2020.), especially from a landscape planning and design perspective, investigating all the three energy transition strategies.

Finally, landscape architecture practice in an energy transition framework has not been broadly discussed beyond the main renewable energy production strategy (e.g. Minichino 2014; Oudes and Stremke 2020). There is a need to inquire the professionals' practices and identify principles or guidelines, regarding both the required knowledge and the suitable design steps that would allow to address the new challenge.

It should be noticed that research about landscape architecture is particularly underdeveloped in the French context.

3. Main objective

The pursuit of more sustainable landscapes is the starting point of this research. It is developed through the prism of energy, which is considered as one of the main levers of action to counter and mitigate climate change and air pollution.

The energy transition, as the overall search for solutions to face ecological crises mobilizes support for decisions, at a political and legal level, which nowadays primarily draws on geophysical, biological data and on scientific methods that are mainly based on modeling. When we move to a project located somewhere, with its implementation on inhabited territories, practiced by inhabitants through uses anchored over time, with the complexity of humans living environment as well as for plants and animals, problems appear very quickly: not only local acceptance problems but also problems for the adaptation of the intentions to sites specificity, of resistance to existing dynamics, natural or human.

Many from scientific and political contexts have started to criticize the supremacy of modeling. Bruno Latour, a sociologist, specialized in environmental policies, insists on the need to back towards the Earth, that policy understand the importance to describe, “to get back to the descriptions of living territories that have become invisible”² (Latour 2017). The interest in landscape planning and design is to get back this link to the earth. At least this is what this thesis wants to test.

This because landscape planning and design could participate in the energy transition challenge (Sijmons et al. 2014), contributing to the deployment of its three main strategies (energy consumption reduction, flow optimization and RE production).

In this context the main goal of this research is to establish and assess energy conscious landscape planning and design. In this regard, a special focus is given to landscape architecture practice (figure 3).

² “reprendre la description des terrains de vie devenus invisibles”

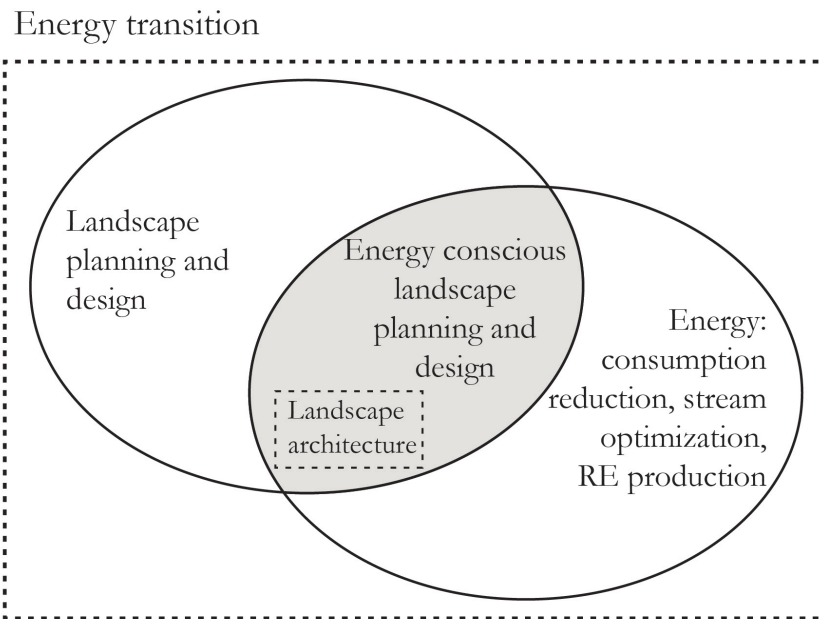


Figure 3. Schema of the main objective framework. Source: author

With ‘energy conscious’ we mean that planning and design activities have the goal to imagine future landscapes, integrating and supporting the implementation of energy transition. We refer to that in a framework of “sustainable energy landscape” which has the goal to improve energy development without compromising landscape qualities such as the aesthetic, the biodiversity, food production and other ecosystem services (Stremke and van den Dobbelsteen 2013).

If not put in a sustainability framework, energy conscious principles could lead to rather unsustainable choices such as monoculture biomass production for energy purposes.

To develop this goal in the research, the choice has been made to analyze the subject progressively from different perspectives in order to address the topic in as much as possible a global manner. Different materials that compose complementary facets of planning and design process are collected and analyzed: planning instruments, landscape focused documents, energy transition agents’ and landscape architects’ perspectives on their practices and expectations. Moreover the inquiry about the main topic is explored in two national contexts – in France and in the Netherlands – two countries engaged in an energy transition process and with a strong landscape architecture tradition. This comparison makes it possible to take a step back in the analysis and therefore to place the results in a broader perspective.

In an energy transition process many dimensions have to be considered such as economy, technology, social behavior, and landscape planning and design are among these dimension participating in the transition process. In focusing on ‘landscape’ I am not denying the importance of other aspects but exploring one of them that may contribute to successfully achieve the energy transition implementation.

4. Research questions

The research is built around three main research questions:

RQ 1:

What are the relations between energy management/development and landscape planning/design in the energy transition framework?

Which concepts and operational principles are available to inform energy-conscious planning and design in the context of sustainable energy transition?

RQ 2:

In the energy transition process what role does landscape as well as landscape planning and design play in the energy transition process at a territorial level? And what is the comprehension that territorial agents have of the connection between energy and landscape?

In this regard, what are the differences – if any – between France and the Netherlands?

RQ 3:

What could be the contribution of landscape architecture to energy transition and how is landscape architecture affected by the energy transition? What are the differences – if any – between France and the Netherlands regarding the role and practice of landscape architects in this field?

5. Methodology

As stressed in the editorial of the first number of *Landscape Research* in 1976, “landscape is not contained within any discipline or profession”(Laurie and Murray 1974, 1; Vicenzotti et al. 2016, 388). Landscape is a subject of interest in several scientific fields such as natural sciences, social sciences, humanities and arts (Tress et al. 2001; Bell, Sarlöv Herlin, and Stiles 2012) and research about landscape generally combines different methodologies (Van den Brink and Bruns 2014) which come from several disciplines such as geography, economy, political sciences, architecture, etc. (van den Brink et al. 2017). The goal of this research is to analyze, from multiple perspectives, the subject of energy conscious landscape planning and design; from energy transition agents and landscape architects perspective as well through planning instruments and landscape focused documents. Different materials and methods have been employed throughout the research. The general methodology framing the entire thesis is a case study research, recognized as able to provide understanding of general phenomena set in real life contexts (Yin 2009), in our case the landscape planning and design for energy transition. The case studies selected for the research are France and the Netherlands, as the inquiry is developed through an international comparison. This choice will be discussed in the next section.

Below the overarching approach is summarized; a more detailed explanation, focused on the respective methods that have been used, is provided in each of the three parts composing this document.

Part 1

In the first part, scientific, grey literature and policy documents are analysed in order to establish a body of knowledge and a framework able to give the keys to the two following parts. The scientific literature has been surveyed combining SCOPUS research and other databases, in particular the catalogues of the *Bibliothèque nationale de France* (BNF) and of *Wageningen University*.

Part 2

The second part is conducted as a *research on design* (Van den Brink and Bruns 2014; Lenzholzer, Duchhart, and Koh 2013), applied on implemented design but also on the design process itself. That method fits the purpose of this thesis, because it questions new practices with undergoing changes in processes and meanings (including the reflexive contributions of energy transition agents), in order to learn from them.

Three territories, considered as embedded cases (Yin 2009), are analyzed: two in France, *communauté de communes* (CC) Monts du Lyonnais and *communauté de communes* Thouarsais, and one in the Netherlands, the municipality of Goeree-Overflakkee. All three territories are engaged in an energy transition process, with an intentional concern for the landscape. This part combines the analysis of semi-structured interviews developed with energy transition agents of the three territories, documents analysis (planning instruments, landscape focused documents, energy transition documents), observation and field visits.

In order to provide a general overview of the French situation about whether and how territories committed in an energy transition process consider landscape issues and its planning and design, a descriptive social survey (Deming and Swaffield 2011) has been performed in the network “Territoires à énergie positives” [positive energy territories] (TEPOS).

Part 3

The third part is also mostly developed as a *research on design* (Lenzholzer, Duchhart, and Koh 2013), inquiring landscape architects work in energy transition related projects, where the projects could be considered as embedded cases (Yin 2009). This part could also be conceptualized as *research for design* (Lenzholzer, Duchhart, and Koh 2013) because a series of principles and recommendations could be drawn from the analysis of landscape architecture practice in the two nations, possibly informing future design in energy transition, and leading to some pedagogical implications. For this part, an on-line descriptive social survey has been implemented. The survey was sent to the landscape architecture offices that were members of the national landscape architects associations – the French “Fédération Française du Paysage” (FFP) and the Dutch “Netherlands Association for Garden and Landscape Architecture” (NVTL). Moreover this part combines semi-structured interviews led with French and Dutch landscape architects and document project analysis.

Even if each part of this research has a defined method, some results and contents for example of the semi-structured interviews are crossing the parts and some extracts have been used to

feed in and put in perspective other parts of the research where the topic was relevant.

Languages and translation

The inquiry has to deal with French and Dutch languages and the final analysis is written in English. The semi-structured interviews were developed in French in France and in English in the Netherlands. However all the interviewees in the Netherlands have good English skills, allowing to collect clear answers.

For what concerns Dutch documents they were translated into English through Google translate online software; in some cases the translated text was compared with the one produced by the translation software DeepL. Translation from Dutch to English through Google translate and DeepL online software has been tested with native Dutch speaking researchers at Wageningen University, who were able to estimate the quality and accuracy of the translation. These translations were estimated able to keep the sense of the sentences, being reliable enough for the analysis. In addition, for some specific cases and topics, Dutch speaking colleagues were consulted in order to assure accurateness of the statement. Moreover, thanks to the research period spent in Wageningen, from March to October 2017, and across the translating process, I learned some key words for the research, useful for the thesis work.

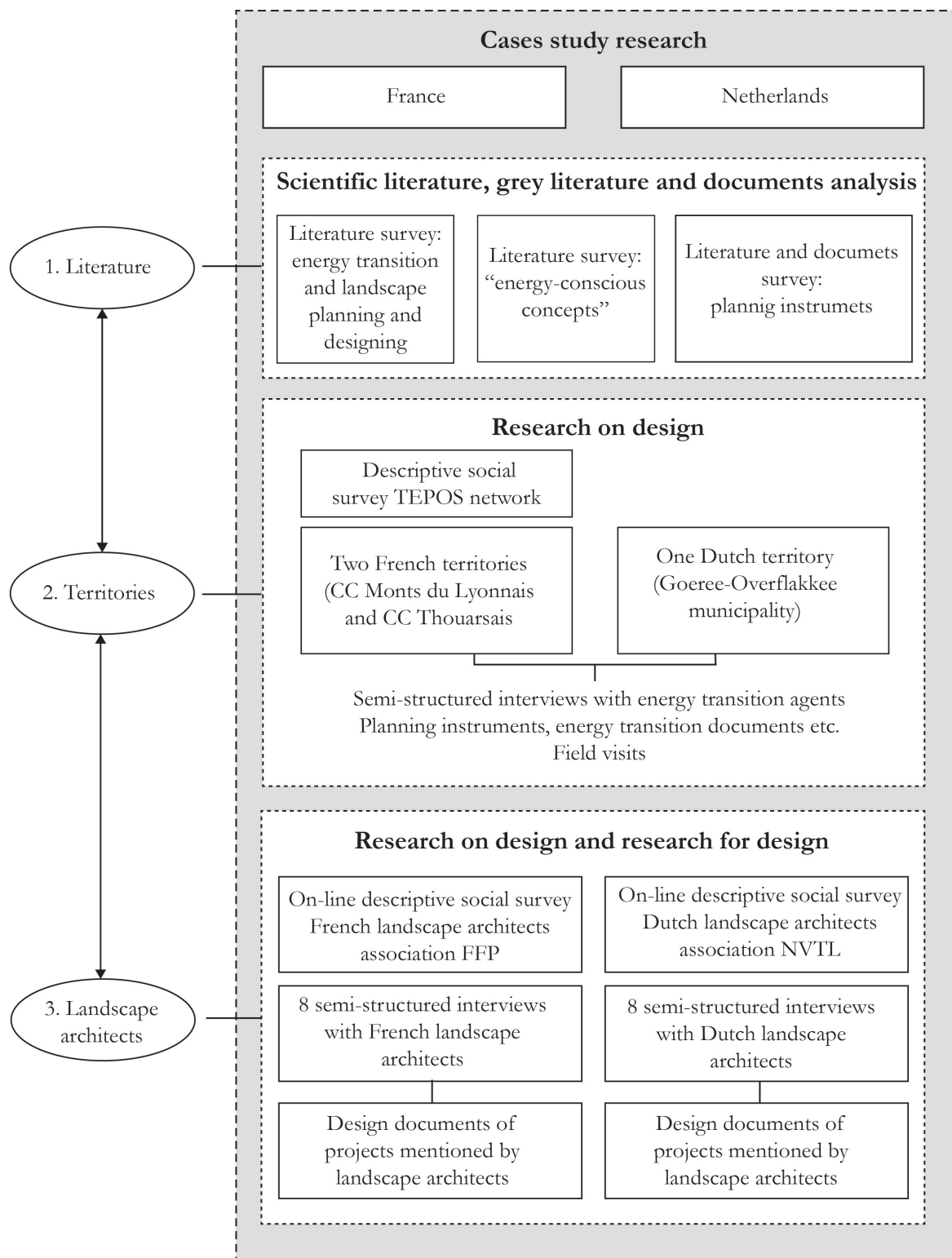


Figure 4. Materials and methods for the three parts of the thesis. Source: author

6. International comparison: the choice for France and the Netherlands

The research sets up an international comparison between France and the Netherlands, nations that each have their political agenda strategies to transition from fossil fuels toward renewables and carbon-free energy sources while each have a long-lasting tradition in landscape architecture (figure 5).

This comparison is believed to put the energy transition process within the two countries in perspective, by highlighting their similarities and differences. Figure 6 illustrates that the surface of The Netherlands is 1/13 that of France, but the population density is four times higher; therefore these characteristics could lead to many differences in approach toward landscape planning and designing for energy transition.

The choice to compare two different national contexts, not only from the point of view of public policy and planning instruments but also in terms of the dimensions, morphology and geography is conscious. This is particularly relevant since this research makes inquiries into landscape. Different geographical characteristics can lead to a different perspectives and visions on landscape planning and design. The comparison is expected to enrich discussion and possibly open up new and different approaches for the two nations. The goal is to understand how energy transition develops in the Netherlands, a nation that, as written by French landscape architect Jacques Sgard who worked there in the 1950's, has a “vocation for spatial planning of



Figure 5. Representation of France and the Netherlands the two case studies of the thesis. Source: author

territory”³ (Sgard 1959, 32). The Netherlands is composed by a vastly artificialized territory (van der Cammen, H. et al. 2012), that it is in great portion under the sea level and surrounded by dykes. This conformation and littoral characteristics expose the national territory to risks associated to climate changes issues, and they have raised sensitiveness and awareness about adaptation to these changes and to their possible mitigation. Here some context information is outlined regarding the situation in the two countries, but more detailed comparisons are to be found in the three parts of the thesis, attached to specific topics.

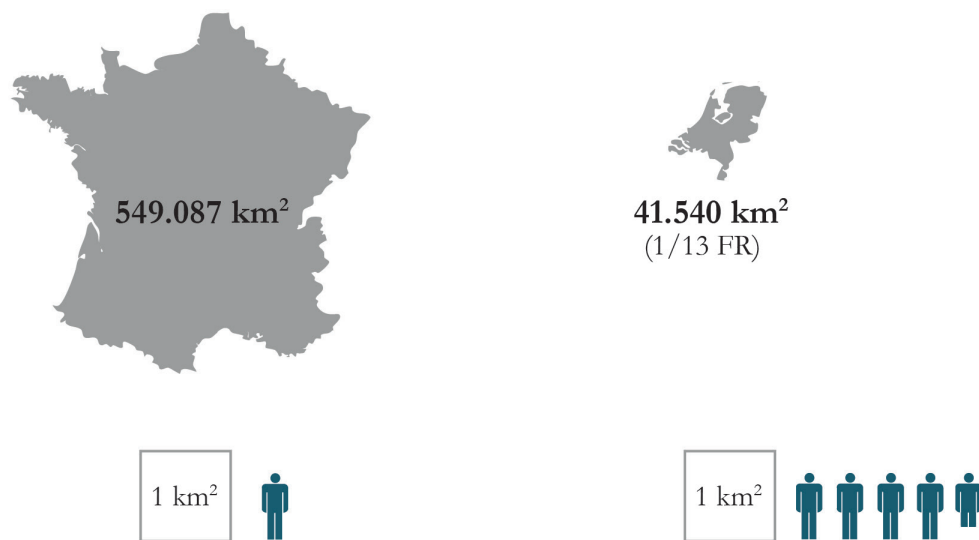


Figure 6. France and Netherlands, differences in the surface and population density. Source: author elaboration from Eurostat 2017 data.

Energy characteristics overview

Table 1⁴ shows that if we look at general quantities, French energy consumption is much higher than that by the Dutch. However if we look at the per-capita data for 2017, we understand that consumption is actually higher in the Netherlands in proportion to the number of inhabitants. Concerning renewable energy, figure 4 illustrates that the share of renewable energy consumption is 10,4% for France and 5,5% for the Netherlands in 2017. However, in France beyond *biofuels and renewable waste*, a huge amount of renewable production comes from *hydraulic energy* especially located in the mountains. This is something totally absent in the Dutch context, because of national topography. However, it can be observed that wind energy production in the Netherlands is higher than in France (1,2 vs 0,8 %). Considering the difference in the extended surface of the two nations, wind turbines must be much more prominent in the Dutch landscape.

³ “vocation de l’aménagement du territoire qui caractérise le Hollandais”.

⁴ The database Eurostat for statistical data is chosen, instead of national databases, because here the energy data are harmonized. This allows to a reliable comparison between France and the Netherlands.

Table 1. Key data for French and Dutch comparison. Source: author elaboration from Eurostat

	France	Netherlands
Population	66.989.083 inhab (2017)	17.081.507 inhab (2017)
Surface	549.087 km ² (France metropolitaine)	41.540 km ²
Density	105,5 inhab/km ² (2017)	498,2 inhab/km ² (2017)
Energy annual consumption	248.745,50 (2017) thousand tonnes of oil equivalent	78.529,50 (2017) thousand tonnes of oil equivalent
Final energy consumption pro-capita (tonnes of oil equivalent (TOE)) 2017	2,20	2,90
Gross inland energy consumption pro-capita (TOE) 2017	3,71	4,60

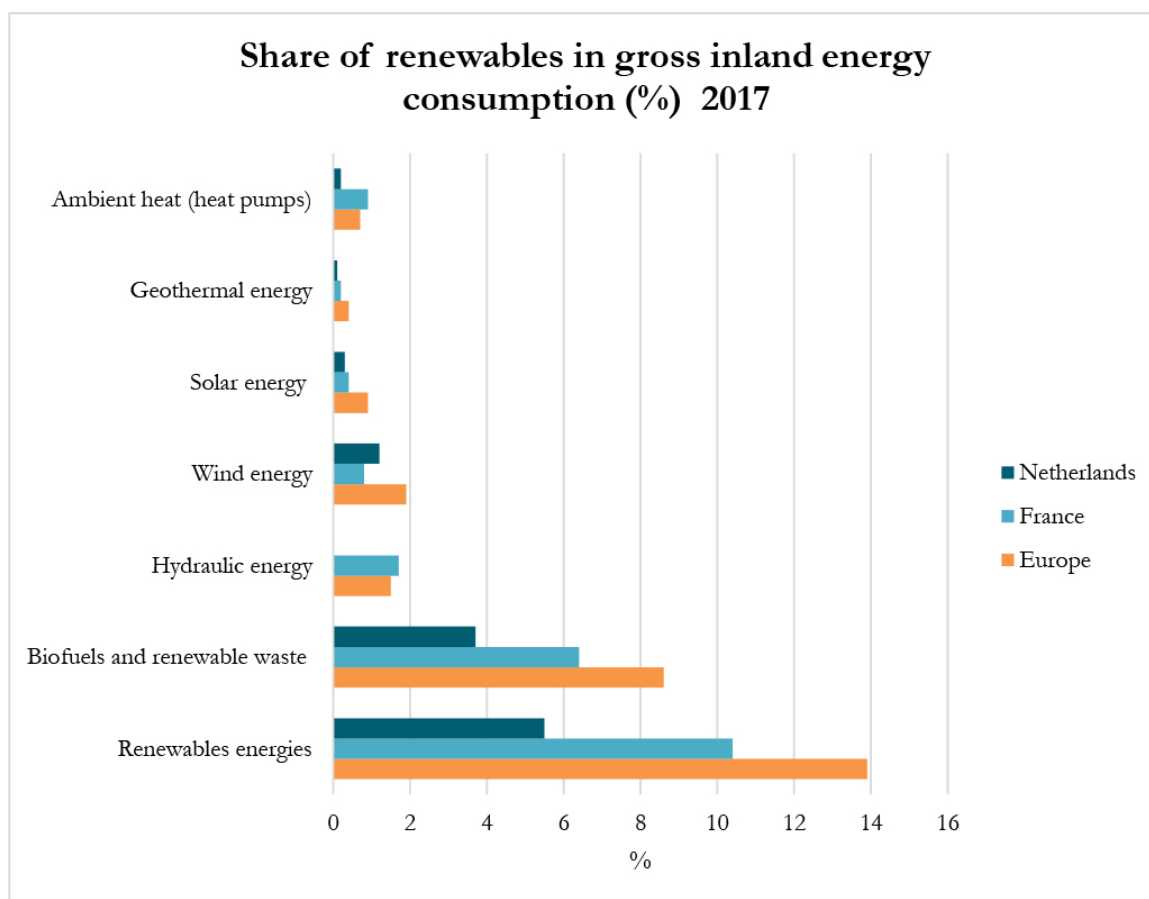


Figure 7. Comparison between French and Dutch and European share of renewables in gross inland energy consumption in 2017 in percentages. Source Eurostat 2017

Energy transition policy and landscape in France and the Netherlands

Figure 8 illustrates the main energy transition policies and laws that have been developed over time, with a special focus on France and the Netherlands. This shows that concern in both nations dates back to almost 20 years ago.

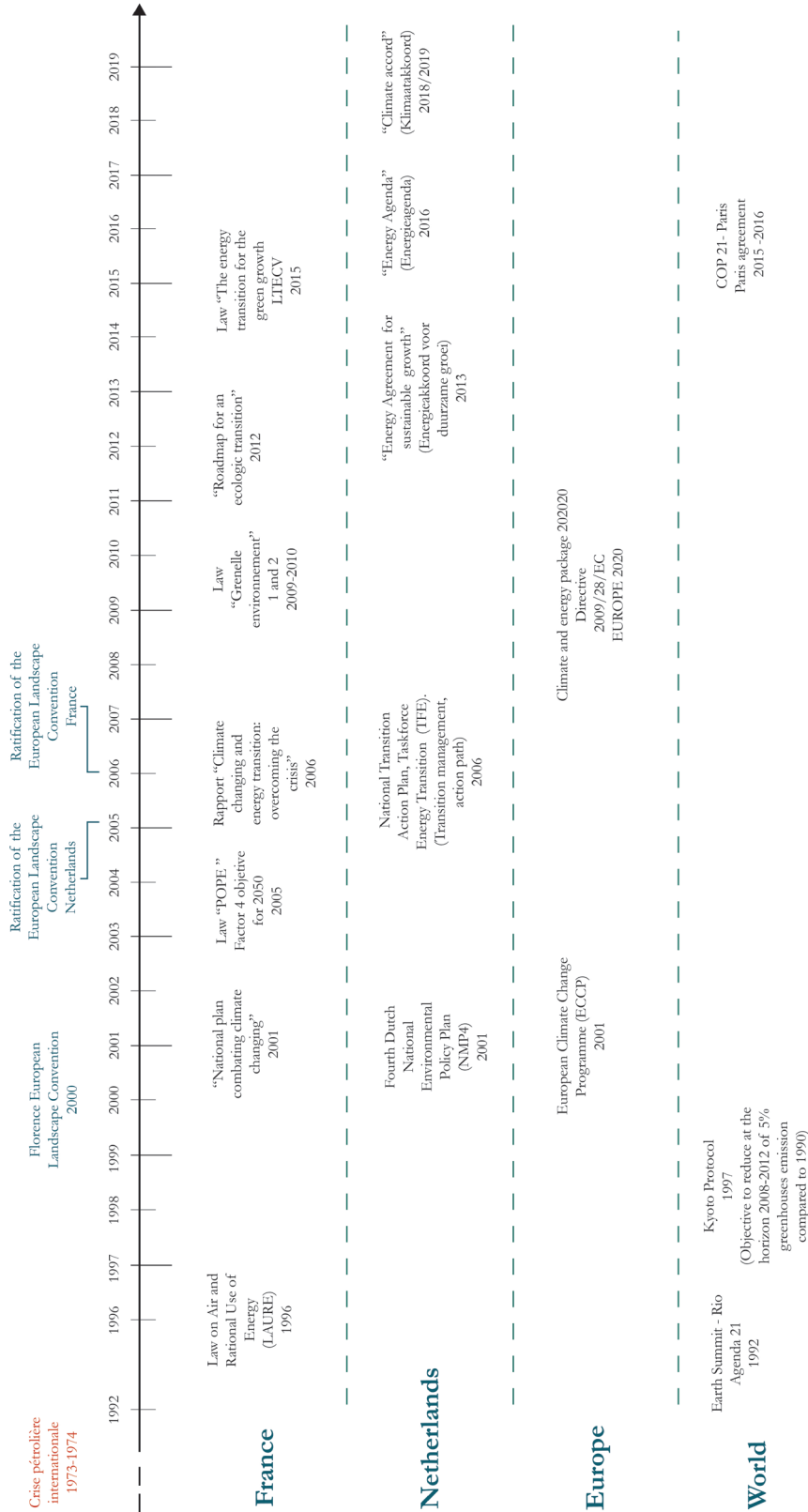


Figure 8. Timeline of the different policies and laws concerning energy transition in France and the Netherlands. Source: author

Energy policy in France

In France, the necessity to redefine public policies for national commitment toward the energy transition process is clearly illustrated in the 2006 report “Changement climatique et transition énergétique: dépasser la crise” [Climate change and energy transition: overcoming the crisis], published by the “Office parlementaire d’évaluation des choix scientifiques et technologiques” [Parliamentary office for the evaluation of scientific and technological choices]. It was followed in 2012 by a guide-document for an ecological transition “Feuille de route pour la transition écologique” [Roadmap for an ecological transition], that lays the foundation for the vote on a law about energy transition at the national level. This roadmap emphasizes the awareness about the necessity for elaborating an integrated model of environmental and energy policies, to carry out proposals for a 2030 scenarios at both national and territorial scales.

Subsequently the law “La transition énergétique pour la croissance verte” [The energy transition for the green growth] (LTECV) was adopted by the National assembly in August 2015 and is now the document in force within France. Among the principal goals stated are the reduction of greenhouse gases by 40% between 1990 and 2030, the reduction of final energy consumption by 20% in 2030 and by 50% in 2050 compared to 2012, the reduction of primary energy consumption from fossil fuels by 30% by 2030 compared to 2012, and 32% of renewable energy in final energy consumption and a decrease of 50% of the nuclear share in electricity production. These are ambitious goals that could lead to major landscape transformations. However, in the actual written document of this law, the word landscape does not appear.

Energy policy in the Netherlands

In the Netherlands the shift to a carbon-free and sustainable energy system has been discussed and is high on the political agenda since long, being at the center of many discussions both political and academic, with connection also to spatial concerns. In the Dutch context the reference document is the “Fourth Dutch National Environmental Policy Plan” (NMP4) published in 2001. It was followed by the publication in 2006 of the “National Transition Action Plan” edited by Taskforce Energy Transition (TFE), an organ specifically created by the Dutch Government to elaborate strategies for a national energy transition. In this document is formulated the concept of “Transition management”, concerning paths or processes that aim to a long-term and multi-dimensional change from a consolidated socio-technical system to a more sustainable one. This concept is also developed by different researchers (e.g. Loorbach and Rotmans 2010).

Concerning about spatial implication of energy choices have been showed. For example, in 2008 the Ministry of Housing, Spatial Planning and the Environment [Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieu] (VROM) at the time responsible for landscape, spatial planning and energy, commissioned landscape architects for the redaction of an energy atlas to investigate spatial impacts of different technologies for electricity production at the national scale: “Kleine energieatlas – Ruimtebeslag van elektriciteitsopwekking” [Small energy atlas - Space requirement for electricity generation] (Sijmons et al. 2008).

The “Energieakkoord voor duurzame groei” [Energy agreement for sustainable growth]

developed in 2013 by the SER, a council advising the Dutch Government about socio-economic perspective, stipulates that 14% of all energy must be generated from renewable energy by 2020, with a further increase of this share to 16% in 2023. The aim of the agreement is also to create new jobs and have a positive effect on consumer energy bill. This document states that the municipalities and provinces have to formulate their own spatial policies, in order to decentralize the supply of renewable energy production in close consultation with civil society. Subsequently the “Energy report. Transition to sustainable energy” (Ministry of Economic Affairs and Climate Policy 2016) presents the long term strategy to achieve low CO2 energy economy in the Netherlands for 2050, working on three main principles: (1) CO2 reduction, (2) make the most of economic opportunities offered by energy transition, (3) integrate energy in spatial planning policy. The report recognizes the spatial consequences of the transition at different scales considering energy production, transport and storage. In spite of those policies, the production of renewable energy is still modest compared to other countries such as France (see figure 7 above).

In 2019 it has been approved the Dutch “Nationaal Klimaatakkoord” [National climate agreement], the document of national Dutch document of reference concerning energy. It states the main goal to reduce by 49% the national greenhouse gas emissions by 2030 compared to 1990 levels, acting through sectors: electricity, built environment, industry, agriculture and land use. For example, for the electricity sector it is agreed that 70% of electricity will have to come from renewable energy production by 2030; for the built environment the goal is to improve efficiency and reduce the consumption of fossil fuel energies (through insulation, RE production, etc.) of 7 million homes.

All these actions could have repercussions in spatial and landscape terms, and interestingly this concern appears stated in a specific section “ruimte” [space] where is pointed out that “The impact of the transition on the physical environment will be considerable: cities and landscapes will be changing as a result. A sustainable energy system requires more space than a fossil-based system”.⁵ Thus, the importance to embed the goals in the planning instruments is highlighted in the agreement. Therefore, the planning instruments will be reformed through an environmental act in 2021/2022.

The concern seems to be more about the material space surface for the implementation of the goal than to address a more global idea of landscape, even if the Dutch energy agreement does stress the need to consider spatial/landscape quality in the process of defining and implementing RE projects.

⁵ “De impact van de transitie op de fysieke leefomgeving is groot: steden en landschappen zullen er door de transitie anders uit gaan zien.”

Landscape in France

Landscape in France has been historically associated in one first phase to heritage and since the second half of the XXth century also to the protection of nature (Donadieu 2009b; Luginbuhl 2012).

In this regards it is interesting to highlight that the term ‘paysage’ [landscape] appears for the first time in French policy in 1906 in a law about the electricity distribution, regarding electricity infrastructures (Barrière 2012). Its article 19 states that inter-ministerial decrees “determine the technical conditions to be met by energy distributions from the point of view of safety of people and public services concerned, as well as from the point of view of landscape protection.”⁶

Since 1995, the *Ministère de l’écologie, du développement durable et de l’énergie* [Ministry of ecology, sustainable development and energy] has been responsible for landscape, grouping together responsibilities that were divided across several Ministries such the agriculture and cultural ones. One of the main laws promoting landscape concern, especially in “ordinary” landscapes, is the “Loi paysage” [landscape law] of 1993 which includes landscape concern in planning instruments, increasing landscape importance in land management and planning (Labat and Aggeri 2013). Donadieu (2009b) points out how, since the European Landscape Convention has been ratified by France in 2006 the participation of inhabitants to any decision process in their landscape – considered as living environment – is also reinforced, anchoring on the preexistent approaches.

Landscape concern in France is now mainly decentralized. At the national level, it is the same ministry now called *Ministère de la transition écologique et solidaire* [Ministry of ecological and solidary transition] which is responsible both for landscape and energy transition. However, another ministry, the *Ministère de la cohésion des territoires* [Ministry of territories’ cohesion], responsible for the implementation of spatial planning in France, has considerable influence on landscape transformation.

Landscape in the Netherlands

Land-use in the Netherlands has been historically very regulated (Hobma and Jong 2016). As explained heretofore, the Netherlands is a relatively small and very densely populated country, which led to conquer land on the sea – the famous *polders*. These constraints obliged the Dutch to have an attentive and continued look about spatial planning (Faludi and van der Valk 1994). The first urbanism law was actually promulgated in 1901: the “Woningwet” [Housing act] that regulated the expansion of built-up areas and obliged the municipalities with more than 10.000 inhabitants to adopt an expansion plan designating areas for streets, canals and squares. For long the Ministry of Housing, Spatial Planning and the Environment [Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieu] (VROM) was responsible for landscape, spatial planning and energy.

Now, landscape, at national level, is under the responsibility of two ministries: the Ministry

⁶ “déterminent les conditions techniques auxquelles devront satisfaire les distributions d’énergie au point de vue de la sécurité des personnes et des services publics intéressés, ainsi qu’au point de vue de la protection des paysages”.

of Infrastructure and Water Management [Ministerie van Infrastructuur en Waterstaat; I&W], considering the landscape concern in spatial planning at national, provincial and municipal level, and the Ministry of Agriculture, Nature and Food Quality [Minister van Landbouw, Natuur en Voedselkwaliteit] that focuses on landscape issues from the perspective of nature and biodiversity. Energy transition (climate, environmental, energy and renewable energy policy) falls under a third Ministry: Ministry of Economic Affairs and Climate Policy [Ministerie van Economische Zaken en Klimaat; EZK].

Historically in the Netherlands the landscape issue has been treated at the national level developing national landscape strategies (de Jonge 2009) such as the “Landschap Agenda” developed conjointly by the at that moment called ministry of infrastructure and the environment and the ministry of economic affairs, agriculture and innovation. In 2005 the Netherlands ratified the European landscape convention but added a declaration specifying that the ratification won't have consequences in the landscape legislation. In reality, thanks for example to the “landscape manifesto”, a tool that wants to increase social awareness and improve landscape quality, Dutch laws are progressively affected by the European Landscape Convention (De Montis 2014).

However, since the “Wet ruimtelijke ordening” [Spatial planning act] (WRO) adopted in 2008 and as subsequently stated in “Structuurvisie Infrastructuur en Ruimte” (2012) a national landscape policy does not exist anymore, having been decentralized to the provinces and municipalities. Recently, the “Council for the Environment and Infrastructure” (Rli) published a report, in order to advise the Dutch government about landscape, because of the transformation it is facing through energy transition and climate changes among others. This report, “The connecting landscape” (RLI Council for Environment and Infrastructure 2016), affirms that it is undesirable to centralize back the landscape responsibility at the national level (*ibid.* p. 28). It is believed that local level landscape characteristics will be better taken into account in an energy transition process anchored on the territory itself.

Landscape in the Netherlands, as for France, is associated with heritage preservation concern (e.g. *waardervolle cultuurlandschappen* 1994), but also with a strong nature and ecological protection component (e.g. law for nature and landscape protection 1998). Along these attitudes there is also a strong attention to landscape, connected with the planning and designing (van der Cammen, H. et al. 2012; de Jonge 2009).

Landscape architecture in France and the Netherlands⁷

The discipline of landscape architecture has long lasting roots both in France and in the Netherlands (de Jonge 2009; Donadieu 2009a; Thompson, Dam, and Balsby Nielsen 2007) with some differences between the two countries. Both professions historically come from garden and park design (Racine 2001; Meeus and Vroom 1986) and since then the profession has broadened including urban planning design and large scale landscape design (Pernet 2014; de Jonge 2009).

In both nations landscape architects are a recognized and protected profession that is acquired

⁷ A broader discussion on landscape architecture in France and the Netherlands is developed in chapter 10 of the thesis.

through dedicated studies in specific Universities. Landscape architecture in the Netherlands is recognized for the historical participation of landscape architects in the planning and designing at strategic territorial scale (de Jonge 2009; Janssen and Knippenberg 2008). Inspired by his experience in the Netherlands in the 1950's, the French landscape architect Jacques Sgard influenced the younger generations of French landscape architects, developing a new field of practice at a regional or territorial scale. This diversity and historical influences between the two countries are believed to enable to learn from each other (among others this thesis) and once again establish constructive connections between the two traditions.

7. Key terms definitions

Translation from one language to one other proved to be a difficult and delicate matter, because some words have different meaning backgrounds in different cultures and languages. Some key terms used in the research are therefore explained below, to clarify the meaning that will be attached to them in this work.

Territory: “an area or division, especially part of a country or the world having definable characteristics but not always fixed boundaries, that could also be an administrative district of a city or country”. In English this definition is often expressed by the word “region”, as also in Dutch “regio”. However, considering the French/Italian literature on the topic and the author background, even if the thesis is written in English, the word “territory” will be used for the redaction.

Environmental designers: this refers to all the professionals working in landscape and spatial design and organisation of the physical environment, such as landscape architects, architects, urban planners, urban designers.

Landscape architect: refers in France to “paysagiste concepteur” and “Landschapsarchitect” in the Netherlands, as professionals that hold a degree from specific landscape architecture schools, with particular professional recognition, and work both in landscape planning and design. Following ECLAS definition “Landscape architecture is the discipline concerned with mankind’s conscious shaping of his external environment. It involves planning, design and management of the landscape to create, maintain, protect and enhance places so as to be both functional, beautiful and sustainable (in every sense of the word) and appropriate to diverse human and ecological needs”⁸.

Landscape design and landscape planning: The relation between planning and design is complex, however, both contribute to the shaping of landscape (Van Assche et al. 2013).

As pointed out by Lenzholzer and al. (Lenzholzer, Duchhart, and Koh 2013), design is both a verb and a noun, defining the activity and the artefact. In the thesis we refer mainly to the

⁸ <https://www.eclas.org/about-eclas/landscape-architecture-the-european-dimension/>

activity, because our analysis and results are mainly developed about the process and definition of strategies than on defined shaped objects. *Landscape design* is the conscious process of thinking and giving form to the physical environment (Lenzholzer, Duchhart, and Koh 2013; Van Damme, Leinfelder, and Uyttenhove 2013), in order to achieve desirable landscape futures. Landscape design in this thesis is considered as acting both at operational small scales as well as strategic broad ones.

Landscape planning: “means strong forward-looking actions to enhance, restore or create landscapes” (CEP 2000). In this thesis, planning is considered as an activity mainly inscribed in an institutional framework, such as that which is elaborated in planning instruments.

Landscape: I am aware of the different shades of meaning that could be attached to the word landscape in the two national contexts. The appearance and meaning of the “landscape” word is the object of debate and different speculations across Europe. The French “paysage” is commonly dated back to the Renaissance and the artistic vocabulary referring to a spectacle of the portion of the country. While in the Netherlands almost in the same period the word “lantscap” which meant “country of abundance” attaches a value judgment which attention is focused more on the action than on the view (Luginbuhl 2012). Now in the Dutch the term that I translate into landscape has become “landschap”. Since then both the French *paysage* and the Dutch *landschap* have evolved in meaning. In this research, the goal is not to study and discuss the different shades of the word that people attach to landscape, but, in some points when estimated as a possibility, the attitudes that people attach to landscape meanings are discussed.

8. Organisation of the thesis

The thesis consists of three parts, comprising a total of 13 chapters plus the introduction and general discussion.

Part 1 is composed of three chapters that explores scientific literature and other documents. Chapter 1 presents a literature review about the landscape dimension of energy transitions. Chapter 2 explores concepts informing energy conscious planning and design. Finally, chapter 3 examines from an institutional perspective the possibility to address landscape and energy transition in planning instruments in France and the Netherlands.

Part 2 is composed of 6 chapters and analyses different territories engaged in energy transition. Chapter 4 discusses the progressive importance given to territories by national institutions in France, and the Netherlands and how they ought to connect energy transition and landscape. Chapter 5 gives insights about the energy transition processes engaged in the three analyzed territories, providing contextual information to ground the results of the following chapters. Chapter 6 analyzes the relationship between energy and landscape in reports or official documents devoted to landscape, and chapter 7 analyzes how this same relation is addressed in planning instruments. While the previous chapters focused on the role of landscape planning and designing, chapters 8 and 9 explore social representation about landscape by the agents who

contribute to transition, by means of interviews and hand drawings respectively.

Part 3 focuses on landscape architecture practice. Chapter 10 provides an overview of the involvement of landscape architects in the energy transition process in France and the Netherlands. Chapter 11 analyzes their contribution to the process from their perspective, compared to the views expressed by territorial agents. Chapter 12 focuses on both the knowledge and design processes that landscape architects employ while working on energy related projects. Finally, chapter 13 explores the potentials and challenges for landscape architecture with respect to energy transition.

PART 1 - Energy conscious landscape planning and design: concepts and principles

The now nationally and internationally advocated passage to a low energy consumption and renewable energy producing energy system is changing the appearance of landscape (e.g. Nadai and van der Horst 2010).

The transformation of landscape according to energy development is not something new in human history (De Pascali 2008; de Jong and Stremke 2020). For example, Lopez (2019) points out, from critical history approach, how the “electric order” shaped the spatial configuration of a certain type of consumption, and how this spatial configuration is now progressively changing because of the development for example of micro-networks that are developing new socio-technical dynamics. However the relations between space and landscape and energy are dynamic and mutually transformative. Landscape could be planned and designed in order to support changing the energy system in the ongoing transition process (see e.g. Sijmons et al. 2014). Nowadays researchers point out two approaches to the topic, a “spatial turn” in energy transition subject (Castán Broto and Baker 2018) and an “energy turn” in spatial and landscape planning and design where the energy subject is considered as an important part of the project (Stoeglehner et al. 2016).

Within this context the main aim of this part of the research is to answer the following question:

What are the relations between energy management/development and landscape planning/design in the energy transition framework?

Which concepts and operational principles are available to inform energy-conscious planning and design in the context of sustainable energy transition?

In order to answer this question this first part is organized in the following way.

Part 1 organization

Part 1 of this research is divided in three chapters. In chapter 1 it is presented a literature discussion about the landscape and spatial dimension of energy transition, and the planning and design approach that environmental designers have while dealing with the energy topic, to support the transition.

Chapter 2 presents concepts informing energy conscious planning and design, and energy principles that could be deduced from three of these concepts (urban metabolism, circular economy, cradle-to cradle). Subsequently, chapter 3 introduces an institutional perspective exploring the possibility that planning instruments have to address both the landscape and energy subjects, introducing the topics and cases studies explored in part 2 of the research.

The method developed for this part is based on bibliographical research and systematic bibliography research in social science.

CHAPTER 1: Landscape and Energy transition: increasing spatial and landscape concerns in energy transition processes

1.1 A landscape turn in energy transition?

The idea of “energy transition” entered the scene during the world oil crisis in the ‘70s and was one of the first times that the term was employed dates back to the *Energiewende: Wachstum und Wohlstand ohne Erdöl und Uran* [Energy transition/turn: growth and prosperity without oil and uranium], (Krause, Bossel, and Müller-Reißmann 1980) published by the Oko-Institut (Institut für angewandte Ökologie) of Freiburg in 1980. This document recommends turning from centralized production to a decentralized one on a national level, advocating the progressive phasing out of fossil and nuclear energy in favor of solar energy (Hake et al. 2015). However, as underlined by Coenen et al. (2012) and Duruisseau (2014) it is from 2000 that there is a growing interest on the subject of energy transition followed by a rising number of publications. Nevertheless some authors also criticize the term “energy transition”, advocating the idea of successive additions from new energy sources (Fressoz 2014). Besides several terms are employed to refer to the progressive modification in our energy systems such as “low carbon transition” (Bridge et al. 2013). We chose to keep the “energy transition” turn of phrase, because we found it in laws and reference documents of the two nations studied. In France it could be quoted the “law for energy transition for green growth” and in the Netherlands the “National Transition Action Plan”, and as well as “transition management” concepts (see e.g. Rotmans and Loorbach 2009). Moreover, the term “energy transition” it is mainly employed in French and international scientific literature where debating the ongoing phenomena¹.

Two main *discourses* exist about energy transition, one “technocentrist and interventionist” and one other “ecocentrist and local” (Audet 2016). The first is mainly promoted by international organizations such as the United Nations system while the second one was started and was mainly developed by the movement *Transition network*, considering the transformation comes from local territorial actions from a bottom-up perspective (Hopkins 2008). Audet (2016) argues that “L’amenagement du territoire” [Territorial spatial organization] constitute a middle path between the previous two different approaches (technocentrist and ecocentrist/localist) for energy transition. This is so because it is a subject that needs to be considered in both approaches, because part of the energy problem comes from years of planning and design for individual cars and high-energy consumption buildings and infrastructure.

Starting from this consideration in this chapter, first the spatial and landscape dimension of

¹ For exemple: VertigO. 2014. *Transition énergétique : contexte, enjeux et possibilités*, GéoCarrefour. 2015. *Les campagnes dans la transition énergétique*, Lermard Pierre, Stoskopf Nicolas et al. (eds.). 2018. *La transition énergétique, un concept historique?*, Septentrion Presses universitaires.

energy transition is discussed. Then subsequently, the discussion turns toward how environmental designers are addressing energy development in this transition framework.

Even if the main focus of this research is landscape (see introduction for definition), in this chapter reference is also made to space, meaning that a component of landscape relating to the surface, extended areas that could be needed, changed and organized for energy transition purposes, carrying a potential landscape.

This distinction is made because in literature, reference is often made to this dimension.

1.1.1 Energy transition and the need to consider its landscape/spatial dimension

Transitions are multi-phased, multi-scaled, multi-level and multi-actor processes (Fischer-Kowalski and Rotmans 2009) that in order to happen need to combine technological advances (Strong 1992), but also a socio-cultural evolution in lifestyles (Rojey 2008; Miller, Iles, and Jones 2013).

Energy transition is a societal process (Rotmans and Loorbach 2009) that involves the natural, physical and geographical characteristics of territories (e.g. Pasqualetti 2012) but also the lifestyle and behavior of the individuals and communities (e.g. Steg, Perlaviciute, and van der Werff 2015; Vainio et al. 2019), the public and private choices, the form and the imagery of the inhabited spaces (Selman 2010).

If the term sustainable development is thought of as being in continuity with the past, the term transition implies the idea of a discontinuity with the present (Chabot 2015), based on the fact that the material order of our society is unsustainable and it will clearly disappear (Bourg, Kaufmann, and Méda 2016). The ongoing energy transition could not be limited to energetic substitution, but it will generate major ruptures in the actual socio-technical system (Duruiseau 2014). The formulation energy transition notion in some cases, to refer to transit from fossil fuels to renewable, is associated with the adjective “sustainable” (e.g. Solomon and Krishna 2011; Strong 1992), in order to emphasize the fact a transition could also not be sustainable as many in the past have not been. For example, the second industrial revolution began in Great Britain and the massive use of coal lead to great technological advances but also created problems due to pollution and social deprivation (Smil 1994).

As explained in the introduction, literally “energy transition” means the transit from an energy system to another. All along human history many energy sources shifts happened (Smil 2010; Fouquet and Pearson 2012; Debeir, Deléage, and Hémerly 2013), from human and animal muscular energy and the use of wind and hydraulic power, to the use of coal, to get to the electricity and fossil fuel, and renewable energy (De Pascali 2008) to which nuclear power could be added in some nations..

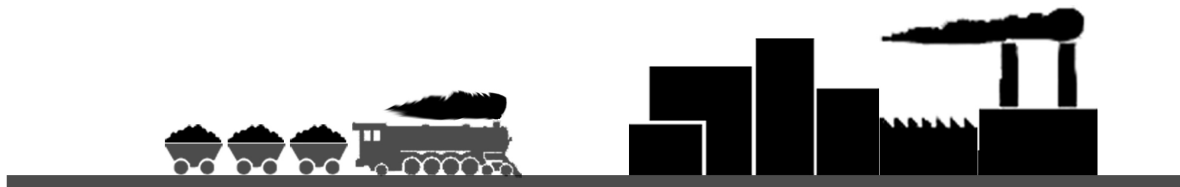
These energy shifts came along with widespread social, economic and political transformations (Miller, Iles, and Jones 2013) but also significant changes in landscape and spatial management. Now it is fully recognized that a long-lasting relationship exists between energy and spatial organization (De Pascali, 2008), and that the use of an energy source or switching from one source to another has always driven landscape change (M. J. Pasqualetti 2012; Selman 2010) (see



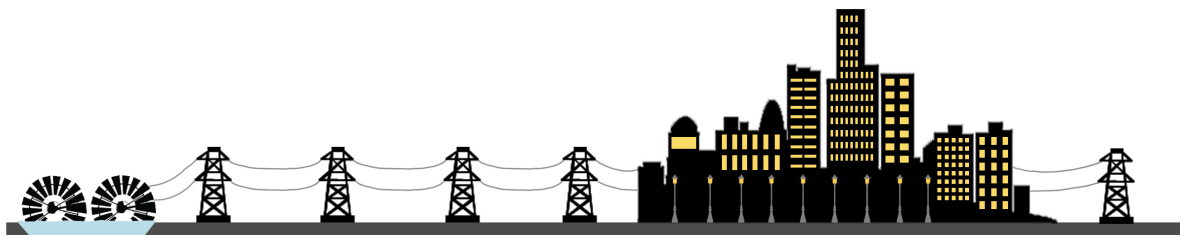
The toil landscape



The landscapes of water and wind



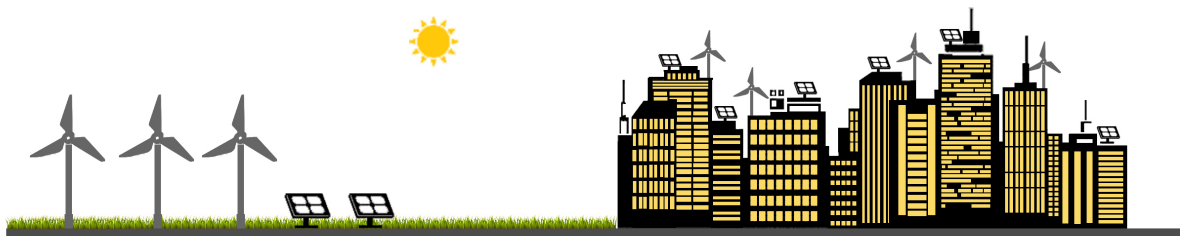
The landscapes of the coal



Landscapes of electricity and the vertical city



Landscapes of oil and the horizontal city



Energy transition landscapes?

Figure 1. Season of energy and landscape through different history periods. Source: author, on the basis of the subdivision made by De Pascali 2008.

figure 1). For a long period of human history the link between space and resources concerning energy development had been developed as a bijective relation, synergetically structuring the territory. Where there was a river, a water mill was built, in windy places, windmills.

The advent of the Industrial Revolution shifted the approach “energy from space” to “energy for space”, using Brucher’s expression (2007) because energy development did not come from spatial or local characteristics anymore, but energy is used to support the consumption in the space. “Brute force” energy is used to solve problems of heating, cooling or mobility (McDonough and Braungart 2002). And Lopez (2019) highlights how big energy facilities have made the connection with resources in territories invisible.

The energy transition towards a low carbon and renewable energy systems needs to get back to an “energy from space” way of planning and design.

1.1.1.1 Renewable energy

Some glimpses of this spatial component appears in energy transition literature. Hays (1979) explores the “solar possibilities” approaching energy transition from the renewable energy production point of view, detailing and discussing several renewable energy production technologies; photovoltaic, wind power, hydropower, bio energy. He problematizes the spatial decentralization of these sources that could lead to better social equity and cultural pluralism. The connection, however, is primarily visual and of aesthetical nature, for example he affirms that if objections arise “windmills could be located out of the visual range of populated areas, even a few miles out to sea” (*ibid.* p. 763).

The same questions seem to persist, more recently in Dubois (2009) there is a specific section: “Les limites physiques : L’espace” [The physical limits: space]. In this energy transition centered book, the notion of *space* in energy transition is treated as a surface, a limited surface on earth, that begins to seem too small to sustain all the consumption made by its living populations. The subject of space as a surface leads to the subject of opposition or possible synergies between densely populated and high consumption urban areas compared to the rural ones because “whether from wind turbines, solar or biomass it is the rural world that has the surface”² (Dubois 2009, 208). This energy pressure on rural areas is recognized as raising new challenges for rural landscapes (Jefferson 2018).

Indeed in the energy transition framework a feeling of unease could be connected with renewable energy production implementation in landscape that in past decades has greatly expanded on the basis of quantitative national or international targets and economic incentives (Frolova, Prados, and Nadaï 2015). On one side it is emphasized how increasing land demands due to renewable energy production could lead to competition for food security (see e.g. Scheidel and Sorman 2012). On another side, transformation of landscape that inhabitants live on through the implementation of renewable energy technologies often gives rise to local opposition, hindering the energy transition process. It is recognized that the social barriers to renewable energy technologies need to be addressed together with the technical and economic challenges

² Translate by the author from French: “Que ce soit à partir d’éoliennes, de solaire ou de biomasse c’est bien le monde rural qui a la surface”.

and obstacles (M. J. Pasqualetti 2011; Frolova, Prados, and Nadaï 2015). In some cases the planning of renewable energy technologies such as wind turbines has led to new ways of valuing landscape by making the landscape dimension “emerge”, changing its protection and regulation (Nadaï and Labussière 2015).

Pasqualetti (2011) points out the need to increase emphasis on social considerations during renewable energy project evaluations, which require that developers acquire deep knowledge of the landscape and that people receive meaningful benefits from these projects. Connected to this last point, and related to spatial energy transition, the notion of “spatial justice” has been elaborated relating to the fact that large scale renewable energy facilities do not nurture local opportunity and wealth, but exploit local characteristics and land, modifying landscape to send profits and benefits elsewhere (Bouzarovski and Simcock 2017; Miller, Iles, and Jones 2013; Yenneti, Day, and Golubchikov 2016). Recently this notion has also been connected with the raising awareness that renewable energy technologies have an environmental cost and spatial impact in terms of distant mining areas, for now, such as in China and Africa. Rare metals extractions needed for RE technologies have a heavy impact in environmental and pollution terms. Recently in France a book written by a journalist inquired about this phenomenon (Pitron 2018) whereas in the Netherlands a report developed by Metabolic and Copper 8 explores the problem and the RE technologies production chain (van Exter et al. 2018). This also raises the question about some approaches to energy transition that primarily address technological improvement to achieve the energy objectives. Some such as Jeremy Rifkin (2013) put forward the coming of *Third Industrial Revolution*, based on the abandonment of oil and fossil fuels, so as to react to the looming climate change. His revolution is based on five pillars that need to happen simultaneously and refer to high-tech and digital internet solutions: (1) shifting to renewable energy, (2) transforming the building stock of every continent into micro-power plants, (3) deploying hydrogen and other storage technologies in every building and throughout infrastructures to store intermittent energies (4) using Internet technology to transform the power grid of every continent into an energy-sharing inter grid that acts just like the Internet and (5) transitioning the transport fleet to electric plug-in and fuel-cell vehicles that can buy and sell electricity on a smart, continental, interactive power grid. In the essay the impact that a similar changes could have on the societal and economic system are recognized, the link to spatial planning and design is not developed to the same extent though. However, this link is strong in terms of infrastructure for energy/electricity transportation or other utilities, but also in terms of planning and design for the built environment and architecture calling for new technologies and new ways to design our city and buildings that could broadly affect them.

Another technological element under discussion is the electricity transmission network such as high-voltage lines, because they are changing due to the more decentralized nature of RE production in territories (Lienert, Suetterlin, and Siegrist 2015) leading to transformations in landscape that could be perceived negatively by inhabitants (see e.g. Soini et al. 2011).

1.1.1.2 Reduction of energy consumption

Besides, beyond technological changes and innovations, reference to better spatial organization for improving energy development exists. Strong (1992) called upon the issue of spatial organization and design claiming that “the whole concept of human settlement needs to be rethought, including not only the design and efficiency of the means of transport themselves, but also the broader issues of land use and urban planning. New ideas must be developed for the location of homes, work space, leisure and communications” (Strong 1992, 493).

Also nowadays some advocate a new way of living that comes along with new form of inhabited space, through the use of low-tech solutions (e.g. Bihouix 2014), where considerations are made about the fact that energy and climate crisis is also due to highly consumption transportation and urban sprawl. They call for a “desurbanisation” and a renewed anchoring to territory resources (*ibid.*), which carry spatial and landscape implications. Moreover, it is also advocated for more radical changes in the way our cities are spatially organized for example: reducing heat consumption and energy for transportation (see e.g. Newman and Kenworthy 1999), reducing high energy consumption urban sprawled cities (e.g. Dubois 2009; Rojey 2008). The issue of a need for spatial planning and design also comes from an economical perspective. Jancovici (2013) claims that it will be the economic crisis emerging from the high price of fossil fuels that will lead to the disappearance of urban sprawl, by provoking a land devolution and impoverishment of suburbs (*banlieus*). This will lead to people moving from the suburbs to small local villages, and means that this new territorial reorganization is a central issue of transition, because it needs to be anticipated and planned.

Indeed, nowadays energy transition is a very space/landscape-sensitive matter in many ways because it requires physical surface for its implementation and a local emplacement (meaning that is located somewhere), for example for the implementation of renewable energy production technologies. The interest in the spatial/landscape component of energy development results also from the fact that energy is a resource but space and territory as well, of which conditions for use have to be considered as part of the equation in an energetic system. Until now this has not been fully recognized by society “Here, just as for the accumulation of any waste, from rubbish of all kinds of heat, the difficulty is created by the finitude of accessible space. Mankind is like an household which consumes the limited supply from a pantry and throws the inevitable waste into finite trash can- the space around us” (Georgescu-Roegen 1976, 13), who advocates the development of a lifestyle that is “less wasteful and indulgent, more modest in their use of resources, notably energy, and more sparing in the pressure they exert on the environment” (Strong 1992, 491).

However the topic already appeared in the report “Limit of the Growth” (Meadows et al. 1974), even if the term energy transition does not appear, is one of the texts providing foundation for the thought about it, space or more precisely *land* is discussed. *Land* is considered as other resources as something finite so an important thought must be developed in order to preserve agricultural land facing the growing population and food necessity. Moreover is recognized that the technological advances in cities, through for example elevators and skyscrapers and more efficient transportation, have removed the constraints of land surface limitations, by increasing noticeably the density and consuming resources. This approach refers its physical

aspect as a surface, which leads to the idea of an ecological footprint (Rees and Wackernagel 1996). So there is a socio-cultural discourse that comes along with another more quantitative of space surface and land use footprint.

However, you look at the question about the ongoing energy transition it is also a matter of space and landscape that require conscious landscape planning and design. Because of this spatial footprint, it could enter in conflict with socio-cultural, natural/biodiversity, relational values, producing a new and different landscape. It is recognized that “the transition towards a low-carbon economy will require the re-appraisal of the form, function and value of some contemporary and familiar landscapes” (Bridge et al. 2013, 335).

Nevertheless several researchers highlight this lack of the spatial component affirming that “Transition analysis has overlooked where transitions take place, and the socio spatial relations and dynamics within which transitions evolve” (Coenen, Benneworth, and Truffer 2012, 969) which could lead to generate an “inadequate localization declination of energy issue” (De Pascali 2008, 7). This leads to missing opportunities because “the socio-technical innovations transform space directly and actively but are, at the same time, dependent on space or spatial conditions, meaning that space and spatial conditions also influence the emergence and spillover of technical innovations” (Levin-Keitel et al. 2018, 5).

This could also be due to a lack of details about different scales for the implementation of energy transition. On this matter Duruisseau (2014) explores different notions of energy transition in several publications from the prism of spatial scale. What emerges from research is that in the analyzed corpus, scale is often not specified and very broad, making the assumption that energy transition has to be implemented everywhere. This leaves uncertainty and vagueness on the topic, knowing that different spatial contexts, be they urban or rural, etc. call for different types of energy development. Energy transition has to take place everywhere, but in practical terms this indefinite “everywhere” is composed of many “somewhere” that will be impacted by change. Often it is because global agendas address landscape as isotropic space, but it is not (Olwig 2011), and often the mismatch between communication and perception of global environmental problems at local scale where they are physically implemented, that leads to conflicts and opposition (van der Horst and Vermeulen 2011a).

1.1.1.3 Energy transition and its landscape and spatial component: a Scopus query

In order to better understand in scientific debate, the link established between energy transition and its landscape and spatial component I developed research through SCOPUS, restricted to peer-review papers. I set up a Boolean research query composed by “energy transition” in combination with spatial components such as landscape, space, territory, regions, etc. (see the annex 1 for the complete research equation and the list of the papers), in title, keywords and abstracts, developed in September 2018. This allows the identification of papers dealing with a spatial and landscape components of energy transition addressed on a more “local” scale, both metropolitan and rural, but not national or super-national. The inquiry results in 719 documents,

3 Translated from Italian by the author

of which after reading the abstract, 90 papers were considered pertinent for our research. Publications were considered to be relevant when they discussed energy transition impact on space/landscape, or about physical area for transition implementation, or about topological placement (e.g. position, distance), or about land use/land spatial aspects, or about the taken into account of sociocultural spatial/landscape perspectives (e.g. acceptability of local wind turbine project). Moreover, papers were also selected when discussing how space/landscape planning and design could affect the transition process improving the reduction of energy consumption, or energy stream optimization or RE production.

There are acknowledged limitations to this search, those limited to a research engine and peer review papers and that do not consider national debate. Moreover the choice to remain limited to the “energy transition” notion and not to other expressions, as “energy landscapes” or other, lead inevitably to exclude some papers that could be relevant in the debate, but the goal of this short inquiry was to show the direct connection between spatial and sometimes landscape directly associated with the energy transition framework, on the international scene. The goal was not to perform an exhaustive systematic literature review.

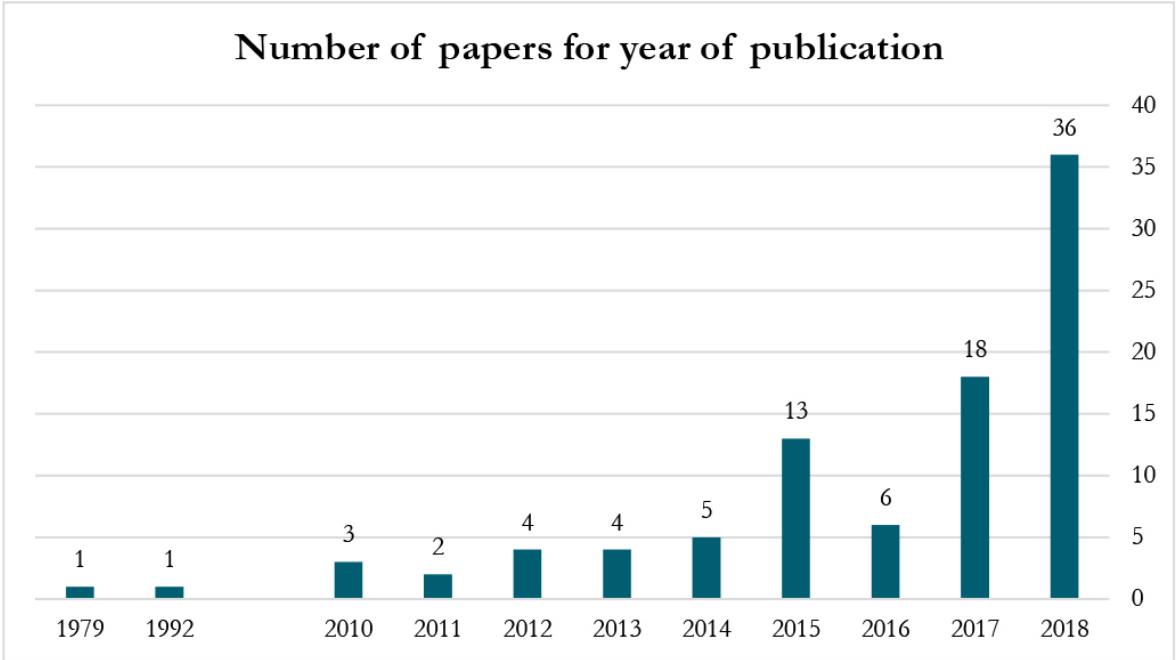


Figure 2. Scopus query “energy transition” in combination with spatial components such as landscape, space, territory, regions, etc. revealing an increasing number of scholarly articles.

A first look at figure 2 about the number of papers published for each year, shows that the subject was present in two pioneers study in 1979 and 1992, but that it began to merge and be approached with a certain continuity since the year 2010 and remain constant from about 2-4 papers almost until a growing number of 2014 and reaching a peak of 36 in 2018, almost the double of 2017. This is also due to the publication in 2018 of a special issue in the journal “Energy Research & Social Science” which dedicated a special issue on “Spatial adventures in energy studies” (editorial Castán Broto and Baker 2018), and the “Landscape Research” journal that devoted a number to “Gouvernance of energy landscapes” (editorial Leibenath and Lintz

2018). However only 39 of these papers in the text refer directly to landscape, and when the topic is acknowledged the majority of references are connected to changes which landscape is undergoing because of energy development (see e.g. Castán Broto 2017; Kropp 2018; de Boer and Zuidema 2016). Only 6 papers (see e.g. Oudes and Stremke 2018; de Waal et al. 2015; Stremke and Koh 2011) address designers' perspectives by analyzing the active landscape design intended, as stated in the introduction, by the conscious process of thinking and giving form to the physical environment (see e.g. Lenzholzer, Duchhart, and Koh 2013) in order to achieve desirable landscape futures in the energy transition framework. This seems to show that this topic is still inadequately addressed.

1.1.1.4 Need for landscape perspective in energy transition

One reason could be due to the fact that the energy transition debate has been for long dominated by engineering, economical and also political sciences (Zélem and Beslay 2015). Indeed the concept of energy has evolved strictly related to the physics discipline related to quantities (Debeir, Deléage, and Hémerly 2013). According to Sovacool (2014) the social sciences art and humanities are secondary in the field of energy compared to the “hard” or “objective” disciplines such as physics and engineering, losing the human dimension of energy. Indeed only a very low percentage (0,6 %) of the literature that Sovacoll analyses (*Energy Policy*, *The Energy Journal* and *Electricity Journal*) has authors that were affiliated with geography, land use planning or planning, architecture landscape planning and other “spatial sciences”. Moreover, studies on landscape and landscape architecture research highlights how topics such as “climate change” and “energy”, very sensitive topics for society, are not yet prominent theme in landscape research literature (Cushing and Renata 2015). However, “energy” is considered an important topic where landscape architects could provide significant contributions (*ibid.*). These two positions bring attention to a gap and potentially a very fertile field of research. Blaschke *et al.* (2013) point out that the landscape concept to energy issue could support embracing many topics such as history, ecology. And if the two perspectives (energy and landscape) continue to be developed in two independent paths, opportunities to integrate and create intelligent synergies will be missed (Sijmons *et al.* 2014).

1.1.1.5 Energy landscape

The concept of “energy landscape” or similar have attracted a progressive interest (Stremke 2015), even if the notion of energy landscape directly connects energy, a very broad topic to the landscape one, resulting in very broad and elusive concepts (see e.g. Blaschke *et al.* 2013).

Energy landscape is a notion used since long in chemistry and physics with the significance of “A multi-dimensional surface in which the energy of a system is plotted against parameters characterizing that system” (Law, Rennie, and Oxford dictionary of physics 2015).

Today it is a notion appropriated by spatial and landscape focused disciplines such as geography (see e.g. M. J. Pasqualetti 2011; Castán Broto 2017) and landscape architecture (e.g. Schöbel and Dittrich 2010; Sijmons *et al.* 2014; Stremke and Koh 2011). In the article “The becoming energetic of landscape” May (2010) expresses how “energetic landscapes” have emerged thanks

to the innovation of technologies for collecting and visualizing energy data, becoming both a research object and a “space for design” (*ibid.*, 25).

In geography an energy landscape could be defined as a “landscape whose images and functions (be they natural, productive, residential, recreational, cultural, etc.) have been significantly affected by energy development” (Frantál, Pasqualetti, and van der Horst 2014, 2). This definition contains a wide range of energy landscape categories, such as fossil fuel landscape extraction, coal-mining landscape, landscape of energy consumption, landscape of renewable energy production just to quote a few. There is no distinction between a landscape affected by the process towards a more sustainable energy system than one transformed with the purpose to implement energy transition strategies. The characterizing element is “energy development” in the very broadest of meanings, while taking into account several landscape aspects such as those ecological, cultural, etc. Another definition coming from geography defines “‘energy landscape’ in the same way as implied by an ‘economic’ or an ‘urban’ landscape: that is, to describe the constellation of activities and socio-technical linkages associated with energy capture, conversion, distribution and consumption” (Bridge et al. 2013, 335). This definition implies, as the precedent one, a very broad range of landscape categories, but details it more by expressing energy focused and related activity, that could be represented over a very broad range. An energy consumption landscape could equally represent a highway or urban areas. Specific focuses on energy landscape in different territorial contexts exist for example with main focuses on “urban energy landscape” defined as “Urban energy landscapes is a concept that helps to study urban energy through its manifestation in visible patterns in the built environment. Urban energy landscapes reveal some of these city-specific conditions and hence, they may provide a useful perspective for rethinking the urban energy transition. (Castán Broto 2017, 756). This definition gives a dynamic point of view, in which energy systems are embedded in the urban form and depending on the functions and activity that are developed in the city and through the concept of energy landscape, paths for transformation could be developed.

Pasqualetti and Stremke (2018) distinguish between entity and component energy landscape, where the first refers to high spatial dominance of energy which represents the predominant land use (e.g. mining landscape). The second refers to a lower spatial dominance of energy which allows compatibility with other functions and land uses (e.g. possibly wind turbines). These definitions refer generally to a landscape that does not address directly energy transition, but other definitions directly linking energy and landscape within the framework of energy transition to more renewable, energy sober and carbon free models are elaborated. Pasqualetti (2011) discusses “renewable energy landscape” focusing on the energy production components facilities implement in landscape, from a social and cultural perspective, detailing how in these projects social aspects need to be further explored at the same time as the technical and economic ones. In connection to landscape renewable energy implementation, energy landscape is conceptualized as a key arena for debating on energy policy for energy transition implementation (Nadaï and van der Horst 2010), how the emerging of renewable energy landscapes contribute to new landscape values from institutional and social perspectives (Frolova, Prados, and Nadaï 2015).

From landscape architecture designer point of view Stremke (2010) discusses about “sustainable energy landscape” referring both to a concept and a process happening when a physical

environment improves its energy system without compromising landscape services, landscape quality, biodiversity, food production and other life-supporting ecosystem services. This point of view defines an operational design perspective, going beyond the descriptive one, and defines a broader framework than energy production facilities by focusing attention on the fact that renewable and sustainable are not synonymous. Discussed mainly from a cultural and esthetic perspective, the “landscape of carbon neutrality” (Selman 2010) notion focuses attention on the reduction of fossil sources and greenhouse emissions. Energy is put in the background, but it is implicitly evoked because the renewable energy source production contributes to the reduction of greenhouse emissions, such the minimization of energy use for transport, construction, etc. The special issue of the French journal *Projet de paysage*, entitled “Le paysage à l’épreuve de la transition énergétique” (Briffaud 2014) [Landscape put to the test of energy transition] affirms that energy transition tests the landscape enhancing its mutation, but the “paysage énergétique” [energetic/energy landscape] is also conditioning as a whole the relationship between society and energy. Two paths are highlighted: one proposes landscape as a material support, as a tool for stakeholders able to develop a democratic deliberation of energy policy, in order to de-sectionalize the energy subject, and articulate energy related projects within territory. The second is to use the energy prism to understand the social relationship to landscape, as discourse and representation in conditions of action and conflict. This is a vision where landscape is a political object linking materiality, symbolism and power, having the potential of social mediation between inhabitants, stakeholders and the territory to promote the territorialisation of big energy projects (Fortin, Devanne, and Le Floch 2010).

Perrotti (2012) develops an analytical framework conceptualizing landscape of energy as an infrastructural device across scales that is both the “ground of action” for designers and a support to conceive it from different social actors’ points of view. The infrastructural conceptualization underlines how different kinds of actors do not have to design a geography of polarized powers but an isotropic one. In this case the attention is focused on everyday energy landscapes considered as important to explore the role of the social perception of inhabitants. The concept of “landscape infrastructure” has been introduced by Gary Strang (1996) with a highly technical connotation to be combined with geographical and ecological one that has been further developed also by Pierre Belanger in its PhD research in 2013. Pierre Belanger (2013) defines “Landscape infrastructure” as “both index and interface that spatially incorporates hard technological systems and soft biophysical processes, by design” (Bélanger 2013, 20) reaffirming the combination of the concept of infrastructure with ecological processes. Landscape as energy infrastructure, even if with an engineer component, support the vision of landscape as a capillary tissue composed by a pattern of energy, material and living beings that represents the fundamental components and structure of the territory (Perrotti 2014).

These are different encompassing ways to look at the concept, however, these different perspectives encourage the idea that our energy system is complex and so an energy transition could not be limited to the implementation of single intervention disconnected from others, but requires a more efficient broad management of energy and resources in a city or a territory. Considering the landscape dimension of energy transition, it could be argued that the transition that we are living is imposed, anticipated, and not the results of technological progress that slowly develops into a progressive economic and living system (Rojey 2008). So even if challenging, the

anticipation and the recognition of going in a particular direction could also be an advantage. In this way the energy transition could not just be suffered but thought upstream and also landscape planned and designed. Indeed the alternation of energetic crisis assesses a central question about the role and skills of design practices in the next mode of energy (Ghosn 2010).

1.2 Energy conscious landscape and spatial planning and design

The previous part discussed the spatial and landscape component of energy transition and why it matters. In the following section inquiry is made in more detail from a planning and design perspective, and the attitude towards energy transition implementation, developing a focus on how environmental designers embraced the subject from a spatial and landscape perspective. Special attention is given to landscape architecture discipline, although the scale of the building, and architecture disciplines is not addressed here, even if its important contribution is recognized in the energy transition process (see e.g. Ratti, Baker, and Steemers 2005; Debizet and David 2018). It is not argued here in this research that planning and design are the response to solve energy problems, but instead that they are part of the problem and they could be part of the solution. Concerns about spatial planning and design are recognized to directly address and to improve energy reduction consumption in contrast with climate changes (Calthorpe 2011).

The first aspect about designers' roles in energy transition concerning a landscape project is the modification of form, leading a modification in what is seen, but actually it could go further by exploring and defining new territorial dynamics, seeking opportunities, needs and connecting them through a project that could also be discreet and invisible. In the following section, several seminal documents are analysed from international literature. The objective is to outline the different postures/attitudes towards energy conscious planning and design for energy transition.

1.2.1 Planning and design approaches for energy transition

In 1958 the landscape architecture domain the book "Landscape of power" (1958) written by Sylvia Crowe inquired about the different equipment used for energy production, such as hydroelectric power plants or nuclear power stations, and the landscape architects' role for their installation into landscape. The book advocates a very dynamic idea of landscape which has evolved through history and it will continue in the future. And it expresses that "the role of landscape design to bridge this gap, for landscape architecture is rooted equally in art and science, and has as its aim the reconciliation of artifice to nature, and of art to science"(Crowe 1958, 41). So the author points out that the primary role for landscape architecture acts as a support for the installation of energy technology facilities and to lead the merging of technologies and nature and art into a "good" landscape in which people would like to live in (see figure 3 and 4). This perspective is shared by the American landscape architect Gary Strang who points out how since long technical infrastructure has been denied in landscape, while designers are mainly appointed with "hiding, screening and cosmetically mitigating infrastructure, in order to

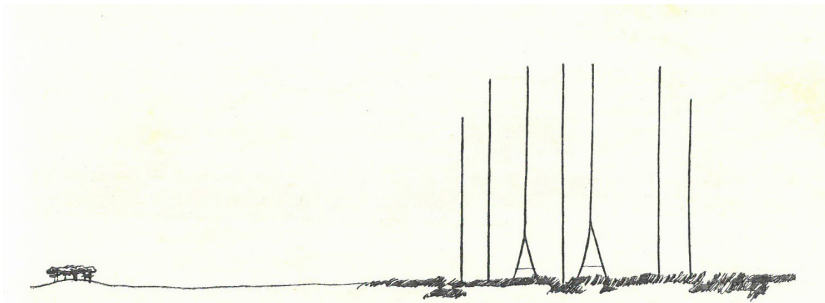


Fig. 16. Pine clumps on the left, once a dominant feature in the landscape, are reduced to the stature of shrubs.

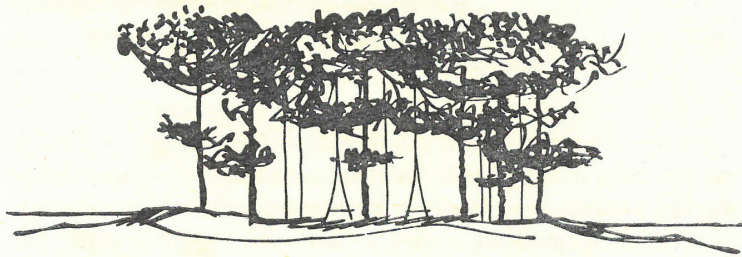


Fig. 17. Where trees and masts are equi-distant from the eye, the trees are dwarfed. But trees near the viewpoint merge the masts into the pattern of their trunks.

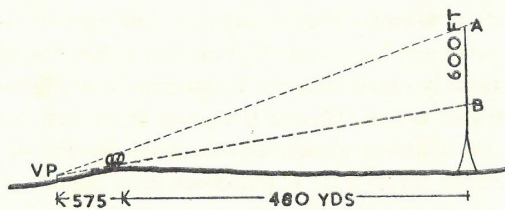


Fig. 18. The scale dominance of masts is quickly lost when seen from falling contours. Here the apparent height is reduced to A-B and appears equal in height to the trees growing on the slope.

Figure 3. Representation of proportions between mast and trees in the landscape. Source: Crow Sylvania. 1958. *The Landscape of Power*, The Architectural Press, London, p.35

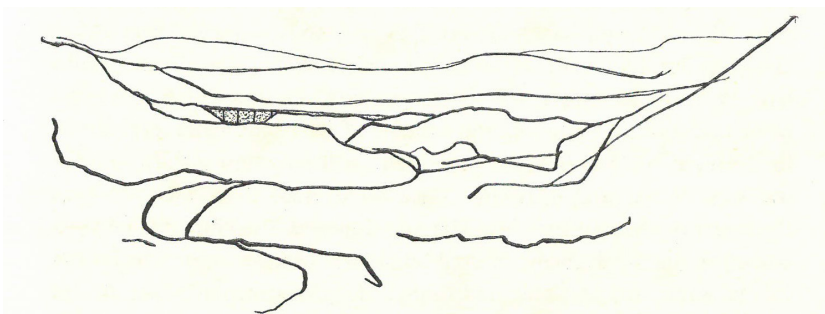


Fig. 54. In the Welsh hills small dams have been absorbed unobtrusively into the landscape by the use of landform and the local rock; these mask the concrete construction; a useful device to minimize intrusion into small-scale landscape.

Fig. 55. The original pattern has been restored by re-arrangement of the landform.

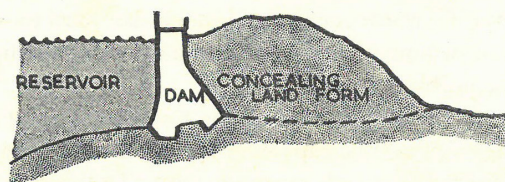


Figure 4. Representation of a treatment of a dam in order to make this less obtrusively in the landscape. Source: Crow Sylvania. 1958. *The Landscape of Power*, The Architectural Press, London, p. 75.

maintain the image of the untouched natural surroundings of an earlier area” (Strang 1996, 11). He, on the contrary, promotes a collaboration among architects, landscape architects, engineers and biologists in order to design while considering the relationship between natural process and technologies, appropriating infrastructure as landscape.

Another point of view towards energy, coming from a design framework, could be found in the book “Landscape design that saves energy” authored by Moffat and Schiller (1981), architects

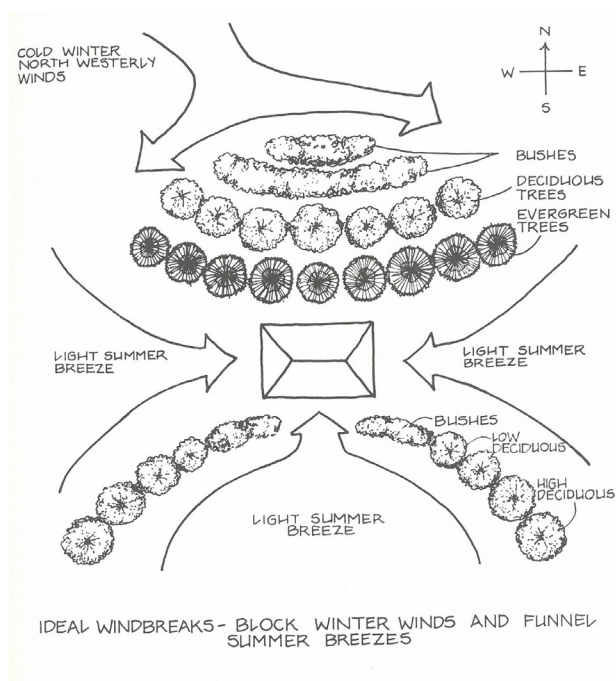


Figure 5. Representation of the position of a hedge to insulate the house. Source: Moffat Anne Simon & Schiler Marc. 1981. Landscape Design That Saves Energy, William Morrow and Company Inc., New York, p. 44.

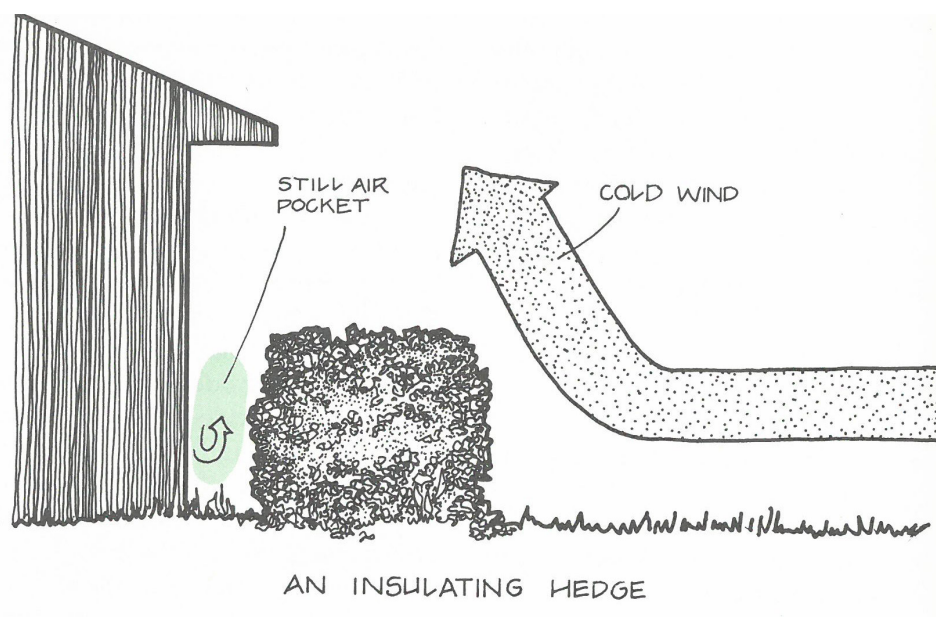


Figure 6. Representation of trees layouts to shed the houses from winter wind and get the cooling wind in summer. Source: Moffat Anne Simon & Schiler Marc. 1981. Landscape Design That Saves Energy, William Morrow and Company Inc., New York, p. 121.

that also thought about landscape architecture. They explain how the use of vegetation (tress bushes, etc.) could be a powerful tool for reducing energy consumption. They provide detailed explanation and tables about how locate plants in combination with residential architecture (see figure 5 and 6), specifying the kinds of plant species use in different climate conditions (hot, humid, temperate). This shows a connection between the knowledge of life sciences and energy saving measures, for wind and sun control, and their location in relation to houses.

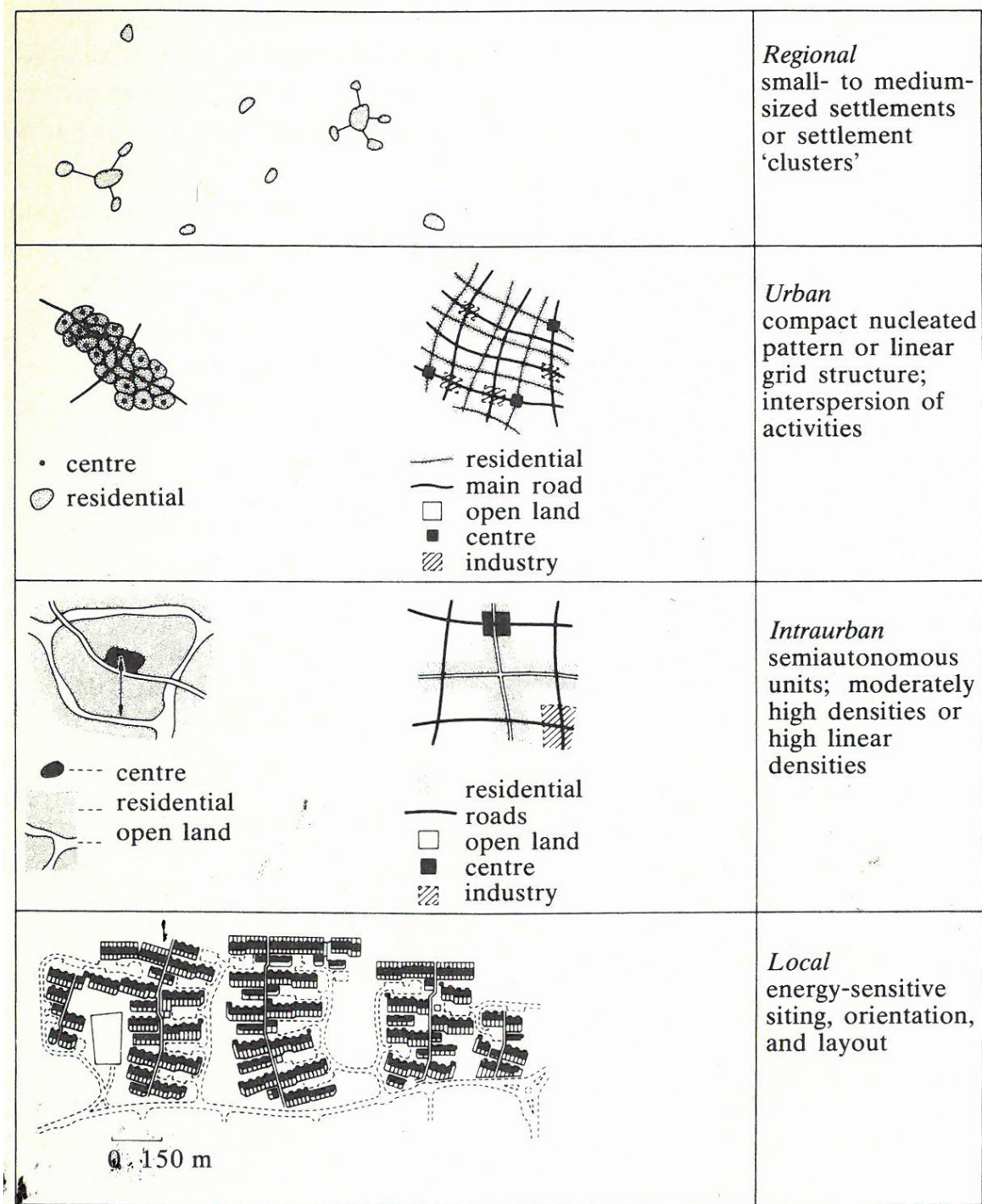


Figure 7. Representations of energy efficient spatial structures at different scales. Source: Owens Susan E. 1986. *Energy, Planning, and Urban Form*, Pion Ltd., London, p. 66.

Still in connection with the topic of reduction of energy consumption Owens, in the urban planning domain, affirmed in 1986 that “The nature and availability of energy sources clearly influences the spatial structure of society” (Owens 1986, 2) and that urban design/planning is a key factor for reducing energy consumption. She identifies the best energy efficient planning solutions at different scales (regional, urban, intraurban and local) essentially linked to urbanized areas (figure 7). Owens does not speak about landscape, but she is concerned with the idea of carefully planning places where people want to live. Furthermore, in another paper Owens (1992) focuses the attention on planning for energy efficiency, exploring at different scales the interaction between energy and spatial structure, such as built form, settlement layout and shape, highlighting both the need for intrinsic energy requirements and efficiency in energy use. In this case she also emphasizes the viability and how it is important to consider people, in planning “a physical environment which permits people to carry out their daily activities using energy as efficiently as possible” (ibid. 189). The behavior of people for transportation for example, it is considered an important part of the energy problem.

If Owens has inquired on energy implications and spatial structures at different scales (building, neighborhood, settlements and regions), Stoeglehner et al. (2016; 2011), more recently, have kept inquiring the energy planning topic and its spatial structure, but through the categorization of four archetypes exploring different contexts: urban centers, suburban areas, small town centers in rural areas and rural areas themselves. Urban areas are the main energy consumers and need to improve their energy efficiency and saving strategies while rural areas tend to be the energy and resource suppliers. Through this analysis Stoeglehner et al. (*ibid.*) identifies three main strategies to support the “energy turn”: firstly by a deeper incorporation of energy efficiency measures and renewable energy supplies by spatial planners and decision makers, who secondly also have to think about how these strategies have to be put into spatial contexts beyond their technological, economic and environmental aspects, and thirdly by awareness raised in people about how they everyday actions and decision could affect energy consumption and production. Here landscape is a secondary dimension, but its importance is recognized as cultural landscape. Beyond the reduction of energy consumption, the design of renewable energy production technologies nowadays is also addressed and is the central topic of a recent book published in 2017 “The Renewable Energy Landscape: Preserving Scenic Values in our Sustainable Future” (Apostol *et al.* 2016). This book provides insights about the fact that aesthetic values are part of a sustainable future. It discusses best practices starting by highlighting the importance to “Analyze landscape character before designing project”, advising to locate RE from the most prominent land features, increasing distances to reduce visual dominance and so on. It also delves more into specific details by defining design tools for their landscape design, such as providing a balance in color and size, and avoiding the spatial chaos for wind turbines implementation for example, but also for photovoltaic parks. These best practices mainly focus on landscape form, and what is seen. A particularly chapter “Improving the visual fit of renewable energy projects” focuses on how renewable energy facilities could be sited within a landscape in order to minimize their visual impact, and mitigate their impact too for example on wildlife.

On this topic of RE technologies landscape design, Schöbel and Dittrich (2010), go beyond aesthetic and scenic subjects, sustaining that the use of renewable energy could lead to a reconciliation between nature and humanity and that landscape architecture’s role could be

to provide and facilitate synergies between renewable energy and others uses such as habitat, agriculture, recreation, etc. by adding an energy layer on the landscape (M. J. Pasqualetti 2012). A book was published in 2013 collecting multiple-perspective entries from many authors about the designing and planning of sustainable energy landscapes (Stremke and van den Dobbelsteen 2013). It also collects methods and insights from authors about a wide range of approaches such as mapping energy potentials, multi-criteria and GIS tools, etc. while stressing the importance of tailor-made solutions for each landscape. This shows the very broad possibilities that exist on the approach for planning and design of energy in space and landscape.

Subsequently the landscape architect Sijmons et al. in the book “Landscape and energy. Designing transition” (2014) shows the reciprocity between energy and space through a “research by design approach” in the Netherlands, developing a comparison of spatial footprints for several renewable and non renewable sources, developing scenarios, concluding that landscape is a mediator between the energy technologies and space where these technologies are implemented, by addressing the transition conjointly as a technical and cultural challenge. It includes energy quantitative modelling scenarios in its design, trying to anchor this data to local characteristics. Concerning this more quantitative component of energy, that has to deal for example with MWh, several researchers explored connections between “hard science” and energy conscious landscape planning and design. Stremke et al. (Stremke and Koh 2011; Stremke, van den Dobbelsteen, and Koh 2011) from a landscape architecture perspective, inquire about the first and second law of thermodynamics⁴ in order to understand how spatial and landscape planning and design could reduce the entropy of the built environment and increase exergy. They define the concept of “exergy landscape” by defining a landscape with high-energy potential (high exergy), few energy losses, dispersion and consumption (low entropy). Five exergy conscious strategies are featured and discussed from building components to the regional (territorial) scale: (1) increase energy efficiency, (2) decrease exergy demands, (3) increase the use of residual exergy, (4) match quality levels of exergy and (5) increase the assimilation of renewable energy. In this case the design profession’s skills based on landscape site analysis for an understanding of the place to propose site-specific projects at different scales are broadened exploring other disciplinary fields, in this case physics, industrial ecology and engineering thermodynamics. Indeed the five strategies mentioned above give insight for energy development, but the social and cultural aspects that characterize the design practice are overshadowed, accenting a more functionalist ideal.

Starting from a similar basis Balocco and Grazzini (2000) inquire the second law of thermodynamics for spatial planning in order to provide useful indicators to measure the energetic sustainability of urban areas, combined with GIS systems. For example, the entropy indicator calculated from the entropy variation due to losses of energy in buildings, and the entropy variation due to solar energy gains, could assist in identifying urban areas in which to intervene to reduce energy losses but also to verify the energetic sustainability of different urban projects, before implementing them.

In connection with spatial representations of energy transition topics on maps, researches explore

4 First Law of Thermodynamics states that energy is always conserved. The Second Law of Thermodynamics states that during any process, exergy (work capacity) is destroyed and entropy (indicating the disorder of a system) is produced.

on “energy potential mapping” a tool and method oriented to identify local energy resources by locating them spatially, through computer systems, with the objective to detect and combine energy needs and potential energy sources (van den Dobbelsteen, Broersma, and Stremke 2011). Recently, Spatial Transition Analysis (STA) has also been developed, by landscape architects to assist in defining spatially explicit and evidence-based targets for energy transition in territories, but also taking into account stakeholders’ values and preferences in order to use them to define short term and long term actions (Oudes and Stremke 2018).

Researchers also explore ecological concepts by describing the relationship between organism and environment to inform spatial planning and design of the physical environment (Stremke and Koh 2010; 2011), with concepts such as *energy flows*, *systems size*, etc. In this case, organism and natural ecosystems are the starting point for inspiration to improve energy management and development in landscape planning and design.

Paola Viganò architect, urban planner and researcher, focuses the attention on the l’ “*énergie grise*” [embodied energy] and how to “recycle”⁵ energy in cities, while considering consumption reduction, and renewable energy production (Viganò 2014b; 2014a). She adopts a vision across scales from buildings to metropolitan regions, inquiring about the embodied energy enclosed in urban areas from their spatial potentials in order to reuse and recycle existing situations, to rationalise territory from energy points of view, creating synergies among city areas, while considering the social needs. Energy maps of Grand Paris and diffuse city of Veneto were drawn in order to represent energy consumption, potential for energy recycling according to different land uses and potential for renewable energy production. These maps are believed to suggest new questions and ways of managing energy development from a spatial point of view. This vision is strictly connected to the “life cycle” concept of buildings and urban areas, where the emphasis concerns the entire design process, not the object itself. This represents a progressive shift in design, for which it is not the final form that matters, but the entire process that leads to a design choice.

Another way to approach the subject considering landscape as a tool to support the discussion has been developed by Selman, affiliated to a landscape architecture department, (2010). He develops the concept of *landscape of carbon neutrality*, that includes both energy production and energy demands and embodied/grey energy, underlining how it is necessary to help people develop a new narrative, to make them understand and “love” today energy driven landscape. Practices such as deliberative mapping, workshops, social sustainability learning, all developed through landscape, are considered methods to explore and accomplish that, to guide people and democratize landscape choices. If not, opposition and barriers will continue to rise, hampering energy transition implementation.

Besides directly addressing the topic and method for design, some explorative research inquires about the designer’s role and association in local energy transition related processes. De Wall et al. (2014) inquired about landscape architecture’s role in energy transition in three European municipalities considered to have successfully transitioned to low carbon and renewable systems: Malmö, Jühnde and Gussing. In these cases, results show that a landscape architecture expertise

5 For “recycle” it is meant the idea not to waste energy, knowing that energy because of second laws of thermodynamic could not be recycled.

was focused mainly on the environmental impact assessment for RE at lower spatial scale levels, with no global strategic vision at a municipal level. In order to better inquire these second possibilities for landscape architecture, the same author (de Waal et al. 2015) investigated another perspective of landscape architecture practitioners. Through the analysis of the results of a Dutch regional landscape design competition, they found that almost all teams worked on RE generation, but only a low percentage on reducing gas emissions, energy distributions, showing a great gap between existing knowledge and practice. This seems to suggest, considering all the literature that exist about the topic, a gap exists between research and practice.

This could be a source of problems if considering that “Landscape will be a crucial battleground in the energy transition” (Sijmons et al. 2014, 18) and the existing approaches and knowledge found in literature could support dealing with this in a more conscious way, on this “battleground”.

Conclusion

This excursus shows how since long several authors affiliated with planning and design disciplines and the landscape architecture domain have discussed the relationship between energy development and spatial/landscape planning and the design practice.

The topic developed through the planning and design perspective cover the three main aspects of energy transition enumerated in the previous section: renewable energy production, discussing design principles for the installation of renewable energy production equipment (e.g. Apostol et al. 2016); energy saving in planning and design, for example, investigating about the development of compact multifunctional urban form in order to reduce energy requirements for transportation (e.g. Owens 1986; Stoeglehner et al. 2016); energy stream optimization of the built environment, meaning to make the most of a given amount of energy (Owens 1992), for example through energy cascading principles from industrial areas to residential ones (e.g. van den Dobbelsteen, Broersma, and Stremke 2011; Stremke and Koh 2011).

Moreover these studies point out approaches both at operational project sites (see e.g. Crowe 1958) and those large scale strategic (e.g. Stremke, van den Dobbelsteen, and Koh 2011). Several attitudes exist, some focusing more on the peoples’ perspectives toward the transition challenge (e.g. Selman 2010), of dealing with “cultural landscape” (Sijmons and van Dorst 2013) while other attitudes deal with more on the physical spatial implications of the energy development (see e.g. Stremke, van den Dobbelsteen, and Koh 2011; Schöbel and Dittrich 2010; Owens 1986). Several research also address energy modeling data, which is however reconnected with spatial or/and landscape components (e.g. Oudes and Stremke 2018; Sijmons et al. 2014).

What emerges is that when working on energy, designers among whom are landscape architects, have to deal with functional criteria, such as technological and quantitative dimensions. Furthermore, these aspects have to be combined with social functions, such as improving the usability of public places and cultural functions, for example giving a sense of identity to a place. It does not have to be forgotten that while designing, designers have to deal with subjective ideas that led them to make choices (Lawson 1980). Nevertheless, even if generally planning and design are meant to improve the quality of the resulting space/landscape this is not always the case, in the cases when planning became only a legal procedure and design became only aesthetics of the forms (Van Assche et al. 2013).

1.2.2 Other disciplines which address the spatial component of energy transition

1.2.2.1 Geography of energy

Beyond landscape architecture and other planning and design disciplines, spatial and landscape implications of energy transition are widening to a broad range of disciplinary fields. One of this is geography. Chanard in her PhD thesis (2011), shows how the geographical discourse on energy and its spatial components exist since long ago but have been modified over time, from an empirical view that studies the organization and distribution of the production and consumption of energy in places and the transportation flows that connect them. To arrive now at an integrated approach to territory including its physical, social, and economic characteristics, in connection to its spatial organization and stakeholder implications. In recent years in France Mérenne-Shoumaker (Mérenne-Schoumaker 2007) published a synthesis book “Géographie de l'énergie: acteurs, lieux et enjeux” [Geography of energy: actors, places, issues],

Moreover, in 2011 the journal *Annals of the Association of American Geographer* made a special issue about “New geography of energy” and in its introduction Zimmerer (2011) states that “geography is central to understanding and addressing the current energy dilemmas. The resource systems of energy production, distribution, and consumption are thoroughly entwined as social–environmental interactions” (Zimmerer 2011, 705). Bridge et al. (2013) aim to discuss the spatial quality of the low carbon energy transition by outlining six geographical components of transition: location, landscape, territoriality, spatial differentiation and uneven development, scaling and spatial embeddedness and path dependency. They argue that the goal for future research is to understand how energy transition is spatially constituted, rather than as a process that affects places (*ibid.* 2013).

And recently two new books about energy geography from transnational perspective (Europe, United States, etc.) have been published, “Handbook on the Geographies of energy” (Solomon and Calvert 2017) and “The Routledge research companion to energy geographies” (Bouzarovski, Pasqualetti, and Castán Broto 2017) showing how the subject is growing in concern and interest. This reveals that disciplines dealing with spatial components inquire on energy at the same time, other disciplines are increasing interested in the energy/space if not landscape combination/pair. Huber (2015) argues that “any concern for an energy transition to renewable or alternative energy must put space at the center of the conversation” (Huber 2015, 2), pointing out geography is fundamental for this to happen. And nowadays in energy geography, a recognized reference is made to relational space (see e.g. Castán Broto and Baker 2018), which leads to very rich definitions that have some similarities with the definition of landscape as treated in this research (see introduction). This is true because it implies a socio-cultural component and also a proactive planning and design component that has the potential to advise future paths for energy development and how it transforms space.

1.2.2.2 Sociology of energy

Even the sociology discipline affirms interest in energy matters, developing a branch of energy sociology. In the French book “Sociologie de l’énergie. Gouvernance et pratique sociales” [Energy sociology. Governance and social practice] (Zélem and Beslay 2015) sociology affirms the importance and the necessity to join the debate on energy and ecological transition. This is because the technocentric approach to energy transition is not enough to overcome the energy and climate crisis we are facing, so social dynamics and the introduction of energy as sociotechnical systems, need to be explored. This means to inquire the condition of emerging technological innovations and their conditions for acceptability, their developments etc. The focus, of course, is on phenomena in human society, but still a spatial/landscape concern is mentioned in relation to its social components and perceptions. This is particularly linked to spatial governance, planning instruments, territorial identity and human attachment to place and there is also a section devoted to “Territoires en transition” [Territories in transition]. “The management and use of energy strongly structures territorial planning, the organization of social space, the design of our cities”⁶ (Zélem and Beslay 2015, 17).

Still concerning the social sciences the journal “Energy Research & Social Science” developed a special issue (2018 n.36) focusing on the spatial component of energy transition starting from the assumption that research from a spatial perspective is significant in order to understand and improve the ongoing energy challenge (Castán Broto and Baker 2018). In this issue a broad range of authors affiliated with different disciplinary fields contribute, geographers, social scientists, landscape architects, urban planners, environmental scientists, showing how the matter of space and energy is transversal to several disciplines.

6 “La gestion et l’utilisation de l’énergie structurent fortement l’aménagement des territoires, l’organisation de l’espace sociale, la conception de nos cites”. Transalte by the author

Box 1. Contribution of chapter 1 to the part 1 research question

This chapter, through literature references shows that within the energy transition there are spatial and landscape dimensions, concerning for example RE production and reduction of energy consumption. However, several research studies acknowledged how this dimension has been neglected for long and are calling to better consider it and integrate it in the process. This because energy is one of the main drivers modifying landscape in the years to come.

The present lack of connections could be attributed to the fact that energy transition debate has been mainly dominated by engineering, economic and political science disciplines, since they were based on scientific and quantitative data, have omitted landscape components. Landscape planning and design disciplines, among which is landscape architecture, could have a leading role in conscious spatial and landscape transformations for energy transition. Literature research shows how landscape architects and other designers are addressing the topics of energy transition and integrating production of RE, reduction of energy consumption and energy stream optimization. These professionals consider both cultural and physical material dimensions of landscape, at the site and strategy levels, showing how actively they could be involved in the transition process, leading to answers on some of the problems that it carries.

CHAPTER 2: Concepts and principles relevant for the planning and design of sustainable energy transition: A systematic review¹

The “energy” topic is of great concern to our society, because of scarcity of fossil resources and emission of greenhouses gas to the atmosphere resulting in climate change. There is a growing consensus to progressively transit towards a more sustainable energy system. This energy transition is encouraged, among others by the European Directive 2009/28/EC EUROPE 2020 and the French “Energy transition law for a green growth” (2015). The implementation of energy transition has started to affect the living environment in many places (Nadaï and Horst 2010) and it is expected to continue to do so for decades (Pasqualetti 2012).

There exists a long-lasting relationship between energy and spatial organization (De Pascali, 2008). The spatial aspects of energy are increasingly addressed by environmental designers such as architects, urban planners and landscape architects. The scale of inquiry for energy conscious spatial planning and design ranges from individual buildings (Schmidt 2009) to the landscape at large (Briffaud 2014; de Waal and Stremke 2014). The number of papers on energy, however, is rather limited in spatial journals and landscape architecture journals in particular (Cushing and Renata 2015). This could be due to the fact that the notion of “energy” has been historically since the 17th linked to technical and engineering processes of production and transformation through mechanical work and thermodynamics laws (Debeir, Deléage, and Hémerly 2013). More recently and thanks to the transdisciplinary nature of energy transition, energy and spatial organization are addressed jointly by environmental designers, social scientists and many other non-technical disciplines.

In this chapter I focus on energy conscious spatial planning and design through the perspective of ‘sustainable energy landscape’ referring to actions and processes for energy-conscious spatial transformation aimed at preserving, improving or creating landscape qualities (Stremke 2015). Several researchers have explored and discussed concepts with relevance to energy-conscious spatial planning and design practice (Stremke and Koh 2010; Kennedy, Pincetl, and Bunje 2011). Nevertheless, there exists no systematic review on “energy concepts” that are relevant for the planning and design of the larger physical environment, and the design operational principles behind these concepts. Therefore, the following research question has been defined: which concepts and operational principles are available to inform energy-conscious planning and design in the context of sustainable energy transition?

An overview of concepts and principles could enhance the understanding of the actual state of debate and highlight opportunities and challenges for energy conscious spatial planning and design. The research aims at environmental designers i.e. urban designers/planners, architects, landscape architects and planners. It intends providing them with useful insights, to advance

¹ This chapter has been written to be published as a review article, co-authored by me, Patrick Moquay, Sophie Bonin, Sven Stremke.

both energy conscious design practice and research. Analyzing the transfer of energy related concepts into environmental design is interesting for improving knowledge on energy-conscious planning and design. But above all, those concepts offer new solutions to some of the challenges associated with energy transition, and new ways of thinking for the implementation of projects. Nevertheless, the kind of approach to energy transition implementation advocated by these concepts need to be questioned too, highlighting potentialities and lacks.

The research focuses on the spatial implications of energy principles, recognizing that other aspects such as economy, technical and quantitative models are also relevant but dealt with elsewhere. Key terms for the research presented in this paper are *concept* and *principle*, defined as follow. Concepts allow the creation of a common understanding of phenomena while principles express and apply these concepts in operational terms. Planning and design *principles* refer to abstract design statements that are taken into account while designing (Dee 2012). They are somewhat generic, not scale and site-specific (van Etteger 2016), and need to be adapted to specific project conditions. A single concept can give rise to multiple operational principles. For example, the concept of *urban metabolism* points out the principle of recycling and reusing local resources in order to reduce city's energy inputs and outputs.

Although we are interested in the consequences of energy transition on the physical landscape, we will here focus on the more general *spatial aspects* of energy-conscious concepts and principles. Concepts and principles are considered to be relevant when they require a physical area for implementation, impact the physical environment or affect the spatial organization of the environment improving energy efficiency or when they take into account socio-cultural, topological (position, distance), physical, land use/land spatial aspects.

Materials and methods: developing a systematic literature review research

The research was conducted by means of a systematic literature review (Petticrew and Roberts 2006) with two rounds of inquiry: (1) Identify concepts that are relevant for energy-conscious planning and design. (2) Discover energy-conscious planning and design principles that are associated with these concepts.

The literature review was developed in early 2017, reviewing publications until 2016 and focusing exclusively on peer reviewed articles. The search was limited to restrain the sample and to assure the academic standards associated with a peer review process. The database selected for the research was Scopus because it covers more journals compared with Web of Science (WoS) (Mongeon and Paul-Hus 2015), including the most relevant landscape planning and design journals (e.g. Scopus covers papers of “Landscape Journal” from 2009 and WoS from 2015; Scopus covers papers of “Journal of Landscape Architecture” from 2006 and WoS from 2012). Furthermore, Scopus indexes the majority of peer review journals within which planning and design scholars publish (Kempenaar et al. 2016).

Through the first round of inquiry, we wanted to identify *concepts* informing energy conscious spatial planning and design, to understand from which disciplinary field they originate from and to what extent they are being discussed. The research query was set up to derive a population of “energy planning and design” related papers which we then further examined to identify the concepts.

The search query combined “energy” with “planning” and “design” in reference to spatial terms as “space”, “landscape” etc. (see annex 2). Several subjects’ areas as chemical sciences, computer sciences, medicine etc. (see annex 2) were excluded because a first sample revealed that there was no useful insight for the research. The query was applied to both the article titles and keywords. We omitted the abstract in this first inquiry because, after a first survey, the sample proved to be too broad, containing inadequate results. Often, the query words were found in the context introduction of the abstract while the actual topic of the paper was not consistent with our research.

The abstracts of a total of 2.359 papers have been read. We found 205 papers related to energy-conscious spatial planning and design of which a total of 65 papers quoted one or more concepts in the title, the keywords or the abstract. These 65 papers were read to determine whether concepts were discussed in linkage to spatial planning and designing activity for energy management.

After summarizing the 65 publications, 15 papers were excluded because they (a) discussed only technical aspects such as wires losses in planning photovoltaic park (Botsaris 2015) or (b) they were only accounting exercises with no spatial insights, for example developing methods for quantifying carbon emissions for a region (Y. Dong, Xia, and Chen 2014). The remaining population of 50 papers comprised a total of 44 concepts.

The second round of inquiry focused on a selection of concepts and consisted of an in-depth analysis of publications in order to identify energy-conscious planning and design *principles*. Three concepts - *urban metabolism*, *circular economy* and *cradle-to-cradle* - were chosen because (a) they were discussed in great many publications, (b) they have a spatial component, (c) they had not been extensively studied prior to our research, and (d) they are associated with operational principles for energy-conscious intervention and not solely descriptive in nature.

For this second step, a specific research query was set up for each concept, searching in title, key words and abstract. The three research queries combined the selected concept with “energy” and with “planning”, “design” or spatial terms as “infrastructure” and “city” (see annexe 2).

For urban metabolism 208 abstracts were read. Out of these 208 abstracts, 45 full text papers were read of which 36 papers were relevant for our research. For circular economy 199 abstracts were read, of which 28 as full text and 18 were selected as consistent. Finally, for cradle-to-cradle 26 publications have been entirely read of which five were selected. We selected papers because they highlighted energy-space concern and/or energy planning and designing principles. These publications were read entirely to summarize the different clusters of the inquiry (e.g. role of planners and designers, scale of inquiry) and the energy conscious principles. Three articles related to both urban metabolism and circular economy, highlighting possible linkages between concepts.

2.1 Results: concepts coming from a broad range of disciplinary field

2.1.1 First round of inquiry: concepts

During the first round of inquiry, 44 concepts have been identified. Figure 1 presents an overview of these concepts, the disciplinary fields where they come from, the number of papers that mention a concept and the connections among concepts that were quoted in those papers. Figure 1 shows that concepts now discussed in relation with energy conscious spatial planning and design come from a broad range of different disciplines such as biology, physics, economy and engineering. Most concepts originate from the field of ecology.

The disciplinary categories/sciences are named according to branches of knowledge of the French Universails Encyclopedia. For the concepts for which it was not possible to identify a discipline cluster, such as *cradle-to-cradle*, *ecological footprint*, *urban energetic theory*, we indicated the disciplinary field of the author who is recognized for coining the concept. Furthermore, *territorial*, *industrial* and *urban ecology* are considered both a discipline and a concept, because their authors are affirming themselves as constituting a defined disciplinary field (Barles 2010).

A closer inspection of the figure shows that many concepts are transdisciplinary, discussed in different fields. *Urban metabolism*, for example, is discussed in ecology and in the disciplines of industrial and urban ecology. *Biomimicry*, another example, originated both in biology and ecology. The definition of all 44 concepts are provided in annex 2.

The most quoted concept is *urban metabolism* (18 times) followed by the concepts *natural-urban ecosystems* (13 times), *Laws of Thermodynamics* (8 times) and *industrial ecology* (8 times) and *emergy* (8 times). Furthermore, two main categories of concepts have been found: (1) existing concepts such as *resilience* that are used to discuss energy planning and design, originating from disciplines and research fields such as ecology and economy (Sharifi and Yamagata 2016); (2) relatively “political” concepts such as *eco-city* that are used for communicative purposes (Premalatha et al. 2013). Papers belonging to the later category include publications addressing sustainability objectives – they are mostly raised as a reaction to the environmental challenges such as increasing of greenhouse emission. Some of the later concepts are discussed in direct connection to the former category. A paper on *low carbon cities*, for example, makes explicit reference to *symbiosis* (Dong et al. 2014). In the following, the first category of papers is explored in more detail because they can inform the discussion on second category concepts and help to devise a framework for identifying and organizing operational principles (second iteration).

The links between concepts - when different concepts are quoted together in one paper - are quite revealing in several ways. Firstly, figure 1 highlights that only few concepts are discussed alone in a paper without a reference to other concepts (see e.g. *green economy*). Secondly, concepts from different disciplines are discussed in the same paper (see e.g. *Laws of Thermodynamics* and *circular economy*). Thirdly, most links can be found between the fields of ecology and physics. The concept of *urban metabolism* is the most discussed in relation with other concepts, in particular *natural/urban ecosystems* and *industrial/urban ecology*.

Figure 1. Constellation of energy related concepts and their disciplinary field(s). The size of white circles corresponds to the number of papers (total of 54 papers) where the concept is mentioned. Line width indicates the number of papers where concepts are mentioned together. Source: author

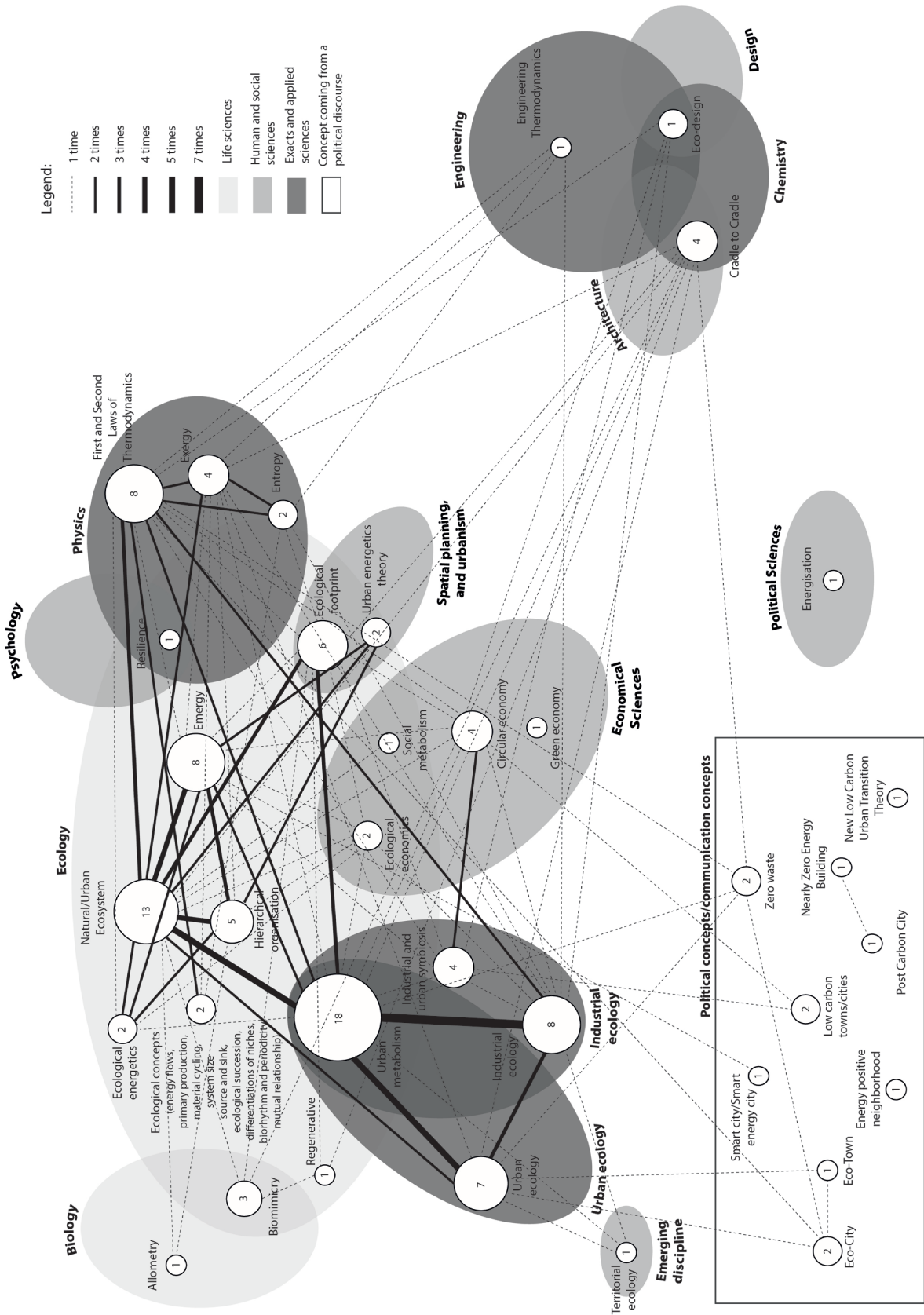


Figure 2. Clusters of papers with relative importance of spatial and energy aspects. Source: author

SPACE			ENERGY
Strong	<ul style="list-style-type: none"> - (s.a) (20) Urban metabolism 	<ul style="list-style-type: none"> - (s.b) (7) biomimicry - (s.a) (13) ecological footprint, urban metabolism - (s.a) (s.b) (15) urban metabolism, natural/urban ecosystems - (s.b) (16) new low carbon urban transition theory - (s.b) (17) Eco-City, zero-waste - (s.b) (23) low carbon towns, circular economy - (s.a) (s.b) (25) exergy - (s.a) (s.b) (29) First and second Law of Thermodynamics, exergy - (s.a) (s.b) (30) First and second Law of Thermodynamics, energy flows, primary production, material cycling, system size, source and sink... - (s.a) (s.b) (37) energy flows, primary production, material cycling, system size, source and sink..., 1st and 2nd Laws of thermodynamics - (s.a) (s.b) (38) cradle-to-cradle - (s.a) (39) Industrial ecology, urban metabolism, ecological economics 	Strong
Modest	<ul style="list-style-type: none"> - (m.c) (28) urban ecology 	<ul style="list-style-type: none"> - (m.c) (1) Energy positive neighborhood - (m.a) (m.c) (2) Post Carbon City, Nearly Zero Energy building - (m.b) (3) industrial and urban symbiosis, circular economy, metabolism - (m.c) (4) allometry, hierarchical organization - (m.c) (m.d) (8) urban metabolism - (m.c) (9) urban ecology, Eco-Town, Eco-City - (m.c) (10) biomimicry - (m.b) (limited) (14) urban metabolism - (m.d) (18) Green economy - (m.b) (19) Circular economy - (m.c) (21) Urban metabolism, cradle to cradle - (m.d) (22) ecological footprint - (m.c) (26) regenerative, cradle-to-cradle - (m.b) (32) urban metabolism, territorial ecology urban ecology - (m.c) (33) urban metabolism - (m.d) (34) social metabolism, natural ecosystem - (m.d) (36) energy - (m.a, m.b, m.c) (41) urban metabolism, ecological footprint - (m.b, m.c) (43) urban metabolism, industrial ecology - (m.d) (45) Urban energetics theory - (m.d) (48) urban ecosystems, energetic hierarchy, ecological economics - (m.c, m.d) (49) ecological footprint - (m.c) (50) urban metabolism 	Modest
Limited		<ul style="list-style-type: none"> - (m.c) (5) Smart city /Smart energy city, energy - (m.b) (m.c) (m.d) (6) Resilience - (m.b) (11) urban metabolism, circular economy - (m.b) (12) industrial symbiosis, low carbon city - (m.c) (24) urban metabolism, cradle to cradle - (m.b) (m.c) (27) urban metabolism - (m.d) 1a (31) ecological footprint, energy, exergy - (m.c) (40) urban metabolism - (m.d) (42) Urban energetics theory - (m.c) (44) industrial ecology - (m.d) (46) ecological energetics - (m.c, m.d) (47) 1st and 2nd Laws of thermodynamics 	Strong
Limited		<ul style="list-style-type: none"> - (1a) (35) energization 	Limited

Legend figure 2:

The first (e.g. l.a) refers to the spatial aspect found in the paper. The number (X) refers to the specific paper that can be found in annex 2, followed by the central concepts developed in the paper.

Energy:

“Limited”: energy mentioned as a side aspect

“Modest”: showing a general concern about energy saving, efficiency and production (e.g. improve energy circularity)

“Strong”: highlighting principles for improving energy saving, efficiency and production

Space

“Limited “: almost absent/not relevant (descriptive)

(l.a) The spatial relevance for energy management as expressed in the criteria “modest” or “strong”, is not evocated/a matter of concern.

“Modest”: general spatial consideration about energy concern (descriptive)

(m.a) Socio-cultural (all scale): if they refer to social-cultural aspect between energy management and space (e.g. non-appreciation of wind turbine equipment)

(m.b) Topological (all scale 3d, position, distance): if they consider distance among functions and proximity localization for energy concern.

(m.c) Physical features (local): if they refer to the physical feature/resources/context of a specific place for energy concern (e.g. building stock, city form etc.)

(m.d) Land use/land cover: if they refer to land use/land cover classes in relation to energy concern

“Strong”: explicit consciousness of the spatial aspect for energy (action)

(s.a) Energy principles: if they highlight specific operational energy principles considering their spatial impact (e.g. the need of a physical surface for implementation)

(s.b) Spatial principles: if they highlight specific spatial related operational principles improving energy management (e.g. orienting a building in order to maximize solar income)

Heretofore, the results focused on concepts themselves. The following section will show the linkage correlation between concepts and spatial planning and design as described in the analyzed papers. Figure 2 reveals how the concept(s) discussed in each paper can be ranked with regards to spatial aspect and energy respectively. For each dimension, we defined three classes: *limited*, *modest* and *strong*. For energy aspects, we consider as a *strong* concern when principles are enumerated in the paper for improving energy saving, efficiency and production (e.g. match energy levels of supply and demand). A general concern about energy (e.g. to improve energy circularity) is considered as *modest*, and a circumscribed concern as *limited*. For spatial aspects, we noticed a *strong* concern when papers enumerate energy principles being conscious of their spatial aspect or highlight spatial principles improving energy management. To refer to socio-

cultural, topological, physical, land use and land cover dimensions in relation to energy concern is qualified as *modest*; while it is *limited* when the previous spatial dimensions are almost absent or not relevant.

As can be seen in figure 2, the cluster *energy modest-space modest* groups the largest number of paper (23), where the most addressed spatial aspect is physical features (m.c; acronyms are explained in figure 2 legend) 13 times, followed by land use/land cover (m.d) eight times, topological (m.b) five, and socio-cultural (m.a) two. It could be highlighted that eighteen papers refer to only one spatial aspect and few (four) group two, as only one paper relates to three of them (n. 41), showing that the spatial component is never comprehensively discussed. In this cluster, the most frequent concept is *urban metabolism*, that, grouping together all the different papers, is associated with all the spatial aspects that we identified.

Twelve papers, less than half of the number of the previous cluster, are discussed in strong relation to energy but with a modest reference to spatial component. In this group physical features (m.c) are addressed six times, followed by land use/land cover (m.d) five times, topological (m.b) four times and no one in reference to socio-cultural (m.a). Here too the papers discuss mainly one spatial component, nine out twelve.

Finally, twelve papers are grouped in *energy strong – space strong*, that discuss energy conscious planning and design concepts and principles. Spatial principles (s.b) are articulated ten times and energy principles (s.a) eight. Moreover, in six publications these principles are both developed, revealing a more comprehensive understanding about space. In this cluster, the most debated are the *first and second Law of Thermodynamics* (three papers).

In order to understand whether planning and designing disciplines (in this paper identified as architecture, urban, regional, spatial planning, and landscape architecture) are involved in these publications we inquired about the faculty or department disciplinary affiliation of the authors. For all clusters in figure 2, publications were authored by different disciplinary fields such as engineering, economy, industrial ecology, environmental sciences, history and politics, forestry etc. and the papers are mostly developed as a collaboration among authors coming from several disciplinary fields. Nevertheless, we found 19 papers in which at least one of the authors affiliate to planning and design disciplines.

For instance, for *space modest-energy modest*, some authors are affiliated with planning (papers n. 21 urban metabolism; 32 territorial ecology, urban metabolism, urban ecology; 45 urban energetics theory; 48 ecological energetics; 49 ecological footprint) and architecture (paper n. 26 biomimicry, cradle to cradle). In the category *energy strong-space modest* two authors come from architecture (papers n. 24 urban metabolism cradle to cradle; 27 urban metabolism) and two from urban planning (papers n. 42 ecological energetics; 46 ecological energetics). In the cluster *energy strong-space strong* we found the biggest number, nine papers out of twelve, of authors coming from planning and design disciplines: architecture (papers n. 7 biomimicry; 25 exergy; 38 cradle-to-cradle), urban/regional planning (papers n. 15 urban metabolism; 16 new low carbon urban transition theory; 39 industrial ecology, urban metabolism) and it is the only cluster where also landscape architecture is represented (papers n. 25 exergy; 29 First and second Laws of Thermodynamics (exergy); 30 First and second Laws of Thermodynamics, energy; 37 energy flows, primary production, material cycling, system size, source and sink (1st and 2nd Laws of thermodynamics)). This is the only group where there are papers co-authored

only by affiliated of planning and design (papers n. 25, 29, 30, 37). This result is in line with the content of the papers grouped in this cluster, papers with the most explicit and assumed links with energy conscious planning and design. In these papers, co-authored by a planning and design scholar, *urban metabolism* is the most quoted concept (5 times), but among several others. What stands out in figure 2 is that the biggest number of papers are classified in *space modest* addressing one or two of the defined spatial components, showing that the spatial aspect of these concepts is not addressed in a broader understanding yet. Besides the socio-cultural aspect (m.a) is almost absent: only two concepts are related to it, *post carbon city* and *urban metabolism*, and it is not addressed in paper with authors affiliated with a planning and design discipline.

Moreover, the same concepts, such as *urban metabolism* or *biomimicry* are enclosed in different clusters, so with different links to the spatial component and energy (e.g. *urban metabolism*, *cradle to cradle*). Some concepts are even both in the cluster *space modest* and *space strong*. Moreover, in the same cluster such as *energy modest-space modest* different spatial components (e.g. m.a, m.b) are associated with the same concepts but in different papers, for example *ecological footprint* in paper n. 22 is associated to land use/land cover and in paper n. 49 also with physical features. This shows that there is not yet a common understanding of these concepts with regards to energy-conscious spatial planning and design.

The insights illustrated in figure 1 and 2 provided the basis to select three concepts for further examination, in line with the selection criteria listed in section *materials and methods* above. The first concept is *urban metabolism*, the most frequently mentioned concept with regards to energy-conscious planning and design. *Circular economy*, mainly debated in China, is beginning to inform planning and design at different spatial scales, aiming for an optimization of energy and material flows. Finally, the *Cradle-to-Cradle* concept which developed with strong ties to product and site design, but that begins to be discussed in relation to spatial components and principles deserves to be further examined with regards to energy-conscious planning and design. All three concepts appear discussed in relation to energy spatial principles in the figure 2 cluster energy strong-space strong, with energy principles.

2.1.2 Design principles embedded in three selected concepts

Table 2.1 shows results from the literature review of energy-conscious principles associated with the concepts of *urban metabolism*, *circular economy* and *cradle-to-cradle*. The principles are clustered according to the *trias energetica* (Lysen 1996) framework as adapted by Tillie et al. (2009): (1) reduce demand, (2) reuse waste energy, (3) use renewable energy sources. Point (2) could be further expanded as “optimize energy stream” to fully account the strategy (Vandevyvere and Stremke 2012). We chose to organize according to these clusters, because they represent the three principal strategies for implementing energy transition.

We were able to identify 105 principles that ought to inform energy-conscious planning and design. Interestingly, it was possible to organize the principles according to categories such as transport management as well as spatial organization at city and regional level. All of which show a global approach of the three analyzed concepts in addressing energy transition. Moreover, the papers reveal that the three selected concepts are interpreted in similar ways, even if the publications originate from different fields. One possible explanation for this might be that

the three concepts and the principles have been coined in reaction to the same environmental problems (S.-L. Huang, Yeh, and Chang 2010; Su et al. 2013).

Urban metabolism is the concept with the greatest number of associated principles, developing the more comprehensive vision about the inquired topic. This is also because it is the concept for which we found the greatest number of papers, so that it seems to be the most broadly discussed in relation to energy conscious planning and design. For *circular economy* we found fewer papers, which resulted in fewer principles. However, the ones that have been identified address all the three strategies of the *trias energetica* - the main framework of sustainable energy transition. *Cradle-to-cradle* is the concept resulting in the least papers and principles. But also in this case, principles relate to all three strategies of the *trias energetica*. We found some differences between principles that originate from different concepts. One of the more evident ones is that whereas *circular economy* and *urban metabolism* strongly affirm the need to reduce energy input, *cradle-to-cradle* papers do not stress this principle. This is because *cradle-to-cradle* sustains that all energy has to come from renewable sources (solar income) so that, according to the proponents, there is no need to reduce inputs. This assertion has been criticized by scholars such as (Bjørn and Hauschild 2013).

Most of the principles refer to the first category of *trias energetica*, “reduce energy demand/consumption”, followed by “optimize energy stream” and fewer are related to “use renewable energy sources”. Nevertheless, in the first category many principles state how to build more efficient new projects at building scale or city/regional scale and fewer papers are concerned with how to deal with the existing building stock (e.g. Retrofitting to reduce energy consumption) that represents a great challenge for energy transition.

Furthermore, principles highlight both technological aspects (e.g. *smart grids*; Van Timmeren et al., 2012), spatial design thinking (e.g., *proximity among different functions*; Sun et al. 2016) and few site characteristics (e.g. *Structural design of building to maximized natural energy use for heating, cooling and lighting*; Andrews 2008). This finding is in line with the transdisciplinary nature of energy transition (Pellegrino and Musy 2017).

When energy principles are further discussed, the spatial implications are not developed to the same extent. Different scholars refer to increasing environmental problems due to spatial challenges such as urban sprawl (S.-L. Huang, Yeh, and Chang 2010; Kennedy, Cuddihy, and Engel-Yan 2007) and transport infrastructures (Van Timmeren et al. 2012), but they mainly focus on spatial land use, distance among functions, leaving aside the social-cultural aspect.

The research focus of this paper lies on the more general notion of space to have enough substance with regards to publication numbers. If we, however, inquire about the notion of ‘landscape’ as living environment, we notice that it is mentioned very few times even in situations where principles have spatial implications such as for land use planning (Q. Huang, Zheng, and Hu 2015; Lu et al. 2016) or infrastructure design (Leduc and Van Kann 2013; Ness 2008) and not a single time with regards to *circular economy*. Landscape is referred mostly with respect to *urban metabolism*. Landscapes are strongly impacted and transformed by urbanization (Codoban and Kennedy 2008), are important for urban quality and livability (Mostafavi, Farzinmoghadam, and Hoque 2014) and have many relations to ecological aspects (S.-L. Huang, Yeh, and Chang 2010). The landscape design components are almost absent while the role of environmental designers (planners, landscape architect, architect) is rarely mentioned and, if so, only in general terms.

Despite that, several papers are developing computer tools to bridge the gap between research, for example about *urban metabolism*, and design practice to create more sustainable environments (Blečić et al. 2014; Chrysoulakis et al. 2013; Mostafavi, Farzinmoghadam, and Hoque 2014). However, Pincetl, Bunje, and Holmes (2012) are the only ones calling on “landscape designers” and with urban planners to improve resource management.

Concerning resources, it is important to mention that energy is often discussed in relation to other flows, particularly waste (Bristow and Kennedy 2013; Lee, Quinn, and Rogers 2016) and water management (Kenway et al. 2013; Kenway, Lant, and Priestley 2011). Analyses often highlight how creating synergies among these could help energy efficiency to reduce inputs and outputs (Pincetl et al. 2016). It's not surprising that there is one principle “Reutilizing of waste to produce energy” that is addressed by papers discussing all the three concepts (Bristow and Kennedy 2013; Islam and Jashimuddin 2017; McDonough et al. 2003). Indeed, the three concepts are key in the critique upon the linear functioning ‘take-make-waste’ of our society, advocating moving to a circular one.

As for the previous step about concepts, we inquired about the disciplinary affiliation of the author writing these papers, leading to different results for each of the three concepts. Many disciplines discuss *urban metabolism*, for example civil engineering, environmental sciences and geographical sciences. For this concept, we found the greatest number of papers with at least one author affiliated to a planning and design discipline: three from architecture (Blečić et al. 2014; Mitraka et al. 2014; Van Timmeren et al. 2012), two from landscape architecture and regional planning collaborating (Mostafavi, Farzinmoghadam, and Hoque 2014; Mostafavi et al. 2014) and ten from planning (Andrews 2008; Barles 2010; Castán Broto, Allen, and Rapoport 2012; Chrysoulakis et al. 2013; González et al. 2013; S.-L. Huang and Chen 2005; S.-L. Huang and Hsu 2003; Kennedy, Pincetl, and Bunje 2011; Leduc and Van Kann 2013; Pincetl, Bunje, and Holmes 2012).

For *circular economy*, the link with authors with spatial planning and design affiliation is weaker compared to the previous one: one paper was published by authors with a creative design background (Moreno et al. 2016), and another from ecological planning (Geng et al. 2009). Finally we found *cradle-to-cradle* in a paper affiliated with architecture (Slavković and Radivojević 2015), in one with planning (Möller et al. 2012) and in one with design housing (Barnes et al. 2009). Several principles such as “developing local renewable supply” are addressed both in papers where authors are affiliated to planning and design disciplines (Van Timmeren et al. 2012) and where they are not (e.g. Codoban and Kennedy 2008), showing their importance across fields.

The principles about “using vegetation for heating cooling benefit” seems to be mainly present in papers about *urban metabolism* with a prevalence of papers co-authored by planning and design scholars (Blečić et al. 2014; Chrysoulakis et al. 2013; González et al. 2013; S.-L. Huang, Yeh, and Chang 2010; Mitraka et al. 2014). Instead, principles linked to *industrial system* come mainly from *circular economy*, but also in this case it's interesting to highlight that three principles are mentioned in a paper co-authored by a planning scholar (Geng et al. 2009).

Table 2.1. Simplified list of energy conscious principles with relevance for the analyzed concepts. The global table is in annex 3. Source: author

Principles (this column)		C2C	CE	UM
Reduce demand/consumption				
Reducing energy demand through spatial organization (city, region)				
1	Avoiding low-density development in order to decrease transportation of people, good and electricity and creating economies of scale in infrastructures.			3 times
2	Considering the urban form as an important element for energy efficiency			3 times
3	Designing to optimize energy efficiency of settlements			1 time
...				
Reducing energy demand and consumption in designing building				
17	Designing building to improve energy building standards: reduce energy consumption (old buildings are more energy demanders)			3 times
18	Designing green building to improve energy production and consumption		2 times	1 time
19	Improving the energy efficiency of buildings, through an high quality of building materials and technological advances		1 time	
...				
Improving the management of energy flow				
28	Reducing energy embodied in construction materials is an important strategy for mitigating our fossil-fuel dependency.			1 time
29	Reducing the embodied energy of materials reusing them or returning them to nature (organic)	1 time	3 times	
30	Closing materials loops: recycle materials to reduce embodied energy. Attention: sometimes Energy requirements for recycling can be high.		3 times	
...				
Reducing energy and fossil fuels in transport management				
36	Sharing transports to achieve a greater energy efficiency (transferring more goods to the rail system).		1 time	1 time
37	Changing infrastructure to elicit different behavior (such as bicycle riding or transit ridership, rather than driving)			1 time
38	Improving energy consumption by developing new public transit routes, to encourage public transport rather than private one.			1 time
...				
Using vegetation for energy efficiency				
45	Using landscape vegetation to reduce energy consumption			1 time
46	Promoting the evapotranspiration in the urban areas to reduce the heat island effect, through the implementation of green surface, and avoid paved pattern.			2 times
47	Increasing urban green spaces and water to reduce heat island effect (and the related energy consumption needed for cooling) helping cooling the city			5 times
...				
Raising public awareness and changing behavior				
50	Developing Capacity-building efforts, in order to improve the public environmental awareness. (green schools, green workshops, green newsletter etc.)			1 time
51	Providing citizens with contextually appropriate, actionable data that enriches their life and facilitates better decisions to reduce energy consumption			1 time

52	Encouraging to change human behavior, household practices in a more responsible way, to reduce energy demand and consumption (choices of technologies etc.)	1 time		1 time
...				
Improving the industrial system				
57	To develop energy saving measures in industries (e.g. eco-design energy cascading, the application of energy efficiency technologies and equipment, energy saving education, and collaboration with local communities)		2 times	
58	Developing Eco-industrial parks		1 time	1 time
59	Restructuring existing industrial parks		1 time	
...				
Energy streams optimization				
Creating synergies among resources				
66	Creating synergies among energy and water to reduce energy use			3 times
67	Using waste water nutrients to produce energy (e.g. biogas)		1 time	1 time
68	Reutilizing of wastes to produce energy (e.g. sludge)	1 time	4 times	3 times
...				
Improving the management of energy				
75	Upgrading the electrical system to reduce energy consumption and its negative impacts.			1 time
76	Reducing the construction energy consumption amounts focusing on the indirect consumption (e.g. material transports)			1 time
77	Exploiting of local resources for energy production (e.g. wood)	1 time		
...				
Improving the management of energy streams in the industrial system				
95	Developing regional eco-industrial network		1 time	
96	Encouraging industrial symbiosis		3 times	1 time
97	Improving cleaner production		2 times	1 time
Use renewable energy sources				
Promoting renewable energies or low carbon solutions				
98	Increasing the use of renewable sources such as solar energy during the building construction. (This is also useful to reduce greenhouse emission)			1 time
99	Developing local renewable energy supply (e.g. solar panels, wind turbines, ground source heat pump)		6 times	5 times
100	Using renewable energy resources to produce energy (e.g. photovoltaic, geothermal, wind, hydro, and biomass)	3 times		7 times
...				

2.2 Discussion about concepts and principles

This chapter reports the findings of a systematic literature review on concepts with relevance to energy-conscious planning and design of the living environment, conducted together with a detailed examination of the operational principles that have been articulated for a selection of three key concepts. Several findings of this study deserve to be discussed critically.

Concerning concepts, the first observation is that only a few concepts originate in social sciences (e.g. political science) and only two originated in the spatial planning discipline (ecological footprint and urban energetic theory). This result confirms that 'energy' has a strong technical background and useful concepts for planning and design are taken mostly from the disciplines where energy has been deeply studied for long, such as in physics (e.g. thermodynamics laws). Besides, many concepts are "borrowed" from ecology, especially with reference to natural ecosystems, because many of them are energy and resource efficient. However even if many concepts come from ecology and physics, no ecology department has been found among the authors' affiliation.

When we cross the results from figure 1, figure 2 and author affiliation we could state that planning and design disciplines are using concepts coming from different disciplines to advance both research and the practice. For example, authors discussing the First and Second Laws of Thermodynamics which originated from physics, are affiliated with architecture and landscape architecture (figure 2, papers n. 29-30-37). At the same time, many other disciplines such as engineering and economy discuss concepts with implications for the physical environment. For example, authors affiliated with thermal engineering and chemistry (figure 2, paper n. 23) discuss the spatial optimization of urban functions to reduce transport energy consumption with reference to low carbon town and circular economy. This second kind of papers are prevailing in the found literature, showing that spatial planning and design for energy transition is addressed by many non-spatial disciplinary fields. They consider spatial aspects as relevant even if spatial planning and design are not their specific field of expertise.

There are differences between these two kinds of papers. The spatial components highlighted in the second group of papers are oriented towards a spatial organization of functions for energy optimization, such as proximity among functions, but without qualitative socio-cultural concern, such as design aesthetics about a compact urban form and the acceptability by people. The first group of papers, on the contrary, highlight the importance of socio-cultural aesthetical aspects needed for an adequate energy planning and design decision making process, such as in (Vandevyvere and Stremke 2012). It is also true that in other papers co-authored by planning and design scholars, these aspects are not addressed. It could be because the main scales addressed are the city or the region, leaving aside the local scale.

Our findings with regards to principles are in line with the previous point. The authors that advocate the three concepts suggest principles that aim to foster management of energy and space in quantitative terms, they rarely venture beyond this quantitative point of view. Environmental planners and designers working on real-world projects have to think in synergies for functional aspects, in this case energy, but also ecological aspects, people participation and with an esthetic concern in order to build a living environment that is energy sustainable but also pleasant to live in. The highlighted principles are valuable and important to advance energy transition but changes in the living environment cannot be isolated from these qualitative considerations.

The fact that other disciplines address the spatial component of energy transition strengthen its importance, but it needs to be further integrated with more global vision of spatial aspect incorporating socio-cultural concern. However in relation to the development of these concepts, it seems that papers with authors affiliated to planning and design disciplines do not fully address all the qualitative considerations mentioned above either.

It seems useful to take inspiration and develop concepts from more technical and quantitative disciplinary fields to advance energy-conscious spatial planning and design. The three chosen concepts for example offer new ways of thinking and addressing problems, trying to develop a synergetic approach among functions and scales to energy transition, but there is a need to go further and enrich them with qualitative components.

Advancing a more synergetic approach to these two dimensions, technical and socio-cultural/esthetical, could possibly support a better acceptance by people of energy transition and the changes in their living environment. Many of the concepts rise as a reaction to the actual urban societal system, therefore relating to space and living environment problems, showing the importance of considering the point of view and possible contribution of spatial planning and design practice. As mentioned above, it should not be forgotten that the founded concepts come from other disciplines and the development of their spatial implications is still in progress. Another questioning aspect in relation to this point is that, for many publications examined, the energy related concepts and principles are developed to be applied in many different locations. This general (or even universal) scope does not pose a problem in theoretical terms but may do so when applied in energy-conscious planning and design. In the planning and design of the living environment, all kinds of characteristics change while societal and cultural aspects have to be taken in consideration. One example is highlighted by Roy, Curry, and Ellis (2015). They found that building more densely populated areas is, generally speaking, a good option to reduce energy consumption for transportation. However, because of the rural culture of Ireland, this principle is difficult if not impossible to implement in the country. Indeed, many of the identified principles help to envision a more energy-conscious and sustainable living environment; they help focusing attention with regard to energy transition but timing and principles have to be discussed critically, selected and, where needed, adapted to the specific circumstances at hand. This point of view aligns with other design scholars researching other subjects (e.g. Prominski 2017), highlighting that design guidelines and principles are useful but need to allow and call for a specific site adaptation, which solely guarantees their appropriateness and effectiveness.

However, many principles, in particular those related to “reduce energy demand”, require to rethink the ways cities and regions are planned and designed (e.g. avoiding low-density development), demanding strong efforts in terms of economy and political will. The same could be said for “energy streams optimization” that questions for example the idea of land use zoning (residential, industrial areas etc.), and advocate the need to rethink energy and road infrastructure at all scales.

Indeed, the diffusion of scientific concepts to the professional sphere needs special attention. Some misunderstanding could arise when generic principles are adopted in practice, for example about proper scale application or possible side effects. For instance, to develop a compact city avoiding low-density is highlighted by many (e.g. S.-L. Huang, Yeh, and Chang 2010; Metzger et al. 2016) as a principle improving energy saving for transport. At the same time, without correct planning of green space and ventilation, the compact city principle may result in substantial heat island problems. Nevertheless, it is also true that some highlighted principles relate to common sense (e.g. optimizing building orientation). Yet, many of these principles have to be rediscovered after having been disqualified by modern technical solutions – getting rid of natural (so-called) “laws” and constraints –, it is highly plausible that some practitioners are already mobilizing

them without naming them in a specific way, nor without any formal reasoning about it. The research in the Scopus database gives a good overview of the international debate about the research topic, identifying the more discussed concepts, but we acknowledge that there are limitations to our exploration based on peer review articles and reviews and with a predominance of English language and exact sciences literature. Furthermore, we are well aware of the fact that there are many national debates on the subject that we did not include here.

2.3 Conclusion

The research presented in this chapter examined which concepts and operational principles are available to inform energy conscious spatial planning and design for energy transition. We found that 44 concepts are discussed in the energy transition context as well as 105 operational principles associated with the three prevailing concepts: *urban metabolism*, *circular economy*, *cradle-to-cradle*. Relevant concepts originate from several disciplinary fields. The identified principles provide insight across the three key strategies for sustainable energy transition: “reduce energy demand/consumption”, “energy stream optimization” and “use renewable energy sources”. In addition, principles refer to several domains concerned with the built environment, for example transport infrastructure as well as the use of vegetation and range from building to metropolitan and regional scale. However, much of the debate focuses on new buildings or boroughs; thus, additional principles on how to deal with the existing building stock deserve to be developed. Moreover, we found that the majority of principles relates to energy demand reduction. Other researches, however, show this as a minor concern to regional planning and design practices where renewable energy production is the most important strategy to implement energy transition. This finding highlights a gap between renewable energy science on the one hand and planning and design practice on the other hand (de Waal et al. 2015). The “global landscape issues”, which integrates “energy” and “climate change”, represent one of the important raising matter of concern for landscape architecture researchers. However, in spite of the National and European political agendas on energy transition, this domain is not perceived as a first priority by practice oriented view (Meijering et al. 2015).

Planning and design practitioners, behind energy realms, affirm taking concepts and using analogies for inspiration coming from different sciences, but they need manipulation and re-adaptation (Sijmons 2012; Viganò 2016). To our opinion, further research from the point of view of environmental designer practices, has to be conducted to better understand the expectations in terms of knowledge on the one hand and what knowledge is already existing on the other hand.

Spatial planning and design could actively contribute to the energy transition goals, because of the possibility of strategic and integrative thinking that looks at the larger living environment as complex socio-ecological system, understanding the parts without isolating them. The mere summing up of globally applicable principles has to be avoided or at least amended to allow sufficient room to identify place and time specific solutions. Moreover, concepts and principles need to relate to the socio-cultural aspects of transitions in general and energy transition in particular. Nevertheless, we do acknowledge that energy transition needs to have a functional

aspect and the analyzed literature confirms this. The principles that we identified can help fostering energy transition implementation from a spatial perspective. The next challenge is to define solutions that answer the technical and functional requirements but in the same time address the socio-cultural demands, valorizing for example local characteristics and place identities.

Box 2. Contribution of chapter 2 to part 1 research question

Energy-conscious planning and design practice is informed by concepts originating from different domains. Some concepts provide inspiration, some serve as metaphors, others provide guidance for planning and design decisions. In spite of the great popularity of concepts such as *urban metabolism*, there exists no comprehensive study investigating these energy related concepts and their associated operational principles in a systematic way. In this chapter are explored through a systematic literature review (1) concepts relevant to energy-conscious spatial planning and design, and (2) operational principles that are associated with the three selected concepts *Urban Metabolism*, *Circular Economy* and *Cradle-to-Cradle*.

The study identified 44 concepts originating from a broad range of disciplines reaching from physics to ecology. Furthermore, 105 operational principles were identified. The principles address both technological aspects and spatial design thinking, covering energy producing, saving and efficiency, and together provide ingredients for a more systemic approach to sustainable energy transition.

However that the great majority of concepts and principles relate to quantitative spatial approaches, omitting social-cultural aspects that bear paramount for improved acceptance of changes in people living environment due to energy transition.

CHAPTER 3: The territorialization of energy transition. An energy turn in planning instruments? And the landscape?

In the previous chapters, the focus was on scientific literature about the connection of energy planning and design of space and landscape.

In this chapter we focus on institutional components by analyzing the relationship between energy and landscape in planning instruments in France and the Netherlands.

The European Landscape Convention (ELC), ratified both by France and the Netherlands, puts dynamic approach towards landscape and in the Recommendations on the guidelines for its implementation is stated at point E to “Integrate the landscape dimension in territorial policies” that “The landscape dimension should be included in the preparation of all spatial management policies, both general and sectoral, in order to lead to higher-quality protection, management or planning proposals” (CM/Rec(2008)3, 1-E). So ELC encourages including landscape concerns in the national planning systems.

Moreover in Europe, after several directives (e.g. energy package 20-20-20 of 2009) and national laws (e.g. LTECV in France) the energy topic has entered the spatial planning system in national contexts, due to the need to give a regulatory framework, for examples to the choice of sites for RE technologies in territories (e.g. Nadaï 2007).

Therefore, potentially planning instruments could combine the landscape and energy topics and address them together. The understanding of this connection could be useful because it is recognized that the planning instruments participate in changes and the evolution of ordinary landscapes (Labat 2011), so their analysis leads to an understanding if landscape is consciously addressed in these documents and if these landscape “changes” are intentionally thought out. Otherwise landscape could be an unplanned consequence, resulting from the superposition of different planning strategies and actions for energy management.

Another area of interest to develop this inquiry is that planning instruments are recognized to be both technical and social tools through which public action, both at central and local levels, manifests and expresses itself (Lascoumes and Le Galès 2005). So the analysis of planning instruments is a way to examine how and if public/institutional actions consider and value landscape in connection to energy transition, by exploring if the landscape notion is present and how it is addressed, for example from a preservation point of view or a more dynamic one? Some researchers have explored the place of landscape in planning context in France (e.g. Labat 2011) and in several European countries (e.g. De Montis 2014), and the place of energy in planning instruments (e.g. Chanard, Sède-Marceau, and Robert 2011). However the connection between landscape and energy in these planning instruments is seemingly still understudied.

Beyond the institutional dimensions of planning instruments there are also social and technical practices that could support the mitigation of climate change (Bulkeley and Castán Broto 2013). Nonetheless according to the focus on energy conscious landscape planning and for our comparison between countries, the institutional level provided a clearer and more comparable framework.

In the following section we explore the French and Dutch planning instruments to study if, and to what extent landscape and energy are treated together.

First the French planning system is explored by analyzing the landscape and energy connection, subsequently the same is done for the Dutch system. Finally, the way in which landscape and space are treated with energy subject in the two planning systems is compared in order to put the two situations in perspective.

3.1 The increasing entry of the energy topic in French planning instruments. And the landscape?

In French context even if the “loi Paysage” [law landscape] (1993) and subsequently the European Landscape Convention contributed to a larger consideration for landscape in public actions, inclusion of landscape regulation in planning instruments still remains low (Labat and Aggeri 2013). At the same time France faced the growing importance of sustainable development, climate change and energy transition developing a series of laws to improve the way energy is managed in planning instruments. Some new instruments have been specifically created to focus on energy (e.g. PCAET) and other ones have been changed to progressively include the energy subject (e.g. PLU-PLUi). Figure 1 shows this increased inclusion of energy topics in planning instruments according to successive laws, and it illustrates how in 2010 and later in 2015 their number significantly increased.

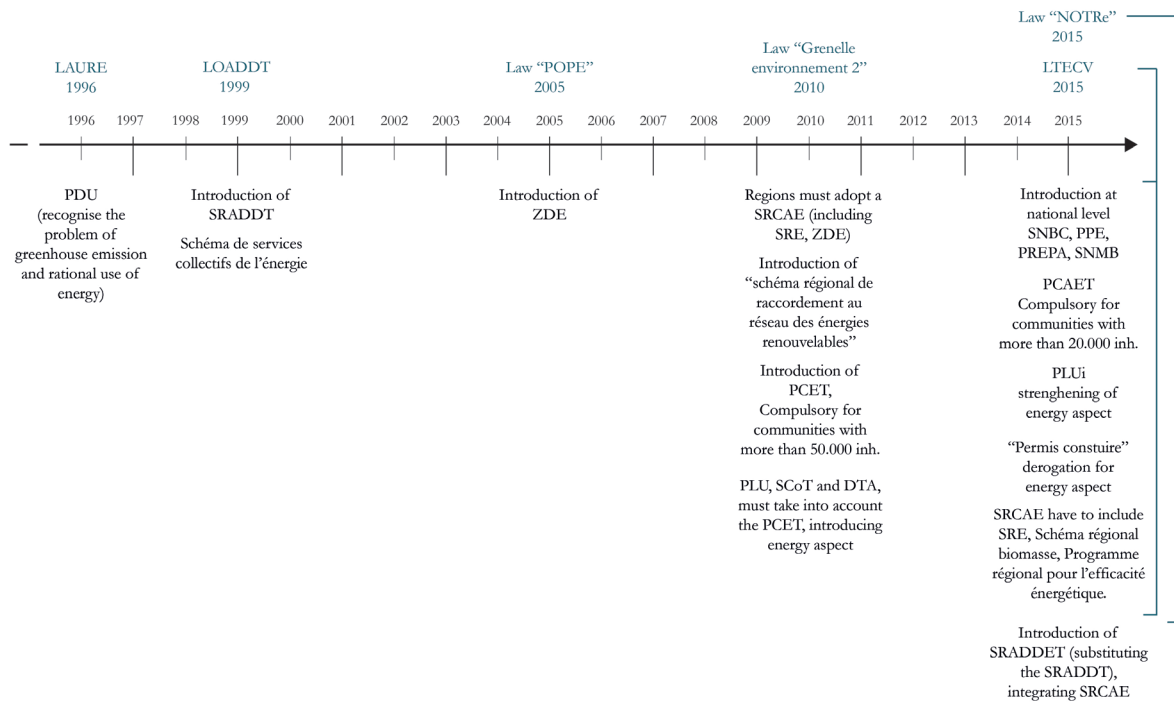


Figure 1. Historical development of planning instrument related to energy topic in France. Source: author

In France, the current reference document for energy transition is the “Loi transition énergétique pour la croissance verte” [Law energy transition for the green growth] (LTECV) of 2015 that gives the orientation and ambitions for middle and long-term applications: reduction of greenhouse emissions by 40% between 1990 and 2030, reduction of final energy consumption, etc. as it was detailed in the introduction. LTECV has also introduced an evolution concerning energy-climate governance, changing the content and adding several planning instruments. However several other laws have progressively introduced new urbanism/planning instruments about energy topics at different scale levels (e.g. regional, municipal).

In the following sections, a short excursus about the planning instruments that include energy topics, led by some key laws, is detailed. Subsequently the planning instruments now in force according to the LTECV (2015) are analyzed, exploring connections between energy and landscape.

3.1.1 The XXth

First the “Loi sur l’Air et l’Utilisation Rationnelle de l’Energie” [Law on Air and Rational Use of Energy] (LAURE) adopted in 1996, in its first article states the need “to economize and use energy rationally”¹, in order to prevent and reduce atmospheric pollution for better air quality. This is the first law that associates a rational use of energy with air quality (Chanard 2011). And one of the actions provided to improve this association, between air and energy, is the introduction in the art. 14 of the “Plan de Déplacements Urbains” [Urban movement/travel plan] (PDU), through which urban areas could define the transport organization of people and freight. One of the objectives is to promote mobility generating lower amounts of pollution and consuming less energy decreasing car traffic and the developing public transportation and bicycle routes. Subsequently the law “Orientation pour l’Aménagement et le Développement Durable du Territoire” [Orientation for the planification and sustainable development of territories] (LOADDT-loi Voynet) of 1999 introduces the “Schémas régionaux d’aménagement et de développement durable du territoire” [Regional scheme of territorial planification and sustainable development] (SRADDT)² a programmatic (perspective) document in order to fix the medium term orientation for 10-15 years, for the sustainable development of a region and indicates strategies to achieve this. The law also introduces the “Schémas de services collectifs” [schemes of community services], nine different schemes are enumerated and among them there is one about energy. According to Godinot (2011) these “schemas de services collectifs de l’énergie” are the first energy focus prospective exercise at territorial scale in France.

Another important law is the n°2005-781 “de programme fixant les orientations de la politique énergétique” [Program law setting out the energy policy orientations] (POPE), aiming to contribute to national energy independence and ensure security of supply, to ensure a competitive price for energy, to preserve human and environmental health fighting the greenhouse effect and to guarantee social and territorial cohesion by ensuring access for all to energy. Moreover

¹ Translated by the author “à économiser et à utiliser rationnellement l’énergie”.

² For “region” it is meant the French administrative division

the law also intends to limit “the landscape impact of wind turbines and power lines”³ (art. 2) so introduces a document: “zone de développement de l’éolien” [wind development area] (ZDE), that have to be established in accordance with “wind potential, possibilities of connection to electricity networks and the landscape, historic monuments and remarkable and protected site”⁴ (art.37). The ZDE combines functional concern with landscape ones, even if it is expressed more in a conservatory vision of the landscape, and many landscape architects were asked to collaborate to develop these documents, but now they no longer exist.

They are not urbanism documents, but an electric document conditioning a good fee/rate for the wind turbine implanted in these areas (Nadai 2010). The ZDE are not compulsory for wind turbine developers even if they exist on the territory, but the fact to position wind turbines in the designed areas enables to profit of economic benefit. Moreover they are not really lead to a decentralization of energy subject, because it is the prefect (exercising the central state power in the region) to give the final approbation to them on the proposal of the municipality or inter-municipalities (Nadai 2010).

3.1.2 “Grenelle de l’environnement”

These laws progressively increased the number and the kind of planning instruments with energy concerns for local authorities. But are mainly the laws “Grenelle de l’Environnement” 1 from 2009 and 2 from 2010 that emphasized the trend for a territorialization of climate and energy policy in France (Nadai et al. 2015). These laws lead to many changes, in several sectors, although here our main focus is on spatial planning instruments.

The *Grenelle 1* defined, among other objectives, the orientation for fighting climate change through five domains: building, urbanism, transport, energy and sustainable development research, but without setting binding and regulatory framework. It is the *Grenelle 2* that renders the *Grenelle 1* operational by introducing, for what might concern spatial planning, several new documents focusing on energy at different scales (e.g. PCET, SRCAE), and strengthening energy concerns in some of the existing ones (e.g. PLU). The urbanism, habitat and transportation policy had been greatly impacted from the energy and climate point of view by the orientation of this law (Godinot 2011).

The law introduces “Le schéma régional du climat, de l’air et de l’énergie” [Regional scheme for climate, air and energy] (SRCAE) (art.68) a regional strategic document fixing orientations for 2020-2050 targeted to mitigate and adapt to climate change, trying to prevent and reduce greenhouse gas emissions and defining the goals, according to different geographical areas, that can be achieved for renewable and waste reuse as potential energy. The SRCAE have to be approved by the regional “prefect” (State representative at the regional level), in this way even if the Grenelle “territorializes” by decentralizing energy management/development, the State still keeps the power to limit regional power (Poupeau 2013). Moreover, as an annex to the SRCAE a “Schéma régional éolien” [Regional wind schema] (SRE) must be drafted in order to define

3 Transalte by the author: “l’impact paysager des éoliennes et des lignes électriques”

4 Transalte by the author: “de leur potentiel éolien, des possibilités de raccordement aux réseaux électriques et de la protection des paysages, des monuments historiques et des sites remarquables et protégés”

suitable areas for wind turbine development and now the ZDE areas have to be developed in accordance with the SRE and the SRCAE. In this way, wind turbine technologies remain a subject controlled by the State (regional prefect). It could be argued that wind turbines are the renewable energy technology attract more attention, since they have specific documents: SRE and ZDE. Moreover, the energy/electric power transmission system operator (RTE) has to elaborate the “schéma régional de raccordement au réseau des énergies renouvelables” [grid-connected regional scheme for renewable energy] that defines the works that need to be implemented or enhanced to achieve the SRCAE targets.

In order to make the SRCAE operational orientation at the lower territorial level (municipality or group of municipalities) the law introduces the “Plan climat énergie territorial” [Territorial climate energy plan] (PCET) and makes it compulsory for municipalities and “établissements publics de coopération intercommunale” [public institutions of intercommunal cooperation] (EPCI). For example the *communauté de communes*⁵, of more of 50.000 inhabitants the PCET is obligatory, but on a voluntary basis for local municipalities or EPCI with fewer inhabitants. This document it is based on the greenhouse gas emission assessments, according to which strategic and operational objectives must be defined for the mitigation and adaptation to climate change, including an action program and a device to follow and monitor it. It is an interesting document, because it is transversal and permits involvement in energy-climate processes of several public policies, activity sectors (agriculture, transportation etc.) and different territorial stakeholders (Chanard, Sède-Marceau, and Robert 2011). If these documents are focused on climate - energy, the law also states that existing planning documents such as the “Schéma de cohérence territoriale” [Territorial coherence scheme] (SCoT) and “Plan locale d’urbanisme” [Local urbanism plan] (PLU) must take into account the PCET. In this way the energy component, from a transversal perspective (energy production, CO₂ reduction, transportation, etc.) enter into these documents, at least for the municipalities EPCI that in respect to their number of inhabitants, are obliged to develop a PCET. This is important to emphasize because the SCoT is a planning instrument that guarantees projects and the implementation of strategic inter-municipal planification in a framework named “projet d’aménagement et de développement durables” [planning and sustainable development project] (PADD). It ensures the reference framework and coherence with different sectoral policies such as spatial planning, mobility, environment, etc. The PLU at municipal level or the PLUi, at inter-municipal level, are planning instruments that determine a global project for spatial planning and urbanism and they establish rules for spatial planning and land use.

3.1.3 The LTECV, since 2015

The following law LTECV of 2015, which is currently the policy framework, continues to increase the coverage of energy topic in planning instruments. This law introduces new instruments at national level (e.g. SNBC, PPE), and leads the evolution concerning existing energy planning instruments (e.g. PCET and SRCAE) but also strengthens the energy and the

⁵ *Communauté de communes* is a French administrative structure grouping several municipalities (communes) through which several municipalities manage together common policies (namely planning) and equipments.

climate components in non-energy focused documents (e.g. PLUi) (Cerema 2016).

3.1.3.1 “Programme pluriannuelle de l’énergie”

The “Programme pluriannuelle de l’énergie” [Multiannual energy plan] (PPE) expresses the orientations and priorities for action of public authorities in terms of energy management in order to achieve established energy goals of the LITECV law. In this document, the word “paysage” [landscape] appears in connection to the programming of onshore wind turbines and is in general linked to RE technologies and their impact assessment and landscape integration. Particularly in the report “Évaluation Environnementale Stratégique de la Programmation Pluriannuelle de l’Energie” [Strategic environmental assessment of the multiannual energy plan] we found a specific, but short chapter named “paysage et patrimoine” [Landscape and heritage]. This chapter focuses mainly on the heritage question and expresses a very general relationship between landscape and energy transition. It explains that renewable energy technologies should be integrated into landscape, both on small and big scales. It could be expected and required to find in this document that, for example foreseen to reach a production, from wind turbines of 21 800 MW (low option) or 26 000 MW (high option), considering that in 2018 French national production was 15 000 MW, a more specific and detailed connection to the landscape subjects. This connection could be expected considering that the same ministry, *Ministère pour la transition écologique et solidaire* [Ministry of ecological and solidary transition], is responsible both for energy transition and landscape. Another point of attention could be raised while studying the rapprochement of landscape and heritage, which seem to relate the landscape question to the strong aesthetic and heritage background of landscape subject in France (Luginbuhl 2012).

3.1.3.2 “Stratégie nationale bas carbone”

The “stratégie nationale bas carbone” [national low-carbon strategy] (SNBC), defines the GHG cap applied to major sectors of activity (industries, transportation, agriculture etc.), and a roadmap to achieve them, by reducing greenhouse gas. We explore, also in this document, the presence and role of landscape. We found it, a few times. Once in the chapter treating sectoral recommendations, referring to “agriculture” and highlighting how, the agricultural sector must achieve the GHG objectives while protecting the environment, natural resources, biodiversity and “preserving landscapes” (SNBC, Ministère de l’écologie, du développement durable et de l’énergie 2015, 71). Another short reference to landscape is made, in connection to biodiversity concerns, in this instance about *bocages* [hedge system], by mentioning how they are key heritage elements in landscape.

Finally, in the section dedicated to renewable energy, even if it discusses biogas energy, photovoltaic energy, hydraulic energy and high-voltage lines, the word landscape appears only in the chapter dealing with wind energy, where it is highlighted how, the onshore wind energy development “modifies landscapes”⁶ (*Ibid.*, p. 134).

Also in this document, as in the previous one, landscape is shortly mentioned and mainly in

⁶ Translate by the author from French: “modifie les paysages”

terms furthering the preservation of its aesthetic and heritage components, for which wind turbines are the major concern, but also briefly associated with ecology.

3.1.3.3 “Plan national de réduction des émissions de polluants atmosphériques”

Always at national level the newly created document “Plan national de réduction des émissions de polluants atmosphériques” [National plan for multi-pollutant atmospheric emission reductions] (PREPA) aims to define the goal of reduction in pollutant and greenhouse gas emissions, and which objectives and actions are made operational by the SRCAE and PPA. In this document, when it covers energy topics, the main accent is put on production of electricity from renewable resources, however the word landscape does not appear.

3.1.3.4 “La stratégie nationale de mobilisation de la biomasse”

In the last national planning instrument introduced by the LTECV “La stratégie nationale de mobilisation de la biomasse” [National strategy of biomass mobilisation] (SNMB) the goal is to explain the procedure for biomass supply for energy production facilities, and in this document landscape concerns do appear. The word “Landscape” appears referring to the risks associated with the use of wood biomass. It describes how the standardisation of forest bases and an increase in forest surfaces, could lead to a decrease in agricultural land for food production, to rural and lower mountain range landscapes by closure and a decrease of a diversified natural environment and therefore of biodiversity. Moreover there is a dedicated section entitled “Preserving landscape quality and limiting natural, agricultural, forest areas: important issues, a neutral or even positive impact through the SNMB measures”⁷ (SNMB, Ministère de la Transition écologique et solidaire 2018, 36), where there is a short discussion about how SNMB could have an impact on both more or less artificialized landscape than on natural or semi-natural landscape. Nevertheless, this impact is considered neutral or even positive about the issue of preserving landscape elements for the agricultural and forestry sector, because SNMB contributes, generally speaking, to non-artificialization of ground soil and there are other planning instruments, etc. that lead SNMB to have a major impact. In other words, the document says that it is a general framework, and there are more specific documents that lead to major (or no) modification in landscape through local choices for biomass mobilization. Also, this document empathizes with landscape preservation focusing on the stages/steps for management and production of the biomass, but does not mention landscape concerns for facilities’ implementation for biogas or other types of production.

These national documents focused on energy are developed by the now called *Ministère de la transition écologique et solidaire*, which is also in charge of landscape, but considering the way and the extent that landscape concerns are discussed it seems that the connection of the two topics is addressed in very general terms. It seems to be approached in static way with the idea of preservation and heritage aesthetics prevailing, or by considering its natural component strongly

⁷ Translate by the author: “Préserver la qualité paysagère et limiter la consommation d’espaces naturels, agricoles et forestiers : des enjeux importants, une incidence neutre voire positive avec les mesures de la SNMB”

connected to biodiversity topic and not integrated in a deeper and more constructive way.

3.1.3.5 SRCAE and SRADDET

Scaling down to the regional level the LTECV, modifies the content of the SRCAE (detailed above) introducing a “programme régional pour l’efficacité énergétique” [regional program for energy efficiency] in order to promote and support energy retrofitting, and a “schema regional biomasse” [regional biomass scheme] setting out the objectives for biomass energy development. Concerning the regional level, another law “Nouvelle organisation territoriale de la république” [New territorial organization of the republic] (NOTRe) of 2015, creates a new strategic planning document the “Schéma régional d’aménagement de développement durable et d’égalité des territoires” [Regional scheme for spatial planning, sustainable development and territorial equality] (SRADDET), which will include and substitute the SRCAE in 2019 and other documents for transportation, intermodality, waste prevention and ecological coherence, with the goal of creating a global articulation among these topics.

3.1.3.5 PCAET

The LTECV made changes to the PCET that becomes the “Plan climat aire énergie territorial” [Territorial climate air energy plan] (PCAET), by adding explicitly concerns about air quality, it is recognized by ADEME as “corner stone for energy savings, in the fight against climate change and the improvement of territorial air quality”⁸ (ADEME 2016, 4). This document now includes a territorial analysis about quantitative GHG emissions, energy production and production potential, etc., that should lead to define a territorial strategy for greenhouse gas emissions decrease, carbon capture, management of energy consumption, production and distribution of renewable energy, reduction of air pollution energy network development and adaptation to climate change. These strategies need to be articulated in an action roadmap specified by activity sectors. Finally, the actions must be monitored and evaluated. Moreover, the PCAET is now compulsory for all municipalities and EPCI counting 20.000 inhabitants, therefor greatly expanding the number of communities that need to develop this plan, compared to the PCET (compulsory for 50.000 inhabitants).

3.1.3.6 SCoT

The SCoT, (already detailed above) is not an energy focused document, but thanks to its cross sectional vision of territory and its sectors, retains an important place as an instrument able to define and articulate energy policy for a territory with its spatial planning, thanks to its connection with the PCAET. A SCoT could include energy issues crossing sectors and spatial planning. For example, a SCoT could act on urban forms favoring a territorial organization, adjoining habitat, commerce and services in order to reduce car movements. It could prioritize

⁸ Translate by the author: “Pierre angulaire de la sobriété énergétique, de la lutte contre le changement climatique et de l’amélioration de la qualité de l’air dans les territoires”

a compact urban form and so on.

3.1.3.7 PLUi, OAP, “Permis de construire”

The LTECV also brings modifications to the PLUi instrument and particularly to one of its components, the “Projet d’aménagement et de développement durable” [planning and sustainable development project] (PADD) that defines general orientations concerning energy networks for heat, electricity, gas and renewables. Moreover, the law strength its power for both for renewable energy production and improving energy sobriety. About the first it is applied to the PLUi a regulatory evolution through which this planning instruments could impose on construction, works, installations and other “aménagements” required in favor of a minimum amount of renewable energy production. In this way municipalities could impose RE production on new building construction. The second concern is about the issue of reduction of energy consumption at the building scale because it allows an exemption to rules concerning the ground footprint, height and external appearance of buildings. This is possible in the case of requesting a “Permis de construire” [Building permit] or “Déclaration préalable” [preliminary declaration of building work] for adding external thermal insulation, and/or for an additional elevation to improve roof insulation and/or for the installation of solar protection devices protruding from the façade. Moreover, the PLUi have to “take into account” the PCAET and so it is obliged to introduce energy concerns, with those about climate and air quality. Other documents that could integrate energy strategies are the “orientation d’aménagement et de programmation” [Planning and programming Orientation] (OAP) that appear through the second *Grenelle* law in 2010. OAP is a document, part of the PLU or PLUi, that targets specific sectors and topics according to the major issues focused on by the territorial collectivity. There could be more than one OAP addressing several different subjects. Concerning energy, it could introduce into the PLUi objectives and strategies for RE technologies implementation within the territory. This document could also integrate landscape concerns, for example the CC of Thouarsais, that we are going to explore in part 3, decided to develop a wind energy focused OAP for a better integration of landscape concerns relative to the development of wind turbines.

3.1.3.8 PDU

Finally, the “Plan de déplacements urbains” [Urban movement plan] (PDU) that constitutes the planning instrument for person and freight transportation, circulation and parking, has to evaluate the GHG emissions and atmospheric pollution, generated within the urban transportation perimeter. This could also have repercussions in terms of energy savings, for example through the increase in the amount of public transportation means to reduce the use of individual cars.

3.1.3.9 Connection among documents

The existing legal links called “compatibility” and “take into account” among documents are quite complex, but for research purposes it is important to underline how planning documents at municipal and inter-municipal level, that are not introduced by the law enumerated above, have to be “compatible” or “take into account” to at least one of the energy-climate documents. By “compatibility” it is meant that a document has to re-transcribe the higher standard/regulation, but with the possibility to adapt the way to do this. By “take into account” it is meant that the lower standard/regulation could differ from the orientation of the higher regulation but for specific reasons that need to be expressed and justified in the subsequent document (Cerema 2016). In a general way, this means that several planning documents include energy topic even if varying by the extent and by the methods involved. To explain more fully: the SCoT, and the PDU have to take into account the SRADDET objectives and they must be compatible with its general rules; the PLUi have to take into account the PCAET, so that energy topic must be addressed to some extent by the SCoT, PDU and PLUi even if they are not energy focused planning documents.

3.1.3.10 Energy and landscape articulation in planning instruments

This overview highlights the progressive development of energy concern in planning instruments, and we witness a more and more compulsory demand for energy management to mitigate climate change in connection with air pollution. This tendency is seen in the PCAET that since 2015 was compulsory for communities of 20.000 inhabitants where before in concerned communities with 50.000 inhabitants. Since the *Grenelle 2*, and subsequently strengthened by the LTECV, energy has been integrated at all the different scales from national to building levels. However, the major orientations are decided at a national level and through the regional SRCAE and SRADDET, that the SCoT, the PCAET and PDU have to “take into account” and be “compatible”, the State, through the regional prefect maintain a global decision-making power.

Nevertheless, some disconnection still exists, for example there are documents such as the “Plan local de l’habitat” [Local habitat/housing program] (PLH) that, among other objectives aims at housing improvement. When the PLH is not integrated in the PLUi, it does not have the obligation to take into account the PCAET or the SRCAE (Cerema 2016). However, as exposed beforehand, the SRCAE must develop a *regional program for energy efficiency* to back energy retrofitting, so a connection between them could always be important to establish.

First thing evident from this schema (figure 2) is that at national and regional level there is the greatest amount of energy focused documents. Scaling down to inter-municipal and municipal levels, for explicitly energy-climate focuses, there is only the PCAET, but the other planning documents need to integrate energy aspects as a cross sectoral aspect, as detailed above. So there are mainly three kinds of documents, those that are specifically focused on energy-air-climate subjects as the PCAET that is transversal to different topics (agriculture, building, etc.), or others that concern specific topics but could have impact on the energy development in territories, for example, leading with transportation and mobility (e.g. PDU) or building (e.g. *permis de construire*), and those documents that guarantee coherence among different sectoral policies and define

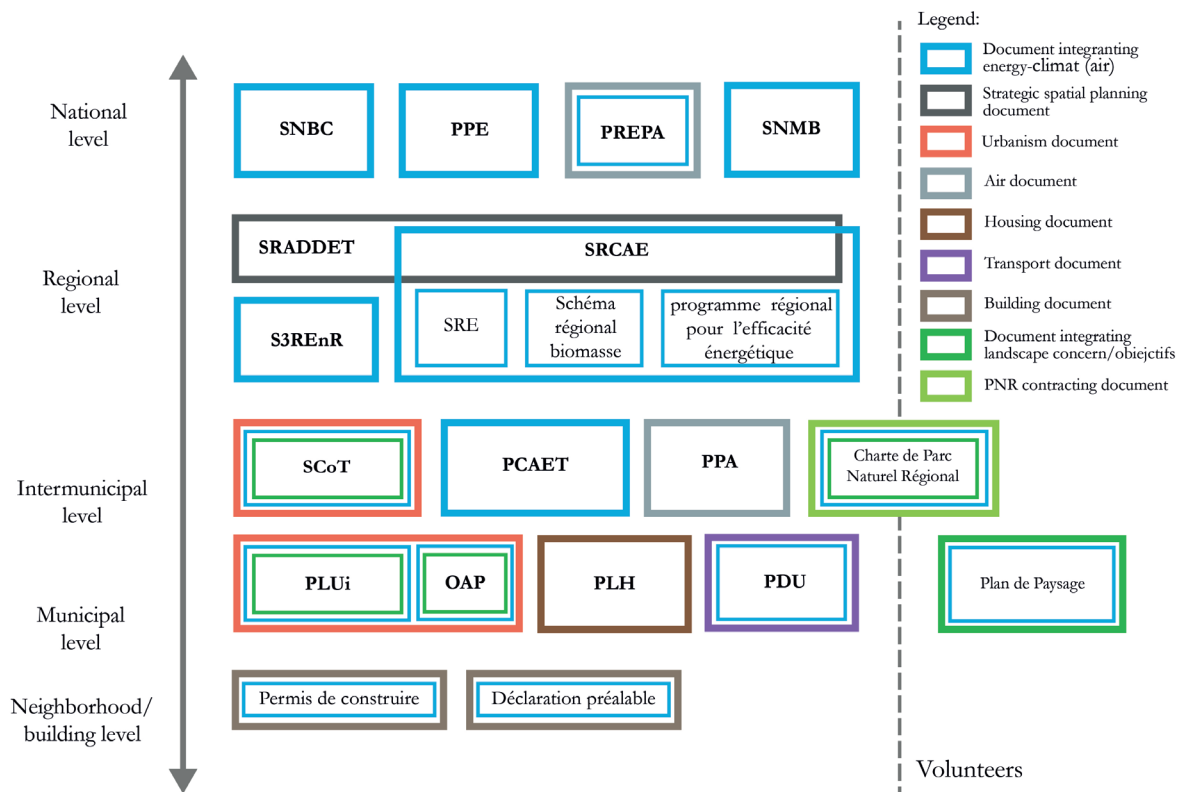


Figure 2. Planning documents integrating energy aspect after LTECV. Source: author, elaborated and adapted about landscape and energy concern on the basis of CEREMA (2016) Gouvernance énergie-climat: que dit la loi de transition énergétique ?

rules for spatial planning (e.g. SCoT, PLUi) including energy subjects.

Until now we have not discussed documents focusing on landscape topics, because in the laws studied they do not appear, and as seen in the figure 2, they are implemented on a voluntary basis. By “volunteer” it is meant that local municipalities or inter-municipalities do not have the obligation to develop these documents, but it is left up to their choice.

However, the law “accès au logement et un urbanisme renoué” [housing access and a renovated urbanism] (ALUR) of 2014 that expresses the French engagement toward the European Landscape Convention, here introduces changes in the Urbanism code strengthening the obligation to develop landscape concern in the SCoT and PLU/PLUi. The SCoT must include, among others, “landscape quality objectives”, inside the PADD that could refer to protection but also management and planning/design of landscape. Landscape concern is also reinforced in the PLU/PLUi, where is stated that its PADD defines the “general orientation of spatial planning, facilities, urbanism, landscape, natural, agricultural, forest space protection, preservation or ecological continuity restoration”⁹ (code de l’urbanisme art. L151-5). Moreover, the PLU/PLUi has to be compatible with the SCoT, and also with its landscape objectives. So the SCoT and the PLUi, even if neither are energy focused nor landscape focused planning documents, include

⁹ Translate by the author from French: “Les orientations générales des politiques d’aménagement, d’équipement, d’urbanisme, de paysage, de protection des espaces naturels, agricoles et forestiers, et de préservation ou de remise en bon état des continuités écologiques”

these dual concerns and seem to be particularly suitable in developing a crossed perspective between energy and landscape, regulating spatial physical changes. However, even if the SCoT and PLUi include energy and landscape, this does not mean that they must treat them together, even if potentially they could.

3.1.4 Landscape documents

3.1.4.1 “Plan de paysage”

The “plan de paysage” [landscape plan] has been introduced since 1993, and is a document that could be developed on a volunteer basis at different municipal or inter-municipal levels. It is not binding for the community developing it. In a brochure developed by *the Ministère de la transition écologique et solidaire* the *plan de paysage* is defined as “a tool at the service of elected officials to increase territorial attractiveness. It enables them to understand landscape as a resource and as leverage for local development. Therefore, it is a process that invites to rethink the way of conceiving spatial planning (urbanism, transportation, infrastructures, renewable energies, agriculture) by putting landscape at the center of the approach. This process concerns both urban and rural areas, degraded and high quality territories, remarkable and everyday spaces”¹⁰ (Ministère de la Transition écologique et solidaire 2015, 6). This definition starts from the European Landscape Convention and refers to energy transition by focusing on renewable energy production in connection with landscape. This is a small juxtaposition between landscape and energy transition, but it is interesting to notice that it has been explicitly mentioned, even if from only the renewable energy perspective, in which the visible implementation of facilities is one of the principal landscape points discussed. A *plan de paysage* could include or be specifically focused on energy transition topic, including also the dimension of energy savings or connections to other sectors such as agriculture. Two examples of energy focused *plan de paysage* are, for example, the one developed by the *communauté de communes* Monts du Lyonnais and *communauté de communes* of Thouarsais that are explored in part 2 of this research. This connection seems to be encouraged at least in discourse. For example in December 2016 the “Club Plan de Paysage”, a network supporting development for the *plan de paysage*, animated at that moment by the named, *Ministère de l’environnement, de l’énergie et de la mer*, who organized a day devoted to “*plan de paysage* and energy transition”. It was open to local authorities, landscape architects, other designers, etc. and the day was articulated through the presentation of existing projects, discussions and workshops. It is also true that the same ministry has developed two programs, one for the development of the “Energy positive territories for green growth” (TEPCV) and another for the *plan de paysage*, without establishing a connection between them.

¹⁰ Translate by the author: “Le plan de paysage est un outil au service des élus pour renforcer l’attractivité d’un territoire. Il permet d’appréhender le paysage comme une ressource et un levier pour le développement local. Il s’agit donc d’une démarche qui invite à repenser la manière de concevoir l’aménagement du territoire (urbanisme, transports, infrastructures, énergies renouvelables, agriculture) en remettant le paysage au cœur du processus. Cette démarche concerne aussi bien les milieux urbains que ruraux, les territoires dégradés comme ceux de grande qualité, les espaces remarquables et ceux du quotidien”.

The *plan de paysage* includes a landscape analysis, on the basis of which quality objectives for landscape are formulated (and are also developed through participatory workshop with local stakeholders and inhabitants), and an action roadmap for the implementation of quality objectives. This document is potentially very useful to lead landscape planning and design actions for energy transition implementation. However, the problem with this document is that there is no obligation to implement the defined objectives, unless they have been included in other binding planning documents such as the SCoT or PLUi, but this depends on municipality or inter-municipality voluntary action. Otherwise, these objectives could be included in projects lead by local agents, but they need to agree by seeing the interest behind them.

Since 2012 there have been calls for projects, lunched by the so called *Ministere de la transition écologique et solidaire* that provides funding (30.000 €) to develop a *plan de paysage* in order to encourage territories to develop them. More recently (2019) the ministry also encouraged the integration of energy transition topic. Nevertheless this funding generally covers only the landscape analysis and the definition of objectives, making it hard to implement them which was sometimes left undone.

3.1.4.2 “Charte de parc naturel régional”

Another document that could lead landscape and energy concern is the “Charte de parc naturel régional” [regional natural park charter] (Charte de PNR) a contract valid only for the municipalities who are part of the “Parc naturel régional” [regional natural park] (PNR). This charter determines orientations for the protection, valorization, development and the measures which enable implementation (code de l’environnement art. L 133-1). The *charte de PNR* includes landscape concerns that are intrinsically important to becoming a PNR. Moreover, the energy transition topic, that could be part of the orientations of the *charte*, is now acknowledged and affirmed as an important topic to be developed by the PNR French federation. For example, the French PNR federation et al. edited a document entitled “Paysages de l’énergie paysages en transition” [Landscapes of energy landscapes in transition] (Alvarez et al. 2014) which confers advice on developing this connection by presenting examples of the articulation between landscape and energy, encouraging a dynamic vision of landscape. However, the focus is mainly on renewable energy facilities, omitting for example the reduction of energy consumption.

3.1.5 Summing up the French situation

To summarize the French situation, we show how over time there has been more compulsory demands to integrate energy in planning instruments at least from a quantitative point of view. Energy focused instruments exist at different scale levels: national, regional, inter-municipal /municipal and building. And at inter-municipal scale we found cross-sectoral documents that could integrate both energy and landscape concerns (SCoT, PLU-PLUi, *plan de paysage*). Landscape topic, it seems mainly addressed in terms of conservation and preservation concern about energy subjects at national level (e.g. SNBC, PPE), while it appears at a more operational design point of view, at least in the possibilities, at local levels (municipal, inter-municipal)

through the SCoT and PLU-PLUi and the *plan de paysage*. However, the *plan de paysage*, the landscape main landscape focused document, could potentially integrate energy transition subjects and support their implementation, but is done so on a volunteer and not-binding basis, creating a potential mismatch between goals and their implementation.

On the contrary, the PCAET, the main energy-climate focused instrument that defines energy objectives and a roadmap at territorial scale, does not integrate landscape concerns presently, focusing mainly on the quantitative aspects of energy production GHG emissions, etc. The fact of including landscape in the territorial analyses in the PCAET document could allow to combine quantitative strategy toward energy transition by grounding it to enhance a more integrated territorial strategy.

3.2 Dutch planning instrument and energy and landscape development

In this section, Dutch planning instruments and their integration of energy and landscape topics are explored in order to put them into perspective with the French system. The Netherlands has ambitious climate and energy targets having subscribed to several agreements such as COP 21 and having approved the Dutch “Nationaal Klimaatakkoord” [National climate agreement] (2019) for strategizing and implementing which spatial planning system has an important role to play.

Strategic planning is known as one of the historical Dutch skills excellence, largely coming from overcrowding that characterizes the nation and that Dutch land is partially artificial, conquered from the sea (Faludi and Valk 2013). However several criticism towards Dutch spatial planning begins to rise, stressing how since the 2008 crisis it has been vulnerable because of investment on land decreased, and local authorities reduced their control to what was strictly necessary (Buitelaar and Bregman 2016). Nevertheless planning in the Netherlands is still recognized as very much part of the Dutch Culture and still retaining possibilities for future development (*ibid.*).

The “Structuurvisie Infrastructuur en Ruimte. Nederland concurrerend, bereikbaar, leefbaar en veilig” [strategy vision for infrastructure and spatial planning. Making the Netherlands competitive, accessible, livable, and safe] (SVIR) defines the national policy strategy concerning spatial planning and states that “Central government intends to bring spatial planning decision-making closer to the stakeholders (individuals and companies), delegating more to local and provincial authorities (decentralization as the first option), and focusing more on users” (Ministry of Infrastructure and the Environment 2012b, 3).

Dutch spatial planning is decentralized. In the Netherlands there are three main tiers leading spatial planning: national (*Rijk*), provincial (*provincie*) and municipal (*gemeente*). To these, three could be added the “regional scale” [regio], which refers to a group of municipalities. In this thesis, we refer to the term *regio* as territory.

The document leading the Dutch Planning system is the “Wet Ruimtelijke Ordening” [Spatial planning act] (WRO) of 2008, which strengthened the provincial and municipal role in spatial

planning (Spaans 2007). A new act “Omgevingswet” [Environmental act] (NOVI) will enter into force in 2022, with the objective of grouping together and simplifying the majority of the regulations for spatial development. This is the first difference with the French system, where planning instruments are adjusted and added with progressive laws. Even if this act has not entered into force yet, some experimentation begins to rise, for example Utrecht City. Moreover “space for climate change and energy transition”¹¹ is defined as one of the four main priorities on which the NOVI will focus. This research examines the WRO, because at the time of research it was the one in force, the other being still under elaboration.

3.2.1 The WRO since 2008

3.2.1.1 “Structuurvisie”

The three tiers must develop a “structuurvisie” [structural vision/spatial development plans] each, which represents a strategic point of view for spatial development.

Structuurvisie is strategic plan that cover the entire territory, according to the development level, aiming to develop a “goede ruimtelijke ordening” [good spatial planning] (Minister of Housing, Spatial Planning and the Environment 2006, 2.2). Every tier could develop several *structuurvisie* that could be centred on a specific topic (e.g. agriculture) or that could be cross-sectoral by addressing different subjects where energy development could be one of them.

The *structuurvisie* is important in order to define how to deal with important topics at different territorial levels such as infrastructure and transportation. This planning instrument is binding at the governance tier, that has made the document, and each *structuurvisie* needs to have a program section explaining the implementation of the envisioned actions, that could have a spill over effect on the lower tiers. In the SVIR document, energy represents one of the thirteen national interests, for which the government continues to take a great part of responsibility, in order to achieve results. In the dedicated chapter “Space for the main (sustainable) energy supply network and the energy transition”, it is briefly discussed the possibilities to implant new nuclear power stations. However, the main objectives discussed are the implementation of energy transition objectives for which “it is necessary to map the (future) spatial consequences of (large-scale) sustainable electricity generation”¹² (Ministry of Infrastructure and the Environment 2012a, 35). Moreover it highlights how, the infrastructure for electricity transmission needs to be developed in order to support this decentralized production, and how it is the responsibility of the province and municipality to provide space for the implementation of equipment for renewable energy production such as biogas and photovoltaic parks. However, national government remains responsible for the development of large-scale wind turbines, dictating more precise regulation and identifying areas for the development of 6.000 MW production aims for 2020. It seems that the focus here is renewable energy production and the need to find a place to implement these facilities, without reference to energy saving measures that should be discussed in a document

11 <https://www.rijksoverheid.nl/onderwerpen/omgevingswet/nationale-omgevingsvisie>

12 Translate by the author: “Voor het uitvoeren hiervan is het nodig om de (toekomstige) ruimtelijke consequenties van (grootschalige) duurzame elektriciteitsopwekking in kaart te brengen”

about spatial planning. Landscape topic in this document is addressed in the section about cultural and heritage landscape, acknowledging landscape’s important role to keep the Country attractive and yet competitive. However, landscape is not associated directly with the energy transition topic. Nonetheless, there is an energy focused national *structuurvisie* “Structuurvisie Windenergie op land” [Structural vision for wind energy on land] (Ministry of Infrastructure and the Environment and Ministry of Economic Affairs 2014), developed by the two ministries *Ministerie van Infrastructuur en Milieu* [Ministry of Infrastructure and the Environment] and *Ministerie van Economische Zaken* [Ministry of Economic Affairs], that discusses in more depth spatial locations, distributed among provinces and how it was decided in accordance with them, on the implementation of 6000 MW from onshore wind turbines for 2020. Landscape concerns appear in this document, where an inevitable landscape impact is identified because of wind turbines. The document explains that to “reduce the effects on landscape and preserve the variety of Dutch landscapes” (*Structuurvisie Windenergie op land*, p. 13) the implementation of wind turbines have to be grouped together in parks and these parks have to be clustered in suitable windy areas, and provide a general map showing the suitable areas (figure 3). Moreover,



Figure 3. Areas for wind turbines large scale parks. Source: Ministerie van Infrastructuur en Milieu , Ministerie van Economische zaken. 2014. “Structuurvisie Windenergie op land”, Den Haag, p.16.

it remarks that these parks have to be carefully planned in order to achieve quality wind energy landscapes. We found here the idea of landscape preservation, but combined with landscape design principles that, even if very general, also acknowledge landscape as an evolutionary entity. *Structuurvisie* and other planning instruments at provincial and municipal levels have to integrate these areas for wind turbine implementation, even if they keep a marge of manoeuvre for negotiating and adapting.

As in France, it seems that the primary discussion is on landscape impact that is led by wind turbine development. It could also be noticed that other *structurevisie* do not exist treating photovoltaic panels or biogas equipment or other technologies. It is also true that the Netherlands is known for its windy characteristics and it surely does not have the same solar potential of more southern nations. Still, in a densely populated nation such as the Netherlands, a reflection about photovoltaic parks on ground, could be helpful.

Concerning the provincial level, generally each province has one main *structuurvisie*, that addresses a wide range of topics relevant for the province such as agriculture, building construction, transportation, etc. and energy is treated among them (e.g. *structuurvisie ruimte en mobiliteit* (2014) Province Zuid-Holland).

Structuurvisie at the provincial level have different names in all the different Dutch provinces: such as *structuurvisie ruimte en mobiliteit* (2014) in the province of Zuid-Holland, or *structuurvisie Noord-Holland 2040* (2015) for the Noord Holland province. These documents include the main spatial policy goals and actions considered important to develop at provincial scale. The energy topic has to be introduced in the provincial *structuurvisie*, because the central Government has developed the “Klimaat en Energieakkoord Rijk en provincies 2009-2011” [Climate and Energy Agreement Central Government and Provinces 2009-2011] with them in order to make them treat the energy topic, by including it in the planning instruments. This agreement introduced energy strategies that the provinces have committed to develop in order to achieve the climate-energy goals. Concerning spatial planning, provinces are obligated to promote energy savings, by setting preconditions for the spatial integration of energy projects and infrastructure, by contributing to the development the production of energy from RE sources, and by providing better spatial planning in view of climate change. Generally speaking, landscape is treated too. However, in two examples of *structuurvisie* for the Province of Zuid-Holland and *Noord-Holland* a section is found about energy and another about landscape, here associated with the heritage topic. So even if the topics of energy and landscape are included in the documents, they are not discussed thoroughly in relation to each other. Perhaps other provinces decided to develop these documents by considering a stronger relationship between these two subjects (energy and landscape), but this is left up to the province itself. The same situation can be found at municipal level.

3.2.1.2 “Inpassingsplannen” [integration plan] and “bestemmingsplan” [land use/zoning plan]

The other central planning instrument of the WRO, but more of an operational nature, are the “inpassingsplannen” [integration plan] at national and provincial level and the “bestemmingsplan”

[land use/zoning plan] at the municipal level. These plans establish land use for all land areas, being both a safeguard (not allowing land use to change configuration) or a development for the areas by encouraging “goede ruimtelijke ordening” [good spatial planning] (Minister of Housing, Spatial Planning and the Environment 2006). They include regulations for the different areas and a planning map that indicates and explains the various zones. The most important level is municipal, that decides its own land use. It defines binding rules regarding building construction, the use of land and the use of buildings.

Concerning energy, there is no obligation in the *bestemmingsplan* to include it. And if the will to develop the energy question exists, it could be written into the non-binding section of explanatory notes, where energy focused measures taken toward the development of the zoning plan could be indicated. The only compulsory aspect on energy topics that municipalities must include in this document is to reserve and provide space for renewable energy production technologies sites, defined by the “Klimaatakkoord Gemeenten en Rijk 2007-2011” [Climate Agreement for Municipalities and Central Government 2007-2011].

However, this plan represents a valuable means to match energy development and spatial planning, in other way. Energy could be thought ex ante for example, while in the process of deciding the development of a new neighbourhood, the location could be chosen in a sun-oriented manner to maximize solar gain and facilitate solar panels being installed on roofs. Or it could create favourable physical spatial conditions to promote proximity among functions that produce residual heat and others requiring high heat demands. Moreover in the explanation section (*toelichting*) of the *bestemmingsplan*, additional energy measures could be indicated, such as design for new buildings, by orienting them in order to maximize solar gains; or to favour dense and compact construction forms, thanks to the ratio between floor areas, the surface of façades, and roofs, in order to reduce energy losses; or to promote at a household scale, the use of heat pumps, solar heating, photovoltaic panel facilities. Besides dedicated surfaces for renewable energy production, for wind turbines or photovoltaic parks could be specifically defined and set aside for future development (Rijkswaterstaat, Ministerie van infrastructuur en waterstaat). The implementation of these energy measures have been promoted by the “Bouwbesluit geldt” [Building decree] (2012).

In alternative to the *bestemmingsplan*, municipalities can adopt a “Beheersverordening” [Management regulation] that only concern areas where it is not provided a future spatial development, such as for residential areas, where it requires compliance and not enter into conflict with the zoning plan on the three different levels.

Rijkinpassingsplannen and *Provinciaal Inpassingsplannen* are developed when National or Provincial interests need to be spatially integrated in the lower tiers plans (provincial and municipal). These overrule the lower *bestemmingsplan*, but in this case consultation is required with the lower tiers at a provincial and/or municipal level (Minister of Housing, Spatial Planning and the Environment 2006, 3.26). Concerning energy transition aspect these two documents could change of land use at municipal level on areas by allowing the construction of wind or photovoltaic parks. This was the case of several wind parks in Zuid-Holland.

3.2.1.3 “Aanwijzing” [orders], “AMvB” [General administrative order] and “Provinciale ruimtelijke verordening” [Provincial spatial ordinance]

National and provincial levels could also develop “Aanwijzing” [orders], that are proactive or reactive in that they react to a *bestemmingsplan* and “remedy” a situation that is not aligned or is in conflict with national or provincial interests. Moreover, national and provincial tiers could formulate normative rules: “AMvB-algemene maatregel van bestuur” [General administrative order] and “Provinciale ruimtelijke verordening” [Provincial spatial ordinance] that impact the lower tiers and make mandatory some objectives, that are stated in the *structuurvisie*. AMvB impacts the *ruimtelijke verordening*, and both have effects on the *bestemmingsplan* or *beheersverordeningen*, strengthening some requirements in the contents. For example, they could prohibit certain types of construction or activity in some areas or they could define specific land uses in other areas. Concerning energy, for example, in the *ruimtelijke verordening* (2014), which is part of its *structuurvisie ruimte en mobiliteit* (2014), the Province of Zuid-Holland indicates locations for large scale wind parks in its provincial territory. That means that wind turbine implementation is allowed nowhere else and it is compulsory to build them there specifically, therefore impacting the municipal *bestemmingsplan* where these areas are located. The document also contains other kinds of rules, such as that existing wind turbines could be replaced with those with a higher performance and that the new turbines cannot be taller than the older ones, in order to preserve landscape values (*verordening ruimte Zuid-Holland*, 2014). However often a dialogue is open between a province and a municipality to accommodate and share this kind of decision during the process of drafting the document. Therefore, even if the local level has a lot of autonomy, the higher tiers always have the power to control and to overrule lower levels, imposing in a top-down vision. There are subjects for which there are national interests, and existing bounding national and international accord, for example, about energy and climate targets, for which the national government could interfere with municipal questions from a top-down perspective. It can impose on the province and the municipality, changes in the *bestemmingsplan* for example, to preserve national interests. One example is the development of onshore wind energy. The Netherlands must have 6000 MW of power from onshore wind turbines in 2020, according to the “Energieakkoord voor duurzame groei” [Energy agreement for a sustainable growth] (2013), which is followed by the *Structuurvisie Windenergie op land* quoted above, to decide the location of wind turbine sites.

So, there is not a specific planning instrument that is only and always focused on energy transition development, as such is the case for France with the SRCAE at the regional level and the PCAET at the municipal and inter-municipal levels. All the same, there are documents such as *structuurvisie* that can be energy focused, or refers to energy while discussing other topics and there is the *bestemmingsplan* that seems to have similarities with the PLU-PLUi, regulating land use and that can define energy saving measures and rules for renewable energy equipment location and implementation.

3.2.1.4 Landscape documents: “Landschapontwikkelingsplan” and “Beeldkwaliteitplan”

Concerning landscape, as was the case for France, landscape focused documents are made on a voluntary basis. Historically, the landscape subject in the Netherlands has been treated at national level by developing national landscape strategies (De Montis 2014) such as the “Agenda Landschap” developed conjointly, by at that moment called *Ministry of infrastructure and the environment* and the *Ministry of economic affairs, agriculture and innovation*. The “Agenda Landschap” [landscape agenda] of 2008, gives national landscape objectives until 2020, highlighting how landscape considerations need to be considered and developed from the beginning of the spatial planning process. In this document, there is a reference to energy, particularly wind energy, as something to be considered for future planning, but that could also carry “quality” dimensions. However this notion of “quality” is not furthered detailed.

In the 2007, the two Dutch ministries at that period named *Ministerie van Landbouw, Natuur en Voedselkwaliteit* [Ministry of Agriculture, Nature and Food Quality], *Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer* [Ministry of Housing, Spatial Planning and the Environment] made a strategic framework “Landschap Ontwikkelen met Kwaliteit” [Developing landscape with quality] (LOK) in order to provide support for provinces and municipalities to made moves to improve landscape quality, through four main perspectives: natural quality, cultural, perceptive and usage values. However, municipalities are not obliged to include landscape policy in their spatial planning instruments such as the *bestemmingsplan* (Baas, Groenewoudt, and Raap 2011). Nonetheless the WRO (art 3.1.6) states that the *bestemmingsplan* has to include descriptions about how cultural-heritage values are taken into account by the document. The word landscape does not appear in the written text, but landscapes are part of the cultural background of a nation, and some are representative of its heritage, so in an indirect way landscape enters into this document, but mainly from a preservation point of view.

Moreover since the advent of the spatial planning act (WRO) 2008, the landscape question has been decentralized from State authority to provinces and particularly municipalities (De Montis 2014). This concept appears in the SVIR: “Central government will leave it to the provincial authorities to coordinate landscape and urban development, in order to leave more scope for tailored regional solutions. As such, policy on the terrestrial landscape will no longer be a central government responsibility” (Summary SVIR, 2012, p. 13). So provinces and municipalities have a lot of responsibilities and maintain significant discretion on determining their objectives and actions. This national choice has been the object of criticism (e.g. Pedrolí, Correia, and Primdahl 2016).

However landscape focused documents exist, and the “Landschapontwikkelingsplan” [Landscape development plan] (LOP) is the main instrument by which local governments manage landscape and landscape development (Baas, Groenewoudt, and Raap 2011). It is a plan developed on a voluntary basis by the municipality or province, with the objective to preserve a specific character or variety of Dutch landscape and with vision on to how support highly-qualitative changes. From 1995 until 2010, the national government allocated subsidies to municipalities to develop LOP, and so after fifteen years, more than the 70% of municipalities have developed them (Agenda landschap, Ministerie of Agriculture, Nature and Food Quality

and Ministry of Housing, Spatial Planning and the Environment 2008). These subsidies could be supplemented by local authorities or other entities to cover actions from their development to the plan's implementation (Baas, Groenewoudt, and Raap 2011). Local authorities have been encouraged to commission a "Landschapscoördinator" [landscape coordinator] to ensure the proper implementation of the LOP and its adaptation and connections with the *bestemmingsplan*. Moreover, in order to receive subsidy for a LOP, a prerequisite is to include citizen participation during LOP development. Even if it is on a volunteer basis, once approved by the city council or other body according to scale, the approval has an influence on the *bestemmingsplan*, on the plan's Landscape quality (Beeldkwaliteitplan, BKP) and other instruments. This articulation between the LOP and *bestemmingsplan* could be developed in several ways. LOP could be developed before the *bestemmingsplan* in order to provide more information on landscape before drawing up the latter. LOP could also be considered part of the *bestemmingsplan* by detailing actions to be undertaken or forbidden in the different zones from a landscape point of view.

LOP are composed of three main sections: the landscape analysis of the territory, a strategic vision that starts from space quality objectives and an action program, where indication is given for each action about who is responsible, the stakeholders involved and often a financing system is identified (Cabrit, Soulié, and Thibault 2018). The document also includes maps.

Another landscape instrument is the "Beeldkwaliteitplan" [Quality landscape plan] (BKP) a plan made on a voluntary basis too, developed by public administrations, private or social entities that include recommendations and guidelines to protect, create and improve the landscape quality of a territory. It considers both the appearance of specific features and how these features are integrated into the environment both in urban and rural areas. A LOP defines strategy for a desired landscape, a BKP is its next step, by providing more information on how to specify and/or guarantee or improve the esthetic qualities of landscape.

Even if they are made on a voluntary basis and are not binding, once developed, they could be connected to the *bestemmingsplan*, and in this case they do become binding.

A high number of LOP have been developed over time, because of governmental financing. Now that these funds are no longer available and the funding to write and implement this plan comes from, - compensation activity, voluntary contributions, municipal council decisions, their development has been more limited. This follows the decentralization of landscape concerns from national government administration to local authorities (provinces and municipalities). It seems that the preservation of Dutch landscape is based now more on local and voluntary responsibility (Baas, Groenewoudt, and Raap 2011) and there is no longer a top-down influence by national policy on the local one. Moreover, in 2015 the Netherlands ratified the European landscape convention, but added that this does lead to changes in its landscape legislation.

Both LOP and BKP could be focused or include energy transition subject. This could be addressed by defining locations or making suggestions to implement renewable energy equipment in the landscape. For example, by suggesting PV parks to be implemented buildings

and not on the ground, but also according to territorial landscape resources that could be used to suggest energy strategies.

3.2.2 Summing up the Dutch situation

Dutch planning system now functions where the national level establishes a planning agenda while lower tiers detail these further in order to adapt them to the characteristics of their territories (Balz 2018). It seems that about energy transition topics the process remains this way, leaving a lot of room for manoeuvres at the provincial and municipal levels, except maybe for large scale, wind turbine park implementations.

Figure 4, provides a general overview of planning instruments in the Netherlands according to the WRO, showing possible connections between energy and landscape. This figure illustrates that at all territorial levels there are planning documents that could address both landscape and energy topics (e.g. *structuurvisie* and *bestemmingsplan*), and even if they do they do not necessarily have to address them by establishing a connection.

Moreover an energy focused specific document does not exist, but energy is treated in documents, especially at provincial and municipal levels that address several topic and energy is among them (e.g. *structuurvisie* and *bestemmingsplan*).

However national commitments about energy transition and climate change mitigation have led to formulate energy focused documents such as the above mentioned *Structuurvisie Windenergie*

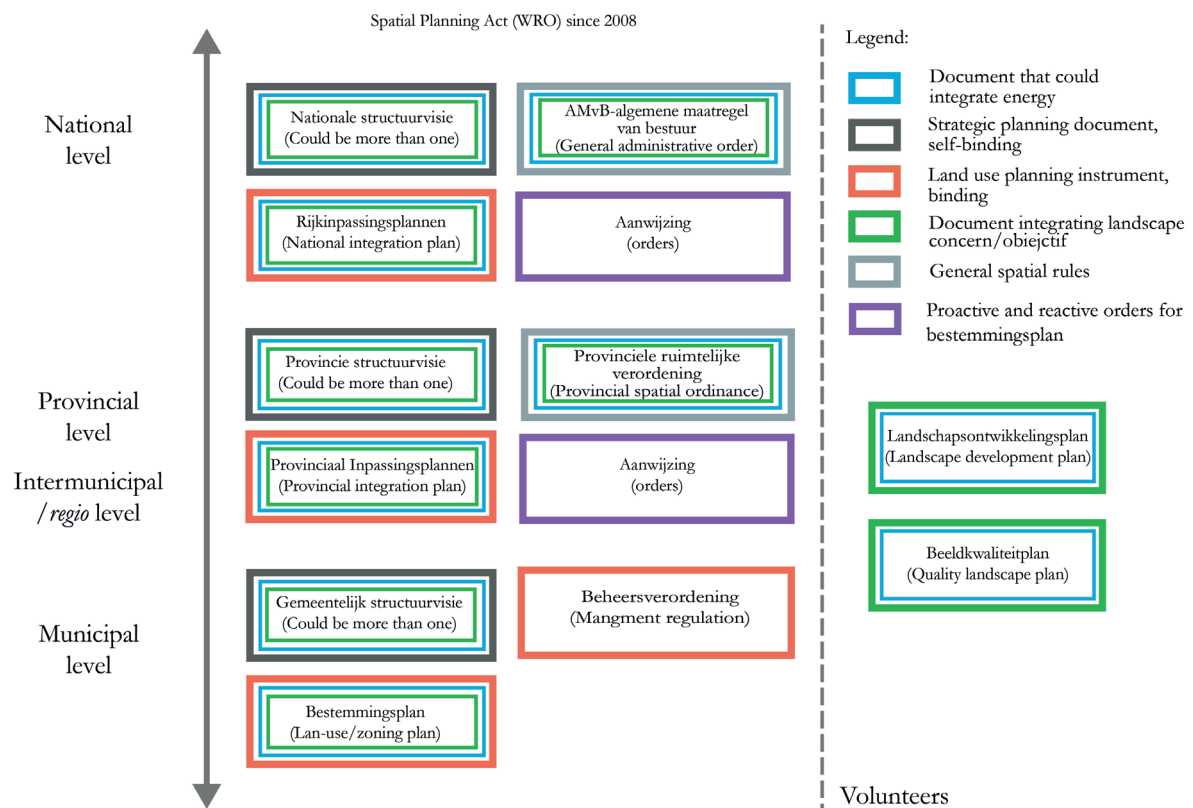


Figure 4. Planning instruments that could integrate energy aspect WRO since 2008. Source: author elaboration on the basis of <https://www.infomil.nl/onderwerpen/ruimte/omgevingsthema/energie/>

op land (2014), in order to define a framework for the implementation of goals for wind energy. Moreover, landscape focused documents also exist that could integrate energy topic, but these documents are developed on a voluntary basis so the development of these documents and implementation of their strategies depend on the will of local (inter-municipal and municipal) institutions.

3.3 Pairing energy and landscape in planning instruments

In previous sections, planning instruments in France and the Netherlands are examined while exploring the possible connections between energy transition and landscape within them. These two contexts are now discussed together highlighting similarities and differences.

3.3.1 Energy topic in planning instruments

In many European countries government decentralization has occurred leading local institutions to increase their spatial planning responsibilities (Albrechts, Healey, and Kunzmann 2003) and environmental agendas are among the driving forces, along with economy, which influences spatial planning systems in countries, filtering in them (Healey et al. 1999). This is in line with what we observed in the French and Dutch contexts, especially in France where energy concerns have become an important topic to be treated at all territorial levels. In France, energy topic seems to be more prominent in the planning system when compared to the Netherlands, because there are compulsory and specific documents which have to treat the energy subject at all the territorial levels (e.g. SRCAE, PCAET). However the multitude of documents and the interlocking areas of competences across territorial levels have been identified as possible difficulties for the development of a coherent energy policy (Chanard, Sède-Marceau, and Robert 2011).

In the Netherlands, the planning system is more flexible and seems to favor integrated planning instruments (Janssen-Jansen and Woltjer 2010). Indeed it a compulsory energy focused planning document that all provinces or municipalities have to elaborate does not exist. However the importance of introducing energy in planning instruments is recognized and it is compulsory to treat energy at provincial level (*structuurvisie*) that have to address both reduction of energy consumption and renewable energy production, and also at municipal level (*bestemmingsplan*), that focus on the location of renewable energy technologies.

A particular, less flexible approach, is reserved however for the wind turbine planning policy, for which the national government “obligated” provinces and municipalities to integrate it in their planning instruments, defining suitable areas on national territory for its implementation, in a very top-down perspective. The only national *structuurvisie* that is energy focused deals with wind energy development (*Structuurvisie Windenergie op land*, 2014).

In France too, wind turbine implementation holds a central role, as could be observed by the existence of wind turbines specific planning instruments such as the SRE. And both in France and in the Netherlands, the State level keeps the larger responsibilities about wind turbine

implementation, exercised in France through the regional “prefect” (State representative at the region level) that approve the regional planning instruments. The conflicting nature towards decentralized energy production of RE technologies for an energy centralized context, such as in France are highlighted (e.g. Emelianoff and Wernert 2018; Poupeau 2013). Obstacles for the integration of energy-climate issues in spatial planning are recognized to depend from the territory and its actors both in France (Richard et al. 2019), and in the Netherlands (Warbroek and Hoppe 2017). This highlights a need to further mobilize and acknowledge territorial actors on the energy transition topic and also about the possibilities they have to deal with it through planning instruments. In France, several public establishments such as ADEME and CEREMA, but also the Ministry of ecological and solidary transition, published guides for elected representatives and technical services in territories, to provide knowledge in order to address energy topics through several planning instruments. An example is the publication of ADEME “Elus, l’Essentiel à connaître sur les PCAET” [Elected representatives, what is essential to know about PCAET] (2016) and another published by CEREMA “Planification énergie-climat, PLUi: quelles articulations ?” [Energy-climate planification, PLUi: which articulation?] (2017).

3.3.2 Energy and landscape

Concerning the connection between landscape and energy in several French and Dutch planning instruments there is the possibility to establish a connection, but this is left to the discretion of local institutions in both countries. This means that in the Netherlands in the *structuurvisie* at all levels or in the municipal *bestemmingsplan* these topics could be treated together, although there is no obligation to do so.

France seems to be potentially well equipped to enhance this integrated vision through the PLUi and SCoT, that operate at an inter-municipal level and deal with both energy and landscape concerns, and therefore could create synergies, to some extent, between the two subjects. Or it could be interesting to include a landscape perspective in the PCAET, even if it is not yet requested. This is a document that focuses on climate, air and energy to establish goals for a territory (municipality or inter-municipality) on short and long terms and to define actions, to implement them. So maybe the PCAET could benefit from landscape perspectives and spatial explicit analyses that could point out energy resources and their availability within a territory by supporting the plan’s draft (Dobbelsteen, Broersma, and Stremke 2011) and facilitating the evaluation of the situation and decision making by local stakeholders (Oudes and Stremke 2018). Landscape focused documents such as the *plan de paysage* and the LOP have also the potential to treat energy and landscape together in an energy transition framework, but for these documents the decision is up to local institutions, leaving great uncertainty as to their development or not. An obstacle to establishing this connection in a dynamic and operational design-oriented way could come from the way landscape appears in energy focused instruments at national level (e.g. *Programme pluriannuelle de l’énergie* and *Structuurvisie Infrastructuur en Ruimte*). Here the main focus is on the idea of landscape preservation and they establish a weak connection with the energy issues, and even if it is established this is predominantly made in connection with wind turbines (e.g. *Stratégie nationale carbone*). In very few cases the connection is made where energy issues are associated to the idea of natural elements such as hedges systems.

Landscape tradition in the Netherlands is recognised as having a natural and ecological protection component (De Montis 2014), but also some connection with heritage components (see e.g. *waardervolle cultuurlandschappen* 1994) that co-exist with a strong organizational design (van der Cammen, H. et al. 2012). Nevertheless, even if *Structuurvisie Windenergie op land* points out some very general reflections on design principles to locate sites for large scale wind turbine parks, at a national level the connection is essentially made through cultural-heritage perspective similar to contexts in France. Traditionally landscape in France is comes from a strong cultural and natural protection perspective (Donadieu and Périgord 2007; Luginbuhl 2012). In planning instruments connected to energy transition topic this attitude seems to appear. Considering sustainability policy agendas in spatial systems, it is among one of the most direct to affect landscapes in Europe (Pedroli, Correia, and Primdahl 2016), probably a more conscious reflexion on how planning and design energy strategies with and in the landscape could be a way not to suffering these strategies but proactively design them. For now it seems that in both national contexts instruments exist, to pursue this logic, but the decision and implementation are largely left up to the discretion of territories.

3.3.3 Landscape focused documents

Similarities exist between the countries in relation to their landscape focused documents, the first is that they remain to be developed on a volunteer basis in both nations. However they could be integrated into a regulating and binding instrument, but it is often still a matter of good-will from municipalities to integrate, a *plan de paysage* into the SCoT an PLUi or the LOP in the *bestemmingsplan*. Gorgeau (2001) emphasizes how the SCoT and PLUi are the planning instruments through which the territorial policy is set up they have to include landscape issues, so the development of a *plan de paysage* could be useful to strengthen the landscape topic in these documents.

Differences between French and Dutch documents exist, and of particular importance is the accent put on the LOP implementation and the need to develop a financing program for each action. This emphasis on implementation does not seem to be applied in France where funding allocated by the *Ministere de la transition écologique et solidaire* in its call for projects, are sufficient for the elaboration of the plan itself, setting aside the subject of its implementation. This could create mismatches in the operational phases of these plans. It is also true that while the Dutch government stopped financing the LOP and affirms a withdrawal from landscape decisions (SVIR 2012), the French launched a national call for projects (since 2012), which has been renewed every year, showing interest for landscape.

3.3.4 Dutch influences on the French “plan de paysage”

However, there are more similarities than one might expect between the French *plan de paysage* and the Dutch LOP: they both combine landscape analysis, and an action program, they include local people and stakeholders during the process of their development, they could be municipal or inter-municipal (region/territory), they are volunteer documents.

This could be explained because the *plan de paysage* is inspired by the Dutch example, previously named *Landschapsplannen*. Jacques Sgard, a landscape architect, that studied in the “École nationale d’horticulture de Versailles” in the “section du paysage et de l’art des jardins de Versailles” [Landscape and garden art section of Versailles] which is now named the “École nationale supérieure de paysage de Versailles”, went to the Netherlands in the ‘50s where he encountered the Dutch approach to landscape planning and the *Landschapsplannen*, particularly important for polder creation, that marked and influenced him (Pernet 2014; Vigny 1995). On the basis of this experience he developed a PhD in urbanism at the IUUP, obtained in the 1958, named “Récréation et espace vert aux Pays-Bas” [Recreation and green space in the Netherlands] where he describes and identifies the *Landschapsplannen*, introducing the subject in France. Subsequently during his practice and work as landscape architect he developed an urbanism plan the first French *plan de paysage*, starting from a commission in the Bitoulet valley/ Lamalou-les-Bains (1955) and taught a new generation of French landscape architects in the Versailles school. Pernet highlights in his PhD while exploring the “grande paysage”, [large scale/global landscape] (2011), that Jacques Sgard’s experience provides France with an enlarged landscape scale for intervention and analysis, by questioning the authorities’ and administrations’ roles and contributions involving spatial planning beyond land use.

For sure, the *landschapsplannen* described by Jacques Sgard in its PhD evolved and were very different from what we have described above (LOP). One point that comes to attention is that these *landschapsplannen* were important for the planning of new polders and for the reconstruction after the flood of 1953, but not exclusively. They were a tool in carrying out immediate operational spillover at that time (Sgard 1958). This dimension seems to have been drastically reduced in the actual LOP and it still a mismatched aspect in the *plan de paysage*.

This short overview on the connection between landscape and energy seemed important for this research, showing how ideas can be cross-national and can influence each other and support a put in perspective in our research.

To conclude, the potential for deep connection to exist in planning instruments able to enhance conscious landscape developments in the energy transition framework, and not to suffer only its consequences, will depend on the establishment of these connections to municipalities and inter-municipalities. So an awareness-raising campaign about the topic could be of interest, in order to better provide local institutions with knowledge to decide if they want to develop it or not.

This chapter wished to discuss possibilities of the planning systems, in part two of this research the planning instruments of three territories, two French and one Dutch are explored to deepen the subject by anchoring onto a territorial scale in order to develop further insights.

Box 3. Contribution of chapter 3 to the part 1 research question

From the institutional perspective of planning instruments in France and the Netherlands it can be observed that energy topic has entered into the planning system at a national level (e.g. *Programme pluriannuelle de l'énergie*, *Structuurvisie Infrastructuur en Ruimte*) and especially in French planning instruments all the territorial levels have energy focused instruments. In the Netherlands although, there is not an energy specific document but energy issues have to be treated by provincial and municipal, in more cross-sectoral documents.

In both national contexts, many planning instruments have the potential to establish a connection between the landscape planning in connection with energy transition (e.g. SCoT and PLUi, *structuurvisie*, *bestemmingsplan*) but this is left up to the initiative of municipalities and inter-municipalities in France and in provinces and municipalities in the Netherlands, leaving a lot of uncertainty for the development of real interconnections.

The landscape focused documents too, could create synergies between the two topics, however, in both nations these are documents that local institutions developed on a voluntary basis and they are not binding, so their drafting and implementation in territories is left up to a lot of uncertainty. Moreover, landscape concerns related with energy topic in planning instruments on the two national levels are few and mainly address preservation attitudes towards landscape, especially concerning wind turbine implementations that may not encourage a deeper connection at lower territorial levels.

PART 2 - Energy and territory: landscape planning and design in energy transition

In the first part of the thesis research I inquired about the connection between energy transition and landscape in scientific literature. Subsequently I explored concepts relevant to energy-conscious spatial planning and design, and operational principles that are associated with three selected concepts: Urban Metabolism, Circular Economy and *Cradle-to-Cradle*. Finally, I inquired at the institutional level exploring how energy and landscape could be addressed through planning documents in France and the Netherlands.

The world energy situation which questions the present energy system (e.g. IPCC report in 2018) raises awareness about the fact that energy is not an isolated topic that can be treated from only a technical perspective. In order for energy transition to succeed, it needs to be considered also from a socio-cultural perspective (Miller, Iles, and Jones 2013) involving the characteristics of territories, but also the lifestyle and behavior of the individuals and communities within them, the public and private choices, the form and the images of inhabited space. These dimensions are even more important as energy transition calls for a gradual relocation and territorialization of resources for the energy system, as advocated by international and national laws (e.g. the French LTECV and Dutch the Dutch *Nationaal Klimaatakkoord*). And the need to rethink our energy systems based on lowered consumption and the production of renewable energy has brought attention to the strong link between territories and energy development (Briffaud 2014; Coenen, Benneworth, and Truffer 2012).

The energy systems participate in the establishment of an economic and sociotechnical framework but also a spatial and geographical one from which a territory is irrigated and drawn (Perrotti and Pouteau 2013). Current models for energy development could change these frameworks and generates implications for a local landscape “here”, within the territory instead of an indefinite “elsewhere”. At the same time landscape design, when reflecting on territories, grounds actions in a situated reality by influencing/changing its flows cycles (Viganò 2014), among which are energy.

In this context, second part of research explores the planning and design of landscape in an energy transition framework in territories engaged in this process. The main research question is the following:

In the energy transition process what role does landscape as well as landscape planning and design play in the energy transition process at a territorial level? And what is the comprehension that territorial agents have of the connection between energy and landscape?

In this regard, what are the differences – if any – between France and the Netherlands?

To answer this question this part is organized in the following way.

Part 2 organization

Part 2 of this research consists of six chapters. Chapter 4 discusses the role given by institutions to the territory for the development of the energy transition process and its connection with the landscape component in France and the Netherlands. This chapter wants to give a general overview of the situation of territories in the two nations of study.

The five following chapters focus and inquire about three specific territories, two are French and one is Dutch. First in chapter 5, are illustrated the material and methods used to analyze the chosen territories. Subsequently, are presented the three territories, their characteristics (geographical, demographic, etc.) and details about the energy transition process, in order to give contextual elements able to anchor results in their territorial context. Then chapter 6 explores the landscape focused documents (e.g. *plan de paysage*) elaborated for the territories to explore the relationship established between landscape and energy transition. Here also inquiry is made on territorial agents' perspectives on the usefulness of these documents. Subsequently, chapter 7 explores the connection between landscape and energy transition across planning instruments. While the previous chapters inquire mainly institutional level, chapters 8 and 9 explore territorial agents' social representations of landscape in the energy transition framework. Chapter 8 illustrates agents' oral narratives while the chapter 9 examines hand drawings representing "energy transition landscapes".

CHAPTER 4: French and Dutch territories committed to energy transition - a national overview

This chapter is based both on empirical data and literature and has the goal to draw a portrait on whether and how landscape concerns are addressed and play a role in territories having short and long term energy goals in the two nations of study. First, insight is given about the notion of territory and the interest to explore landscape perspectives in energy transition process in this entity. Secondly, it is inquired how recent laws and national calls for projects are addressing the link between energy transition and landscape in territories in France and in the Netherlands. In both countries, according to a perspective of decentralization, energy transition and landscape issues are increasingly entrusted to the local community (municipalities, provinces, group of municipalities). Hence the interest at a territorial level.

Subsequently, we investigate in the French TEPOS network whether and how landscape is taken into account and whether and how landscape architects are involved in the process.

Finally the French and Dutch contexts are compared and discussed, showing differences and similarities about to what degree the need to address landscape in territories in the energy transition process become compulsory and the involvement of landscape architects. This could provide a picture of the two situations able to put the results in perspective over the next chapters of the research.

4.1 Territory as a key scale for energy transition?

4.1.1 Territorial scale and energy landscape planning and design

4.1.1.1 The territory

The notion of territory¹ is variable and blurry and sometimes used in place of landscape (e.g. Dubost 1991). In this research landscape and territory are not synonymous. Territory has been defined, for example, as “a more or less vast extension of the earth surface, which could be delimited according to geophysical divisions (mountains, rivers), according to linguistic differences, according to political and administrative divisions that could overlap with the geophysical and linguistic ones or ignore them”² (Assunto 1976, 49). We refer to territories

1 In English the French word “territoire” is often translated with “region” but considering the French/Italian literature on the topic and the author background even if the thesis is written in English I use for the redaction the word “territory”.

2 “Per territorio si intende, difatti, una più o meno vasta estensione della superficie terrestre, che può essere delimitata secondo divisioni geofisiche (monti, fiumi), secondo differenze linguistiche, secondo delimitazioni politico amministrative che possono coincidere con quelle geofisiche e linguistiche o possono ignorarle”

as delimited institutional entities that could range from a single municipality to a group of municipalities, such as in France *communauté de communes*, PNR, *Pays*. This definition fits the research aims by allowing us to study planning instruments as well as the territorial projects concerning energy transition that normally covers a delimited institutionalized surface. This interpretation, however, does not mean that interaction at other institutional levels or nearby territories does not exist.

There are many different kinds of territories, such as urban, rural, etc., but they are all featured by a network of components “central-place communities which are connected by transport and communication linkages and surrounded by less intensely settled land” (Neuman 2000, 118). A territory, within institutional boundaries, could be characterized by different landscape entities and could be the support of sentiment for belonging and identification by the society that live in it (Toublanc 2004).

From an energy perspective, any territory is a thermodynamically open system with energy input and output (Stremke 2010). In a territory energy is consumed, potentially produced and energy-saving measures could be implemented as well; these actions have close links and depend on local characteristics that are both natural (topographical, natural, etc.) and human (technical, economical, etc.) (Mérenne-Schoumaker 2007). However throughout past centuries there has been a progressive disconnection and resulting independence between society, its territory and its resources (Magnaghi 2010), and subsequently its landscape as well.

The transition to a low energy consumption and renewable production system needs to occur and be integrated across scales (Sarrica et al. 2018; Fischer-Kowalski and Rotmans 2009). The territorial scale has been identified as pertinent entry point to address energy and climate issues thanks to the sectors transversality that could be addressed by this entity, where interaction can be identified and improved among transportation policies, habitat, economy, living environment, etc. (Theys and Vidalenc 2011). Territory has also been recognized as a scale where long term strategic thinking can be articulated with more concrete implementation projects (Kempenaar 2017). This is particularly important in a transition process in which long-term visions and short term actions need to be addressed together (Kemp 2010; Rotmans, Kemp, and van Asselt 2001). Moreover, from an institutional energy policy perspective, it is at the interface between the local bottom up and top down initiatives and goals (Nadai, Labussiere, et al. 2015) where it is allowed to explore their articulation. At the same time the development of project and definition of targets as well as their implementation could also be experienced as difficult at this scale, because of the complexity of multi-actor, multi-interest (e.g. economical) and multi-level issues that are often at stake (Späth and Rohrer 2010).

The fact that territories have been studied along with increasing concerns for energy transition issues does not mean that landscape, landscape planning and designing perspectives has been a major matter of concern. Indeed, “territorialization” could also mean to address the topic from a social, stakeholder, or economical point of view that beyond the fact to be located in a certain territory with defined boundaries, does not mean that take the spatial organization and landscape characteristic into account. Researches focusing on a territorial scale conceived as a delimited area, have analysed energy flows that quantitatively give insight about supply and demand (e.g. Hecher et al. 2016), inquiring the role of actors in the change of energy system (Hauber and Ruppert-Winkel 2012), of energy policies and how institutional stakeholders deal with energy

through the development of energy projects on the territory (Chanard 2011). Exploration has been developed that inquires the spatial component of energy goals in territories, in geography field, for example Vaché (2009) identifies different territorial spaces favourable to different kinds of renewable energy production projects. She shows how renewable energy potential has to be connected to consumption and uses, because it is not homogenous with the territorial space. Nevertheless, it has been argued that research at territorial level on energy transition frameworks are still underdeveloped and deserve further study (Hoppe and Miedema 2020) also because a structured energy transition process across territories is considered beneficial to render national energy targets operational (Lutz et al. 2017).

4.1.1.2 Landscape planning and designing in territories

Territorial designing has been addressed and explored since long (e.g. McHarg 1992). And territory is considered a meaningful entity in the landscape planning and design realm as able to develop strategic visions on critical topics such as water management and climate change (Meijsmans 2010).

Obstacles too have been recognized for landscape planning and designing at this scale, such as the time required for long terms changes and the uncertainty these could imply (Sijmons 1990). Moreover, planning and designing of large territorial systems adds a great degree of complexity to the process, that designers have to face (Meijsmans 2010).

From an environmental designer perspective, energy transition has been explored on several scales such as building (e.g. Schmidt 2009; Ratti, Baker, and Steemers 2005), neighbourhood (e.g. Souami 2009; Tardieu et al. 2015) and a national scale as well (e.g. Sijmons 2017).

However, in connection to energy transition, territory is recognized from a landscape architecture perspective as important to be explored in order to make energy transition take shape (Sijmons et al. 2014). At the same time, landscape is considered as a meaningful entry point to develop energy projects in territories, by recognizing landscape's capacity to make the social relationship with energy perceivable (Briffaud 2014). Indeed, territorial project and landscape project are not synonymous. The first refers to a coherent elaboration of long-term or short-term images grounded in territorial characteristics and resources, be they social, economic, environmental etc. While the second type of project concern the physical form and organization of the natural and build environment of a territory, including both material and immaterial components (e.g. identity feeling, symbolic). However, landscape consideration and project could support the development of the other and vice versa (Donadieu 2007). For example, to develop spatial analysis and representations of energy targets can assist local stakeholders in energy transition short and long terms decision making for territories (Oudes and Stremke 2018).

Despite this increasing connection on how landscape concerns and landscape designing could meet energy transition goals and their implementation in territories, the topic still needs research. In the following section the evolution of this connection is explored using as case study France and the Netherlands.

4.1.2 Landscape concerns in territories engaged in energy transition in France

In France from an institutional level, as discussed in chapter 3, territory gained importance in the energy transition process, through the “Loi transition énergétique pour la croissance verte” [Law energy transition for the green growth] (LTECV), that directly uses the terms “territoire” [territory] in the law itself (article 8). A role that was also reiterated through the call for project “Territoire à énergie positive pour la croissance verte” [Energy positive territories for green growth] (TEPCV), lunched by at the time named “Ministere de l’environnement, de l’énergie et de la mer” [Ministry of environment, of energy and sea] and in the evolution of the local planning instrument (PCAET for all the collectivities of at least 20.000 inhabitants). Nadai et al. (Nadai, Labussiere, et al. 2015) highlights how in the LTECV, local territories appear for the first time in French energy law, while avoiding the term decentralization.

In addition to these instrument it could be observed a rise of energy focused networks in France, many of them in connection with the European level, that have become proactive encouraging energy actions on a “local” level for territories (e.g. TEPOS) but also cities (e.g. Eco-cité) and municipalities (e.g. Convenat of Mayors) (see figure 1).

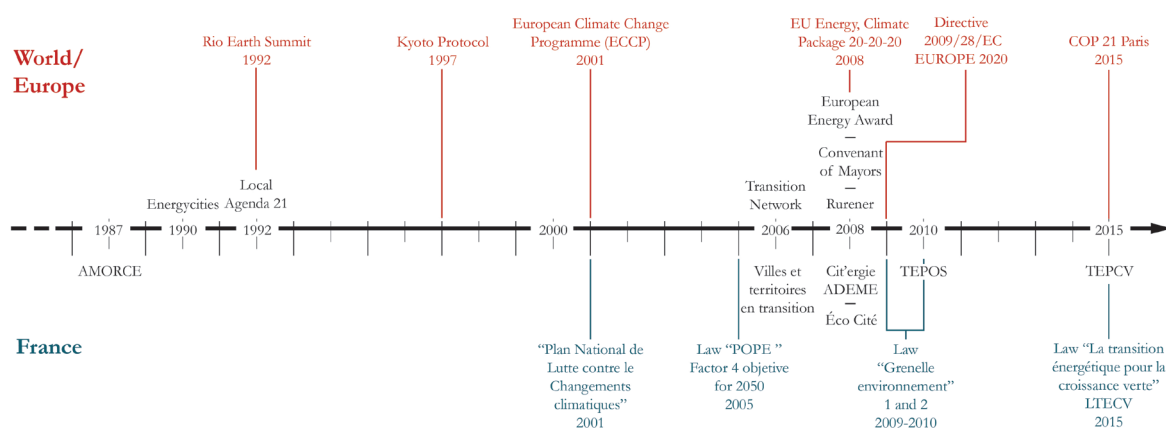


Figure 1. Time line of development of Label in Europe and France. Source: author

One important network in the French context for territories is “Territoire à énergie positive” [Positive energy territory] (TEPOS) introduced by CLER, “Reseaux pour la transition energetique” [Network for energy transition], a French association created in 1984, that founded the TEPOS network in May 2010. A TEPOS it’s a territory that aims the objective of reduce its energy need through the energy efficiency and sobriety, and to supply the through local renewable energy. TEPOS and TEPCV are different because this last one rewards not a global and territorial approach, but the promotion of exemplary punctual actions (Nadai, Debourdeau, et al. 2015, 6), such as changing to LED technologies all the public illumination in the territory. Instead the TEPOS network encourage territories to adopt a specific approach which “integrates energy question in a political, strategic and systemic engagement in order to

favor a local development”³ (<http://www.territoires-energie-positive.fr/presentation/qu-est-ce-qu-un-territoire-a-energie-positive>, 2018).

However TEPOS territories, such as the ones awarded the TEPCV does not cover the whole French surface, being scattered throughout the nation, and they are based on a voluntary engagement. The TEPOS territories were in 65 in 2018, and they are mainly rural areas.

Nevertheless the LTECV law makes the development of the PCAET mandatory for the communities of at least 20.000 inhabitants, while previously it had to be developed only by collectivities with 50.000 or more inhabitants. So this makes compulsory the definition of energy goals in the short (6 years) and long terms, for a higher number French communities.

According to a study developed by the ADEME, the territories (municipality, *communauté de communes* etc.) with more than 20.000 inhabitants that, according to the LTECV must develop a compulsory PCAET are 739 and represent about 60% of the French local communities (ADCF and ADEME 2016). Figure 2 shows how the territories with defined energy transition goals and strategies cover a broad part of the national French territory, but not all of it.

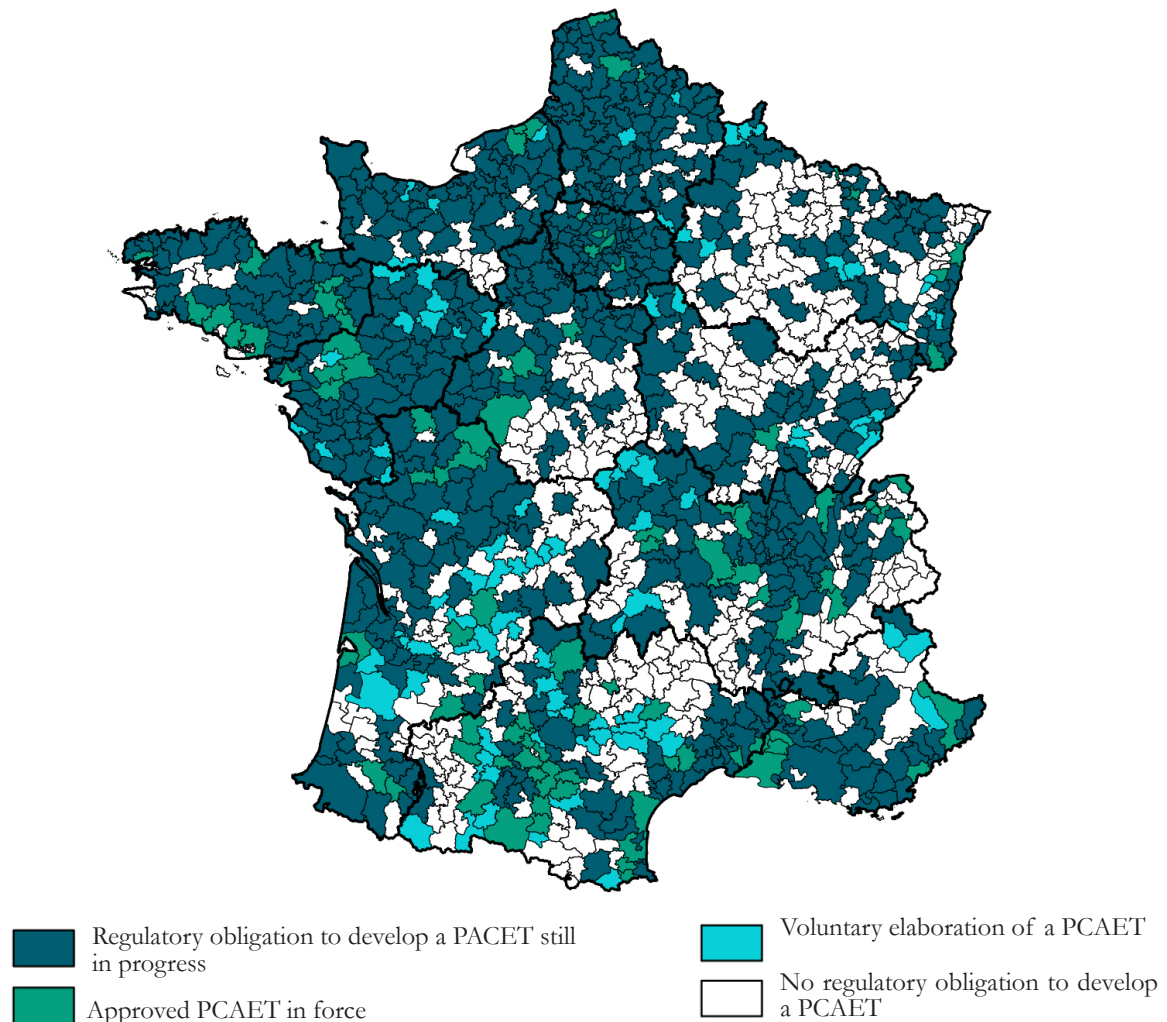


Figure 2. Map of the situation and advancement of local communities (EPCI etc.) in the development of a PCAET in France. Source: author on the basis of data of the “Ministère de la transition écologique et solidaire”, April 2020.

3 “Il intègre la question de l’énergie dans un engagement politique, stratégique et systémique en faveur du développement local.”

However, this map (figure 2) means that these local institutions have defined energy goals for their territories but not that there is an articulation developed between *landscape* and these goals nor that the actions are spatially worked out and organized.

In terms of quantitative energy goals it is at the highest level, through the SRADDET, which has to be elaborated for each region (meaning for region the French administrative division), that 100% of the French surface is characterized by medium and long-term goals about energy management/development. This however, remains in a very general level, since the regions have very large surfaces and they include many *communauté de communes*, municipalities, etc. with very different characteristics that have to take into account the SRADDET goals in the elaboration of the PCAET and the SCoT in order to be compatible with its (SRADDET) rules.

4.1.2.1 Energy transition and landscape: TEPCV, “plan de paysage”

The connection between energy transition goals and *landscape* in territories seems still not well established from a national perspective in France even if recently a closer association between the two has been encouraged.

In 2014, in parallel to the LTECV law project the “Ministere de l’environnement, de l’énergie et de la mer” [Ministry of environment, of energy and sea] launched the call for projects TEPCV, to encourage local communities to engage in concrete actions for energy transition projects by backing them with about 500 000 € each. In 2015, the same ministry of environment launched a parallel call for projects for the “*plan de paysage*” [Landscape plan], without establishing any connection with the precedent one. Moreover each project of the “*plan de paysage*” was awarded by 30.000 €, showing a significant financial difference between the two, where the landscape plan is much less favored.

The *plan de paysage*, is directly connected to the idea of territory, meaning that quite a broad range of entities that could apply to the call: *communauté de communes*, PNR etc. Entities that have broad geographic areas and could be characterized by different landscape units, so refers to the idea of “grand paysage” [landscape on a large scale] (Pernet 2014). Moreover, the connection with the term territory is explicitly made. In the written brochure about the *plan de paysage* proposed by the *Ministere de l’environnement, de l’énergie et de la mer* in 2015, it is stated that “The *plan de paysage* is a voluntary initiative, driven/carried by a collectivity that invites the agents/actors of its territory to rethink the way spatial planning is achieved”⁴ (Ministère de la Transition écologique et solidaire 2015, 5). Direct reference to the territorial scale is also made in the calls launched by the ministry, where for the first time in 2013, it is stated how the *plan de paysage* “allows an understanding on the evolution of landscape and its transformation in a prospective way, transversally in accordance with the various policies at work on territories, and spurs the definition for the framework of evolution, through the point of view of territorial projects”⁵ (Ministere de l’écologie, du développement durable et de l’énergie 2013). This formulation is

4 “Le plan de paysage est une démarche volontaire, portée par une collectivité qui invite les acteurs de son territoire à repenser la manière de concevoir l’aménagement du territoire”

5 “Il permet d’appréhender l’évolution et la transformation des paysages de manière prospective, transversalement aux différentes politiques à l’œuvre sur un territoire, et de définir le cadre de cette évolution, sous l’angle d’un projet de territoire”

also included in the following years' calls (2015, 2016, 2017, 2018, 2019). This directly connects landscape to operational design, establishing it as at the service and to be developed in parallel with the energy ambitions of the territory.

Since 2015, the concern to articulate landscape with energy transition seems to be encouraged at national level descending to the territorial scale. The *club plan de paysage*, created under the now named *Ministère de la transition écologique et solidaire* [Ministry of ecological and solidarity transition] in 2013, supporting local institutions committed to the development of a *plan de paysage*, elaborated a short report "To elaborate *plans de paysage* for the energy transition" [élaborer des plans de paysages pour la transition énergétique] (2017) that discusses issues and elements appeared during a workshop/meeting organized in Lyon in December 2016 specifically organized around this landscape in energy transition topic. This meeting presented best practices and was open to the participation of territorial agents and different stakeholders. The *club plan de paysage* in 2017 counted 16 territories labeled TEPCV and five labeled TEPOS, but only four of them address the issue of energy transition (among others) in the elaboration of their *plan de paysage* (Elaborer des plans paysages pour la transition énergétique, 2017).

However, some initiatives from the *club plan de paysage* to encourage territories to include energy transition issues in the *plan de paysage* could be traced. In December 2016, the "Club Plan de paysage" organized a work group, devoted to the energy transition discussing two main questions: To what extent can the *plan de paysage* contribute to the energy transition through actions that accompany and render it concrete? And how can synergies be developed between a *plan de paysage* and energy transition? The day was open to landscape architects working in local communities (*communauté de communes*, PNR etc.) but also to all other kinds of agents working in these contexts, even if the majority of participants were environmental designers.

More recently, the call for *plan de paysage* project of 2019 launched by *Ministère de la transition écologique et solidaire* specified that "For applications with a very strong energy transition dimension, particularly for wind power, candidates could be offered to request a specific assistance demand from the ADEME, which could be allocated according to general rules for the attribution incentives from the ADEME"⁶ (Appel à projets, *plan de paysage*, Ministère de la transition écologique et solidaire, 2019a, p.2). This means that the "Agence de l'environnement et de la maîtrise de l'énergie" [Agency for the environment and energy management] (ADEME) a public establishment participating in the implementation of public policy about environment, energy transition, sustainable development, that endorses financially related projects in territories, begin to see the interest in integrating a landscape viewpoint in its activity. Indeed the possibility of receiving this additional financial support for energy transition actions could be an incentive for territories to include this dimension in their *plan de paysage*. In this call (2019) we see an evolution in the formulation of the *plan de paysage* tool where it ensures not only the goal for quality in landscape and support for any territory projects, but the accent is now put on the *plan de paysage* as a tool that is able to support and improve the transition into a more sustainable system in the territory: "The *plan de paysage* is a support tool for the change and experimentation that allows mobilization by the territory's initiative and creativity to service transformation and transition

6 "Pour les candidatures ayant une dimension transition énergétique très affirmée, notamment sur l'éolien, les candidats pourront se voir proposer de réaliser une demande d'aide spécifique auprès de l'ADEME, qui pourra être attribuée selon les règles générales d'attribution des aides de l'ADEME"

towards a more sustainable model”⁷ (Ministère de la transition écologique et solidaire 2019a, 5). The same attitude is renewed in 2020 through the call for *plan de paysage*, which encourages territories to transit to more sustainable systems. Again, it is specified that “for applications exploring energy transition theme, through reasoning about wind turbine development in the territory or possibly around other renewable energies, candidates could be requested to seek specific support from the ADEME.”⁸ (Ministère de la transition écologique et solidaire 2020, 2) So even if much is left to the local institutions’ discretion, territories begin to be encouraged to establish a connection between the two subjects, at least from the landscape perspective. Nevertheless it seems that the primary focus is on renewable energy technologies and mainly on wind turbines.

4.1.2.2 “Contrat de transition écologique” [A contract for ecological transition]

In 2018, the *Ministère de la transition écologique et solidaire* launched the “contrat de transition écologique” [ecological transition contract] (CTE) and extended it in 2019 to include a total of 80 territories. Conceived as a voluntary process, it is undertaken by one or more territorial inter-communities to “co-construct among local communities, State, companies, syndicated groups, associations, etc. starting from a local project”⁹ (Ministère de la transition écologique et solidaire 2019b, 1) to develop specific strategies in support of an “ecological transformation”. It defines a roadmap for the territory with precise goals to achieve and to aim at attracting private investment. Even if the adjective “ecological” is used, it is based on the idea of renewable energy production, energy consumption reduction and improved energy efficiency, along with and in connection with mobility, agriculture, circular economy, biodiversity, etc. Probably the use of “ecological transition” at the place of “energy” give it a more “green” and less technological idea, in the process or maybe this formulation is believed to better address the idea of sustainability in the process.

However, as it was true for the TEPCV, also for the CTE the consideration of landscape dimension is not specifically addressed. Moreover, even if the CTE and the *plan de paysage* are developed under the aegis of the same ministry, no connection are explicitly made between them, even though the 2019 call for *plan de paysage* encouraged taking energy transition into account. So, in landscape focused document there is an encouragement and expectations for energy transition, nevertheless the opposite remains untrue. In other words, in the territorial energy transition focused initiatives, such as TEPCV and CTE the landscape components is not explicitly addressed. As illustrated in chapter 3, spatial components enter through planning instruments.

⁷ “Le plan de paysage est un outil d’accompagnement au changement et d’expérimentation qui permet de mobiliser l’initiative et la créativité des territoires au service de leur transformation et de leur transition vers un modèle plus durable”

⁸ “pour les candidatures explorant le sujet de la transition énergétique à travers une réflexion sur le développement de l’éolien sur le territoire, ou éventuellement d’autres énergies renouvelables, les candidats pourront se voir proposer de demander une aide spécifique auprès de l’ADEME.”

⁹ “CTE est coconstruit à partir de projets locaux, entre les collectivités locales, l’État, les entreprises, les syndicats, les associations... partant d’un projet local”

4.1.3 The Netherlands towards 100% coverage of spatial/landscape-conscious energy goals

In the Netherlands, the territorial scale in the energy transition framework seems to have gained importance and responsibilities. In 2017, seven pilot regions/territories engaged in the so-called “Regionale Energie Strategieën” [Regional energy strategy]: Friesland, Noord Veluwe, Midden Holland, Drechtsteden, West Brabant, Hart V. Brabant and the Eindhoven region. The definition of the word in Dutch *regio*, corresponds to the concept of “territory” used in France and to the definition we gave at the beginning of this chapter.

In 2018, the *Regionale Energie Strategieën* program was extended to the whole nation for a total of 30 *regio* that all together cover the entire surface of The Netherlands (see figure 3). The program is developed and piloted across the three Dutch tiers, at a national level by the “Ministerie van Economische Zaken en Klimaat” [Ministry of Economic Affairs and Climate Policy] and by the “Ministerie van Binnenlandse Zaken en Koninkrijksrelaties” [Ministry of the Interior and Kingdom Relations], at provincial level by IPO and VNG (municipal association) and at municipal level. The *Regionale Energie Strategieën* is an instrument introduced in the Dutch *Nationaal Klimaatakkoord* that led regional choices for (1) renewable energy production, (2) heat transition in the built environment, (3) energy storage and energy infrastructure. This was done to commit to the *Klimaatakkoord*'s goal of 49% CO₂ emission reduction compared to 1990 emissions and to 70% electricity produced from renewable sources by 2030.

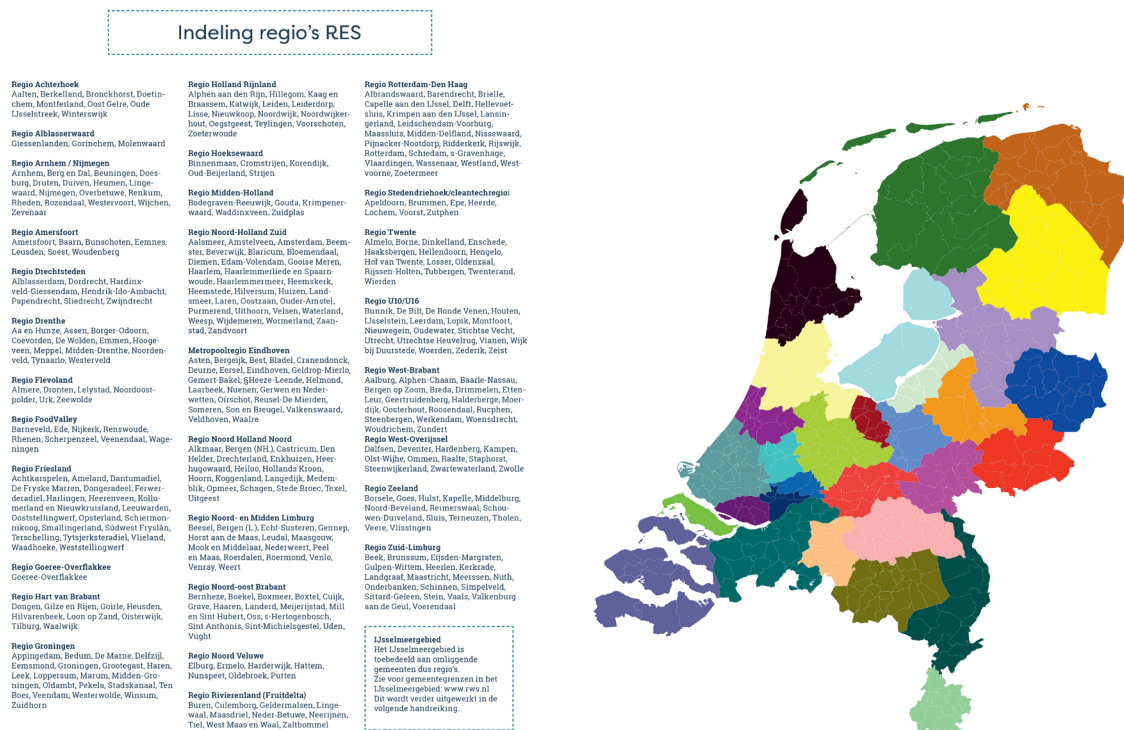


Figure 3. Map representing all the territories committed to the Regionale Energie Strategieën. Source: <https://www.regionale-energiestrategie.nl/kaart+doorklik/default.aspx>

Each *regio* has to set a road map and define energy goals explaining the way and schedule to achieve them. Moreover, the program will support networking amongst *regios* to share their experiences, best practices, and to challenge them to improve their vision for the future. The national government provides funding (€ 22.5 million per year) to support the *Regionale Energie Strategieën* program, both for its organization and facilitation in the 30 *regio*, made available annually from 2019 to 2021.

The spatial delineation in the *regios* are developed through discussion at the provincial and municipal level, the majority of them consist of several municipalities, with some exceptions. For example Goeree-Overflakkee municipality, that is characterized by a very broad surface and defined borders (an island), is considered as a *regio*.

The spatial, even if not landscape components, of the *Regionale Energie Strategieën* is explicitly considered and addressed. Indeed, in the chapter about them in the *Klimaatakkoord* is stated that “The task facing the region is complex and the spatial impact of the climate and energy transition will be considerable. It is precisely the translation of climate ambitions into locations and projects that the social and spatial consequences and dilemmas become tangible”¹⁰ (“Klimaatakkoord” 2019, 222). And so “provinces and municipalities are strongly committed to make the RES [Regionale Energie Strategieën] (qualitative and quantitative) spatially possible”¹¹ (*ibid.*, p. 223). This means that not only do the *regios* have to verify the spatial area available, (for example to reach their goal about photovoltaic energy production) but also that its implementation is qualitative. This idea of “quality” however remains a little bit general and unclear, is it an aesthetic quality? Or an environmental quality? Or both?

Further clarifications are provided in the *Klimaatakkoord* by a list of four “spatial principles” [ruimtelijke principes] that need to be included in decision making according to the *Regionale Energie Strategieën* (*ibid.*, p. 180):

1. efficient and multiple use of space (where possible);
2. closest possible alignment of supply and demand of renewable electricity;
3. combination of tasks and targets; trade-offs and rezoning if necessary;
4. close alignment with area-specific spatial quality.

These principles seems to mainly refer to a consideration on spatial design and they highlight how strategic reasoning about the site for functions could improve the efficiency of energy systems, creating synergies between sectors and localize the production facility near consumption areas. Some examples and clarifications are provided in the text: “At the initiative of the region, at the invitation of sectors or otherwise, spatial planning and other measures in the field of mobility, industry and agriculture can also be included in the RES. For mobility, for example, this may relate to the effective integration of the charging infrastructure and the spatial impact of zero-emissions urban logistics. With regard to the industry, for example, this may relate to the landfall of offshore wind energy close to industrial clusters and the transport and storage of hydrogen

10 “De opgave waar de regio voor staat is complex en de ruimtelijke impact van de klimaat- en energietransitie zal groot zijn. Juist in de vertaling van de klimaatambities naar locaties en projecten worden ook de maatschappelijke en ruimtelijke consequenties en dilemma’s concreet.”

11 “De provincies en gemeenten zetten zich nadrukkelijk in voor het (kwalitatief en kwantitatief) ruimtelijk mogelijk maken van de RES”

and other sustainable gases and raw materials.”¹² (*ibid.*, p. 216).

Through this national program in the Netherlands, the territorial level has become a key scale for the implementation of the energy transition, including its spatial qualities even if what they meant for “quality”, such as for example aesthetic, environmental quality it is not further detailed.

4.1.3.1 Energy conscious landscape planning and design’s role in territories

Delta Metropool¹³, a Dutch association that develops research and conducts projects on several topics among which is energy transition. It has elaborated a census in 2018 of the existing spatial/landscape perspectives necessary for energy transition implementation on territories in the Netherlands. This makes a general (ongoing) overview possible on whether and how landscape is integrated, or not, in the reflection on energy transition goals and their achievement in the Dutch context.

Figure 4, is a global vision of the Netherlands elaborated by the Delta Metropool association which brings together in one map, all the existing energy strategies, where they are thought and represented spatially. This map shows that more than an half of the surface of the Netherlands already has an energy conscious spatial design plan, even if some territories seem to have more a elaborated and detailed plan (e.g. 21-Noord-Holland Noord or 04-Groningen) compared to others that seem to be less detailed and more descriptive (e.g. 08 Zeeland or 07-Twente). The differences in the graphic representation of these maps results from their elaboration by different agents, planning and design firms. Moreover spatial perspectives exist both for more “rural” territories such as the Zeeland (08) or Goeree-Overflakkee (24), but also for metropolitan areas such Rotterdam (05) and Amsterdam (09), and show how energy transition is addressed spatially from high to low-population densities.

Table 4.1 summarizes and gives more details about the reports existing about these territories exploring them from a spatial/landscape perspective in connection to their energy transition goals.

What stands out in the table is that exists leaders in environmental design firms in the domain of energy planning and design, who sometimes collaborate among themselves such as: H+N+S landscapearchitecten, StudioMarcoVermeulen, FABRICations and Posad. H+N+S it is a landscape architecture firm while StudioMarcoVermeulen, FABRICations and POSAD even if they include landscape architecture as an expertise, they also integrate architecture and urban planning and urban design, professionals.

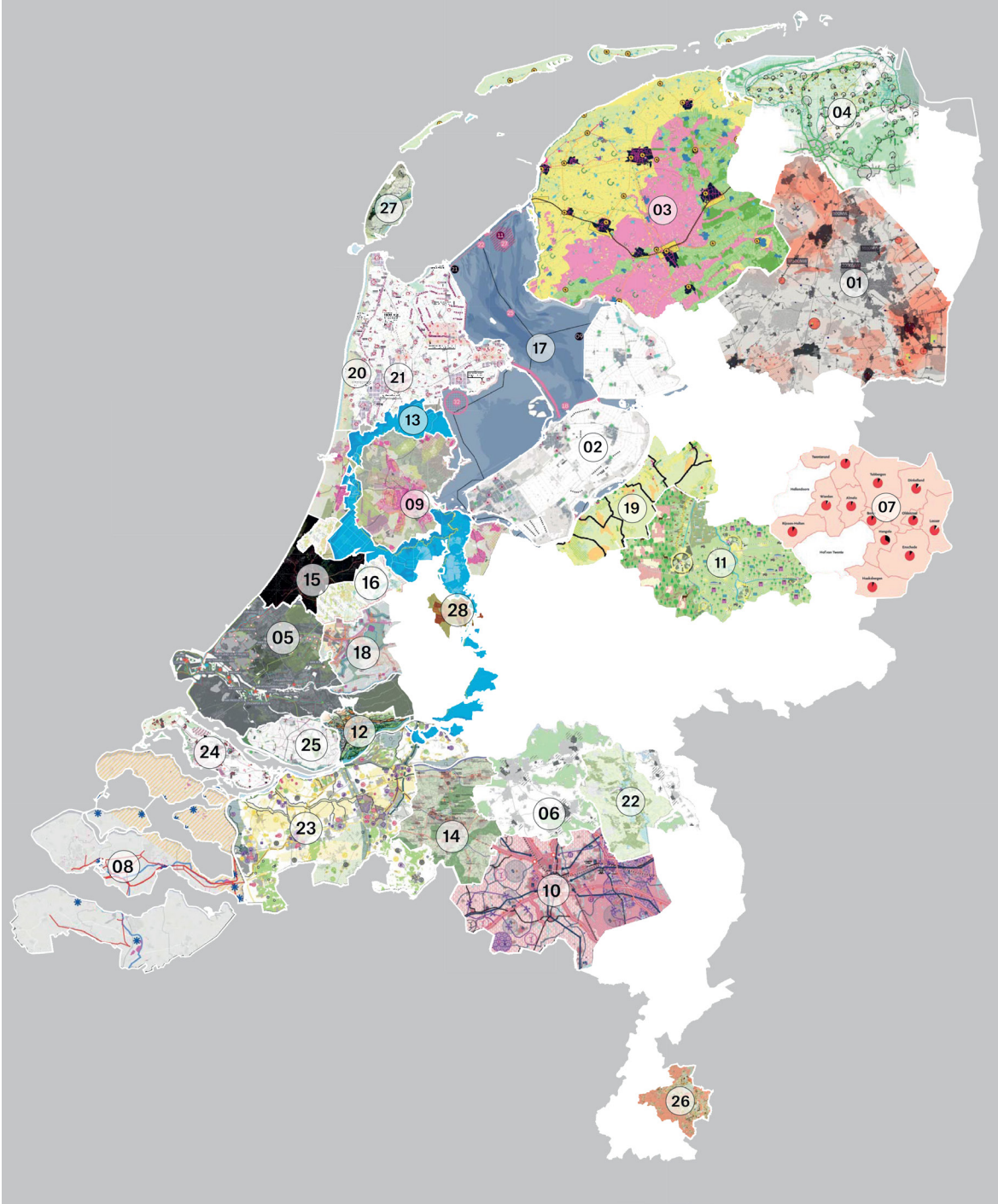
Secondly, we notice that the majority (15) of the territories have a report dating from 2017/2018 in accordance with the beginning of the reflection about the *Regionale Energie Strategieën* program according to what outcomes were expected from the *Klimaatakkoord*, that would take force in

12 “In de RES kunnen op initiatief van de regio, al dan niet op uitnodiging van sectoren, ook (ruimtelijke) maatregelen op het gebied van mobiliteit, industrie en landbouw worden meegenomen. Voor mobiliteit kan er bijvoorbeeld gedacht worden aan het goed inpassen van de laadinfrastructuur en de ruimtelijke consequenties van zero-emissie stadslogistiek. Voor industrie kan bijvoorbeeld gedacht worden aan aanlanding van wind op zee nabij industriële clusters en transport en opslag van waterstof en andere duurzame gassen en grondstoffen.”

13 <https://deltametropool.nl>

2019/2020. Nevertheless several reports were elaborated before the *Klimaatakkoord* discussion showing how spatial planning and design for the energy transition was already an important aspect to be explored even if not compulsory at that time. For example, the Province of Zuid-Holland report dates from 2013 and the Parkstad Limburg report from 2015. Moreover, it is also possible that the territories that are inventoried in the table with a spatial energy report from 2017 or 2018, updated from previous exploration. For example, Goeree-Overflakkee has

Figure 4. Map, summing up, the existing energy strategy explored from a spatial perspective (end 2018). Source: <https://deltametropool.nl/nieuws/regionale-energiestrategieen/>.



landscape report with goals to explore scenarios for alternative renewable energy production dating from 2012. It was developed by H+N+S landscapearchitecten (“Goeree-Overflakkee. Duurzame Energie in Het Landschap” 2012), illustrating how local institutions had already an interest, before *Regionale Energie Strategieën* program in addressing the energy transition from a landscape perspective.

Table 4.1. It groups the reports that explore the energy transition process for territories from a spatial/ landscape perspective. Source: author elaboration according to the Delta Metropool list (2019) of territories and the report quoted in the table

	Dutch territory	Report on a territorial scale spatial and landscape exploration of energy transition*	Environmental design firm office	Year of the report
1	Province Drenthe	“Drenthe energy landscape”	studioMarcoVermeulen	2017
2	Flevoland	“Space for energy in Flevoland. Exploration of Energetic Potential in Flevoland 2050”	Posad	2015
3	Province Friesland	“Energy & space workshops. An exploration of the spatial possibilities for energy transition in the context of the regional energy strategy in Fryslân”	H+N+S Landschapsarchitecten and BügelHajema advisers	2017
4	Groningen	“The Nordic city. Energy transition as a driver for the Next Economy in the city and region of Groningen”	IABR – workshop (collaboration with H+N+S Landschapsarchitecten)	2016
5	Privincie Zuid Holland	“Zuid-Holland on power! Space for the energy transition”	Several design studios: studioMarcoVermulden, Posad, FABRICations, H+N+S Landschapsarchitecten, JA Joubert Architecture	2013
6	Noord Brabant	“Energy Implementation Program”	/	2016
7	Twente	“Twente energy strategy”	Twente municipality	2017
8	Zeeland	“Regional energy & climate strategy”	Unknown	In progress since 2018
9	Metropoolregio Amsterdam	“Spatial exploration for energy transition MRA”	Marco Broekman urbanism, research architecture and Posad	2016/2017
10	Eindhoven	“energy strategy Zuidoost Brabant”	Unknown	2017
11	Cleantech Regio (Apeldoorn, Brummen, Deventer, Epe, Heerde, Lochem, Voorst en Zutphen)	“Towards an energy-neutral city triangle”	Eo Wijers competition to make the Stedendriehoek territory energy-neutral by 2030.	2016
12	Drechtsteden	“Drechtsteden energy strategy to be energy neutral in 2050”	Drechtsteden municipality	2017

13	Energielinie (province nord Holland)	“Heritage in transition. Energy lines”	H+N+S Landschapsarchitecten	2015-2017
14	Hart van Brabant	“Regional energy strategy for Hart van Brabant”	Unknown	2017
15	Hart van Holland	“Heart of Holland energy neutral. In the regional agenda for an environmental vision ”	FABRICations and Posad	Started 2017
16	Holland Rijnland	“Strategy areas, sustainable energy for Holland Rijnland”	Posad	2016
17	Ijsselmeergebied	“Energy strategy in the Ijsselmeer region”	Ijsselmeergebied municipality	2017
18	Midden Holland	“Energy & space workshops”	Posad, V-eld landschap en stadbouw	2017
19	Noord Veluwe	“The Energy Potential map of the Noord-Veluwe region A study into the spatial application possibilities for renewable energy technologies”	Green Spread Advies & Ontwikkeling BV	2014
20	Noord-Holland	“The spatial effects of the energy transition in North Holland”	ECN (not spatial or landscape design firm)	2015
21	Noord-Holland Noord	“Energy and space in North-Holland North. Exploring spatial perspectives for the energy transition in Noord-Holland Noord”	StudioMarcoVermeulen	2017
22	Northeast Brabant	“Agro as de peel”	studioMarcoVermeulen and Alterra (WUR)	2017
23	West-Brabant	“Energy and space in West Brabant”	Posad and H+N+S Landschapsarchitecten	2017
24	Goeree-Overflakkee	“Energy producing Goeree-Overflakkee”	studioMarcoVermeulen	2017
25	Hoeksche Waard	“Hoeksche Waard energy neutral in 2040; a spatial analysis”	BVR advisors	2018
26	Parkstad Limburg	“Parkstad Limburg energy transition” (PALET)	WUR, Hogeschool Zuyd and H+N+S Landschapsarchitecten	2014
27	Texel	“Atelier/Workshop planet Texel”	IABR workshop The design research is conducted by LA4SALE and FARO Architects	2014
28	Utrecht	“Utrecht energy plan”	Utrecht municipality	2015

* Dutch original titles: (1) “Energieelanschappen Drenthe”, (2) “Ruimte voor energie in Flevoland. Verkenning Energetisch Potentieel Flevoland 2050”, (3) “Ateliers energie & ruimte. Een verkenning van de ruimtelijke mogelijkheden voor de energietransitie in het kader van de regionale energiestrategie Fryslân”, (4) “De Nordic city. Energietransitie als aanjager voor de Next Economy in stad en regio Groningen”, (5) “Zuid-Holland op St(r)oom! Ruimte voor de energietransitie”, (6) “Uitvoeringsprogramma Energie”, (7) “Twente energiestrategie”, (8) “Regionale Energie & Klimaat Strategie” (REKS), (9) “Ruimtelijke verkenning energietransitie MRA”, (10) “Energietrategie Zuidoost Brabant”, (11) “Naar

een energieneutrale stedendriehoek”, (12) “Energiestrategie Drechtsteden energieneutraal 2050”, (13) “Erfgoed in transitie. Energielinie”, (14) “Regionale Energie Strategie Hart van Brabant”, (15) “Hart van Holland energieneutralal. In the regionale agenda voor de omgevingsvisie ”, (16) “Gebiedstrategie, duurzame energie Holland Rijnland”, (17) “Energiestrategie IJsselmeergebied”, (18) “Energie & Ruimte ateliers”, (19) “De Energiepotentiekaart van de regio Noord-Veluwe. Een studie naar de ruimtelijke toepassingsmogelijkheden van duurzame-energie-technieken”, (20) “De ruimtelijke effecten van de energietransitie in Noord-Holland”, (21) “Energie en ruimte noord-holland noord. Verkenning van ruimtelijke perspectieven voor de energietransitie in Noord-Holland Noord”, (22) “Agro as de peel”, (23) “Energie en ruimte West Brabant”, (24) “Energieproducerend Goeree-Overflakkee”, (25) “Hoeksche Waard Energie neutraal 2040; ruimtelijke analyse”, (26) “Parkstad Limburg Energie Transitie” (PALET), (27), “Atelier planet Texel”, (28) “Energieplan Utrecht”.

These reports, even if featuring differences in format and contents, have similarities such as an analysis and prospective section for the exploration of explicit spatial repercussions and landscape design solutions for energy targets of the *regio* (e.g. “Energy and space in West Brabant”, “Spatial exploration for energy transition MRA”).

4.2 Exploring landscape components in TEPOS territories

In order to draw up a portrait of the French situation (and to be able to make a comparison between countries) I developed an additional inquiry to examine whether or not TEPOS territories committed to energy goals employ a landscape point of view. For the Dutch case a good overview on how landscape/spatial perspective are addressed in territories undergoing energy transition is given by the survey carried out by the Delta Metropool association, about the *Regionale Energie Strategieën*. In order to deepen the inquiry for the Dutch case, it would have been interesting to study the *Regionale Energie Strategieën* in territories, which for surface and objectives are comparable to the TEPOS network. Even if, how explained above, the *Regionale Energie Strategieën* appear in the *Klimataakkoord*, so they are introduced by national tiers and they cover the entire Netherlands. However, the implementation of these process does not fit within the research schedule, because the process for defining energy strategy in the territories starts at the end of 2018. Moreover, with this inquiry I do not want to jeopardize the ongoing process. Good timing for developing that kind of questionnaire could come in a couple of years (about 2022), when strategies will be fixed and implementation started.

4.2.1 Survey method

For this research we developed a descriptive social survey (Deming and Swaffield 2011, 72) structured by a set of questions (see annex 4 for the complete French and English questionnaire) to identify whether and how territories, engaged in transition to an energy positive situation, consider landscape components and its planning and design as part of the formula for the energy transition. The collection of quantitative data permits to draw an overview about landscape considerations in the French energy transition processes.

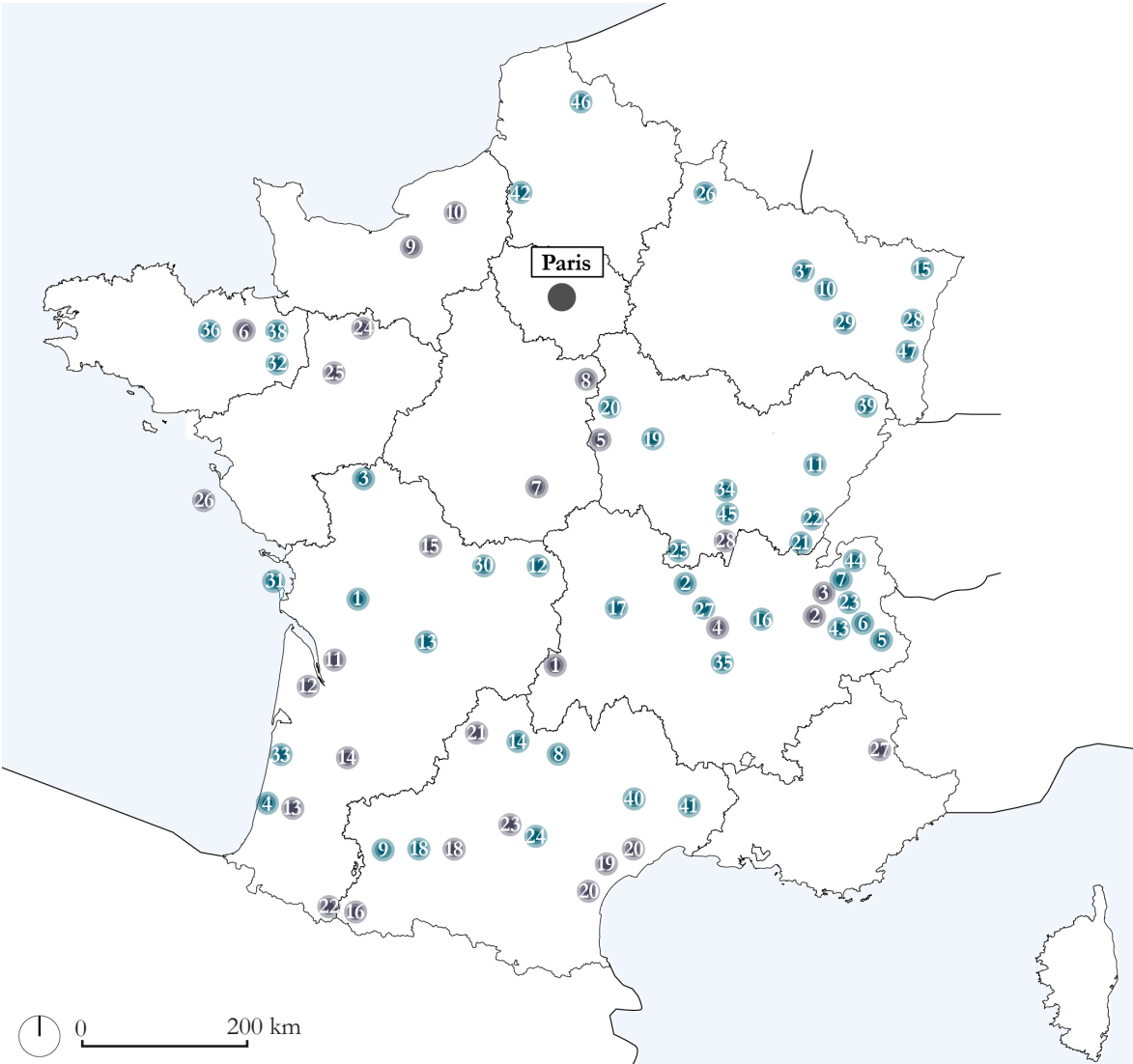
The inquiry was limited to the TEPOS territories network. They have been chosen for this investigation because, they integrate strategic energy issues and systemic commitment to local development, considering both energy consumption reduction and renewable energy production.

Moreover, the territories engaged in this network are well recognized with a project manager supporting the process and making answers more comparable. The two French territories chosen for further analysis (chapters 5, 6, 7, 8, 9) are part of the TEPOS network. The questionnaire consisted of 20 questions; multiple and single-choice questions, but also short open questions.

The first step of the inquiry has been developed during the “8eme Rencontres Nationales des Territoires à Énergie Positive” 8th national meeting of energy positive territories from 26 to 28 September 2018 in Montmelian (Coeur de Savoie). The printed questionnaire was distributed to the attendees of this meeting, focusing to project leaders in charge of development for energy transition processes.

It was considered pertinent to gather data during this meeting, because at this occasion many TEPOS project managers come to explore ideas and learn from several thematic workshops (e.g. urban planning and energy, RE technologies and transportation networks, etc.) and share their

Figure 5. Territories of the TEPOS network (or those in the process) which answered the questionnaire and the TEPOS that did not answer (end 2018 – beginning 2019). Source: author



Legend:

TEPOS Territories who answered the questionnaire

- ① PÉTR du Pays du Ruffécois
- ② Beaujolais vert
- ③ CC du Thouarsais
- ④ MACS la CC Sud Landes
- ⑤ Pays Tarentaise Vanoise
- ⑥ Pays de Maurienne
- ⑦ Communauté d'agglomération Arlysère
- ⑧ PÉTR Centre Ouest Aveyron
- ⑨ CC Astarac Arros en Gascogne
- ⑩ Pays Terres de Lorraine
- ⑪ CC Jura Nord
- ⑫ Est-Creuse
- ⑬ CC Bastides en Haut Agenais Périgord (CCBHAP)
- ⑭ Grand Figeac
- ⑮ CC Sauer-Pechelbronn
- ⑯ Le Grésivaudan
- ⑰ Clermont Auvergne métropole
- ⑱ PÉTR Pays Porte de Gascogne
- ⑲ CC Bertranges et com com Haut Nivernais-Val d'Yonne
- ⑳ CC de Puisaye-Forterre
- ㉑ CC Jura Sud
- ㉒ CC Haute Jura Arcade
- ㉓ Coeur de Savoie
- ㉔ Pole territorial de l'Albigeois et des Bastides
- ㉕ CC le grand Charolais
- ㉖ CC Cretes Préardennaises
- ㉗ CC Monts du Lyonnais
- ㉘ Commune de Muttersholtz
- ㉙ SCoT Vosges Centrales
- ㉚ Pays du Haute Limousin
- ㉛ CC de l'île d'Oléron
- ㉜ CC Roche Aux Fées
- ㉝ CC de Mimizan
- ㉞ CC de Pouilly-en-Auxois
- ㉟ Valence Romans Agglo
- ㊱ Commune Le Mené
- ㊲ PÉTR Coeur de Lorraine
- ㊳ Pays de Fougères
- ㊴ CC Rahin et Chérimont
- ㊵ PNR des Grands Causses
- ㊶ TEPCV Galeizon, Hautes vallées cévenoles
- ㊷ CC de la Picardie Verte
- ㊸ CC du Trièves
- ㊹ Grand Chambéry (Chambéry/Annecy/Baurges)
- ㊺ CC Sud Cote Chalonnaise
- ㊻ Mairie de Loos-en-Gohelle
- ㊼ CC de la Vallée de Kayzersberg

TEPOS territories who did not answer to the questionnaire

- ① CC du Pays de Salers
- ② Biovallée
- ③ Nord-Isère durable
- ④ CC du pays Mornantais
- ⑤ PÉTR du Pays Graylois
- ⑥ CC du val d'Ille-Aubigné
- ⑦ Mairie de Saint-Georges-sur-Arnon
- ⑧ Pays Gatinais
- ⑨ Intercom Bernay Terres de Normandie
- ⑩ Mairie de Malaunay
- ⑪ CC de la Haute-Saintonge
- ⑫ Conseil départemental de al Gironde
- ⑬ CC des Landes D'Armagnac
- ⑭ CC Coeur Haute Lande
- ⑮ Mairie de Buxerolles
- ⑯ PNR des Pyrénées Ariégeoises
- ⑰ PNR Narbonnaise en Méditerranée
- ⑱ PÉTR Pays du Sud Toulousain
- ⑲ CC la Domitienne
- ⑳ Commune de Celles
- ㉑ PNR des Causses du Quercy
- ㉒ Parc National des Pyrénées
- ㉓ Syndicat mixte du Pays Midi-Quercy
- ㉔ CC du Mont des Avaloirs
- ㉕ GAL Sud Mayenne
- ㉖ Commune de l'Île d'Yeu
- ㉗ Conseil départemental des Hautes-Alpes
- ㉘ Pays Serre-Ponçon Ubaye Durance
- ㉙ Commune de l'Île d'Yeu
- ㉚ Conseil départemental des Hautes-Alpes
- ㉛ CC du Clunisois

 Regional border

experiences. Groups of people were approached with a brief explanation about the research project and to help find the target person that could best answer the questionnaire. Generally speaking, the questionnaire raised curiosity and interest in it convinced the majority of people to agree to answer.

A total of 33 questionnaires were filled in. Five of them were not analyzable because information was missing about the TEPOS name they were working on. Of the 28 analyzable questionnaires, 14 territories concerned were members of the TEPOS network, while 14 territories elaborated energy transition goals and developed them to different extents into energy focused actions in line with TEPOS objectives, philosophy and were in the process of joining the TEPOS network. In our data processing we also included this second category of territories considered pertinent because of their objectives along with the implementation of several actions.

The second step of this inquiry consisted in sending an on-line questionnaire (Dillman 2013) to the territories that we found missing from the previous step between January and February 2019, by looking at the TEPOS list (2018) and thanks to CLER network collaboration. In this way, we added 19 answers to our database for a total of 47 answers where each one represents a territory, where 33 already belong to the TEPOS network and 14 are in the process of joining (at the time of writing). Considering that the number of territories that adhere to the TEPOS network in 2018 are 65, the number of answers represents a good and representative sample of 51% of TEPOS members with the additional data of 14 in the future.

Figure 5, represents the TEPOS that answered the inquiry and those that did not. The TEPOS territories are located across all of France even if there is a higher number in the regions of Auvergne-Rhône-Apes and Nouvelle Aquitaine. This could be connected to the fact that some regions: Aquitaine, Bourgogne, Rhône-Alpes, before the merging due to the territorial reform Law NOTRe, launched in 2012 a call for TEPOS project in collaboration with the ADEME, encouraging territories to commit to the process.

Thanks to this inquiry we have been able to collect insights from TEPOS project managers about landscape perspective beyond the existence or absence of documents/projects linking landscape and energy transition.

4.2.2 Landscape concerns in TEPOS territories: an assessment

This section presents the results of questions about the energy transition process, if and how landscape concerns were associated with the process of achieving TEPOS goals and if and how environmental designers, especially landscape architects, were associated with the process.

4.2.2.1 Commitment in the energy transition process

The figure 6 illustrates the year of the beginning of the transition process in the territories. In some territories the first energy transition conscious actions go back more than 20 years. Particularly Montmélian city which has since 1983, been promoting and developing solar energy, even if a more global approach to the transition was adopted later around 2007. However, an increasing number of territories committed to ambitious energy goals to produce RE and save

energy began in 2009 and 2010. These are the years of the “Grenelle de l’Environnement” one in 2009 (three territories) and two in 2010 (five territories). These laws empathize the planning concerns about energy issues at local/territorial scale (see chapter 3). Moreover the 2010 was also the founding year for the TEPOS network. In 2013, several territories (five territories) committed to the process. This is probably because several regions (e.g. Poitou-Charentes, Rhone-Alpes, etc.) in collaboration with the ADEME lunched a call for projects to encourage territories to become TEPOS, and were allocating money for energy assessments, roadmaps and projects. Another spike in territory commitment happened in 2015 (11 territories) coinciding with the law “loi transition énergétique pour une croissance verte” (LETCV). Presumably thanks to the TEPCV call for projects promulgated by the ministry, now called Ministry of ecological and solidary transition, providing funding to develop renewable energy production, reduced energy consumption or improvement on energy efficiency within the territory. Since 2015, other local institutions decided to commit their territories to the energy transition process, where the TEPCV call for projects was lunched again in 2016 and 2017, but not renewed afterwards. If figure 6, data suggests that many local institutions seized the economic funding opportunity to start an energy transition process, figure 7 (next page) shows the trigger factors which contribute to committing the local institution to the energy transition process and to become TEPOS, is

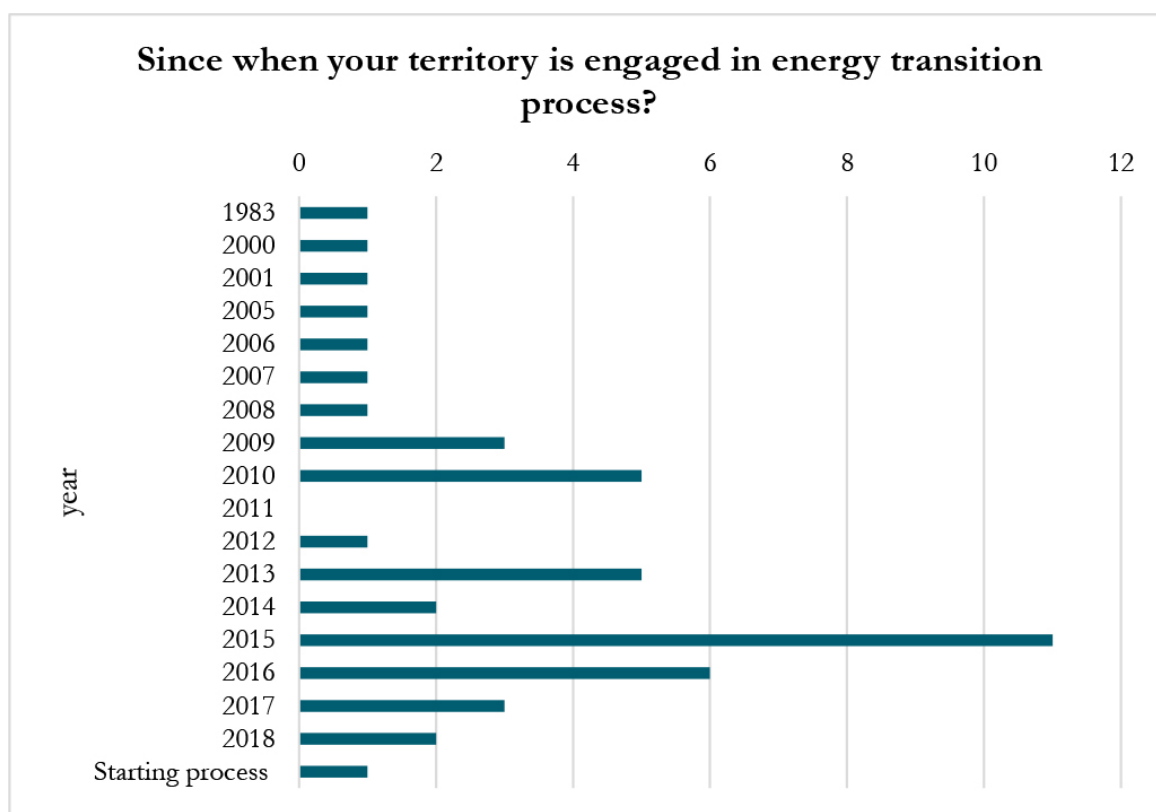


Figure 6. Year of commitment for territories to an energy transition process. Source: author from online inquire 2018-2019

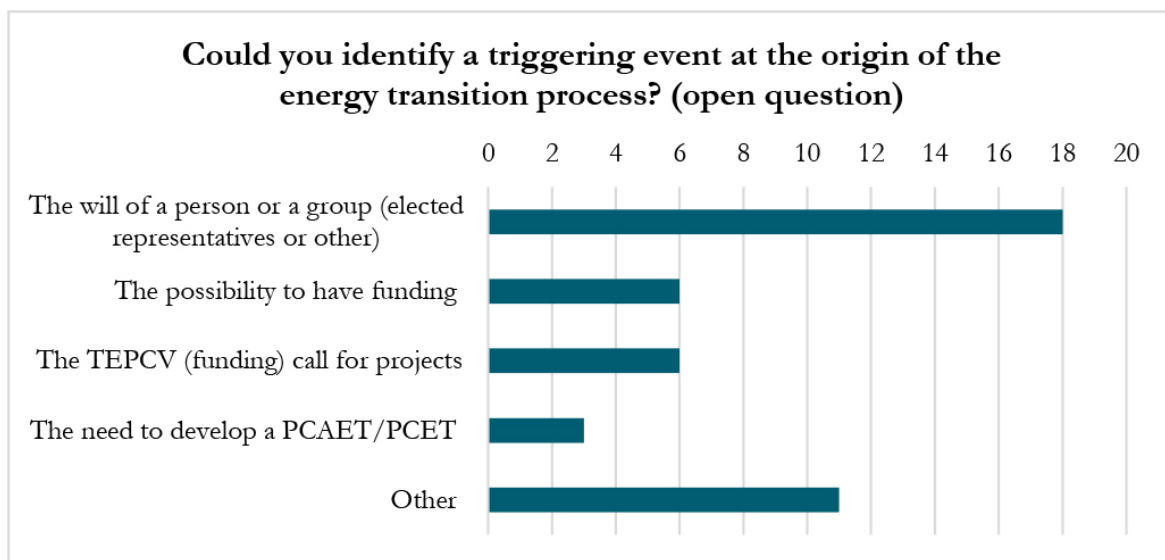


Figure 7. Question about the triggering event at the origin of the energy transition process within the territory. Source: author from online inquiry 2018-2019

primarily associated with the presence of a person, or group of persons, that decided to start the process (18 times). Often it is mentioned that an elected representative, but in some cases also persons from the technical services department did so. This is not in contradiction with the precedent results, where one person raises awareness about the energy transition themes in the territory allowing to seize an economic opportunity. Actually, several territories directly brought attention to the economical aspect as a trigger factors originating from the call for projects, made by the ADEME or the regions, and mainly by the TEPCV call for projects, launched by the ministry of ecological and solidary (6+6 times). Finally, for three territories, local institutions seem to commit to the energy transition process because the institutional obligation to develop a PCET, now called PCAET, planning instruments, that define the energy/climate goals and strategies to be achieved by the territory (for more detail see chapter 3). Other respondents mentioned local events such as the construction of energy producing facilities as a prompt.

In connection to the process, we asked if from a planning point of view, the existing planning instrument promotes the transition process and interestingly the opinions are quite divergent. While 29% of the respondents consider that the planning instruments promote, another 29% are undecided, where most respondents, 42% consider that the instruments slow down the transition process (figure 8). The reasons listed are many and different, but a recurrent topic for affirming that they slow down the process is that there are too many rules and that a lot of money is used for the planning and definition of strategies and objectives but not enough for implementation in the territories. The answers are equally very different about “promotion” answers. However, in this case as well a topic that emerges is the fact that planning instruments could include compulsory rules about energy development that bind local authorities to commit to them.

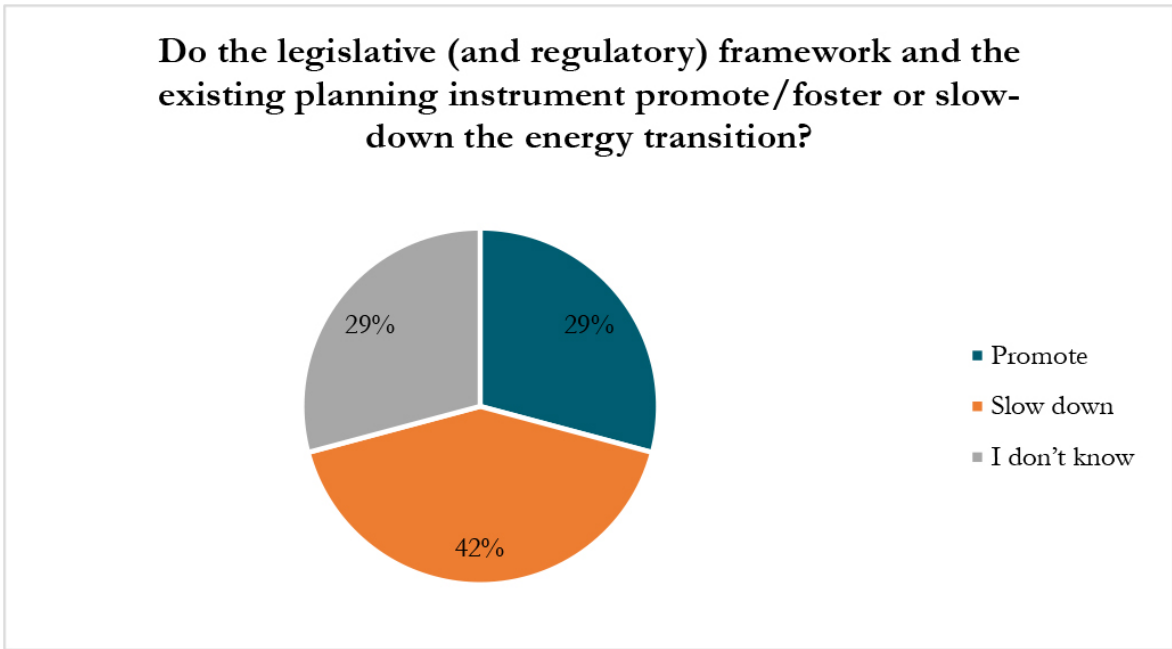


Figure 8. Question about the perception of the legislative and regulatory framework for the energy transition process. Source: author from online inquiry 2018-2019.

4.2.2.2 Landscape

When respondents were asked whether landscape was taken into account during the transition process, figure 9 shows that most of the respondents (54%) answered positively. However a non-negligible part (38%) consider that landscape has not been taken into consideration and an additional 8% state that they do not know. This result shows that landscape is not something directly and easily associated with the transition process.

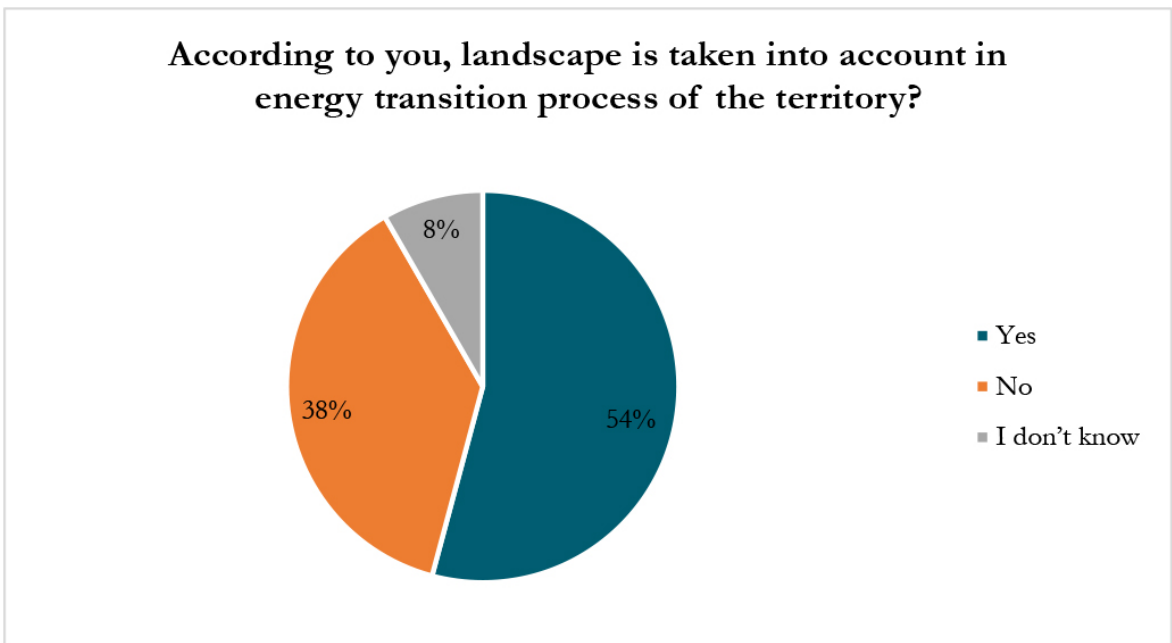


Figure 9. Question about the take into account of landscape in the energy transition process of the territory. Source: author online inquire 2018-2019

Furthermore, as it can be seen from figure 10, a great number (15) of TEPOS project managers affirm that energy landscape is not really taken into account in the energy transition process of their territory. However, another 10 affirm that there is an attempt to integrate energy subjects in planning instruments even if this does not imply direct association with landscape, but at least with space management and land use. Interestingly, eight respondents affirm that on their territory, a draft is being made or it is undergoing elaboration for a *plan de paysage* or a *charte paysagère*, showing a more specific and direct connection with landscape, potentially representing a design perspective. Finally, other respondents specify actions that are linked to several sectors, mainly agriculture, such as a schema for *bocage* planting, in order to develop wood-energy sector, which could greatly affect landscape even if not directly connected to it.

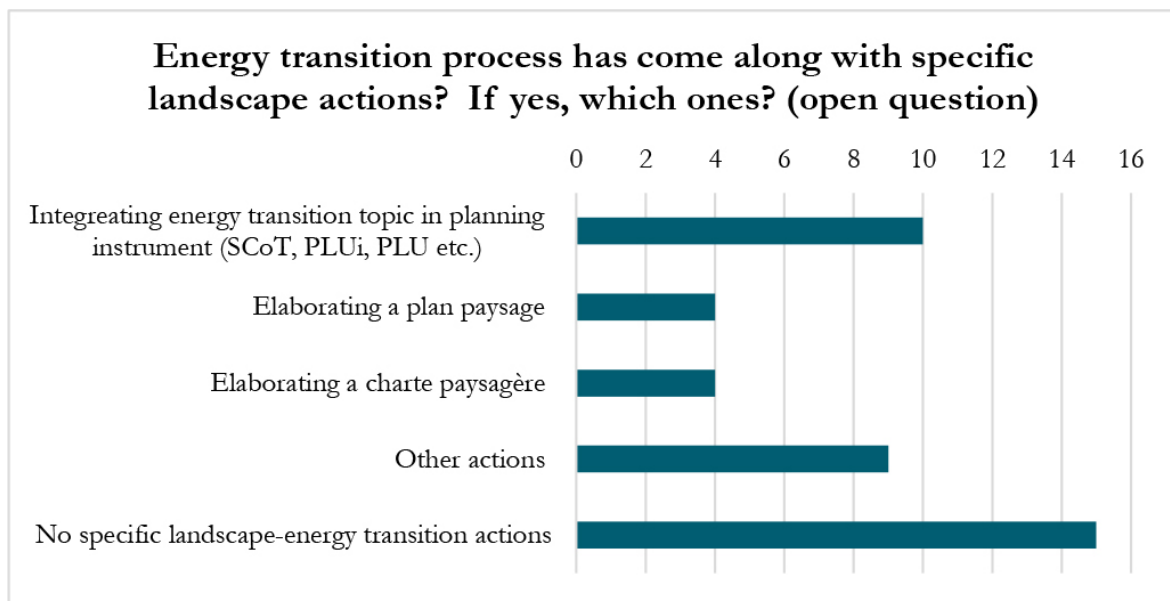


Figure 10. Question about specific landscape actions going along with the energy transition process. Source: author online inquiry 2018-2019.

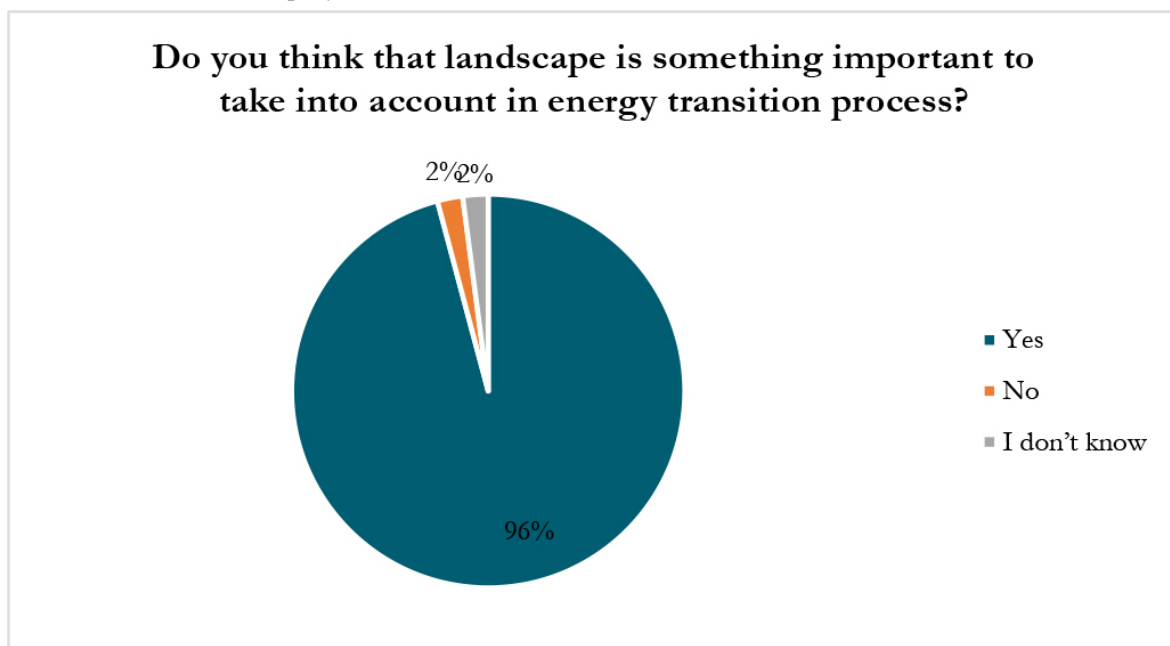


Figure 11. Question about the importance of taking landscape into account in energy transition process. Source: author from online inquiry 2018-2019

However, 96 % of respondents indicate landscape as something important to be taken into account in the energy transition process, as illustrated by figure 11, even if the connection, according to previous results is still underdeveloped. This seems to show an existing gap or mismatch between what is happening in the territory and possible aspirations. This seems to be an encouraging result for a future possible closer connection between landscape concerns and the energy transition process.

When asked specifically, through an open question, why they consider landscape important, the main reason highlighted is attached to socio-cultural perspectives (24 times), for which we mean the relational point of view established between landscape and people. This concerns aesthetic judgments but also a sense of identity and belonging. In this category the reason most emphasized for taking into account landscape is to increase/facilitate the local acceptability (14 times) and refers to landscape modifications developed during the transition process.

“Without taking landscape into account, there is a risk of difficulties with the project’s acceptability and, of course, there is the need to protect landscapes”¹⁴ (Pays de Fougères, 2018)

“If the energy transition degrades the landscape then the chances of getting there are greatly reduced. If the energy transition improves the landscape, it makes it more attractive, then it can work for sure!”¹⁵ (CC des Monts du Lyonnais)

This is connected to the idea that landscape must be considered in order to preserve it or to reduce the impact of the process towards TEPOS goals on it. Indeed several responses (four times) focus attention on the negative impact that some actions taken could lead to in order to achieve the transition goals, referring primarily to the implantation of renewable energy technologies.

“Some actions related to the energy transition could negatively impact the landscape. For example, the massive implantation of ground-based photovoltaic parks that replace the forest”¹⁶ (CC de Mimizan, 2019)

Interestingly, two respondents give another point view, pointing out a more active role for landscape as a mediator, a shared tool that would make the transition process easier and more understandable for local inhabitants.

“Because it allows to speak about the energy transition by door that speaks to everybody, which everyone could appropriate, and that allows to project ideas (in the past and in the future).”¹⁷ (Syndicat mixte du

14 “Sans prise en compte des paysage, risque de difficultés dans l’acceptabilité des projets et bien évidemment, nécessité de protection des paysages”

15 “Si la transition énergétique dégrade le paysage alors on limite considérablement les chances d’y arriver. Si la transition énergétique améliore le paysage, le rend + attrayant, alors ça ne peut que marcher !”

16 “Certaines actions liées à la transition énergétique peuvent impacter négativement le paysage. Par exemple, l’implantation massive de centrales photovoltaïques au sol qui viennent se substituer à la forêt.”

17 “Car il permet de parler transition énergétique par une entrée qui parle à tous, que tout le monde peut s’approprier, et qui permet de se projeter (dans le passé et dans l’avenir).”

SCoT des Vosges Centrales, 2018)

“Inhabitants and elected representatives are very attached to their landscape heritage, so it is a field that quickly creates an easy dialogue and an effective awareness about the constant evolution of our society and its ability to change models.”¹⁸ (CC Sauer-Pechelbronn, 2018)

Moreover, in three answers another reason could be identified that emerges from an environmental perspective, meaning how landscape concerns could support reducing human pressure over other living-natural environments (e.g. biodiversity, reducing greenhouse emissions).

“Landscape translates the spatial organization by human activities so is related to the preservation of all natural spaces, and to the consumption, and to energy production.”¹⁹ (Clermont Auvergne métropole, 2018)

“Yes, because landscape reflects the management of Man on his environment. A poor landscape (Beauce type nowadays or plain of the Marne) shows us only large agricultural plots, poor in biodiversity, with very limited landscape interest and greedy in energy [high energy consuming] to keep it as it is (input minerals, phytosanitary products (fertilizers), fuel consumption for tractors A rich landscape (Cotentin bocage for example) allows us to valorize the wood of bocage, to limit the input of agricultural supply (services provided by biodiversity).”²⁰ (PETR Coeur de Lorraine, 2018)

Two respondents also call attention to an economic reason for considering landscape, in order to continue to attract people for tourism.

“Landscape is more important for tourism questions”²¹ (CC Astarac Arros en Gascogne, 2018)

4.2.2.3 Landscape design

Several inquiry questions are devoted to understanding whether environmental designers collaborate on the roadmap for the transition process and/or on its implementation process. When the TEPOS project managers were asked about collaboration with environmental designers (figure 12) the majority (54%) answered positively, even if almost half, a non-negligible amount, responded negatively (44 %). This seems to suggest that even if some collaboration exists, it is still not the general practice.

18 “Habitants et élus très attachés à leur patrimoine paysager, donc domaine qui crée rapidement une facilité de dialogue et une prise de conscience efficace sur l'évolution constante de notre société et sa capacité à changer de modèle.”

19 “Le paysage traduit l'organisation de l'espace par les activités humaines donc est lié à la préservation des espaces naturels, à la consommation, production énergétique.”

20 “Oui car le paysage reflète la gestion de l'Homme sur son environnement. Un paysage pauvre (type Beauce de nos jours ou plaine de la Marne) nous montre uniquement de grandes parcelles agricoles, pauvres en biodiversité, d'un intérêt paysager très limité et gourmand en énergie pour le maintenir en l'état (intrans minéraux, produits phytosanitaires, consommation en gasoil pour les tracteurs.... Un paysage riche (bocage du Cotentin par exemple) nous permet de valoriser le bois du bocage, de limiter les apports d'intrants (services assurés par la biodiversité).”

21 “Le paysage à de l'importance plus pour des questions touristiques”

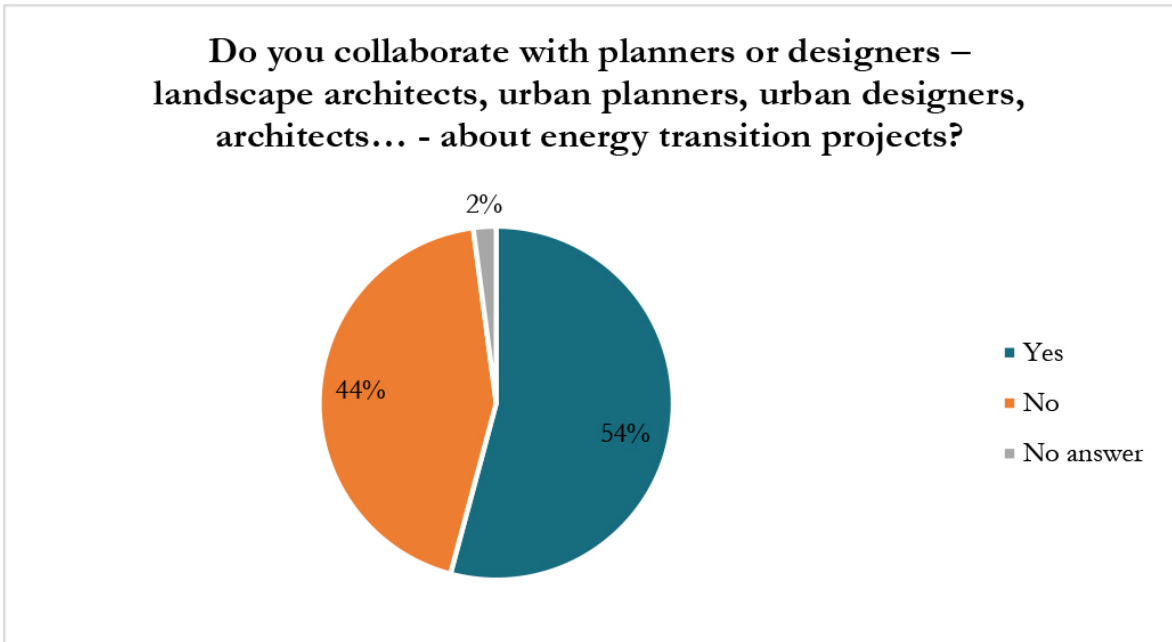


Figure 12. Question if TEPOS project managers collaborate with planners and designers concerning energy projects. Source: author from online inquiry 2018-2019

In order to have a better understanding of the kind of environmental designers working on energy projects we asked project managers to specify what kind of environmental designers are working on the TEPOS implementation. Figure 13, reveals a greater involvement of architects (67%) and urban planners (65%), followed by landscape architects (44%). Just a small number of respondents affirm that any environmental designer is working on the process (6%) and only few do not know about their implication (10%) in this process. The mention of these different environmental designers suggests that in the territory energy focused projects are developed, or are developing, at several scales, from the building scale, to the neighborhood scale to urban areas or even over the whole territory.

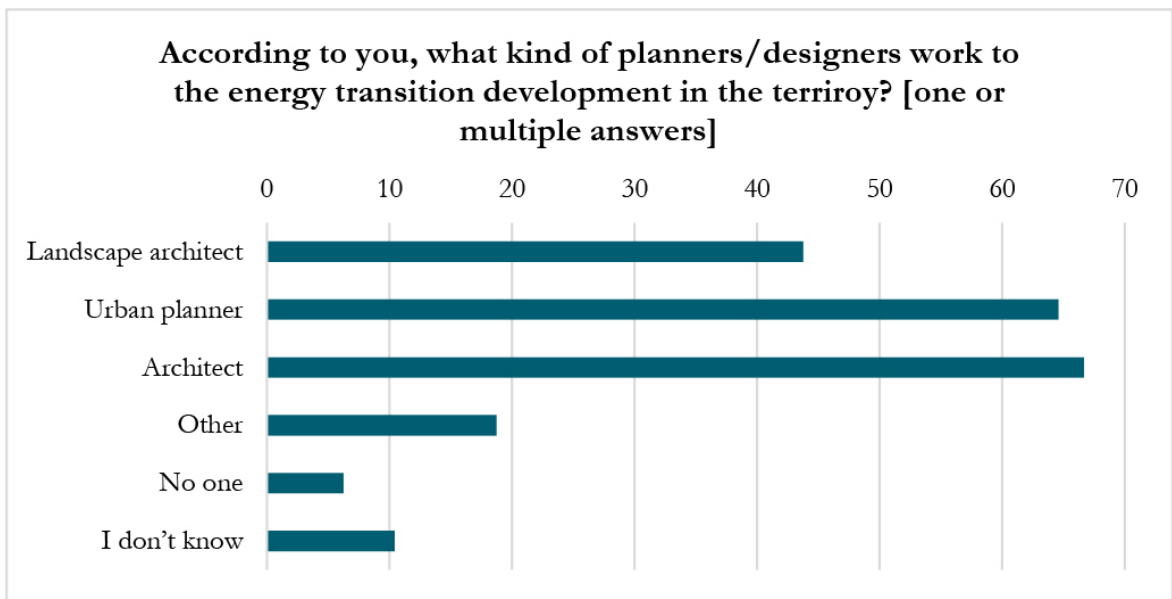


Figure 13. Question about the kind of planners/designers working on energy transition development in TEPOS. Source: author from online inquiry 2018-2019.

Subsequently, we questioned them more specifically on the landscape architect’s role in energy transition, because of the focus and goal of this research (practice that we discuss broadly in part 3). Figure 14 provides an overview of the different types of projects landscape architects are working on in TEPOS territories. This profession is recognized as most often working on “environmental impact studies for renewable energy production equipment” (17 times) and “Integrating energy landscape in planification/planning instruments: PCAET, SCoT, PLUi...” (16 times), followed by “Slow Mobility (e.g. public transportation, bicycle paths ...)” (11 times). This shows quite a broad range of projects from site implementation to a more strategic level, across sectors through planning instruments. However, a non-negligible number of respondents (13) affirm not knowing about the kind of contribution landscape architects make in the transition process, showing again how their contributions are not fully acknowledged by agents working on the TEPOS objectives. This is revealing in some way of a still limited articulation between the establishment of TEPOS goals roadmap with a conscious landscape planning and design.

If one or more landscape architects work to development of energy transtion, specify what kind of project: [one or multiple answers]

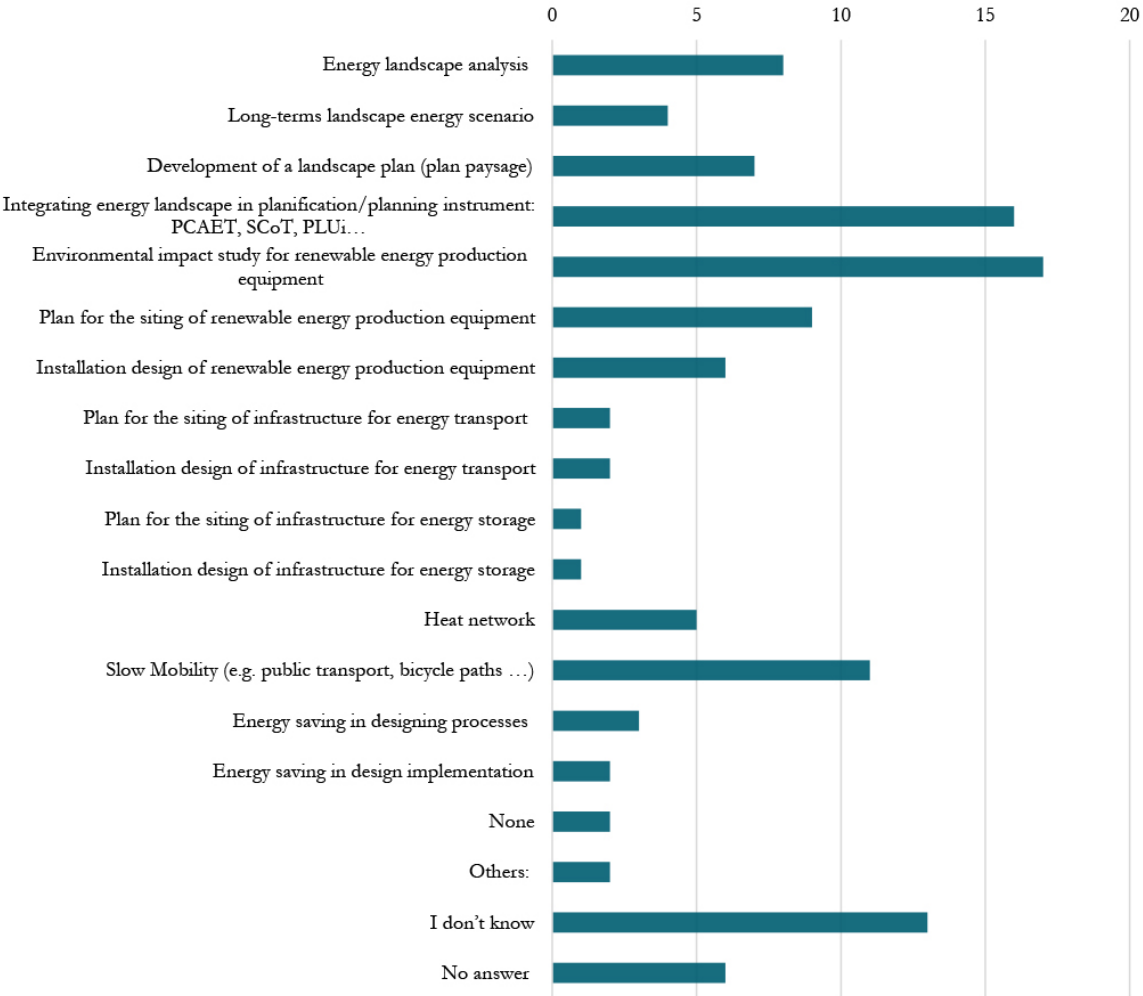


Figure 14. Question about the kind of energy project where landscape architects are working toward TEPOS goals. Source: author from online inquiry 2018-2019.

However, when respondents were asked whether they consider it useful to collaborate with landscape architects in the transition process (figure 15), even if it was still not the case in their projects, the majority (53%) gave a positive answer. Nevertheless, a total of 24% of project managers affirmed not having a clear opinion about the possible value of collaborating with landscape architects and an additional 21 % respondents did not answer the question. These answers could reveal a lack of knowledge about the landscape architecture profession and the contribution that could be made for the energy transition process in territories.

4.2.3 A wish for landscape in TEPOS territories?

The research presented in this section investigates whether and how landscape is a matter of concern in TEPOS territories and if environmental designers are associated to the process. It is necessary to remember that this inquiry collected point of view issued from TEPOS project managers, that could have some lack of knowledge about all the experts working on the TEPOS even if, because of their manager mission have a broad and global vision about the process and the sectors and agents working on it. Nevertheless the very fact of questioning them, which are among the leading agents in the transition process, is a first attempt to understand whether landscape is or could be a matter of concern from the perspective of people that are not specialist or particularly involved in the landscape perspective but which are well placed for future integration and development between landscape and energy transition. Firstly, the inquiry reveals that landscape focused documents that were developed at a territorial scale in connection with the energy transition process, are few, such as the *plan de paysage*. Nevertheless, respondents seemed open-minded and interested about a more integrated approach that includes landscape in the process, seeing in it different values, such as the idea that landscape could support to increase local acceptability of RE technologies. Even if the connection is weak this general tendency seems encouraging and may give results in the year to come.

Secondly, even if some environmental designers are recognized as working in connection to the TEPOS territorial goals, as well as landscape architect professionals, a high number of respondents that do not express an opinion (“I don’t know” or no answer figure 15). This shows that generally speaking, the collaboration and the involvement of landscape architects in the energy transition process is still not well established and/or not well recognized yet.

Nevertheless, when recognized landscape architects seem to be involved both in strategic thinking, for example through *plan de paysage* development or through their contributions to planning instruments, that in specific site projects such as the environmental impact studies for renewable energy facilities implementation.

4.3. Landscape perspective in territories engaged in energy transition in France and the Netherlands: summing it up

The goal of this chapter is to give a portrait of the general situation in France and in the Netherlands in order to better situate and appreciate the results of the three territories analysed in the next chapters. However some similarities and differences could be highlighted, which allow to draw some lessons.

4.3.1 Gouvernance

In both nations, the territorial scale is now addressed as important in the definition of energy transition goals in combination with landscape component. We could see this through explicit action for energy transition as addressed in the call *plan de paysage* of 2019 and 2020 in France and in the Netherlands through the explicit “spatial quality” and “spatial principles” requested for the *Regionale Energie Strategieën*. It is also true that in this last document “spatial quality” needs to be addressed and the word landscape is not used directly. However the use of the idea of “quality”, goes beyond the idea of space as quantitative surface for energy strategies implementation. Moreover, the involvement of several landscape architect offices or other firms in which landscape architects’ work seems use an approach very similar to the landscape one.

However, differences in the compulsory aspect of landscape component exist in the two nations. In the Netherlands it is compulsory to take into account “spatial quality” component in order to establish and support energy goals in the *Regionale Energie Strategieën* framework. For this reason many environmental design offices have been commissioned to explore this relation.

Instead in France, the decision to undertake a *plan de paysage* is discretionary as well as the idea to treat energy transition within it, even if it is encouraged. However, the obligation to develop a PCAET remains for a great number of territories and imposes the definition of short-term energy goals but for which the spatial/landscape component is not treated as compulsory. Nevertheless, landscape and a possible connection with energy transition could be addressed in other planning instruments such as the SCoT and the PLUi, but they are not energy transition focused (see chapter 3).

So some similarities could be seen between the *Regionale Energie Strategieën* program and the PCAET, as are the territorial scale of intervention and the goals, and defining both short and long-term energy goals for the territory and a program to achieve them. But a main difference lies in the fact that the first must address compulsorily spatial quality/landscape, while in the second does not. This seems to illustrate a difference of opinion/value towards the benefit/advantage of addressing landscape components in France and the Netherlands, where it is seeming more integrated in the second. This could be due to the different geographical characteristics of the two nations, where in the Netherlands, considering space and landscape while defining strategies has always been a sort of necessity given its high density population (van der Cammen, et al. 2012) and today challenges, such energy transition seem be no exception.

However the fact that the *Regionale Energie Strategieën* is still in a step on objectives and documents definition, leaves a certain amount of uncertainty around the program. And it leave open the

question on how to make operational the goals stated in the program and how these spatial/landscape energy transition components are translated in a binding way. Some Dutch researchers advocate a clear and explicit manner for taking landscape into account also in the phase of implementation of the *Nationale Klimataak*, a take into account that for now is perceived as still uncertain and not clearly defined (e.g. Dekker and Jongman 2019).

In recent years in the Netherlands, a progressive shifting back in the planning system it has been observed toward an approach providing national planning guidance while being responsive to the territories' desires and characteristics (Balz and Zonneveld 2018). Concerning the energy transition process the *Regionale Energie Strategieën*, under the *Nationale Klimataak* seems to belong to this approach and to continue in this way.

In France, “territorialization” of landscape is considered both as the broadening of the scale from garden to territory and as an approach to territories based on the construction of inhabited space and policies that make sense for individuals, has been acknowledged (Davodeau 2011). At the same time, energy-climate issues through their integration in planning documents (e.g. PCAET) are leading territories to address the topic even if obstacles strongly dependent on the territory and its actors are recognized (Richard et al. 2019). In this context, according to this research the energy transition topic could be seen as continuing to strengthen this dynamic “territorialization” of landscape. Nevertheless the main reason to encourage taking a landscape perspective in energy transition into consideration seems to be, according to our TEPOS survey, mainly linked to landscape heritage and natural preservation in order to not compromise local “social acceptability” due to changes that transition could bring in order to prevent a NIMBY syndrome (van der Horst 2007). The idea of “social acceptability” it is nowadays strongly put forward by local institutions to prevent possible local protest especially concerning RE technologies implementation (e.g. Fortin and Fournis 2014; Nadaï 2007). However the role of the *plan de paysage* is more extensive than that, and it has the goal to proactively connect territorial projects with its landscape (Follea 2001; Gorgeau 2001). So probably a better acknowledgment of this document and its objectives could strengthen a better understanding of its purpose and potential by energy transition agents, possibly reinforcing the role of landscape architects in territories.

4.3.2 Landscape architects involvement in energy transition process

Landscape architects' implication to support the development of energy transition goals in territories does not seem to be an established practice in France nor in the French TEPOS. On the contrary, in the Dutch *Regionale Energie Strategieën*, they are actively involved in the process. The French context seem to be in line with other situations analyzed in Europe where landscape architects are mainly involved in “operational” projects such as low level single projects, for example the elaboration of landscape impact of RE technologies (de Waal and Stremke 2014), compared to a proactive long term planning and designing of the large scale landscape. Instead the Dutch context seems to be more favorable for designers, even if it seems that the projects and strategies are mainly assigned to some lead offices, proficient on energy topics. This could originate from the fact that Dutch landscape architects have been historically, particularly since the 40-50's, involved in strategic large scale landscape planning and design (de Jonge 2009),

so the fact of involving them in the energy transition at a territorial level could be seen as a continuity with their past role in society²². However also in France, researches have put forward the importance of environmental designers in energy transition process of territories as able to lead individual projects to collective project (Debizet and David 2018). The inquiry in TEPOS territories acknowledges an interest by TEPOS local agents to take landscape into consideration during the energy transition process, many of them featuring it as useful to collaborate with landscape architects. This, along with the progressive encouragement to develop *plan de paysage* that treats energy transition topics, seems to show promise for their involvement in years to come.

Box 4. Contribution of chapter 4 to the part 2 research question

This chapter aims to provide an overview of the existing connection between energy transition process and landscape in territories in France and the Netherlands.

In both nations, a combination of the energy transition topic with its landscape component at territorial scale is observed and it is encouraged by the national institutional level. We could see this in France, through the explicit action for energy transition addressed in the call by the Ministry of ecological and solidarity transition for the *plan de paysage* of 2019 and 2020 and in the Netherlands through the explicit “spatial quality” requested in the elaboration of the *Regionale Energie Strategieën, by the Nationale Klimataakkoord*.

However, differences in the compulsory status of this landscape component exist in the two nations. In the Netherlands it is compulsory to take into account the qualitative spatial component in order to establish and support the energy goals in the *Regionale Energie Strategieën* framework. For this reason many landscape architecture offices have been commissioned to explore this relationship. While in France, the *plan de paysage* and the idea to treat it with the energy transition, even if encouraged is not compulsory, and the document is not binding. Moreover in the PCAET, the energy focused planning document, there is no indication given on the necessity to address requirements from landscape perspective.

Nevertheless, the survey made in TEPOS territories, points out that landscape is considered by agents as important and needs to be taken into account in energy transition, and this seems to be encouraging results for future development. However the collaboration and the involvement of landscape architects in the energy transition process in France, TEPOS seem still not to be broadly addressed, while in the Netherlands landscape architecture firms have been hired to participate in the elaboration of the *Regionale Energie Strategieën*, showing their clear involvement in the energy transition process of territories.

²² The subject of landscape architecture practice in France and the Netherlands in the framework of energy transition process is the subject of the third part of this research, where it is described more widely

CHAPTER 5: Three surveyed territories

This chapter focuses on the description and analysis of three territories engaged in energy transition, two in France and one in the Netherlands. First the method and research materials are explained. Secondly, I present the main characteristics of the territory - social, geographical, landscape along with its current energy transition situation and its energy objectives for the future. The steps towards energy transition undertaken by local institutions are presented, in order to understand the process, the motivation and (if so) how landscape played a role.

The chapter concludes with a crossed perspective of three territories, discussing point of strength and weakness and differences between the French and Dutch context about the process of energy transition, focusing on governance, economical perspective, and the way to ground energy projects based on territorial characteristics. The crossing of cases and perspectives could be useful to learn some lessons, even acknowledging that each territory has its own characteristics and the energy transition process needs to be tailor made. The goal of this chapter, beyond providing some results in itself about the transition process in territories, is to give insights and dress a portrait of the territories analyzed in order to better ground the results that are at the core of the questions about landscape.

5.1. Methods and Materials: Embedded case study

5.1.1 The embedded cases choice

The inquiry is conducted as *research on design* (Brink and Bruns 2014) and based on case study research (Francis 2001), the objective is to advance energy conscious planning and design by drawing conclusion from case studies, in order to learn from them. France and the Netherlands are the cases study countries for this research; the analyzed territories are considered as embedded cases (Yin 2009).

The choices of embedded cases relied on contacts and inquiry with several networks engaged in energy transition at territorial level in France: CLER-Réseaux pour la transition énergétique [Network for energy transition], TEPOS network, Cit'ergie, "La fédération des parcs naturels régionaux de France" [French regional natural park federation] and the Chaire "paysage énergie" of ENSP Versailles. In the Netherlands, the network inquiries were the "Vereniging van Nederlandse Gemeenten" [Association of Dutch municipalities] (VNG), "Regionale Energie Strategieën" [Regional energy strategy] and the research laboratory NRGLab-energy landscape and beyond.

Embedded cases have been selected based on the following criteria:

- The local institution has to be committed in an energy transition process with the objective to be energy neutral or positive.
- To reach the energy goal several strategies and projects must be present in the territory

both for renewable energy producing and energy consumption reduction. In this way the energy transition strategy has been addressed at least through two of its main axes.

- A concern about landscape at large must be displayed/declared at the territorial level. This means that the concern shall not only focus on a site demonstrating wind turbine park implementation.
- Landscape architect/environmental designers must have been involved in the projects at some point during the energy transition process.

Drawing on these networks and criteria, three territories have been selected. In France we chose two territories the *communauté de communes*¹ (CC) of Thouarsais (CC Thouarsais) and the *communauté de communes* of Monts du Lyonnais (CC Monts du Lyonnais) part of the TEPOS network, committed to become an energy positive territory in 2050. In the Netherlands, the municipality of Goeree-Overflakkee has been selected; it has the ambition to be energy neutral by 2020 and energy positive by 2030. These territories are settled in three geographical and socio-economic situations, with differences in time frames in commitment for the energy transition process and implementation and adoption of planning instruments. This allows to put in perspective the process and the tools, providing a wide range of insight and strengthened by its bi-national inquiry. In any case, in order to lead a satisfying comparison, we selected rural territories that are comparable in terms of the surface and context, even if the proximity Goeree-Overflakkee and the CC Monts du Lyonnais to the metropolitan area of Rotterdam and Lyon respectively may affect the energy transition processes.

I chose this kind of situation, because these territories have both agricultural and urban areas, so local institutions have the possibility to create synergies and develop energy actions in both contexts. Moreover, these territories have less dense populated areas that allow implementation of large scale renewable energy technologies, interesting to analyze from a landscape perspective. This could lead to a potentially global vision of energy transition issues.

Currently the implementation of renewable energy in metropolitan cities is quite limited, because of high density populations and lack of available space. However energy production represents a big issue in terms of space usage and landscape concerns. For the objectives of research here, it was an important issue to be analyzed, leading our choices to predominately rural areas: The territories we analyze are characterize by “ordinary” landscape, meaning that they are not the object of particular degree of safeguard for heritage or natural characteristics such as UNESCO label at territorial level. However this does not mean that these territories don't possess specific cultural and natural remarkable heritage or protected landscapes.

The two cases are *Communauté de communes* in France. Goeree-Overflakkee is a municipality, which, in terms of surface coverage is comparable to the former two. Moreover Goeree-Overflakkee consisted of four municipalities merged together in one in 2012. We chose this Dutch case at municipal level, because when considering planning in Dutch situations and their instruments (see chapter 3), it is an important institutional scale for the implementation of spatial/landscape strategies. Considering the influence of the Dutch provincial level in energy transition and

¹ *Communauté de communes* is a French administrative structure grouping several municipalities (communes) through which several municipalities manage together common policies (namely planning) and equipments.

spatial planning matters as well, some insight and explanation on relations between the Province of Zuid-Holland and Goeree-Overflakkee municipality are detailed across the analysis.

The diversities sought in the cases are conscious and driven by the institutional differences between the two nations.

The choice made by analyzing different cases, two French and one Dutch, was made during the initial phases of research, according to the length of the research period spent at Wageningen University in the Netherlands's. The stay was sufficient enough to analyze the Dutch case in an exhaustive/comprehensive way.

5.1.2 Embedded case analysis methods

5.1.2.1 Semi structured interviews

Once the choice of the embedded cases were made, we developed a protocol for semi-structured interviews with agents active in the energy transition process as a research method (Kaufmann 2011). The face-to-face interviews had the double purpose to collect information about the energy transition in the territory and their discourse and points of view about the landscape components in the process. It has been chosen to question a large variety of agents in order to develop a multi-perspective point of view.

I started in the three embedded cases by an interview with the project manager of the energy transition process, in order to have first a global view of the main topic of our research while considering that interviewee would know further people involved in the process to interview as well. For the selection of other people, we combined a snowball technique asking the interviewee for agent names and to identified key institutions.

The interviewed are defined as agents meaning professions that act in order to reach an effect or goal (Stevenson and Oxford dictionary of English 2010), in this research the goal is the energy transition implementation. Researches (e.g. Strengers 2012) have questioned professions agents' role and practice for affecting managing energy demand and households have been also recognized as agents for a smart and sustainable energy transition (Naus, van Vliet, and Hendriksen 2015). Here we refer to energy transition agents to all professional that are in different way and with different degree of involvement acting for the implementation of energy transition in a territory.

I tried as much as possible to question the same kinds of agents in each of the three cases to develop a parallel view of their discourse, but the differences in territories and nations lead to divergences. However in each case, we questioned at least one person from an institutional body (e.g. elected council members), one from a technical service inside the community dealing with the energy project (e.g. in France the project manager for TEPOS), one from an external consultancy (e.g. wind project developer/cooperative, chamber of agriculture, etc.), a private person implementing an energy transition project (we interviewed three farmers) and the landscape architect that had developed the project at territorial scale.

I developed an interview framework concerning the following main subjects:

- the energy transition project being developed
- landscape incorporation and role in the energy transition process
- collaboration with other professions/experts/stakeholders
- source of inspiration and international context
- difficulties, lack of competences for the goals of energy transition implementations
- the role and practice landscape architects/environmental designers in energy transition projects
- the knowledge of urban metabolism, circular economy, *cradle-to-cradle* concepts
- the notion of energy transition landscape

These main categories were constantly addressed throughout the interviews (see annex 5 and 6, for the set of questions asked during the interview in French and English); however, some questions were adapted according to the competences and the role of the interviewee.

The interview process started in early 2017 for the French cases and lasted until spring 2018. The Dutch interviews were conducted between spring and autumn 2017 during the research period spent at Wageningen University in the Netherlands (from March 2017 to October 2017). The interviews lasted between one hour and two according to time availability. In France they have been done in French, and in English for the Dutch case. All Dutch interviewees expressed themselves perfectly understandable English.

The interviews have been fully transcribed in their original language, the extracts quoted in text (where applicable) were translated into English by the author. A total of 30 interviews have been conducted: 11 for CC Monts du Lyonnais, 10 for the CC Thouarsais and 9 for Goeree-Overflakkee (the complete list of interviews for the three embedded cases can be found in annex 7).

I used qualitative coding to analyze the interview content (Miles, Huberman, and Saldaña 2014), starting from the first content based coding scheme that has been furthered, widened and detailed to highlight the various facets of the subject examined.

Some evolution occurred during the one-year interview process. After having conducted the first two interviews, it was evident that some agents had difficulties speaking about spatial and landscape components of energy systems. So, in order to solve the problem, we decided to add at the end of the interview the request to draw an “energy transition landscape”. The act of drawing forced the agents to go beyond the quantitative and technological aspects of the case at hand, and think about the landscape/spatial issues of energy transition, and what they considered to be good planning and designing of it. Many interviewees were initially surprised explaining that they were not able to draw well. Eventually, all interviewees did draw.

Next to the semi-structured interviews, we analysed the planning instruments in each case to understand how the articulation between energy transition and landscape is treated at the institutional level, and in perspective with agents’ discourse. For the French cases we explored planning instruments both at the regional CC scale, and for the Dutch case at the municipal and provincial scales in order to understand whether and how energy transition and landscape are approached at different spatial scales and institutional levels. We also analysed landscape specific

plans such as the French *plan de paysage* as a planning instrument. The differences between the two nations' planning documents allows them to be put in perspective by highlighting potentialities and weaknesses.

Alongside the planning instruments, other kinds of documents and reports were analysed too (e.g. TEPOS application dossier), to deepen and better understand the embedded case.

5.1.2.2 Observation

Moreover, we applied the observation method (Beaud and Weber 2010) while participating in several meetings and workshops in the three territories. The French territories are in the process of updating several of their planning instruments, for example the PCAET pursuant the new French law for energy transition LTECV both in the CC Thouarsais and CC Monts du Lyonnais, but also the SCoT, the PLUi and a *Plan de paysage* in the CC of Thouarsais. So for these two TEPOS it was possible to participate in a PCAET meeting for the CC of the Monts du Lyonnais, and in three ateliers for the *plan de paysage* in the CC Thouarsais.

The observation process of the meetings allowed us to sense the general feeling about the transition process, to better understand the context and to follow the evolution of the process. By picking up on the more sensitive and controversial issues, we were able to determine if and how the approach on the subject has changed.

In the Netherlands, I was invited to a workshop with local agents and stakeholders to discuss future energy transition spatial scenarios, but because of the inaccessibility of the Dutch language following this kind of event wasn't possible. However, in order to have some insight about this content of this workshop we asked several agents that participated in it, to develop its contents during an interview. Moreover, I contacted and have dialogued with the designers in charge of this event (studio Marco Vermeulen).

5.1.2.3 Field visit

Certainly, the semi-structured interviews and the analysis of planning instruments give a good overview of the process in progress and of the developing projects. However, it does not give an exhaustive form of the changing landscape and its features for the energy transition process. So, several field visits of the analyzed territory have been done to directly witness/observe and better understand the projects undertaken. Moreover, these field visits helped to develop more precise questions during the semi-structured interviews and allowing us to understand and visualize projects or place persons during the course of the interviews.

The field visits took place alone and with agents; several were happy to share their knowledge of the territory, thoughts about the change they were witnessing and what that they would like to see in future years in connection with the energy transition.

5.1.2.4 Planning document analyses

We explored the energy transition and landscape connection through the analysis of landscape focused documents (e.g. *plan de paysage*) and the planning instruments for the three embedded cases. We chose this point of entry for several reasons. First, as explained in chapter 3, both landscape and energy transition topics have experienced high development through planning instruments through the past years, but they are not necessarily often connected to one another. An inquiry about the way this connection is developed planning instruments in the three cases, could be of value for highlighting potentialities and weaknesses for future development.

Moreover planning instruments are a framework through which public action and local government is mobilised and expressed, combining technical and social issues (Lascoumes and Le Galès 2005). At the same time planning instruments are also connected to the material and immaterial (social-cultural) processes in territories (Healey 2012; Watson 2009).

So their analysis focuses on questioning objectives and constitutes a way to inquire on the main interest and connection of public actions taken on landscape and their connection to energy transition, merging a bottom-up and top-down approach. The planning documents analysis allow to examine from a pragmatic contextual perspective more “general” concepts or notions synthetized in them (Healey 2012), in our case energy transition.

Planning instruments also carry a future project framework to shape cities and territories, including somehow energy focused operational principles. The exploration of these principles in specific sites could allow learning opportunities and support future initiatives.

The analysis of these principles allows us to develop parallelism to see if connections exist with the concepts (urban metabolism, circular economy, *cradle-to-cradle*) that we explored in chapter 2. Even if this connection is not conscious.

To conclude this survey about planning instruments developed through a bi-national inquiry allows to put in perspective the content of these documents and their capacity to treat energy transition and landscape together. However we acknowledge that a disconnection could exist between what is stated in the planning documents and the territorial dynamic, (economic, political etc.) and could affect the transformation the territory as well.

5.1.2.5 Data triangulation

To ensure the quality of research, the interview findings are triangulated with observations, field visits, meeting participations and document analyses, such as studies, reports and planning documents. Therefore, method is based on the perception collected through agent’s narratives – through words and drawings – and put in perspective with the factual analysis of documents and places.

It is important to emphasize that these complex processes - advancing towards the far horizon in 2030 and 2050 - are ongoing and susceptible to change and modification. This research analysis has been done until the time of writing, so some new updates occurred in territories could not be included in this manuscript.

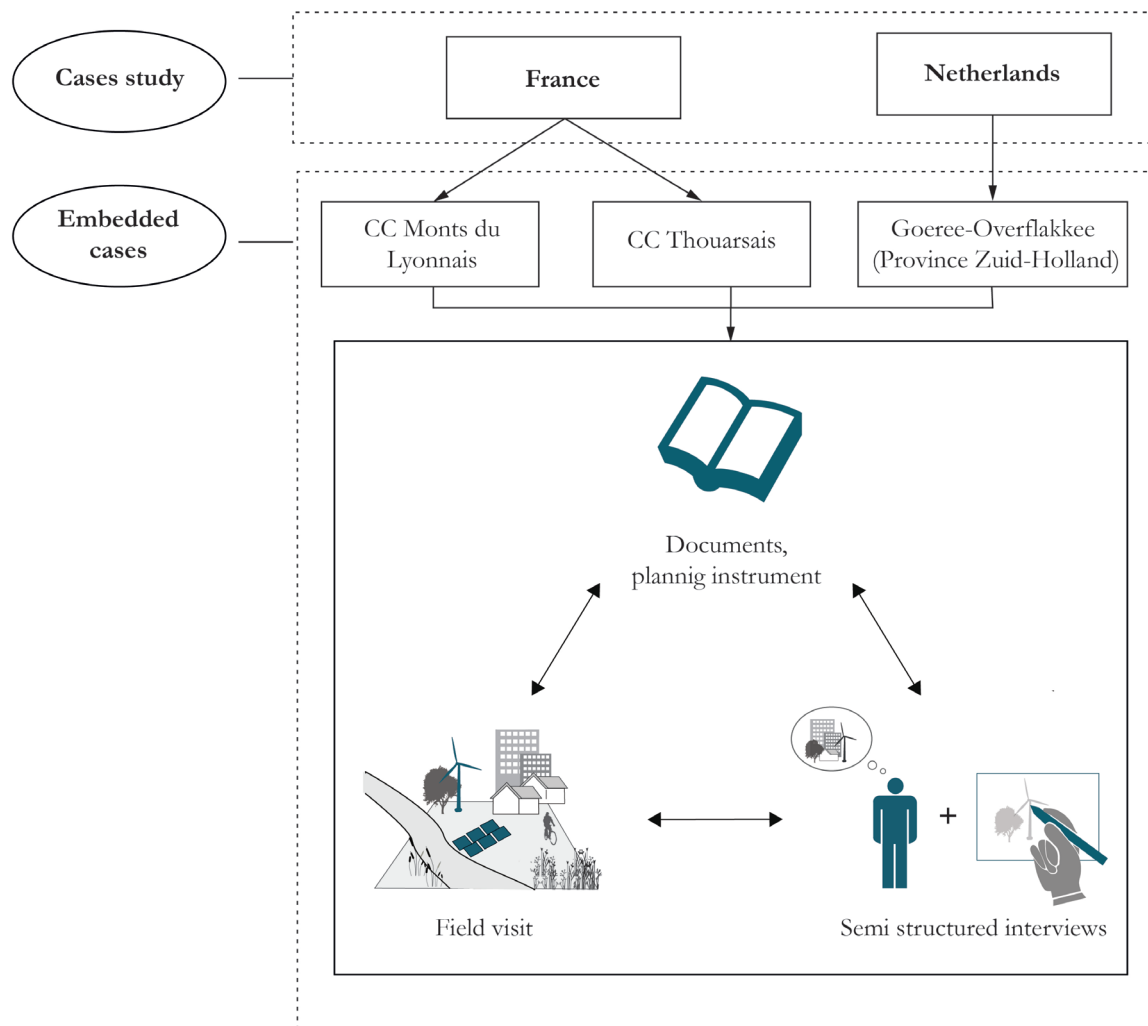


Figure 1. Method triangulation scheme. Source: author

5.2. The process towards energy transition – ambitions and objectives

This section describes territorial characteristics followed by an illustration of the process of energy transition within the three embedded cases: CC Monts du Lyonnais, CC Thouarsais and Goeree-Overflakkee.

First, it gives a general overview of the territory providing some insights about territorial and social dynamics, while also briefly describing its main geographical and landscape characteristics. These elements give general knowledge and understanding of the territory, that could support a better understanding of the reasons and the process by which local institutions committed to and developed their energy goals.

Secondly, the trigger point for each territory is explored where each commits to an energy transition process and steps elaborated to achieve its goals. Here insight is given on reasons that convinced the elected representatives or the technical department of the territories to commit

to the process. Thirdly, the main energy goals and strategies are described in detail. Finally, a comparison between the three cases is provided, identifying similarities and differences.

5.2.1 The CC Monts du Lyonnais

5.2.1.1 Territory

The *Communauté de communes* of Monts du Lyonnais (CC Monts du Lyonnais) is situated in the region Auvergne-Rhone-Alpes and it is composed of 32 municipalities, straddling two departments the Rhone department mainly (25 municipalities) and the Loire department (7 municipalities). The CC Monts du Lyonnais exists since 2017/2018 combining together three smaller *communautés de communes*: CC Chamousset en Lyonnais, Forez en Lyonnais and Haute des Lyonnais. However, since 2001 the “Syndicat Intercommunautaire des Monts Lyonnais” [Intercommunity syndicate of Monts du Lyonnais] (SIMOLY) exists grouping together these 3 CC to coordinate a territorial project among them and implementing the process of energy transition since 2010. Now the SIMOLY does not exist anymore replaced by the CC. The CC Monts du Lyonnais is a rural territory of low mountains between 420 and 964 meters

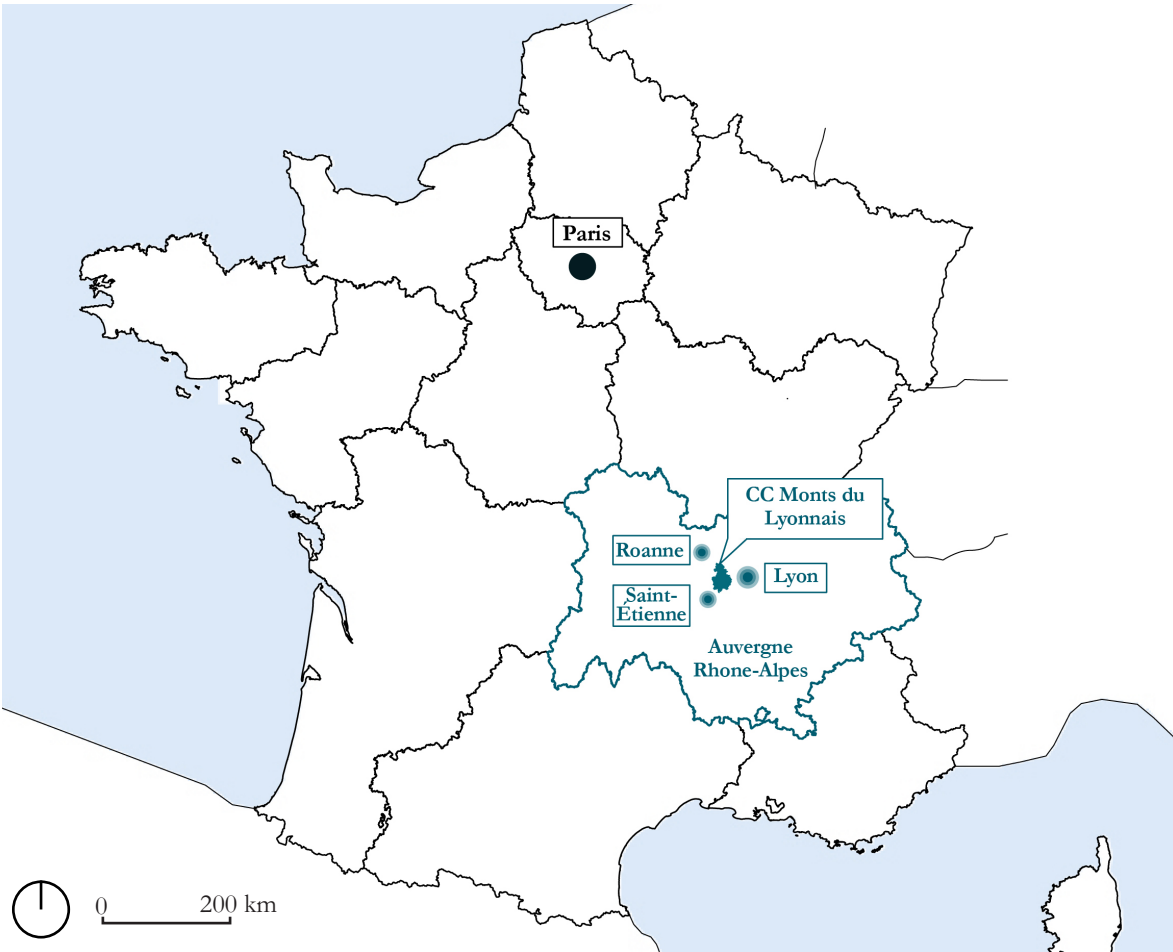


Figure 2. Location of the CC Monts du Lyonnais. Source: author

high and covers a surface of about 400 Km². It has a population of 29.460 (INSEE 2016), living primarily in small villages with about 1.000 inhabitants (2/3 of the population) or small towns with between 5.000 and 1.300 inhabitants (INSEE 2015). The average population density is 90,9 inh/km² (INSEE 2016), below the French average. This territory has experienced a phenomenon of decreasing population, with a decline most notable between 1969-1975 (-0,6 % INSEE). Since 1980 however, the inverse has been true with the population progressively growing. A process that intensified since 1999-2010 (+1,4 INSEE) and between 2010-2015 (+1,0 INSEE) due to a positive net migration rate mainly through to peri-urbanisation/urban sprawl process along the fringes of the CC. This is true thanks to the Lyon agglomeration proximity to the East, Saint Etienne to the South-West, Roanne in the North. This particular dynamic has been accompanied by the construction of new buildings leading to urban sprawl around historic villages. About 32% of the actual housing stock was built before 1919, composed of mainly historical village centers. This housing supply expanded by 14% until 1970, then underwent a strong increase of 24% between 1971-1990, continuing between 1991-2015 with an additional 30% (INSEE 2015). The resulting buildings are comprised by 79,2 % of single houses and 20,6 % of apartments (INSEE 2015). The single house is considered a high consuming building typology and for their respective construction periods, will need retrofitting measures to reduce energy consumption. Moreover, the rural character of the CC combined with the sprawled housing lacks an efficient public transport system, and results in commuter movement where 46% of the resident active population work outside territorial boundaries (INSEE 2015). This leads to a massive single car use, where indeed the 90,5% of households possess at least one car (INSEE 2015). Considering all of these aspects, the data showing energy consumption is not surprising (figure 3, where residential energy consumption (35%) and that for industries (25%) are the most energy intense, along with the transport sector (24%). The territorial surface area is 75% allocated to agriculture, 17% covered by forest and 8% by urbanized areas (SCoT CC ML 2016). The agriculture sector is characterized mainly by cow breeding for milk production covering the 57% of the active/developed agricultural land (Agricultural chamber 2016).

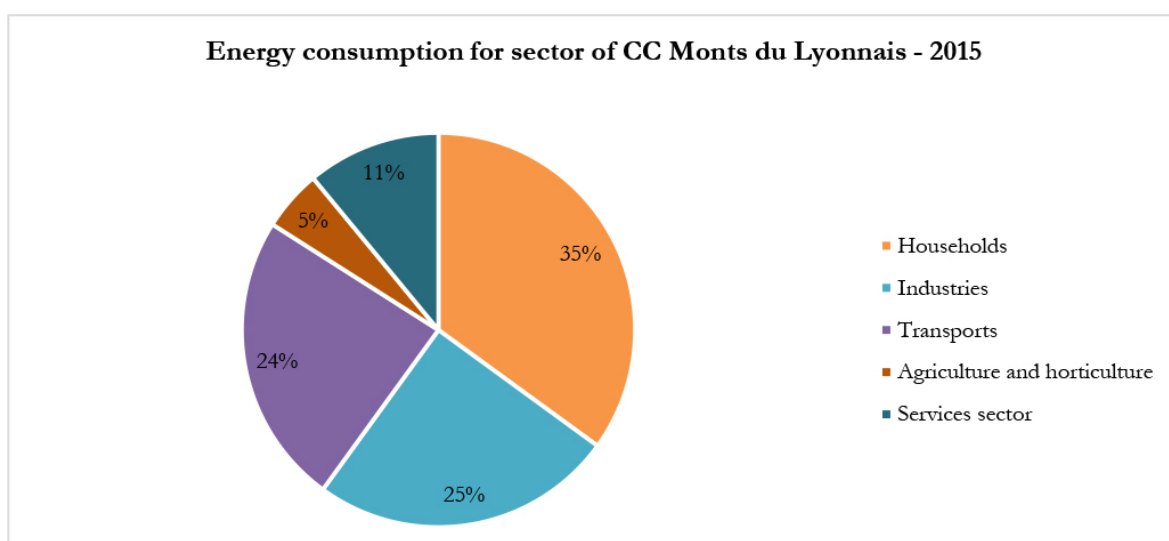


Figure 3. Energy consumption in percentage distinguished for sectors. Source: PCAET CC Monts du Lyonnais, provisional version, June 2018.

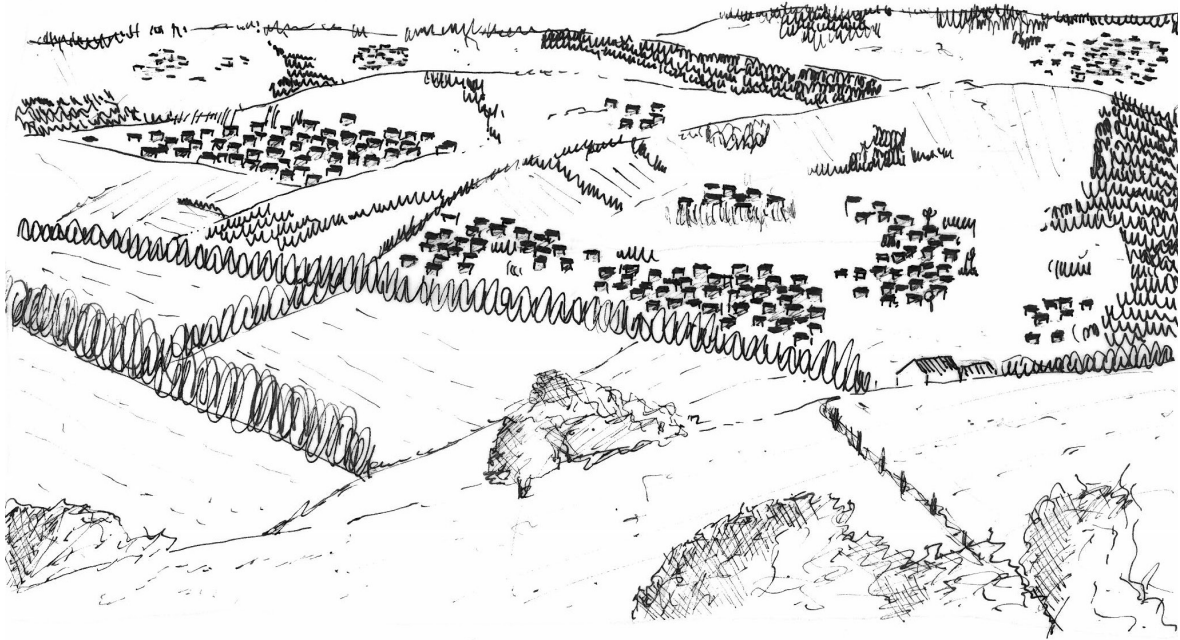


Figure 4. View on the Monts du Lyonnais. The ridge is characterized by many villages dotting the area, March 2017



Figure 5. U-shaped farms, Pomeys March 2017. Source: author.

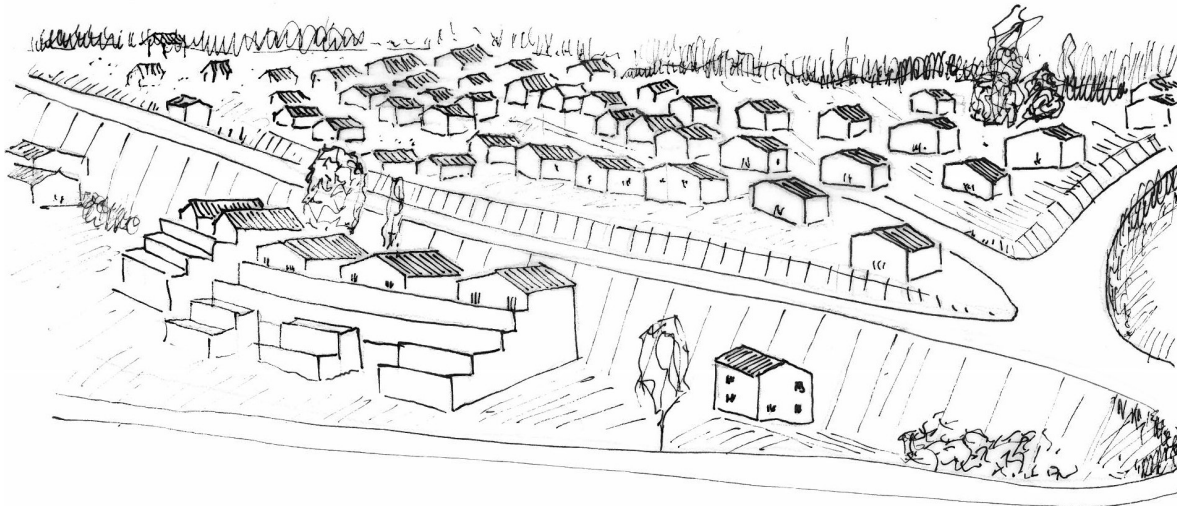


Figure 6. Urban sprawl through single-house extensions around the old historical, compact center, Saint Symphorien sur Coise, March 2017.



Figure 7. The historical center and single-house urban extension (on the right), Saint Symphorien sur Coise, January 2017. Source: author.

The territorial trait of low mountain ranges strings a system of valleys creating several viewpoints, where gradual discovery is made while crossing it. This main feature is characterized by a certain homogeneity. Hedges, tree lines, and wood fences articulate the agriculture system and its fields are characterized by permanent grassland but also assigned to cereal crops. Many forest areas are visible alternating with agriculture. However even if the territory has a low-density average it gives the impression of a more densely populated area (figure 4), because it assembles many single farms, both the historic typical “U farm” (figure 5) and the bigger and modern ones, and village urban areas. For the latter, the urban composition is very recognizable, with a compact historic center where a church is situated generally on high ground, and the progressive urban creep mostly through single-house construction extends around in all directions on the low mountainside (figure 6 and 7).

5.2.1.2 Towards the energy transition commitment and implementation

The idea of commitment to the energy transition process of the CC of Monts du Lyonnais started in connection to the building sector. According to the interviews developed with the energy transition technical services of the CC and an elected representative, the starting point of the gradual commitment to transition process was the creation and development of the “Parc Eco Habitat” a resource and information center about retrofitting techniques and environmentally friendly construction. In 2006 the elected council members developed this idea in order to revive the economy in connection with the “Maison Familiale Rurale du Val de Coise et la Communauté de Communes des Hauts du Lyonnais” (MFR) that trains young apprentices in the building sector since 1970. The first step was to apply to a call for projects for “poles d’excellence rurale” [rural excellence poles] lunched by the government with the objective to support innovative projects to create directly and indirectly employment on rural territories. The project was awarded a subsidy, in order to build a high energy performance building to host training and information sessions for citizens and building professionals to promote technologies for building insulation and renewable energy production in connection with buildings. The construction of this building wants to show the exemplary commitment and best practice by the territory. This building was completed in 2010 (Figure 8).

Using the words of an elected representative:

“The core dilemma was mainly this: how to train companies for the energy transition, moving them from the RT [French thermal standards for buildings] 2000 to the RT 2005, then to the RT 2012, and be

Figure 8. Parc Eco Habitat, Saint-Symphorien-sur-Coise, January 2017. Source: author.



*able to understand all that. And Above all, how to adapt in order to stay on the territory and create a market on the territory*² (mayor, b.VP energy transition-ML 2018).

The SIMOLY defined in 2012, in its territorial chart the energy and climate challenge as transversal issues and this lead the SIMOLY to apply to the call for “expressions of interest” (AMI) launched by ADEME and the Rhone-Alpes region in 2012, to encourage territories to commit to the energy transition and achieve TEPOS objectives for 2050. The SIMOLY has awarded funds for the development of territorial analyses and several energy transition actions. In 2013, the territory territorial local institutions engaged in a volunteer PCET thanks to the economic support of the AMI-TEPOS award call.

In 2015, the SIMOLY with the Parc Eco-Habitat was awarded of the call for expressions of interest (AMI) lunched by ADEME and Rhone-Alpes and it becomes “plateforme locale de rénovation de l’habitat” [retrofitting local platform for housing renovation], an public service board about energy retrofitting for housing and building for the local population. Considering the initiatives gradually developed in 2015 the SIMOLY was also granted the TEPCV label and consequent funding after the call for projects by the French Ministry of environment energy and sea, to economically support action for the territory towards the energy transition.

Subsequently and accordingly to the LTECV of 2015 the SIMOLY is developing a compulsory PCAET, that begun in 2017 by hiring a person in charge of the development of this document. Moreover, in 2017 an “energy transition service/board” was created, based in the building of the Parc Eco-Habitat.

This short historical tour shows how the SIMOLY first and subsequently the CC Monts du Lyonnais seems to have structured its energy transition process by seizing/catching different opportunities often connected with funding, but without compulsory obligation to engage them from a top down vision. Instead a bottom-up territorial commitment was implemented deciding to apply to these calls, yet combined with a top-down vision indirectly. In the sense that the territorial institutions applying to the different national/regional calls for projects has been guided in their energy orientations/choices by these levels (regional and national) that dispatched funds according to topic interesting for them.

However, it is also true that calls for expression of interest, to which territorial institutions decided to apply, were chosen in order to answer to some specific issues the territory encountered. As explained in its general description, the CC Monts du Lyonnais has an extensive old high energy consumption building stock made up of mainly single houses. The idea of energy retrofit is an energy-saving measure and a way to reduce the household energy bill.

At the beginning, actions focused on energy in the building construction and retrofitting sectors but gradually the subject broadened by committing to TEPOS network objectives where both renewable energy and the reduction of energy consumption, improves for example, slow mobility. However, the first committed actions allowed the CC Monts du Lyonnais to be awarded the more ambitious and global call for projects (TEPOS), due to energy conscious

2 “À la base c’était surtout ça : former les entreprises pour faire la transition énergétique, passer de la RT 2000 à la RT 2005, puis à la RT 2012, et pouvoir comprendre tout ça. Et surtout s’adapter de façon à rester sur le territoire et avoir des marchés sur le territoire”

actions already under development in the territory.

When considering the reasons for commitment to this process, there has been an initial idea and motivation originating from local elected members, “the Parc Eco-Habitat is a visionary idea of elected members, in 2007”³ (responsible energy transition service, Parc Eco Habitat-ML 2017). At the same time, the depleted economic situation in this rural territory, seems to have played an important role, leading agents to search for opportunities to boost/revive the local economy and various activity sectors. This component is revealed several times in interviews with the project managers of the energy transition service that say:

“I think when considering territory wealth. I was going to say...I do not mean that...the territory it is not necessarily a very rich territory, and the fact that it is not a very rich territory, we will seek solutions that are full of common sense. And, finally, among the solutions that are found on the territory , they are solutions that go in the direction of energy transition, and that since long ago”⁴ (responsible energy transition service, Parc Eco Habitat-ML 2017).

“And then something that comes up often, I think, among elected members, is the economical spinoff effect. For example, something that is often repeated is: ok, so the Parc Eco Habitat is a great investment, but behind, it generated a million euros in turnover for local companies, which worked on this retrofitting project”⁵ (TEPOS project manager-ML 2017).

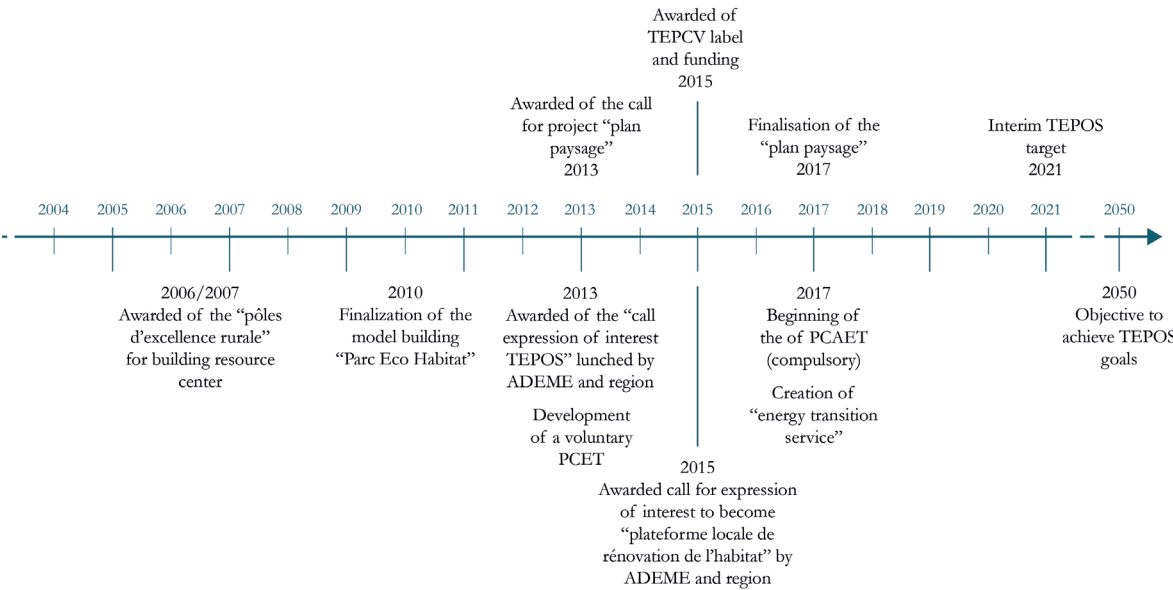


Figure 9. Timeline with the main steps of energy transition process of CC Monts du Lyonnais. Source: author.

3 “le Parc Eco-Habitat c’est une idée visionnaire des élus, en 2007,”
 4 “je pense, par rapport à la richesse du territoire. J’allais dire... J’veux pas dire qu’le... le territoire n’est pas forcément un territoire très riche, et le fait que ce ne soit pas un territoire très riche, on va chercher des... des solutions qui sont pleines de bon sens. Et finalement, au fil des solutions qui sont trouvées sur le territoire, c’est des... des solutions qui vont bien dans le sens de la transition énergétique, et ça depuis longtemps”
 5 “Et puis quelque chose qui revient souvent, je pense, au niveau des élus, c’est les retombées économiques. Par exemple, voilà quelque chose qui est souvent répété, c’est : OK, donc, le Parc Éco Habitat, c’est tant d’investissements, mais derrière, ça a généré un million d’euros de chiffre d’affaires pour les entreprises locales, qui ont travaillé sur des chantiers de rénovation performants”.

5.2.1.3 Energy transition goals and current situation

The CC Monts du Lyonnais has objectives to reach TEPOS goals for 2050, being committed to produce as much renewable energy as it consumes, combining both energy producing and energy-saving actions.

The TEPOS action plan elaborated in 2013 lists the following energy saving measures:

- Decreasing energy consumption, retrofitting private and public buildings and densifying the urban areas by -28%
- Energy saving through sustainable mobility by encouraging alternative modes of development.
- Raising awareness and providing information for territorial stakeholders and inhabitants
- Decreasing energy consumption by private companies with the objective of -38% in the industrial sector and -14% in the service sector.

The actions concerning the development of renewable energy are:

- Extensive development of solar energy sector: photovoltaic parks and heat solar collectors
- Development of wood energy sector
- Development of biogas facilities
- On the long-term: development of hydropower and wind energy

The goal is to cover 100 % of consumption with RE production by 2050 through the indicated strategies. In 2015 RE production covers about 10,3 % of the primary energy consumption (“PCAET CC Monts Du Lyonnais, Provisional Version” 2018), comprising 77% wood-energy, 14% geothermal, bio-gas electricity 3% photovoltaic, and 2% solar heating (figure 10).

This small production shows that at the implementation phase a concerted effort is still needed. This aspect of which the technical energy transition service is well aware of: “But we have anyway a lot of things that are done in terms of energy sobriety, but in terms of renewable energy development, well, there is still a bit of work to do...”⁶ (TEPOS project manager-ML 2017).

Renewable energy production in CC Monts du Lyonnais - 2015

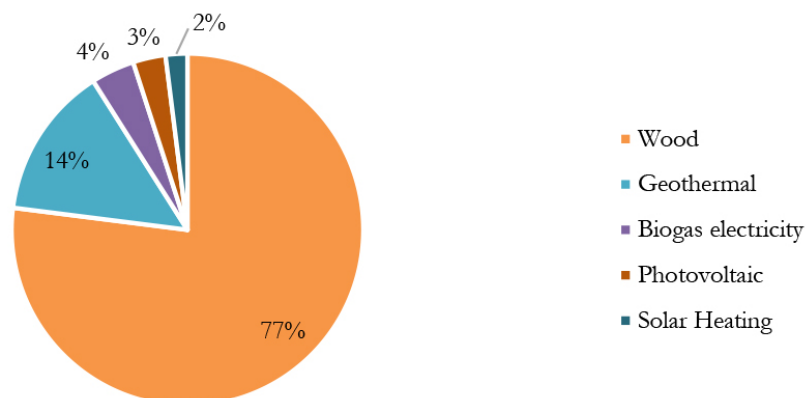
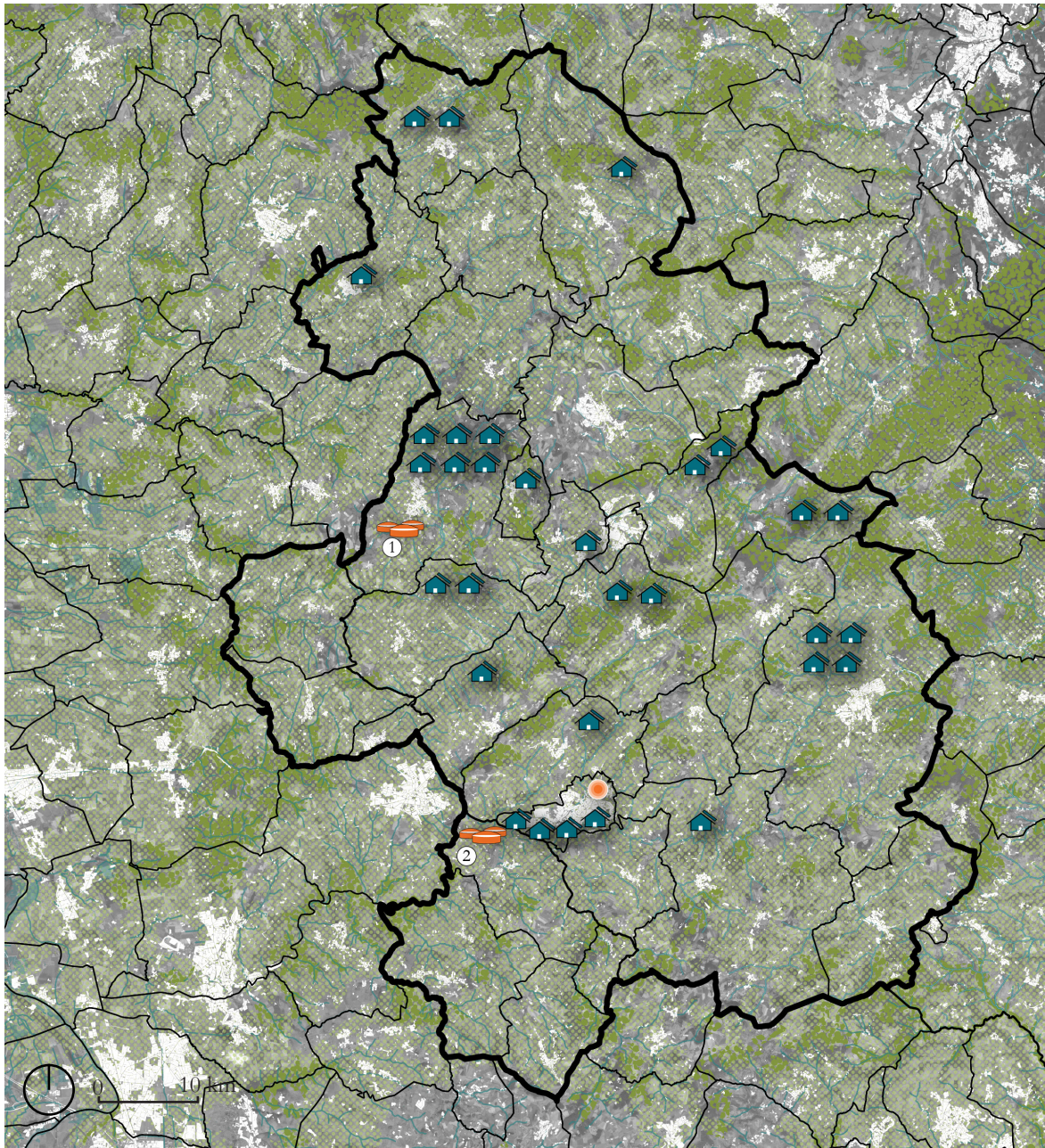


Figure 10. Renewable energy production in CC Monts du Lyonnais-2015 divided for Source: PCAET CC Monts du Lyonnais, provisional version, June 2018

6 “Mais nous, on a quand même pas mal de choses qui sont faites en termes de sobriété énergétique, mais en termes de développement des énergies renouvelables, voilà, il y a quand même un peu de boulot...”



Legend











- | | | | |
|---|---------------------------------|---|-------------------------------|
|  | Farmland |  | Realised biogas power-plant |
|  | Built areas |  | PV panels on big surface roof |
|  | Forest |  | Parc Eco Habitat |
|  | Water | | |
|  | Municipal border | | |
|  | Regional border | | |
|  | Municipalities community border | | |

Figure 11. Location of RE facilities on CC Monts du Lyonnais, 2018. Source: author, according to data CC Monts du Lyonnais, <http://www.montsenergies.fr/>, OSCOM Auvergne-Rhone-Alpes (2016)

Table 5.1. Main RE production facilities CC Monts du Lyonnais- 2018. Source: CC Monts du Lyonnais. Source: CC Monts Lyonnais, <http://www.montsenergies.fr/>

	Facility	Location	Year	Production
1	Biogas power plant (4 farms)	Métharavouere, Haute Rivoire	2016	160 kW electrical capacity
2	Biogas heat plant (6 farms)	Méthamoly, Saint Denis sur Coise	2019	6000 MWh/year biogas heating
-	Biogas power plant (2 farmers, 1 tree nursery)	Méthasavi Not defined yet	in planning	Unknown
-	PV panels on big surface roof	31 roofs in 16 municipalities	in planning	About 858 kW

However renewable energy production increased 26% since 2005 (“PCAET CC Monts Du Lyonnais, Provisional Version” 2018), showing an progression in production, especially due to photovoltaic and geothermal energy, while wind energy production has not yet been seriously developed.

The Parc Eco Habitat assisted about 960 households for energy retrofitting between 2015 and 2017 (data Parc Eco Habitat) 225 of which did or are in the process of construction with the objective to obtain a BBC label [Low consumption building]. Surely beneficial for the energy saving equilibrium for the territory, yet difficult to quantify for the residential sector which remains still high in terms of energy consumption. However, even if other aspects played roles in decreased energy consumption beyond building retrofitting, energy consumption in the CC Monts du Lyonnais decreased by 14% between 2005 and 2015 (data Parc Eco Habitat), even lower compared to the Rhône-Alpes 11% decrease.

On the issue of sustainable transport some action has been taken, such as bolstering a bus line connecting some communities with Lyon and Saint Etienne within the region, and a web platform for carpooling, identifying stops in different towns (www.covoiturage-montsdulyonnais.fr) (figure 12). These actions were useful but not enough to lead to a real decrease in transport energy consumption.

Indeed, it seems that consumption reduction for transport was the most problematic point to be made operational, through the rural sprawl, the low density housing characteristic of the CC, and because the high transversality of the subject. Using one agent words:

“It is a question that is so complicated that it is always put aside. In territories agree that everyone will need their car all the time. I think that on average people here travel 50 km a day to go to work, so ... We have bus lines that exist today, but from year to year they have less and less stops scheduled. So, there is no infrastructure as in large cities, as in urban centers. So, at the same time, we are asked take action on transport, but ... finally, here, today, very clearly, the community is not the organizing authority for



Figure 12. Car-pooling signal panel in Saint-Symphorien-sur-Coise, May 2017. Source: author.



Figure 13. "Métharavouere" biogas facility, Haute-Rivoire may 2017. Source: author.

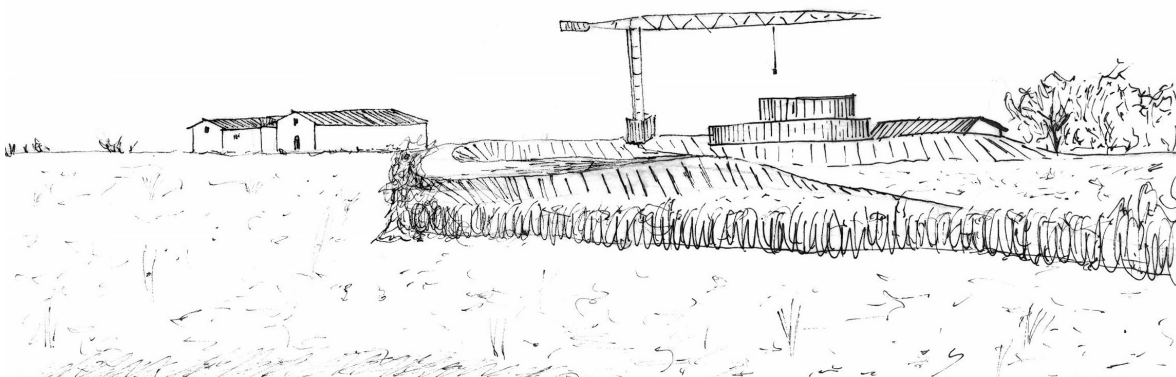


Figure 14. "Méthamoly" biogas Facility, Saint Denis sur Coise March 2017. Source: author.

*transport, and so it remains complicated*⁷ (TEPOS project manager-ML 2017).

For now the main focus is on actions for raising awareness on people's daily behavior by creating a platform to encourage them share cars, etc. But it is not enough:

“And indeed, until now, there were actions that were on just on the behavioral level: to carpool, to organize participatory ride-sharing... I do not think it really meets people's possibilities [...] but instead of trying to act on the behavioral level, we should perhaps think more about carbon-free transportation”⁸ (TEPOS project manager-ML 2017).

Moreover, the RE facilities implementation seems to have been delayed. Since 2010 local institutions, relying on the agricultural character of land and its dairy production, support biogas production development in the territory. So three biogas production facilities, were projected as operational at the eve of 2015, for a production of 12,8 GWh, increasing the RE production. However, in 2018 only one facility “Métharavouere” (Haute-Rivoire) had started functioning since 2016 (figure 13). The construction of the second “Méthasavi” facility, grouping two farmers and a tree nursery, has not yet been approved.

The third biogas facility “Méthamoly” (figure 14), the largest, born from the initiative of six local farmers and for which the procedure was initiated in 2013, will be in function in 2019, needed about six years from the initial idea until implementation. This facility produces biogas from manure originating from six local farms into bio methane that is injected into the gas network feeding the local network.

The farmer that started the “Méthamoly” project explains how:

“The territory had already initiated the subject of [biogas], since there had been extensive exploration work done by our elected officials, there are already ten years documented on biogas. So to dive in the depth of the subject within our community and participate in meetings, I said, “We may be able to do something”. In 2013, following a report from a feasibility study made by the territory about biogas, I federated a small group of farmers”⁹. He also highlights that even if “we have elected officials since the beginning that supported us body and soul”¹⁰ the process “It's very complicated. Here in France it's quite normal on a project like this [for the process to be complicated], since there are a lot of authorisations to secure. It's long. But it is necessary too, I think, to develop such a project appropriately. After all, in France, we are still not very comfortable with anaerobic digestion, so the administration, the instructors,

7 “c'est une question qui est tellement compliquée, qu'elle est toujours mise de côté quoi. Sur des territoires comme ça, tout le monde aura tout le temps besoin de sa voiture. Je crois qu'en moyenne les gens, ici, font 50 km par jour pour aller sur leur lieu de travail, donc... On a des lignes de bus aujourd'hui qui existent, mais d'année en année elles il y a de moins en moins de... d'arrêts, d'horaires. Donc, y a pas les infrastructures comme dans les grandes agglomérations, comme dans les pôles urbains. Donc, à la fois, on nous demande d'agir sur la mobilité, mais... Enfin, voilà, aujourd'hui, très clairement, la collectivité n'est pas autorité organisatrice des transports, c'est compliqué”

8 “Et effectivement, jusqu'à maintenant, y avait des actions qui étaient sur les... les comportements : faire du covoiturage, organiser l'auto-stop participatif... Je pense pas que ça réponde vraiment aux possibilités des gens, [...] mais au lieu de... d'essayer d'agir sur les comportements, faudrait peut-être plus réfléchir à une mobilité décarbonée”

9 “Le territoire avait bien initié le sujet [méthanisation], puisqu'il y avait eu un gros travail de prospection de fait par nos élus, y a déjà dix ans sur la méthanisation. Donc de baigner là-dedans aussi avec notre collectivité, de participer à des réunions, j'ai dit : « Mais tiens, nous peut-être que on peut faire quelque chose. » Et puis en 2013, suite à un rendu d'étude de faisabilité, par le territoire, sur la méthanisation, j'ai fédéré un p'tit groupe d'agriculteurs”.

10 “on a quand même des élus qui dès le début nous ont soutenus corps et âme”

and the bodies that issue authorizations still have a period of instruction that is too long for me”¹¹ (farmer, biogas project initiator, ML 2018).

So it seems, even if we had only one point of view that the “delay” – set deadline for RE production at least for the biogas component is mainly attributable to difficulties and long-time needed in the setting up of the project, and demand for authorization.

In 2017, the technical service for energy transition was launching and developing an extensive development of photovoltaic panels on the territory of the CC, with the objective to strongly increase renewable energy production. The project is based on citizen participation, and organized in a local production company. This local company (SAS Monts Énergies) finances the photovoltaic panel’s implementation through direct funding of members (which lives on the territory) and an additional bank capital loan. In this way the company owns the panels, loans the implementation sites and sells energy to the network. The income of the sale is divided with the partner and used to finance a new project of public interest within the territory. At the time of research this production was still not quantified and located. The only project implemented was the photovoltaic panels on the roof of the municipal library of Saint-Symphorien-sur-Coise (figure 15). However it is interesting to see that from the beginning the implementation of RE facilities have been thought as a local resource, local funding for local income, without external developers.

“It is inside the framework of the “positive energy territory logic”. We are not going to do it. But, if you [citizens] are interested, well we help you to organize the project and tomorrow it is you [as citizens] who produce energy”¹² (responsible projects CoopaWatt-ML 2018).

Wind turbine technologies appear in the TEPOS strategy as a secondary possibility, but they are currently abandoned. It seems that the energy potential estimated by an external technical office on this low mountain range territory was quite high but according to the TEPOS project manager:

“we wanted to take a closer look at the “built” constraint. It is mandatory to keep 500 meters between the wind turbine and the building. And, I told you earlier, we are in a territory that is really really very patchy. And so, when we look at these ... spaces free of this constraint, we end up with a very small potential. So the technical study office has estimated a potential that we do think ... not is realistic. At least, that is in the state of today’s administrative, technical and regulatory constraints. For the moment it’s stopped”¹³ (TEPOS project manager-ML 2017).

11 “C’est très compliqué, mais c’est normal, voilà, en France c’est tout à fait normal sur un projet comme celui-là, puisqu’il y a un tas d’autorisations à avoir. C’est long. Mais c’est nécessaire aussi, j’pense, pour développer correctement un tel projet. Après, en France, on n’est encore pas très à l’aise avec la méthanisation, donc l’administration, les services instructeurs, les organismes qui délivrent les autorisations ont encore un délai d’instruction qui est pour moi trop long”.

12 “Ça rentre dans le cadre de la logique territoire à énergie positive. C’est pas nous qui allons le faire. Par contre, si ça vous [citoyennes] intéresse, ben on vous aide à vous organiser et demain c’est vous [citoyennes] qui faites de l’énergie”

13 “on a voulu regarder de plus près la contrainte « bâti ». C’est-à-dire 500 mètres obligatoires entre l’éolien et le bâtiment. Et, je vous le disais tout à l’heure, on est sur un territoire qui est vraiment vraiment très mité. Et donc, quand on regarde ces... ces espaces libres de cette contrainte, on se retrouve avec un très petit potentiel. Donc, le bureau d’étude nous a estimé un potentiel qui nous semble pas... pas réaliste. Enfin, aujourd’hui, en l’état des contraintes administratives, techniques et réglementaires. Mais donc, du coup pour l’instant c’est arrêté”.

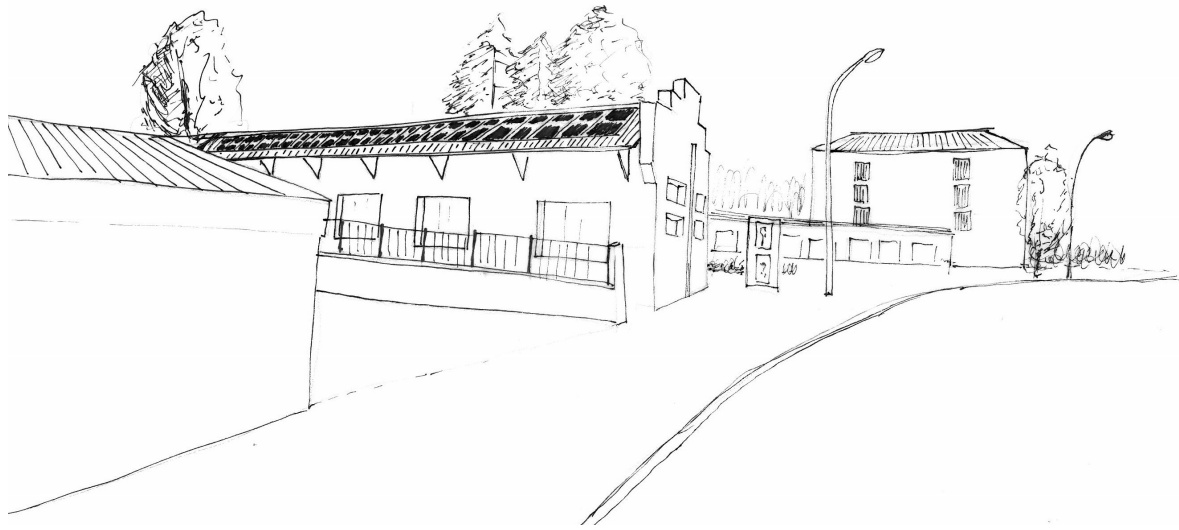


Figure 15. PV panels pilot projects on the municipal library of Saint-Symphorien-sur-Coise, May 2018. Source: author.

Indeed wind turbine implementation is often a controversial subject, and another argument against their implementation, even if not directly highlighted in the interviews, could come from the fear to lose residential attractiveness towards new inhabitants working in the nearby urban agglomeration.

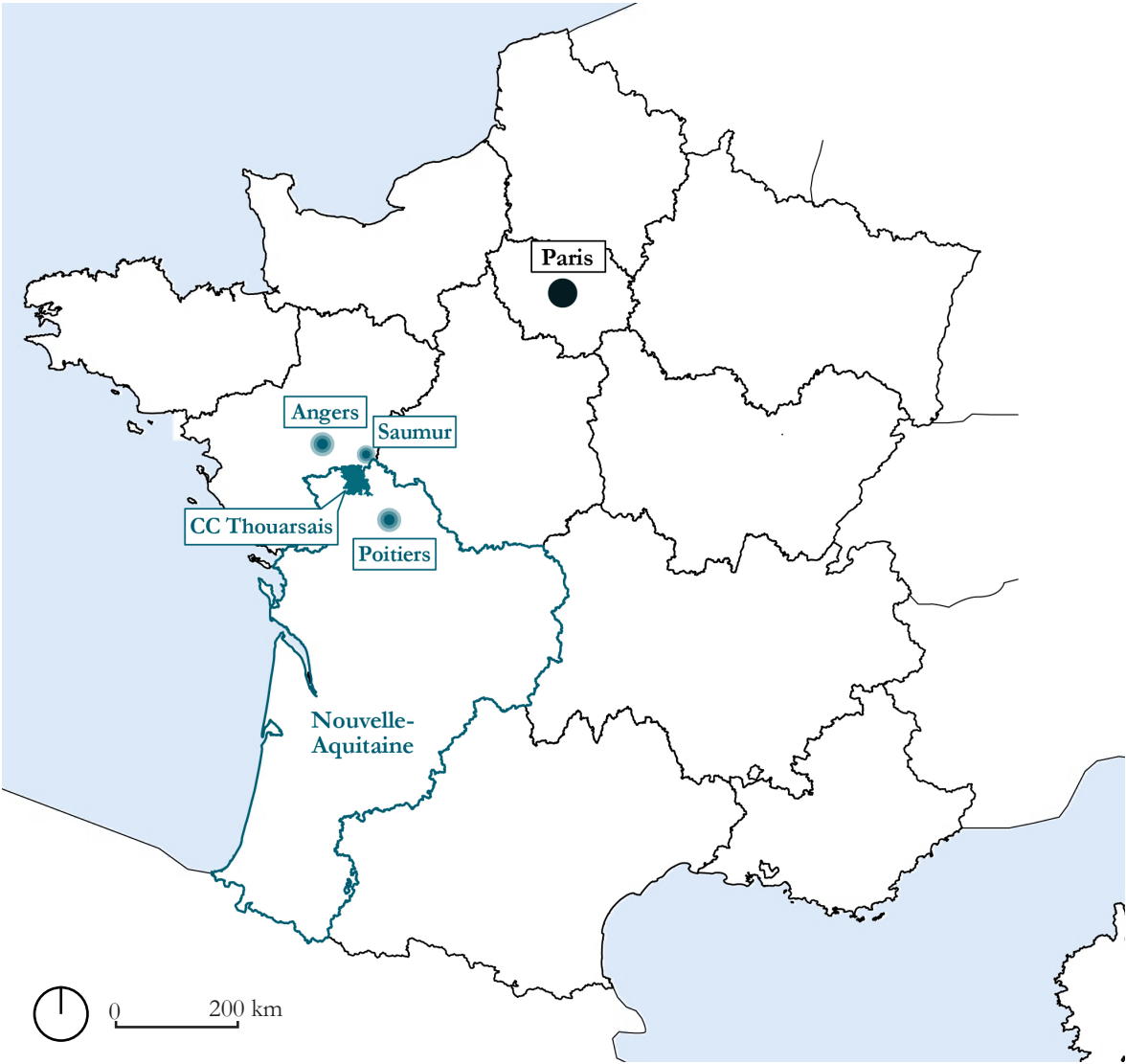
This territorial energy picture shows that despite the roadmap and the actions developed, the results, in terms of energy production and energy saving (e.g. transport, etc.) are insufficient and still very far from the stated goal. This seems mainly due to the chosen main energy saving strategy, that even if it is the most advanced, is still too underdeveloped to have a really big impact on territorial energy reduction. To this could be added a voluntarist attitude, in which local inhabitants could decide to develop a biogas facility or PV installation, but with not defined objectives, and the CC plays a role in analyzing its potential and raising awareness on the issue. Moreover, some financing difficulties could be added along with a long procedure for RE project implementation and a complex system of competent authorities for project development - as for the transport system. The highly transversal nature of the energy theme runs across sectors and regulatory authorities, can lead to slowdown and sometimes block implementation.

5.2.2 CC Thouarsais

5.2.2.1 Territory

The *communauté de communes* of Thouarsais (CC Thouarsais) is located in Deux-Sevres department in the region Nouvelle-Aquitaine, grouping 18 municipalities extends over an area of 620 km². With a population of 36.382 inhabitants (INSEE 2016), its characterized by a relatively low population density of 59 inh/km². This territory is located quite far from bigger cities (Angers is almost 1 hour away) the nearest big urban area is Saumur, to the north about 40 minutes by car.

Figure 16. Localisation CC Thouarsais. Source: author



The biggest urban center is Thouars at the center of the territory. The Thouars urban agglomeration (Thouars, Saint Jacques, Saint Jean, Saint Verge, Louzy) concentrates 46% of the population of the CC (INSEE 2015). The population is dispatched mainly in small municipalities, 11 counting fewer than 500 inhabitants, 16 between 500 and 2.000, three between 2.000 and 3.000 and the bigger city of Thouars having more than 9.000 inhabitants (INSEE 2015).

About 75 % of the inhabitants work in one of the municipalities of the CC (SCoT 2018). But it not seem to be an attractive territory. Since the '80s there has been a low or negative population stability, which has declined -0,2% between 2010 and 2015 (INSEE 2015), leaving an 11% empty household stock (INSEE 2015). However, the working population of the territory is 66% a bit higher than the regional average of 64 % (INSEE 2015). Still the territory is experiencing a population aging phenomenon, between 1999 and 2015 there has been an increase of 3.097 of people in their fifties (INSEE 2015) and in 2015 the youth indicator¹⁴ is 0,9 (INSEE) compared to 1,13 in 2010 (INSEE), showing a gradual increase of people of 60 and older compared to 20 or younger.

The territory is mainly a rural area and 86 % (537 km²) of land use is dedicated to agriculture, compared to the 5,1 % occupied by built-up areas (SCoT CC Thouarsais 2018). However, the figure 17 shows the main energy consumer sectors are the residential (30%), industrial (30%) and the transport sector (24%) (AREC 2018-PCAET CCT 2018). Households are 88,7% free-standing houses that consume, generally speaking, more energy than apartments which constitute only 10,7% of the building stock (INSEE 2015). Moreover the existing built stock is quiet old, where 22,5% was built before 1919, that expanded to 12,7 % built between 1919-1945, and 16,8% built between 1946-1970, with an increase of 28,7% between 1971-1990.

Final energy consumption for sector of CC Thouarsais (%) - 2015

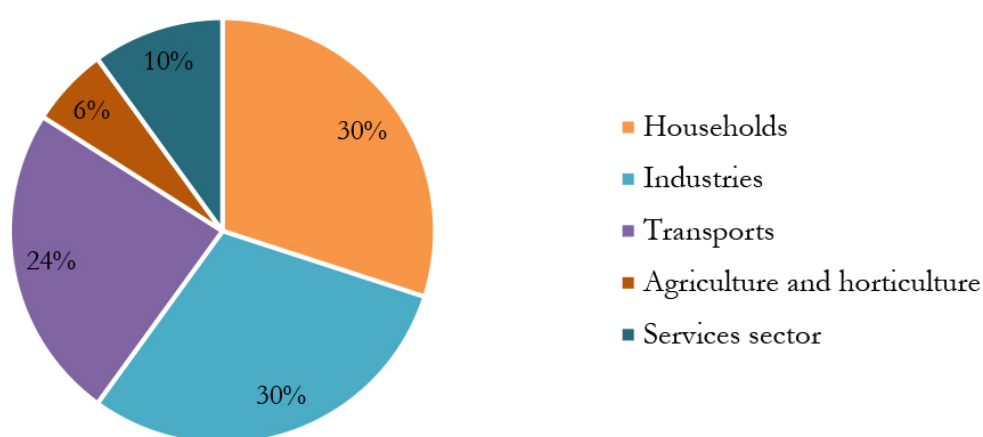


Figure 17, Final energy consumption divided by sector. Source: AREC, PCAET Thouarsais (2018)

¹⁴ The youth indicator is the ratio between the population under 20 years old and the population aged of 60 and older.

Since 1991 the number of new houses seems to decrease by 19% until 2013 (INSEE 2015). In light of their construction periods, these buildings require a lot of energy for heating, and require specific actions in order to reduce their energy consumption. The transport sector is also high energy consuming, because it is affected by the urban sprawled form, and the constellation of villages across the municipalities, it lacks strong system of public transport, and encounters a high use of private cars where 89% of households possess at least one car (INSEE 2015). The industrial sector high energy consumption is mainly due to the extraction industries of rock and sand from four quarries, and the processing of construction materials, representing 40% of industrial energy consumption (AREC 2018-PCAET CCT 2018). These quarries are quite noisy and very visible, forming landmarks in the landscape: elevated waste heaps and deep holes in the ground.

The CC Thouarsais is composed of a certain landscape diversity as witnessed in its different locations. Constituted by a flat plain on a plateau, it is mainly dedicated to open field cereal production at east (figure 18), whereas an area in south-west is mainly characterized by a system of agriculture *bocage* [hedge system] (figure 19) and in the north approaching the Loire River and Saumur city consists of hilly vineyard landscape (figure 20). Moreover, along the Thouet river and its tributaries which cross the territory from south to north, we find a system of wetland valleys (figure 21). Similar to the CC Monts du Lyonnais, even this CC population density is lower, there are many small villages located on the territory, many have farms deployed on the territory and every municipality possesses a main village with other small districts around. The historic center is characterized by a denser and more compact form often developed along the main street, around which are constructed more recent single houses as urban extension.



Figure 18. Agriculture openfield with wind turbines in the plain Saint Generaux, July 2018. Source: author



Figure 19. Bocage area and wind turbines, Glenay, July 2018. Source: author



Figure 20. Vineyard of Tourtenay, June 2016. Source: author



Figure 21. Thouet river valley crossing the Thoursais, July 2018. Source: author



Figure 22. Quarry in Saint-Varent, June 2016. Source: author

5.2.2.2 The path towards energy transition and implementation

The first energy-conscious action in the territory dates back to 1984, when the municipality of Saint Varent, one of the municipalities within the CC, built a public indoor swimming pool heated by solar energy (figure 23). The mayor was a quarry engineer and was interested in innovative technologies. Even if one small project, it aroused interest because it showed that renewable thermal energy production includes money saving: “There were some pretty good subsidies. So it was peasant common sense, finally in a rural territory, it was common sense to use the sun to heat water. Especially in the 80s, it was the beginning of the 80s just after the oil shock.”¹⁵ (Project manager energy and climate-CCT 2017)

A long time after that first project, in 2001, another project was developed in the same Saint Varent municipality, for a wood-energy heating network to warm several municipal buildings: the swimming pool, the school, the sports hall, the retirement home and a municipal administrative office building. “So, they made this wood chip fuelled heat network, which began to function, making budget savings while functioning”¹⁶ (Sustainable territorial management division director-CCT 2017). The trigger element, for these projects is the economical criteria, but they were useful as an example for other nearby municipalities, introducing the energy issue and

15 “Y avait des subventions assez intéressantes. Donc, c’était du bon sens paysan, enfin : territoire rural, c’était du bon sens de faire avec les apports du soleil pour chauffer de l’eau. Et surtout dans les années 80, c’était donc le début des années 80, choc pétrolier”

16 “Donc, ils ont fait ce réseau de chaleur bois, qui là aussi s’est mis à fonctionner, à faire des économies budgétaires en termes de fonctionnement”



Figure 23. Solar swimming pool Saint Varent. Source: author July 2018. Source: author

raising awareness about it.

Indeed in the same period, 2001, at that period named “Syndicat du Pays Thouarsais” (that would later become the CC du Thouarsais) had the possibility to hire in 2001 a “conseiller en énergie partagée” [Energy consultant in shared energy] to accompany and support for RE production projects, mainly for wood energy heating, but also to raise awareness and support on other energy themes such energy-saving measures through retrofitting buildings. The creation of this position was possible thanks to the financial support of the ADEME and the region Poitou-Charentes which renewed the position until 2006. This initiative allowed the supply of energy specific expertise within the territory without the need to address to external “bureau d’étude” [technical consulting office]. Because these projects “require a lot of engineering knowledge, that the [elected council members] did not have in their small municipality”.¹⁷ (Project manager energy and climate-CCT 2017)

In 2005, another project was launched: “Technologies Innovantes pour la Production d’Énergies Renouvelables” [Innovative technologies for renewable energy production] (TIPER); with the objectives of high rates of renewable energy production from several different technologies: photovoltaic, wind energy, biogas, in an area with polluted ground soil.

In 2006, the Syndicat du Pays Thouarsais, signs a “Contract local Initiatives Climat” [Local climate initiatives contract] with the l’Ademe and the Poitou-Charente region for the period 2007-2010, and that was renewed for the 2010-2013. This initiative was launched in the framework of a State-Region contract with the objectives of innovation, territorial competitiveness and sustainable development.

The first agreement received funding for hiring a project manager to elaborate a *climate plan*, defining a diagnosis and actions with the objectives to reduce of 4 greenhouse gas emissions. Particularly “the agreement at the level of the national ADEME, had to test a methodology that was actually prefiguring the Climate Plans”¹⁸ (Sustainable territorial management division director-CCT 2017). While considering the existing project in the territory and the link among the two issues, the elected representatives decided to include greenhouse gas emission reduction objectives and renewable energy objectives on the long term: “so it was not called like that at that time, it was not positive energy territory yet -, it was to just to achieve energy neutrality of the territory”¹⁹ (Sustainable territorial management division director-CCT 2017). The signature of this agreement and the undertaking of objectives was possible because of the awareness that elected members had on the subject, thanks to different projects implemented or in progress in the territory. At the same time the agreement allowed funding for the project that intended to have economic impact on the territory. This agreement also provided funding for a person in charge of a new service “Espace info énergie” [Office for energy information] with the goal to mobilize and support inhabitants on energy subjects. In the second three-year agreement the territory undertook a regulatory document called the “Plan climat énergie territoriale”

17 “ça demandait quand même pas mal d’ingénierie, qu’ils [elected members] n’avaient pas dans leur petite commune”

18 “la convention au niveau de l’ADEME nationale, devaient tester en fait une méthodologie qui allait en fait préfigurer les Plans Climat”

19 “alors on l’appelait pas encore comme ça à l’époque, c’était pas encore territoire à énergie positive -, c’était d’atteindre la neutralité énergétique du territoire”

[Territorial climate energy plan] (PCET) that became an official regulatory document after the Grenelle laws. However, it remained a voluntary process because before the LTECV of 2015 the PCET was compulsory for the collectivities with more than 50.000 inhabitants which was not the case of Thouarsais. Several projects were implemented gradually, wind parks, biogas equipment, etc.:

“And then, after the various programs that we put together every three years, the idea was to be more and more operational, to have flagship exemplary projects, and then to go more and more into mass actions. And to massively develop more and more”²⁰ (Sustainable territorial management division director-CCT 2017).

So, the territory began to have quite a broad range of developed projects, defined objectives and supporting staff when in 2011 through the CLER network for the energy transition, with three other territories the TEPOS network was founded:

“And so, around the table, that’s how we found this title of ‘positive energy territory’. Because we were in the full period when the label of ‘positive energy buildings’ had just been released, so we tried to establish a parallel”²¹ (Sustainable territorial management division director-CCT 2017).

In 2014, the CC Thouarsais was awarded the third place of the European RES champions league, for the rural community category. It was quite an important achievement particularly to raise knowledge and awareness from within from all the elected representatives about this territorial energy transition project.

From the beginning of 2014, it has been created the “Communauté de Communes du Thouarsais” (CCT), because of the French territorial reform, that groups together new municipalities that were not associated with the precedent Pays du Thouarsais. So the RES champions award allowed to raise awareness, in new municipalities of the CC Thouarsais, of the interest in the commitment to the energy transition process.

In 2015, the CCT applied and was awarded a project “territoires à énergie positive Poitou Charentes” launched by the ADEME and the region Poitou-Charentes to define a TEPOS program during the period 2015-2018 and to fund projects, the provision of external studies and the organization and implementation of several actions inscribed in the action plan. In the same year, the CCT was also awarded the call for TEPCV project, at the time by *Ministry of environment, sea and energy*, that brought extra funding for the development of energy transition projects.

In 2016, thanks to the Ademe-Regional agreement and the TEPCV funding, it established a “plateforme de rénovation de l’habitat” [Retrofitting habitat platform] supporting inhabitants in building retrofitting, besides two new project leaders are hired for three years in the CCT, one to develop TEPOS projects about agriculture and industries and another about the Cit’ergie label process and the local inhabitant’s participation in renewable energy projects. Indeed the

20 “Et puis après, au fil des différents programmes qu’on montait tous les trois ans, l’idée c’était de... c’était d’être de plus en plus dans l’opérationnalité, d’avoir des projets phares exemplaires, et puis d’aller de plus en plus dans des actions de masse, quoi. Et de massifier de plus en plus”

21 “Et donc, autour de la table, c’est comme ça qu’on a trouvé ce titre de « territoire à énergie positive ». Parce qu’on était dans la pleine époque où venait de sortir le label des bâtiments à énergie positive, donc on a essayé de faire le parallèle”

topic of the public participation and financing of renewable energy projects has evolved in the mind of elected council members over time by now encouraging the financial participation of inhabitants:

“Developers, they saw that there was a dynamic process in this territory and they came there [in the territory]. And, the turn also came from our elected representatives, that is to say: yeah, but economically the wind turbines, it is very thoughtful [ironic], but, beyond the tax, they do not bring much to the local economy. So, today, there is no wind project without crowdfunding”²² (Sustainable territorial management division director-CCT 2017).

Nevertheless, today the people working on the process of energy transition for the CC Thouarsais are 7,5 full time paid employees and even if at the beginning they were hired thanks to the ADEME or the region or by state subsidy, the objective is to ensure the continuity of their employment status thanks to tax revenues coming from the implementation of renewable energy technologies. This way of income is now considered as a strength considering that the CC “will lose half of the funding”²³ and that “the withdrawal of the State, next to that hurts”²⁴ (Sustainable territorial management division director-CCT 2017).

In 2017, the CC started the process for PCAET elaboration because now it is a compulsory documents for territories with more than 20.000 inhabitants after the LTECV of 2015. The PCAET includes the TEPOS objectives and develops an energy transition strategy for the coming years in a defined framework “Because you need to fit into the boxes. So, until now, we were pretty free, now we must fit in the boxes anyway”²⁵ (Sustainable territorial management division director-CCT 2017). Launched alongside this in 2014, was the formulation of SCoT and of PLUi in 2015, developed to cover the scale of the new *coommunauté des communes*, including energy transition topic. Mainly the specific OAP (Orientation d’aménagement et de programmation) [planning and program orientation] is developed in the PLUi about these energy issues. They have been finalized at the end of 2019, and the PCAET was approved by the end of 2018.

In this territory, similar to the CC Monts du Lyonnais, the idea and development for the energy transition process comes from the attempt to revive the local economy in a territory struggling with population decline, how explained by one energy transition agents of the territory:

“In fact, we are a territory where today we are losing inhabitants. Where there are not very dynamic touristic or economic elements that brings people here. The idea of elected members was to say: how do we get out of this situation? How can we make our territory a showcase for something, in order to attract people? So, attract the population, but also attract economic actors. And so, the idea of working on energy transition and to become a reference territory in energy transition, thus, it is to create a dynamic on the territory, to be a reference and also to carry out at the same time environmental objectives, but

22 “Mais, voilà, les développeurs, ils ont bien vu qu’il y avait une dynamique sur ce territoire et ils sont venus là. Et, du coup, le virage aussi de nos élus, aussi, qui est de dire : ouais, mais économiquement les éoliennes, c’est bien gentil, mais, au-delà de la fiscalité, ça nous rapporte pas trop en économie locale. Donc, aujourd’hui, pas de projet éolien sans qu’il y ait du financement participatif”

23 “va perdre la moitié de nos financements”

24 “le désengagement de l’État, à côté de ça, qui fait mal”

25 “Parce que faut rentrer dans les cases. Donc, jusqu’à maintenant, on était assez libres, là il faut quand même qu’on rentre dans les cases”

also economic development, and a social bearer as well ²⁶ (Sustainable territorial management division director-CCT 2017).

The energy transition process has an economic base but at the same time is an attempt to give new visibility to the territory endowing energy identity characteristics “This [energy] favors... selling the image of the territory”²⁷ (mayor, VP energy transition-CCT 2017).

Moreover the process was developed by catching different calls for projects to finance the projects in the territory, which starts from small projects, such as the solar swimming pool and the wood energy heat plants and its network to broaden progressively towards a more global vision of energy saving and energy production that leads them to be awarded the TEPOS call for interest in the region and by the ADEME. Also in this case the political support of elected representatives were at the basis of the project, an aspect that often comes along with economic concerns, thanks also to the very early hire (2001) of an “Energy consultant in shared energy” by whom “awareness was raised through elected representatives about energy issues”²⁸ (Project manager energy and climate-CCT 2017).

So it seems that was a voluntary bottom-up development, made possible through European, national and regional funds, through different calls for projects which progressively encouraged the development of a local strategy. In this territory, a high contribution to development of RE projects also comes from private developers, mainly in the early wind turbine projects. Instead local institutions in CC Monts du Lyonnais are encouraging inhabitants to develop citizen RE production projects, that more recently the CC Thouarsais is also exploring.

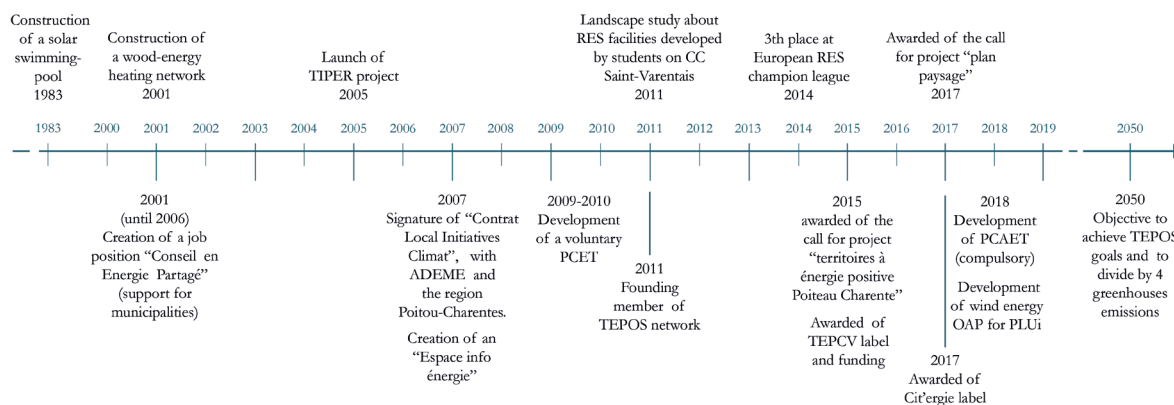


Figure 24. Timeline with the main steps of energy transition process of CC Thouarsais. Source: author

26 “En fait, on est un territoire où aujourd’hui on perd des habitants. Où il n’y a pas un élément touristique ou économique très dynamique qui amène les gens. L’idée des élus c’était d’s’e dire : comment on va sortir du lot, quoi? Comment on peut faire de notre territoire une vitrine sur quelque chose, pour aussi attirer? Alors, attirer de la population, mais aussi attirer des acteurs économiques. Et du coup, l’idée de travailler sur la transition énergétique et de faire un territoire de référence sur la transition énergétique, voilà, c’est créer une dynamique sur le territoire, d’être référencé, et qu’ce soit aussi un vecteur à la fois environnemental, mais qu’ce soit aussi un vecteur de développement économique, et un vecteur social aussi”

27 “ça permet de... ben, de vendre l’image du territoire”

28 “Les élus avaient été fortement sensibilisés aux enjeux énergétiques”

5.2.2.3 Energy transition goals and current situation

The CC Thouarsais has the objective to be energy positive in 2050 and to divide by 4 greenhouse gas emissions. In terms of RE production, it is more advanced compared to the CC Monts du Lyonnais.

In 2017, the renewable energy production covered about 29% of total energy consumption. Figure 24 shows that the most of RE production covers electric energy consumption (82%), and heat consumption (29%), but they do not contribute to mobility and other sectors. In 2015, the RES production covering electrical consumption was about 34%, that has drastically improved thanks to the new wind park, increasing the number of wind turbines from 6 in 2015 (27GWh/yr) to 21 wind turbines in 2018 (about 123 GWh/yr)

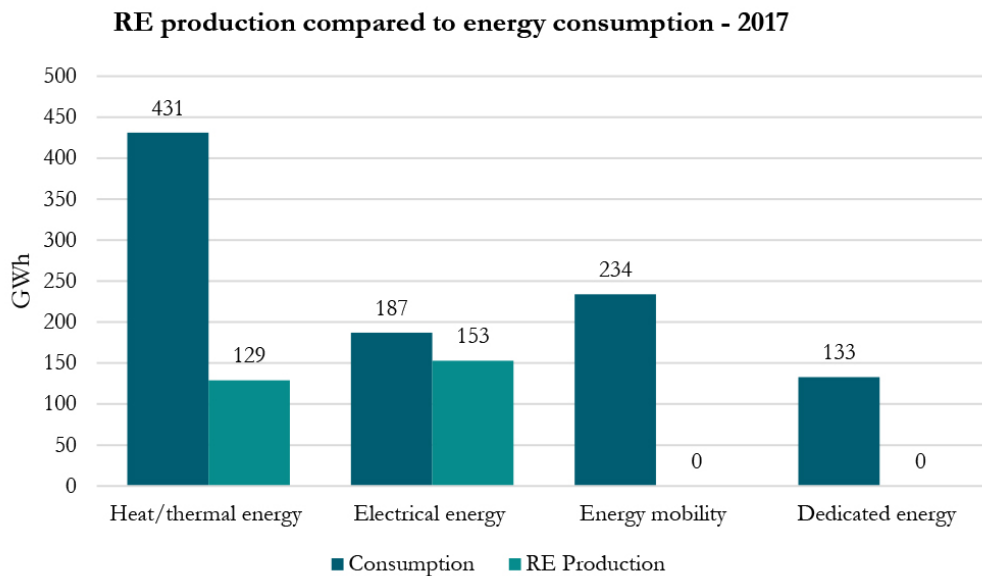


Figure 25. Comparison between energy consumption and RES production in 2017, Source: Data CC Thouarsais.

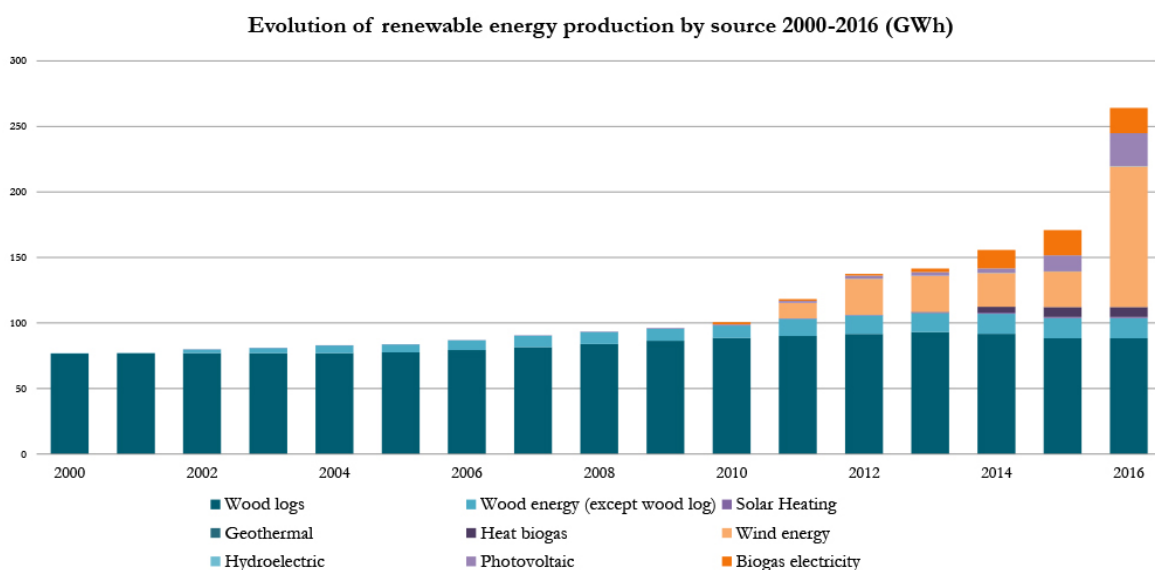
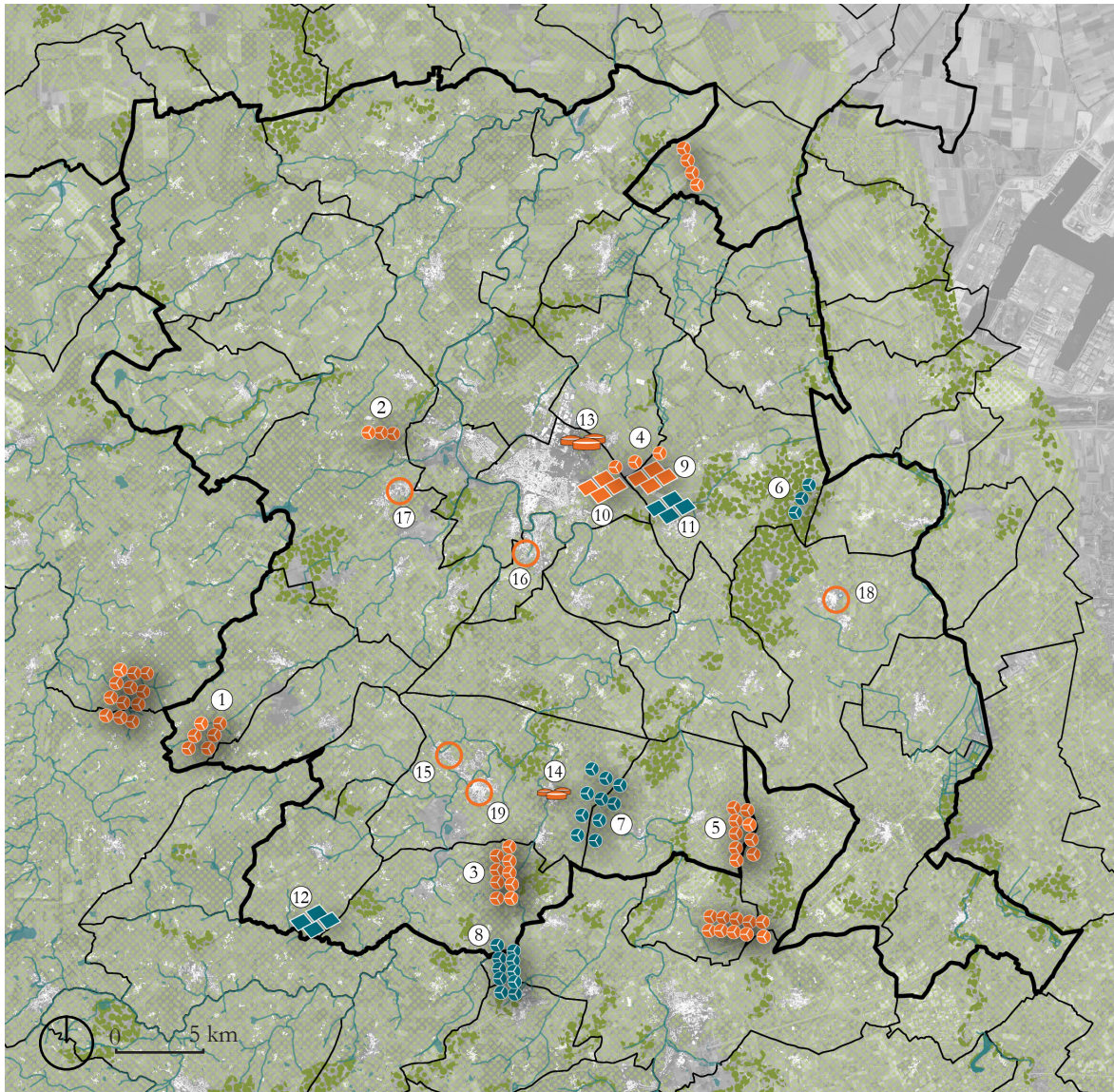


Figure 26. Graphic of the evolution of the RE production for each source in the CC Thouarsais. Source: AREC 2018, CC Thouarsais

The figure 26, shows how the predominant RE source was from the year 2000 wood energy produced both from power plant and heat network sources, but also from household scale equipment, moving towards progressive differentiation of the energy system, where now the greatest energy producing sources are wind turbines.

Table 5.2, Main equipment renewable energy production CC Thouarsais. Source: Elaboration from CC Thouarsais data and PCAET CC Thoursias 2018

	Facility	Location	Year	Capacity (MW)
1	6 wind turbine park	Coulonges- Thouarsais	2011	12 MW -27
2	3 wind turbine park	Mauzé-Thouarsais	2016	6 MW
3	9 wind turbine park	Glenay	2016	29,7 MW
4	3 wind turbine park	TIPER (Thouars/Saint-Léger-de Montbrun/Louzy)	2017	6 MW
5	7 wind turbine park	Saint-Generaux /Irais	2018	18 MW
6	3 wind turbine park	TIPER extension - Saint-Léger-de Montbrun	project	6 MW
7	10 wind turbine park	Saint-Varent/ Saint-Generaux	project	42 MW
8	3 wind turbine	Glenay extension	project	9 MW
9	GPV park – 16 ha	TIPER solaire 3, Louzy	2014	8,7 MW
10	GPV park – 21 ha	TIPER solaire , Thouars	2015	10,8 MW
11	GPV park– 16 ha	TIPER solaire 2, Saint-Leger-de-Montbrun	project	6,6 MW
12	GPV park -14 ha	Pierrefitte	project	6 MW
13	Biogas combined heat and power plant (62 farmers and agro-industries, 75.000 tons of organic material per year)	TIPER méthanisation, Thouars	2013	2 MW electrical capacity 1,6 MW heating capacity
14	Biogas power plant (9 farms, 35.000 tons of organic material for year)	CAPTER méthanisation Saint-Varent, Riblaire area	2014	530kW electrical capacity
15	Wood energy heat plant and heat network	Réseau “nord”- Saint-Varent	2001	750 kW wood chips
16	Wood energy heat plant and heat network	Saint-Jean-de-Thouars	2007	150 kW wood chips
17	Wood energy heat plant and heat network	Mauzé-Thouarsais	2007	250 kW wood chips
18	Wood energy heat plant and heat network	Oiron	2008	485 kW wood chips
19	Wood energy heat plant and heat network	Réseau “bourg” – Saint-Varent	2010	400 kW wood chips



Legend:














- | | |
|--|--|
|  Farmland |  Realised wind turbines |
|  Built areas |  Realised photovoltaic park |
|  Forest |  Realised biogas power-plant |
|  Water |  Local heat network |
|  Municipal border |  Wind turbines in project |
|  Regional border |  Photovoltaic park in project |
|  Municipalities commu | |

Figure 27. Location of RE facilities in CC Thoursais, 2018. Source: author, according to data CC Thoursais, PCAET 2018, IGN (2014)

The strategy written in the PCAET of 2018 to reach the TEPOS goal, continues in the direction of developing energy saving measures on consumption according to different sectors:

- Residential: the goal is to reduce -80 GWh about 27%, both retrofitting houses and raising awareness about daily ecological gestures
- Passengers transport: the goal is to reduce -10 GWh about 30%, through the development of carpooling for long-distance journeys, for house/work journeys encourage the use of bicycles, reinforce public transport, and convert 2000 cars into electric cars.
- Merchandise transport: the goal is to reduce -60 GWh about 30%, mobilizing stakeholders to increase transport through road-rail and fluvial transports and the use of low emission vehicles.
- Service sector: the goal is to reduce -30 GWh about 31%, both retrofitting buildings and raising awareness about daily ecological gestures
- Agriculture: it is the least energy consuming and the goal is to reduce -10 GWh about 16%, by increasing more efficient facilities.
- Industrial sector: the goal is to reduce -60 GWh about 26%, through actions of retrofitting buildings and optimizing processes, and actions about the development of industrial ecology and eco-design for raw materials, wastes, etc. by improved management

The PCAET at the same time highlights the objectives for further RES development to reach the TEPOS goal:

- The development of wood-energy (one of the biggest RES production sources) is not further developed because of the limitation of the wood resource in the territory and because of the CO2 emissions produced
- Increase biogas production to 90 GWh (+333 %): heat biogas power plant TIPER, 4 farm scale biogas plants
- Increase photovoltaic solar 60 GWh (+300%) both on roofs and on the ground: 3 bigger scale PV ground parks, 1.600 house roofs covered by PV, 110 big surface roofs of industrial or agricultural buildings
- Increase of solar heating 10 GWh (+1923%): 5000 residential or industrial or agricultural buildings to be equipped with a solar water heaters.
- Increase of wind energy 250 GWh (+926%): new wind turbines park under construction.

Both energy savings and RE production are extensive. The additional wind turbine parks projects in progress are considerable. This goal will require a lot of space for future implementation, leading to impacts on broader areas of the territory.

How could be seen in figure 27 the wind turbines parks and the other RE facilities are mainly implemented in the south part of the territory, both in the *bocage* [hedges system] than in the plain open field, while in the north, which is mainly characterized by wine production, has none of them. This could be because the municipality of Saint Varent was one of the first to develop energy projects is located in the south, where it raised awareness and emulation phenomena in the nearby municipalities. Another cause could be the fact that the north is more under the influence of the richer Saumur territory and because wine production these municipalities tend

to preserve a certain image not “ruined” by RE facilities. During the field visits people were proud about vineyard landscape characteristics, defining them in similar fashion to Tuscany hills, implying that change is not really desired.

However, the difficulty to implement these extensive objectives throughout the territory but also in the locations that are less involved in the process is recognized by the technical service in charge and the elected representative, highlighting how:

*“we did all the obvious and easy locations. It is done. And now, it’s: how are we going to manage the rest? And that is not easy, because it means that it is not hyper-profitable projects and those hyper favorable for renewable energies, it means that there are people who are not necessarily aware...”*²⁹ (Sustainable territorial management division director-CCT 2017).

So communication and efforts to raise awareness of inhabitants became central for the future. These problems come along with the difficulties that emerge from the transversal nature of energy issues, as highlighted for the CC Monts du Lyonnais. This means that leading certain projects such as reducing energy in the industrial sector, implies convincing and working with different partners with whom “It is not always easy to share the same goals. The goals of the structures and those of our partners are not always exactly the same as ours, thus, sometimes this could slow down and make the project deviate from course”³⁰ (Project manager energy and climate-CCT 2017). This comes along with the uncertain financial aspect of future projects, shared by many agents interviewed and indicates a visibility problem for the long-term.

Moreover one of the aspects that seems to raise most concern is energy reduction, combined with emission reduction, or concern about “transport”. For now the territory has not extensively worked on these subjects and because of its vastly rural characteristic, remain big issues:

*“There, we feel, actually, that it blocks. It blocks, because even when we try to develop the collective [transportation], such as for companies, the problem is that we don’t use it [the car] only to go to work, but also get bread, children, well there it is. And these are routes/journeys that cannot necessarily be shared, so it’s not... That’s it, we have a big challenge”*³¹ (mayor, VP energy transition-CCT 2017).

For the CC Thouarsais even if the TEPOS goal still requires a lot of implementation, has successfully developed renewable energy production to cover a considerable amount of energy consumption, even if the energy-saving measures are not engaged to the same extent. Despite the extensive future RE implementation, in which many factors will interfere, such as the inhabitants’ participation and the uncertainty of the financing system, leaves a certain amount of incertitude for the future.

These are the two French cases as cited above; in the next section the Dutch situation is explored.

29 “Je pense qu’on a fait toute la partie évidente et facile. Elle est faite. Et maintenant, c’est : comment on va chercher le reste, quoi? Et qu’est pas facile, parce que ça veut dire que c’est pas des projets hyper rentables et hyper opportuns pour des énergies renouvelables, ça veut dire qu’il y a des gens qui sont pas forcément sensibilisés...”

30 “il n’est pas toujours facile de partager les mêmes objectifs. Les objectifs de structures et de nos partenaires ne sont pas toujours exactement les mêmes que les nôtres, et du coup, parfois ça peut ralentir et dévier les projets”

31 “Là, on sent, effectivement, que ça bloque. Ça bloque, parce que même quand on essaie de faire du collectif, style sur les entreprises, le problème c’est que on s’en sert pas que pour aller au travail, c’est aussi pour aller chercher le pain, les enfants, enfin voilà. Et c’est des trajets qui peuvent pas forcément se partager, donc c’est pas... C’est ça, là-dessus, on a un gros défi”

5.2.3 Goeree-Overflakkee

5.2.3.1 Territory

Goeree-Overflakkee is an insular polder belonging to the Dutch Delta, included in the Province of Zuid-Holland located in the South of Rotterdam. The island was divided in four municipalities (Dirksland, Goedereede, Middelharnis and Oostflakkee) which joined together in 2013 to compose the municipality of Goeree-Overflakkee, now sharing the same vision and ambition regarding energy transition.

Figure 28. Location of Goeree-Overflakkee. Source: author



The municipality is mainly characterized by rural agricultural land, but also coastal areas. Indeed, it is also a tourist seaside destination in its western part bordering the North Sea (Goeree). The municipality has a total area of 422 km² of which 261 km² is land, while the rest are water bodies surrounding the island. It has a population of 49.130 inhabitants (CBS 2017) and a density of 188 inh/km² (CBS 2017), which is much lower when compared to the high density of the Zuid-Holland province (density about 1.300 inh/km² according to CBS 2017). The most populated villages are almost attached to one another and are located in the center of the island: Middelharnis and Sommelsdijk counting 7.292 and 7.230 inhabitants respectively (CBS 2017). The remaining population is dispatched in three villages counting between 5.000-6.000 inhabitants, one between 3.000-4.000, another four between 2.000-3.000, with four more villages counting 1.000-2.000 people (CBS 2017). The population living on the island has been growing since 2010, registering an increase of about 3% (CBS 2017). However, the island has been also experiencing an aging population phenomenon: in 2017 the youth indicator is 0,86 (CBS 2017) showing a higher number of people over 60 years of age compared to the population of 20 years or younger.

However, thanks to the North Sea recreational coastal part, Goeree-Overflakkee is a tourist destination hosting about 270.000 overnight and day visitors per year especially during summer (CBS 2016). This increases the local population and energy consuming temporarily. Figure 29 shows high energy consuming sectors are transports (38 %) and households (32%) followed by the service sector (18%). Industries are almost completely absent, although a high number of employees are in commercial/trade activity 20%, and tertiary service mainly linked to healthcare 23% (LISA 2016). The municipality has experienced an economic recession since 2005, registering a decrease in the number of business companies accompanied by an increasing rate of unemployment (LISA 2015) from which it currently seems to have begun recovering, even if unemployment still remains a matter of concern on the island.

The majority of the island's surface is used for agriculture, representing about 70% of the land use surface (CBS, 2018) where urbanized areas cover about 5% (CBS, 2018), not including water surface. However the agriculture area has decreased by 11% between 2000 and 2015 (GO *geemente* data) both because of the establishment of natural park reserves but also due to pressure from tourist camping villages, golf courses and urban extension. Indeed, dwellings land consuming because the 87% of the building stocks are free-standing houses and row houses while only 13% are apartments. Moreover considering that 30% of buildings have been built before 1940, and experiencing an increase of about 38% between 1975-2000 (CBS 2017), and of 6% since 2000 (CBS 2017), the existing building stock is for the most part old and quite energy consuming. The transport sector is high consumption too compared to the rest of the Zuid-Holland Province, because even if many bicycle paths exist on the island along with a system of public bus transport, they remain underdeveloped and the use of private cars is still predominant. The average of the island is 1,3 car per household, compared to the lower 0,8 for the Province of Zuid-Holland. Moreover, about 1/3 of the population (CBS 2017) works outside the municipality producing a daily commuter movement, and there is no train connection with the island. The access from the mainland is possible only by car and bus through six bridges: two in the North from Rotterdam, one in the East from North Brabant, and three connecting the island with the province of Zeeland in the South.

Final energy consumption for sector (%) - 2015

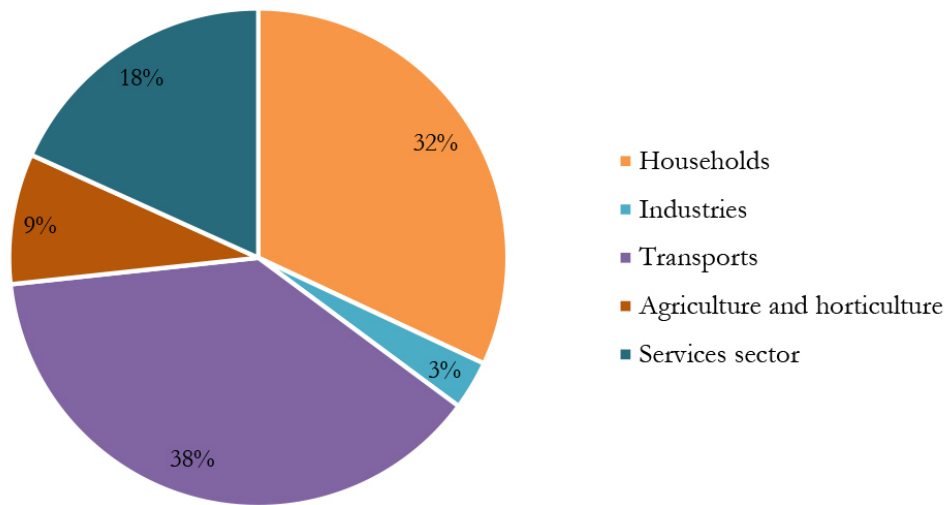


Figure 29. Final energy consumption for sector of Goeree-Overflakkee (%) in 2016. Source: Klimaatmonitor.databank.nl

Even if Goeree-Overflakkee is part of the Province of Zuid-Holland, its delta characteristics make it more similar to Zeland, and its main features and landscape are quite architypical. It is a flat land series of (former) polders, created progressively through dikes being enlarged starting from several small existing islands, now merged into one, leaving behind visible old dikes, many of them have been used for road development. The municipality has a depth below sea level average of about -1,5 m, which lowers at some points to -5 m and increases to +10 m on the edges as dunes and dikes towards the North Sea. Goeree on its sea border is characterized by sand dunes and shore features whereas the other internal coasts are protected by reinforced ground dikes, beyond which extends into open agriculture fields with tree lines planted on the dikes and hedges for wind protection. The fields are mainly cultivated with beets, potatoes and onions in the internal Overflakkee location while more dairy farms and flower seed cultivation are present in Goeree. The villages present a historic compact center developed around harbor channels and main roads, characterized by the typical Dutch red-brick row houses, that have gradually expanded around and in different directions, but keep similar building characteristics. However even if somewhat sprawled, the form of the main villages are quite compact. Several-isolated farms punctuate the territory protected by bushes and trees on the prevailing wind site (figure 32).



Figure 30. Polder characterized by succession of trees in a row and wind turbines in Goeree-Overflakkee, July 2017. Source: author.



Figure 31. Dike between the internal Volkerak sea and the polder Piet de Wit, protecting the wind turbine park at the edge of the island, July 2017. Source: author.



Figure 32. Farm protected by tall vegetation against the wind in Nieuwe-Tonge, July 2017. Source: author.



Figure 33. New row houses in Middelharnis, September 2017. Source: author.



Figure 34. Historical windmill in Haringvliet, September 2017. Source: author.



Figure 35. Tourist site on the shore, North Sea coast in Ouddorp, July 2017. Source: author.

5.2.3.2 Towards the energy transition commitment and implementation

It seems that the first energy action developed on the island dates back the end of '80, when an inhabitant of the island working for “Lagerwey”, a Dutch company that still exists and was one of the first producing wind turbines in the Netherlands, decided to develop one on the island. Now nonexistent it was the “first wind mill was small and it was like ‘that’s a nice hobby to have a small windmill” (Director Cooperative Deltawind-GO 2017). However, this small project created a certain awareness on the issue by letting people know about it. Many years later, in 1996, the first park with seven wind turbines was implemented on the island by local farmers and supported by Deltawind cooperative. Deltawind is a local cooperative that supports the implementation of renewable energy facilities on Goeree-Overflakkee. It still exists and is active on the island. A wind turbine park prevails on the same location even if the wind turbines have been replaced with four higher and more efficient ones in 2016.

Even if several wind parks have been developed on the island over the years, such as the “Piet de Wit” in 2003 with 12 wind turbines, the original integrative idea for implementing energy transition arrived on the island in 2009/2010.

A level of consciousness about the renewable energy production existed on the island, but the majority of those interviewed mention that the main triggering to start the energy transition process was the decision of the central Dutch government to produce 6.000 MW from onshore wind energy stated in the “Structuurvisie Infrastructuur en Ruimte. Nederland concurrerend, bereikbaar, leefbaar en veilig” [Strategy vision for infrastructure and spatial planning. Making the Netherlands competitive accessible, liveable and safe] (SVIR) and in the “Energieakkoord voor duurzame groei” [Energy agreement for sustainable growth] (SER) (2013) further detailed in the “Structuurvisie Windenergie op land”. This choice was a repercussion of the commitment of the Netherlands to produce 14% of renewable energy after the European 20-20-20 package, to achieve 20% of renewable energy production in 2020 at an European level. And this ambition was reinforced by the then Ministry of Economic Affairs, Agriculture and Innovation where the energy report of 2011 defined investment for the RE production sector.

The negotiation between the Dutch central government and the provinces through “InterProvinciaal Overleg” [interprovincial consultation] (IPO) started in 2010 in order to find a shared agreement on the wind energy development areas across the different provinces and establish the “Structuurvisie Windenergie op land” that was finally published in 2014. After negotiations, the Province of Zuid-Holland committed to install a 735,5 MW capacity of wind energy by 2020. This provincial assignment was subdivided into smaller tasks negotiated within the municipality. And it is at this point, during the negotiation that the municipality of Goeree-Overflakkee was indicated as one of the suitable areas for large scale wind park implementation, with the objective to install 300 MW of wind turbine capacity. Through negotiations the task became a 225 MW. One of the reasons for this choice was the low density characteristic of the territory, as expressed by one agents:

“The more people live the more...they say... protest is stronger, but also we have a flat country, you see, and its easy to catch the wind and we are living near the sea and wind is most west and south-west and it’s very unique for that. In the Randstad you have a lot of high buildings, you have a lot of factories so that’s not good places for wind turbines. And therefore they look to this area, it’s a flat country, not really

dense ...” (municipal councilor innovation and sustainability-GO 2017).

Indeed the Province “looked where there are chances, where is not so crowded, where there are a lot of industries in order not to bother, where there is nature you want to protect. So all these arguments...” (energy transition program manager-PZH 2017) were used in order to develop negotiations with the municipalities.

In 2010, the development of an “energie visie” [energy vision] document was undertaken by the “Intergemeentelijke Samenwerkingsverband Goeree-Overflakkee” [Intermunicipal cooperation Goeree-Overflakkee] (ISGO) the entity supporting the process of fusion among the four municipalities, supported by the province, developed three different possible scenarios according to different degrees of ambition “must”, “can” and “want”, in order to share an energy roadmap to negotiate with the Province and the national government. The “must” scenario follows the provincial decision and national policy, without much more. The “can” scenario develops a more active approach in which the municipality improves its energy transition ambitions by developing a more global vision on the issues, with the purpose of being energy neutral. Finally, the “want” scenario promotes a proactive attitude in which the island becomes an energy exporter, well beyond energy neutrality. The “can” scenario was the one selected by the local institutions that resulted in the report “Energie neutraal Goeree-Overflakkee 2030” of 2012 and guided the signature the same year of the accord “Duurzame energie op Goeree-Overflakkee” [sustainable energy in Goeree-Overflakkee] between the municipality and the province of Zuid-Holland.

This wind energy production negotiated with the province it was not well received, but the choices for the municipality were:

“to say we don’t want wind energy, in that case each province will dictate where to set up them, [...] or you can say as municipality: ok we accept this responsibility, and we want to run the process. So we will do the stakeholders alignment and we will figure out where we want to put them. Even if we really don’t want them, we prefer to put them in ourselves than you telling us how to do it” (sustainability policy adviser-GO 2017).

And finally the municipality of Goeree-Overflakkee chose this last option “it says ok, we accepted that we have a commitment, to put two hundred and something MW of wind on our land on the island, but we decide where” (sustainability policy adviser-GO 2017). By ‘energy neutral’, they meant to balance energy production and consumption of the island. Moreover, through the negotiation process with the municipality the vision to be energy neutral was allowed to back the objective to produce an amount of wind energy, even if this remains the biggest amount, combined with other technologies such as photovoltaic panels, biogas production, tidal energy and energy-saving measures. The starting point was the compulsory assignment cascading from national, to provincial to the municipal level to implement large wind parks, but as the sustainability policy advisor of the island highlights “because of the wind assignment the ambition was moved forward. With the clear remark and promise by the province that it would not be just wind. They will also helped us to make this into a broader commitment, so include, sun, biogas and also tidal energy” (sustainability policy adviser-GO 2017). So the wind production on land is reduced from 300 MW to 225 MW, and the municipality committed to produce additional energy with other renewable energy facilities. These objectives have been

included in the provincial Zuid-Holland spatial structurevisie “Visie ruimte en mobiliteit” [Vision space and mobility] of 2014, and in its regulation part “Verordening ruimte”. Since then, a delegation from the municipality participated in the COP 21 of 2015, and since the ambition of the island to be energy neutral was accelerated from 2030 to 2020, because of the high potential and significant number of RE production projects developed over these years, was reached faster than expected. Now the ambition for 2030 is to have an energy production surplus in terms of electricity, which could be exported or used to develop new activities on the island. This ambition is currently in the process of being detailed and developed through the national “Regionale Energie Strategieën” program, conducted within the framework of the Dutch “nationaal klimaatakkoord” [national climate agreement] of 2018 having the goal of CO₂ emission reduction of 49% by 2030. In this program, each of the 30 Dutch energy *regios* [territoires] defines its energy objectives and the road maps moving towards 2030, through analysis and exchange at the municipal, provincial and national level (Ministry of economic affair and climate policy, ministry of interior and kingdom relations) to elaborate a global and shared vision among all the *regio* to contribute along with other sectors (industry, etc.) to achieve National objectives. The Central Government states subsidized (2019-2021) the program development and some implementation projects that will be different according to the *Regionale Energie Strategieën*. Goeree-Overflakkee is one of the six *regios* in the province of Zuid-Holland and the negotiation for the “Regionale Energie Strategieën” action road map started in 2018 to be achieved at end of 2019.

The energy transition process merged top-down and bottom-up initiatives. Bottom-up because the early projects developed by the renewable energy cooperative (Deltawind) on the island and afterwards by the municipality decision to broaden the “energy vision” for the island, not limiting themselves to the wind energy assignment. Top down because the motivation for the development of the “energy island vision” comes from the national and provincial level through the wind energy production compulsory assignment (225 MW), that is recognized to be the triggering force: “I guess the wind turbine discussion was really the beginning fuel for the discussion about energy transition” (since 2017 account manager of energy transition in Stedin, before Program manager for sustainability and innovation GO 2017). Currently, it seems the “Regionale Energie Strategieën” program continues in this direction, providing a national framework general assignment for electricity production and CO₂ reduction as a starting point for further negotiation and agreement with regional/local agents who develop territorial tailor-made solutions. However even if the ability to make local decisions about the implementation process is perceived as positive, the energy task does not seem to be supported by an adequate technical knowledge, at municipal levels especially at the beginning of the process, leading to problems and uncertainty about the results:

“for the goals it’s really top down, because it is the National government that is going to aim for so many wind turbines, so much solar power, so much CO₂ reduction. So the goals are globally gripping down, but the implementation, how it must work out in the region, that’s more the role of the municipality, which is pretty difficult, because you say well... the target is going to be put over the fence and they say “good luck”. And you see municipalities say “ok, I really want to do that, but I have not knowledge, I don’t have the legal tools to do so...” So that’s the friction...” (since 2017 account manager of energy transition in Stedin, before Program manager for sustainability and innovation GO 2017).

This crossroad point seems to have been taken more in consideration in the “Regionale Energie Strategieën” program, which has been developed into a national platform supporting step-by-step development, sharing knowledge and data (“Klimaataakkoord” 2019).

Another recurrent subject highlighted as a reason why the municipality engaged with high ambition in the energy transition is the historical cultural relationship with the sea and the danger awareness for an island country that descends below sea level:

“In 1953 there was a big disaster here, the Deltaworks were built after that. There was a lot of flooding. So we know what flooding means, and how disruptive that can be. So there is this image that people still have from that period. So they say no, we don’t want climate change, we have to act now and we won’t be somebody that just follows” (sustainability policy adviser-GO 2017).

Some aspects that have not been raised during the interviews, as important components in favor of the energy transition implementation, are economic (new jobs, drawing investments etc.), and the idea to create new attractiveness for the municipality, where other rural areas experience aging and decreasing phenomena.

However the question persists on whether big wind turbine developers should come and implement wind turbines on the island, whose benefits do not fall to the local community was raised by the Province ZuidHolland energy transition program manager that explains:

“So it’s quiet a balance on what is allowed what is possible and what is liked. And there is a new sentiment about this kind of energy that is “they [wind turbine developers] have all the earnings from the wind mills and we suffer from it. So they got all these big farms, starts wind turbines, they got rich then, the big energy company, makes ten or 15 wind turbines on they own, they get rich, and we get all the shadows and the night light”. So it’s a difficult situation. So we try to involve local energy cooperatives to erect wind turbines themselves, or to get a fair share of the revenues.” (energy transition program manager-PZH 2017)

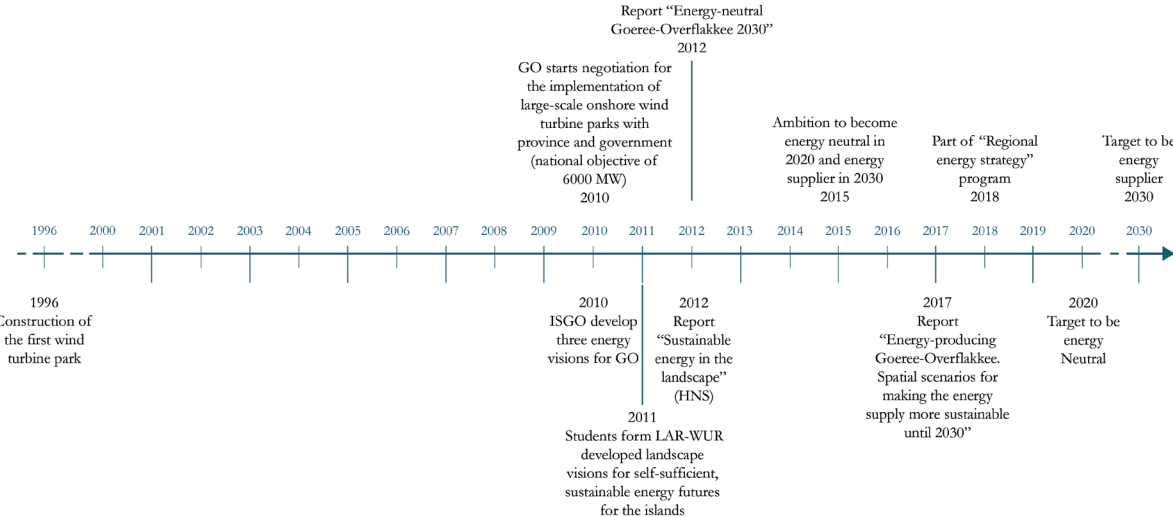


Figure 36. Time line with the main steps of energy transition process of Goeree-Overflakkee municipality. Source: author

5.2.3.3 Energy transition goals and current situation

By 2020, the municipality has the ambition to be energy neutral, meaning that energy production has to be equal total consumption, for residential, industrial, transportation, agricultural, and services sectors. The main focus is on electricity production to compensate gas and fuel use through the generation of renewable electricity. The calculation starts from the total primary energy consumption of the island for the year 2015 that was estimated around 4.100 TJ. In this way, the fluctuation to accommodate tourism during summer on the North Sea coast was taken into account. The general vision for the energy neutrality goal does not list energy reduction for example nor the actions to reduce energy consumption in buildings. The sustainability policy adviser explain this choice: “because even if the demand declines the island will be even better, and to be safe it is better not to scaling it down” (MvS, sustainability policy adviser-GO 2017). Moreover, consumption is expected to remain the same because the estimated economic growth, coming from energy development will neutralize/compensate the efforts from energy saving efforts. In 2015, RE production covers about 40% of primary energy consumption, with the objectives to arrive at +120% in 2020. The energy is mainly produced by wind turbines, the main RE technology developed on the island. This can be seen in table 5.3, even if some ground PV parks exist or are under development, or compared next to the experimental tidal power plant. In 2017, seven wind turbines parks functioned generating together about 707 TJ per year, and five more parks were under development adding another 27 wind turbines and raising the production of 1585 TJ per year (StudioMarcoVermeulen. 2017), “Energieproducerend Goeree-Overflakkee”). This production, combined with the replacement of old wind turbines with more efficient ones (e.g. “Piet de Wit” wind turbines park), a tidal energy plant, several PV parks and PV on roofs, and farm-scale biogas power facilities will amount to about 120% of energy consumption.

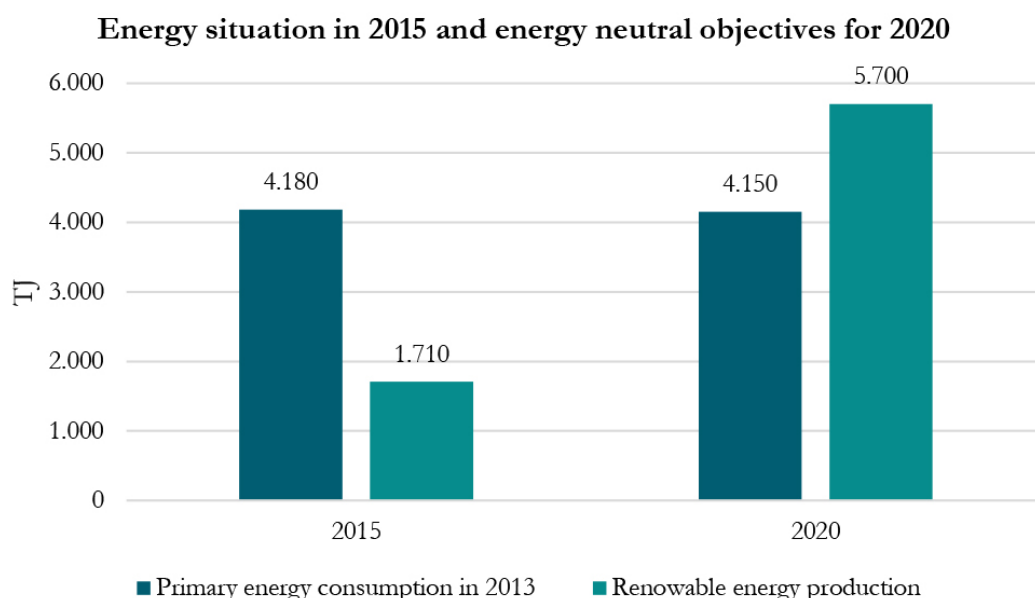
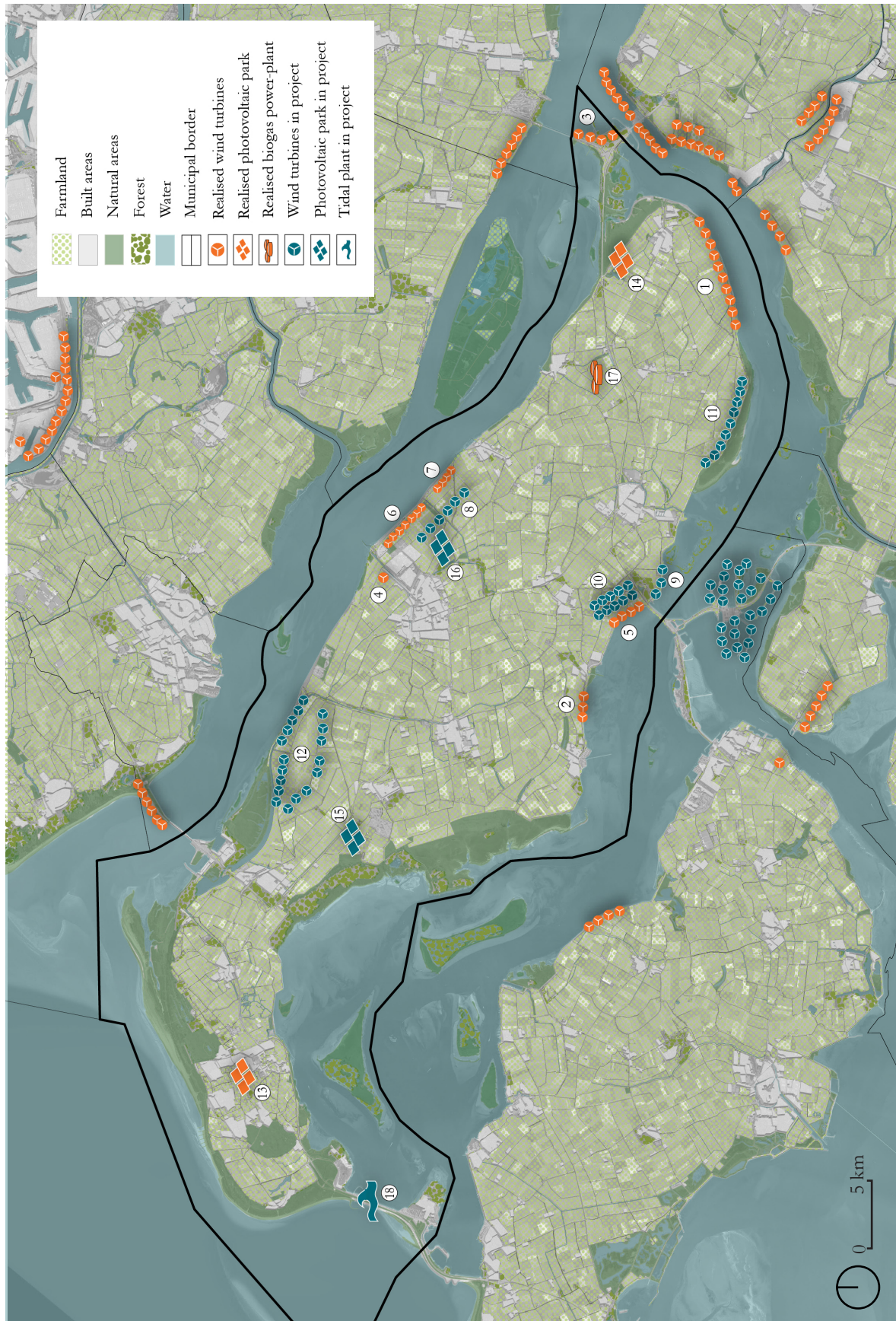


Figure 37. Energy situation in 2015 and the expected situation in 2020, would accomplish the objective to be energy neutral with a surplus generated by renewable energy production. Source: Data Gemeente Goeree-Overflakkee.

Table 5.3. Main installations for renewable energy production in Goeree-Overflakkee. Source : Geemete GO, <http://www.enervisa.nl/kaart>, StudioMarcoVermeulen. 2017. “Energieproducerend Goeree-Overflakkee. Scenario’s voor de verduurzaming van de energievoorziening tot 2030”

	Facility	Location	Year	Energy Production for year (TJ)
1	12 wind turbine park (Deltawind) (in 2018 planned the replacement and addition of 7 wind turbines to produce 360 TJ)	Piet de Wit - Ooltgensplaat	2003	164 TJ
2	3 wind turbine park	Herkingen	2014/ 2015	70 TJ
3	4 wind turbine park	Hellegatsplein	2015	129 TJ
4	1 wind turbine	Waste water treatment - Middleharnis	2015	5 TJ
5	4 wind turbine park (Deltawind) (replacing 7 wind turbines implemented in 1996)	Battennoert – Nieuwe Tonge	2016	129 TJ
6	4 wind turbine park	Polder Oude Stad, Martina Comelia- Middleharnis	2017	101 TJ
7	7 wind turbine park	Polder Oude Stad, van pallandt - Middleharnis	2017	109 TJ
8	6 wind turbine park	Van Pallandtpolder - Middleharnis	In project	149 TJ
9	3 wind turbine park (Deltawind)	Suyderlandt – Oude Tonge	In project	129 TJ
10	10 wind turbine park	Battennoert extension – Nieuwe Tonge	In project	327 TJ
11	8 wind turbine park	Anna Wilhelminapolder – Oostflakkee	In project	208 TJ
12	18 wind turbine park	Zuiderdiep	In project	772 TJ
13	GPV Park camping - 1,3 ha	Ouddorp	2012	0,5 TJ
14	GPV Park – 37 ha	Adriaanpolder-Ooltgensplaat	2018	110 TJ
15	GPV Park – 19,5 ha	Roxenissepolder - Melissant	Project	30 TJ
16	GPV Park – about 45 ha	Van Pallandtpolder – Middleharnis	project	82 TJ
17	Heat biogas plant	Ras farm- Den Bommel	2015	2 TJ from manure to gas for heating
18	Tidal energy plant	Ouddorp dam	Project planned	About 72 TJ

Figure 38. Location of RE facilities on Goeree-Overflakkee, 2018. Source: author, according to data municipality Goeree-Overflakkee, Deltawind



Expected mix of energy production in the year 2020

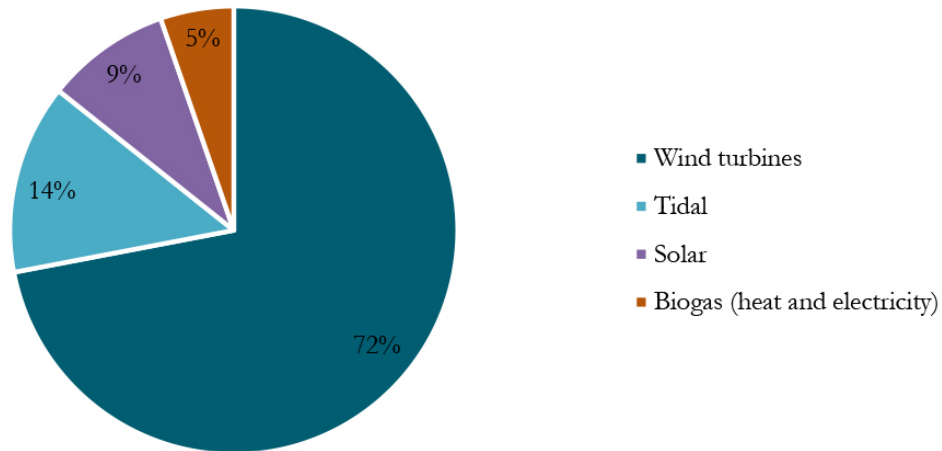


Figure 39. Percentage of energy production for each RE technology for the 2020. Source: Data Gemeente Goeree-Overflakkee.

Even if the municipality's energy program, has the ambition to differentiate RE technologies, wind turbines remain by far the most prevalent ones (figure 39), fitting/following the provincial and national objectives from the beginning of the process by at least installing 225 MW of wind energy on land by 2020.

The energy-saving measures are not the main criteria developed in the energy transition for the island that, as it was already explained, until 2020 is focused on electricity production. However some actions for energy saving on building stock were undertaken, also because national objectives of promote 1,5 % energy saving each year to reduce CO₂ emissions (Energy Agreement for Sustainable Growth 2013), and several subsidies allocate to home owners and housing corporations target improved building insulation, solar water heating, etc. The municipality of Goeree-Overflakkee works mainly with three housing corporations on the island (e.g. Fidewone) and "it's in process and it was a lot of preparation, and it's still slow going, but now they [housing corporations] have the plan to renovate 3000 of their apartments over the next several years, that's small, but it's a start" (MvS, sustainability policy adviser-GO 2017). The difficulties to implement the household energy-saving measures are perceived as problematic because:

"you need more people right, you can build 20 wind turbines with one company and you need, a thousand house owners, all these different stakeholders all these people need to be in the same vision so it's much more difficult, it's much more heterogeneous group" (sustainability policy adviser-GO 2017).

Moreover, the island strategy, based on electricity compensation for fuel energy consumption, for now does not seem to include a strategy for reducing transport consumption that in any case could be important to develop considering it represents the highest energy consumption sector on the island.

“Regionale Energie Strategieën”

In any case, if the energy transition is clearly defined up until 2020, the action program towards 2030 with the goal to export energy is not yet defined. The *Regionale Energie Strategieën*, which will detail these objectives will be drafted for the end of June 2020 (“Klimaataakkoord” 2019), according to the final national climate agreement. From the interviews with the technical services for sustainable development and energy transition of the island, the action program will continue the implementation of renewable energy sources, but will include and also reinforce energy-saving measures such as building stock retrofitting, an aspect specifically highlighted by the regional energy strategy program. With the purpose of supporting decision-making, the municipality commissioned a scenario study “Energieproducerend Goeree-Overflakkee. Scenario’s voor de verduurzaming van de energievoorziening tot 2030” [Energy producing Goeree-Overflakkee. Scenarios for making the energy supply more sustainable until 2030] was published in 2017. In order to support decisions for subsequent strategy, the three developed scenarios combine both energy production and energy-saving measures, and mainly focused on the attempt to retrofit existing building stock (these scenarios are detailed in chapter 6). The third scenario focused on the possibility to produce green hydrogen gas by the surplus of renewable electricity (a measure to realize energy storage).

Even if a definitive choice has not been made yet and an action roadmap does not exist yet, this last scenario seems to have attracted attention because the municipality is launching a pilot project for a green hydrogen production platform, produced from the surplus of renewable electricity (“Convenant Groene Waterstofeconomie Zuid-Holland, Proeftuin Energy Island Goeree-Overflakkee (H2G-O)” 2017). It is a pilot project developed with the support and collaboration of the national government, the province of Zuid-Holland and the city of Rotterdam, whose industrial harbor will mainly benefit from the produced hydrogen.

Goeree-Overflakkee, among the three studied territories, seems to be more advanced in terms of energy production, compared to the French cases, taking into account that it has really little energy consumption for industry. Indeed it is also facing difficulties in its implementation and one difficulty often highlighted in the interviews is the need to transmit knowledge and raise awareness about energy transition issues to people “one of the biggest things is [that] energy transition sustainability is not really at top of minds. So it’s hard for people to get into action”. This is a common aspect with the French situation along with the problem of financing, is highlighted as follows: “there is not enough money for the transition” (municipal councilor innovation and sustainability-GO 2017) and “the financial incentives at the moment are not that high compared to the actions you have to undertake” (since 2017 account manager of energy transition in Stedin, before Program manager for sustainability and innovation GO 2017). Moreover the complexity created by the need to address energy transition in all sectors, residential, industrial, etc. to develop projects and achieve goals is also in this case one of the main concerns:

“one of the bigger things I tried to do is to bring people and organizations together and see if there is energy... if there is a meaningful relationship and which could work out to be a new successful project. Because we all have a piece of the puzzle, and we are trying to fit it in, but the puzzle is [composed] only by a whole, that brings all the pieces together” (since 2017 account manager of energy transition in Stedin,

before Program manager for sustainability and innovation GO 2017).

At the same time it recognized that every sector has its own strategies and goals and every “world of transformation has difficult challenges, but that’s what has come to affect everybody as a whole” (energy transition program manager-PZH 2017).

Moreover a specific problem that seems to arise, but still not experienced on large extent in the CC Thouarsais, generates some concern for future ambitions is the “public opinion on the wind turbines [...] that could raise really heavy opposition”(Director Cooperative Deltawind-GO 2017), considering the high number of projects developed and still under construction on the island.

So Goeree-Overflakkee, even if quite advanced concerning energy production, still needs to effect great efforts in terms of energy saving, both for the residential and the transport sectors. Further strategies towards 2030 are not detailed yet, but in line with the general, nation-wide framework of the regional energy strategy program that concerns both production and energy saving.

5.3 A crossed perspective on three approaches and objectives

First, one needs to remember that this research concerns transitions that, by definition, are ongoing processes, and at the time of research the data collection stopped during 2019, even if the inquiry potentially could go on until 2050 and beyond.

These three territories are commonly mentioned as successful examples, in the territorial network (TEPOS, VNG) and in some publications (e.g. Kuijers et al. 2018), treating the energy transition process, as frontrunners of a process in which more and more territories are beginning to commit themselves in a more or less voluntary way.

Table 5.4. Comparative overview of the three embedded cases concerning case studies characteristics and energy transition timing. Source: author

	CC Monts Lyonnais	CC Thouarsais	Goeree-Overflakkee
Country	France	France	Netherlands
Entity	<i>Communauté de communes</i>	<i>Communauté de communes</i>	Municipality
Surface	400 km ²	620 km ²	422 km ²
Inhabitants	29.460 inh (INSEE 2016)	36.382 inh (INSEE 2016)	49.130 inh (CBS 2017)
Population Density	91 inh/km ² (INSEE 2016)	59 inh/km ² (INSEE 2016)	188 inh/km ² (CBS 2018)
Start of energy transition process	- 2006 awarded of “pole excellence rural” (building retrofitting) -2013 committed to TEPOS goals	- 1984 (solar swimming pool) - 2010 commitment to TEPOS goals	- 1980 1 st wind turbine - 1996 1 st wind park - 2010 global ET engagement
Energy transition goals	energy positive in 2050	energy positive in 2050	- energy neutral in 2020 - energy exporter in 2030

Table 5.4, gives an overview of the three embedded cases, showing how for the three territories, the elaboration of a global energy transition commitment is occurred around 2010, but the energy goals of Goeree-Overflakkee are set about 20-30 years before the two TEPOS. This reveals a huge difference in the timing for energy strategy implementation.

The process and results in the three cases each come from a local socio-economic, geographic and planning context leading to different results and levels of engagement, but some lessons regarding the management of the energy systems could be learned or at least lead to a deeper understating in other cases.

5.3.1 Gouvernance and scale

For the more advanced and committed territories CC Thouarsais and Goeree-Overflakkee an observation can be made that a pilot “idealistic” project, a solar swimming pool and a wind turbine were developed by the local initiative of one person. This precedes the institutional process and definitely begins to draw attention to and display energy as one possibility for the territory, raising awareness about the topic.

Researches on driving factors for territorial energy transition mentions economic circumstances, planning, processes and engagement in formal networks (Lutz et al. 2017). These factors it seems that could be found in the studied cases.

Considering the economic and planning circumstances for the two French cases, the necessity to boost the local economy and the social context characterized by a progressive decreasing, are recognized to be the main motivations to engage the energy transition, from a bottom-up perspective. However, they do remain in the institutional domain, since initiated by local agents working for the *communauté de communes* institutions. Territories have experienced a top down perspective from a national and a regional level that has progressively encouraged them to commit to energy transition and develop local projects. Local institutions application to many national and regional project calls for funding has somehow guided the direction on energy choices in territories showing a progressive change of governmental influence in local affairs that has been defined as a “gouverner à distance” [to govern from distance] (Epstein 2006). At the same time, the same author stresses, the economic resources in this way become concentrated in territories that have more capacities and means to answer the calls for projects, possibly creating disparities among territories. This shows ambiguous effects that grants for local institutions to develop energy projects can develop, and some research points out that funding schemes if they are not adequately thought out, could jeopardize the development of local energy initiatives (e.g. Creamer 2015). For example, the financial uncertainty and lack of predictability for future financial support are a shared concerns among local institutions in other territories (e.g. Yalçın-Riollet, Garabuau-Moussaoui, and Szuba 2014)

In the Dutch case, on the contrary, the trigger point comes from the top down, by the assignment from the national and provincial levels for wind energy production on the island, transformed into a more integrated ambition towards energy neutrality, with the contribution of other renewable sources. The widening of the energy production mix, as being a means to negotiate the reduction of the number of wind turbines installed in the municipality. Maybe it is because for this different trigger point, compared to French ones, that in the answers of Dutch agents

lacks the idea that energy transition could support revitalizing local economies compared to the French interviews. This could also be due to the fact that the persons that were interviewed do not feel the need to share this aspect, and prefer instead to give a positive image of their municipality. It is also true that probably even if with some social and economic problems, Goeree-Overflakkee thanks to its proximity to Rotterdam City, and summer tourism activity does not experience the local problem to the same extent due to the decline in attractiveness of the territory experienced by the French contexts that were analyzed.

One main difference between the French and Dutch cases is that CC Monts du Lyonnais and CC Thouarsais do not have the obligation to produce a specified amount of MW from wind turbines, as defined at national level, even if done with further negotiation. In France, the PPE set up national goals for renewable energy production as well and these goals are defined for each region, but follow a bottom up logic based on the goals specified in the regional SRCAE. However, differing from the first wind energy policy (2010) in the Netherlands through the now ongoing development of the *Regionale Energie Strategieën* (see chapter 4 for more details) the approach seems to be changing where each *regio* [territory] has to analyse its own energy sources and set up energy goals and strategies to achieve them. The national tier does not impose a RE production amount of wind turbines or other RE technologies on each territory, even if the territory goals have to be consistent and in line with the national goals stated in Dutch *Nationaal Klimaatakkoord* (2019).

In the elaboration of this *Regionale Energie Strategieën* Goeree-Overflakkee seems to benefit from its early commitment to the energy transition process. For this territory, the fact of having expanded its energy strategy beyond the wind energy production to negotiate with the province is now an advantage for the elaboration of the document, for which a more global approach to energy transition (e.g. several RE from different sources, energy saving) notably for the territory, is demanded.

The benefits of an early engagement in a transition process for the territory anticipating the national policy is a common point with the French territories.

The French territories adhered voluntarily to TEPOS networks and developed a first voluntary PCET document. And now this voluntary attitude is evolving in a more compulsory obligation, following national policies that since the LTECV (2015), have increased regulation and extended compulsory engagements for energy engagement in territories. Indeed, the two French territories that are studied are in the process of PCAET drafting. As illustrated in chapter 3, the LTECV extends the obligation to develop a PCAET to all local collectivities with more than 20.000 inhabitants providing them with an energy and air analysis and an action program to achieve the defined objectives of energy consumption reduction and renewable energy production. Moreover the French “national low-carbon strategy” (SNBC), has to be taken into account in the elaboration of the regional SRADDET that in turn has to be taken into account by the SCoT and PCAET, that have also to be compatible with it, at the lower territorial level (see chapter 3 for the overview of planning instruments). This enhances a cascading process from the national to the lower scale of energy production, energy saving, CO₂ reduction objectives, but at the same time leave a certain amount of leeway to territories that are not imposed a specific amount of energy production by predetermined sources. Besides local collectivities retain the possibility through “compatibility” and to “take into account”, the higher level planning instruments to

motivate a different modality for application or some differences in the orientation. Moreover, beyond the planning instrument for governance, the decision for French territorial institutions to voluntarily commit to the TEPOS network and goals, has been considered an emerging form of policy localism (Nadai et al. 2015). However, for French territories, research argues that future energy development in territories is still broadly played and decided at a super and inter-territorial level (Balaye et al. 2018).

Nevertheless, according to the interviews developed in this research, a challenging point in French territories, seems to concern the involvement and mobilization at the lower territorial level of the municipality for the development of the energy projects. Indeed, the CC Monts du Lyonnais and CC Thouarsais both have objectives covering the whole territory, but these are not specifically allocated/distributed among the municipalities, and for now there is not a specific way/tool that could force each municipality to develop a wind turbine park or other energy projects, leaving the decision up to the volunteer municipality or individual for engagement, as expressed by the following excerpt:

“We have objectives for photovoltaic electrical energy production. Afterwards, it’s true that we did not develop the project at the municipal level. Finally, what we see in the municipality is the more or less important potential. And here is a question that arises today. How do we develop/encourage it a little bit at the municipal level? And here today, the strategy of the community, it is rather on how we can support collective projects, but those which come from willpower”³² (TEPOS project manager-ML 2017).

This type of difficulty is not found in the Dutch territory, because even if it spans a large surface, Goeree-Overflakkee is now one municipality. However Hoppe et al. (2020) when studying the regional (territorial) energy transition in the Netherlands, pointed out as a one of the main barriers, is the differences in decisions of different municipalities in their contribution and involvement for energy transition activities of the *regio*, similar to the French context.

These results seem to illustrate how the achievement of energy transition goals in rural territories will be dependent on the balance between State decisions, the need of energy autonomy while contributing to the common good (Debizet and David 2018).

5.3.2 A territorial grounded energy transition process

In territories it seems to a certain extent, that energy projects have been thought in accordance with the geography of the territory, even if for the French cases, as explained above, the energy projects have also followed the possible call for funding. For example, in all the three territories that have an important agricultural sector, biogas power plants using the agricultural waste have been developed.

32 “On a des objectifs de production d’énergie électrique photovoltaïque. Après, c’est vrai qu’on ne l’a pas décliné au niveau des communes. Enfin, on voit par commune quel est le potentiel plus ou moins important. Et là, c’est une question qui se pose aujourd’hui. Comment on décline un petit peu au niveau des communes? Et là aujourd’hui, la stratégie de la collectivité, elle est plutôt sur comment on peut accompagner des projets collectifs, mais qui sont issus de volontés quoi?”

5.3.2.1 Energy transition strategies

Particularly the CC Monts du Lyonnais, that entered in the energy transition process by starting from an energy saving strategy, through buildings being retrofit. This strategy is consistent with the need of the territory that is characterized by a sprawled urban habitat of single houses with high energy consumption. At the same time, this choice is also based on calls for projects to get funding (see previous section). On the contrary both, the CC Thouarsais and Goeree-Overflakkee, even if they have household sector with high energy consumption began to in more or less voluntary way, a RE production strategy, while energy saving measures have been more recently begun to be actively considered.

For CC Thouarsais, this entry through a RE approach seems to have guaranteed a certain economic independence by providing revenues³³ that allowed local institutions to retain the teams in charge of different energy transition projects and making it possible to develop new projects. This makes them less dependent on the funds allocated by ADEME, region or state that, anyhow, have been decreasing. For example, the TEPCV and TEPOS subsidy schemes will not be renewed by the central state government for 2019 and beyond, even if other tools and programs are in the process of development.

On the contrary, the CC du Mont du Lyonnais is focusing on energy savings for buildings and, even if it is consistent with the territorial characteristics is now leading to some difficulties because it resulted in local institutions being more vulnerable to funding decreases and more depend on future calls for projects to finance the transition, because it do not provide active income. A concern that has been highlighted by the CC energy transition technical services:

“Well, we will first reduce consumption, which is also smart, but, well, there are territories... I know that there are territories... I know that there is a territory... it must be Pays du Thouarsais... Okay. Well, that's it, they've made the choice to really develop renewable energy, as a result they have a good interest, because, well in fact their ... their projects are already profitable. They have wind power, so it helps too, because... that's what pays a lot. And, so from there, today they are really working on the control of consumption, etc., and they can afford the [financial] resources”³⁴ (PCAET project manager-ML 2017).

This shows the importance of sharing knowledge and experiences among territories, in a logic of supporting each other more than competing between each other. Aspects on which the TEPOS network is actively working on and supporting. This point of monitoring existing experiences and developing a shared platform in order to learn from them, has been emphasized as an important point for supporting territorial institutions and stakeholders in order to successfully achieve their energy goals (Loorbach and Rotmans 2010; Hoppe and Miedema 2020).

Even if the CC Monts du Lyonnais is implementing energy saving measure, connected to the

33 In France wind turbine installation is an economic activity generating various tax revenues particularly under property taxes, “Cotisation Foncière des Entreprises”, “Cotisation sur la Valeur Ajoutée des Entreprises” and “Imposition Forfaitaire sur les Entreprises de Réseaux”. These incomes are about 10-15 k€ per MW installed for year (Ministère de la transition écologique et solidaire)

34 “ben, on va d'abord réduire les consommations, c'qui est aussi intelligent... Mais, ben, y a des territoires, moi je... je sais qu'y a un territoire là... ça doit être Pays du Thouarsais... OK. Ben du coup, ouais, voilà, eux ils ont fait le choix de développer vachement les énergies renouvelables, ils ont du coup une bonne rente, parce que ben en fait leurs... leurs projets sont déjà rentables. Ils ont de l'éolien, donc ça aide aussi, puisque c'est... c'est là que ça rapporte beaucoup. Et, du coup, ben, à partir de là, aujourd'hui, ils... ils sont vraiment à travailler sur la maîtrise de la consommation, etc., et ils peuvent mettre les moyens”.

building sector, this is an underdeveloped strategy of energy transition, in all three cases and in line with other cases across Europe, whereas the main entry in energy transition is, generally speaking, focused on RE production (de Waal and Stremke 2014). One of the reasons could be that the reduction of energy consumption is more transversal through sectors, residential, industrial, etc. needing communication and mobilization from local companies that decide to share resources, cascade energy, or inhabitants that decide to retrofit their houses, that decide to improve and change their behavior. The financial aspect that resides in convincing and supporting the process becomes a central concern. The transversal nature of energy becomes both an opportunity and a block, because of the need to share goals among multiple sectors, different stakeholders and concerning multiple scale levels. This is also linked to an energy efficiency component that is mentioned less in the discourse, and appears in some references about the development of electric cars (French discourse), and in the proposed substitution of old wind turbines with more highly performing ones (Dutch discourse). Moreover, concerning the transportation sector, all three territories, because of their geography and territorial characteristics, have related high energy consumption, but even if some actions have been undertaken (e.g. carpooling, etc.) these actions are still not sufficiently addressed. This has been observed also in other TEPOS territories where energy building retrofitting and the reduction of energy consumption for transportation are little treated by inter-communities such as *communauté de communes* for rural territories (Balaye et al. 2018), and remain as a big challenge.

5.3.2.2 Involve the Inhabitants to empower and ground the process

In the three territories another point to ensure the continuity of the energy transition process and its grounding in the territory, is the involvement and mobilization of inhabitants, to potentially avoid the NIMBY syndrome (e.g. van der Horst 2007). In order to achieve this the CC Thouarsais and CC Monts du Lyonnais are currently developing participative local crowdfunding for RE technologies implementation, instead of relying on external developers as it was done for the first wind parks in the CC Thouarsais. In the Netherlands, both kinds of projects exist, several being crowd-funded thanks to Deltawind a local cooperative working on the Delta, based on Goeree-Overflakkee, and established since 1989 with the mission of developing projects supported and financed by the local population. The possible financial income will play an important role in encouraging local communities to develop energy projects, and energy projects funded by local inhabitants with local cooperatives and co-investors has been recognized as helpful in enhancing local prosperity and encourages a higher “acceptability” for the projects by inhabitants (e.g. Radzi and Droege 2013).

However, in all three territories local agents and institutions emphasize the importance of raising a sense of pride for the commitment to the energy transition process, expressing the will to become show cases for other territories to emulate. Using the words of an agent:

“We want to lead, we want to start, we want to do something and hopefully make sure that other municipalities will follow and we want to be a good example.” (sustainability policy adviser-GO 2017).

It has been put forward that in rural territories it is necessary to reinvent belonging sense and identity forms (Moquay 2015) and it has been analyzed that in some territories energy has

become a social and symbolic resource through which the territory constructs a new shared identity while economically revitalizing the territory (Yalçın-Riollet, Garabuau-Moussaoui, and Szuba 2014; Dobigny 2016). The three cases analyzed seem to share this similar perspective.

5.3.2.3 Spatial and landscape perspective

The spatial and landscape characteristics are not highlighted as a trigger factor for developing energy transition in France. Maybe the fact that the analyzed territories have a low population on average and “free” space (meaning not yet built), are considered as having potential compared to dense urban areas. Using one interviewee’s words: “it’s true that, we also have space for energy production projects, and that’s good, it’s an advantage, but it can be problematic too... something has to be brought back to the territory”³⁵ (Sustainable territorial management division director-CCT 2017). In the French cases, this is recognized but not at the centre of the discourse, instead for Goeree-Overflakkee its rural, low density population and broad open spaces characteristics have led, among other reasons, the province to choose the municipality as one of the preferred areas for wind turbine installations, because of the relatively high population density of the Province of Zuid Holland and the Netherlands as a whole. So in all three cases, the availability of space is recognized as connected in respect to energy transition, but as the previous quote points out, the presence of RE production projects need to bring local benefits, otherwise it could lead to conservative attitudes, from inhabitants, as observed in Goeree-Overflakkee and CC Thouarsais.

This subject of “available surface space”, in rural territories, highlights rising issues about the relationship and tension between urban and rural territories in energy transition perspectives where some argue that rural territories have the surface needed to RE production (e.g. Dubois 2009) and that landscape of rural territories is under huge pressure that needs to be carefully thought (Jefferson 2018). A recent publication of CLER [Network for energy transition] with the title “Nouvelles solidarités urban rural. Une condition de la transition énergétique nationale” [Urban rural new solidarities. A condition of national energy transition] focused on this topic by pointing out the need of cooperation among rural and urban territories each one contributing to the general goals and of thinking on a global process according to the territories’ characteristics (CLER 2018). The question of the RE production, ownership and access to energy is recognized as a reshaping energy social issues as important factor to consider, and ensuring energy justice (Emelianoff and Wernert 2018). This is also connected to the idea of solidarity among territories connected to distribution energy networks and whose control is nowadays often a subject of conflict between metropolitan and rural areas (Poupeau 2019).

In this chapter we described the characteristics of three territories, their objectives and processes of energy transition. In the next chapters, the landscape component of the three same cases and its connection to energy transition are analyzed in greater detail.

35 “c’est vrai que nous on a l’espace aussi pour les projets de production d’énergie, et c’est bien, c’est un avantage mais ça peut être problématique aussi... il faut que ça rapporte quelque chose au territoire”

Box 5. Contribution of chapter 5 to the part 2 research question

This chapter inquires about the reason that leads territorial institutions to start and develop an energy transition process in the territory. This is developed in order to give a contextual overview and some useful insights on the three studied cases, two of them in France one in the Netherlands.

Results show that, even if started from different trigger points, both bottom up and top down perspectives contribute to local institutions' commitment and elaboration of energy transition strategies. Especially for the French cases has the revitalization of local economy been a major driver in encouraging the development of energy projects following calls from funding sources. This early engagement of the three territories to a broad approach to energy transition has proven to be beneficial and gives an advantage to these territories that already had a certain capacity and experience in the field, because from the governance perspective, the process begins to be more and more codified and compulsory (e.g. after LTECV for France and *Nationaal Klimaatakkoord* for the Netherlands). Nevertheless, RE production remains the main strategy addressed in the territory compared to the reduction of energy consumption that is mainly developed in the CC Monts du Lyonnais. This focus on RE production comes from an economical income perspective and also because in rural territories there is "free space" to implement it, compared to more densely populated and built areas. Particularly, the geographical characteristics of the more rural Goeree-Overflakkee has been a triggerpoint for the Province of Zuid-Holland to select the municipality as a location for a high number of wind turbine parks. This subject highlights a rising issue of energy spatial justice and solidarity among territories both rural and urban.

CHAPTER 6 - Exploring the relationship between landscape and energy transition in landscape focused documents

This chapter explores how spatial and/or landscape component is treated in connection with energy transition and the role this process plays in the three embedded cases. Here we focus at the institutional level combining the analysis of landscape focused documents and semi-structured interviews with energy transition agents (see chapter 5 for the method).

In the first part of the chapter, it is discussed when and how landscape concerns entered the debate concerning energy transition for the three territories analyzed, inquiring into the reason that lead local institutions to commission for the elaboration of these landscape focused documents in relation to the energy transition process.

Moreover, through examples, it is questioned the vision and the degree of with these landscape documents by local agents. Differences and similarities between the French and the Dutch contexts are found and in the final section a cross analysis is developed through the territories. The comparisons between the two nations could reveal similarities and differences able to bring attention to useful insights for future elaboration of these landscape focused documents in energy transition context. This is especially interesting knowing that the French landscape focused documents known as *plan de paysage* have been inspired by the Dutch ones (Pernet 2014; Cabrit, Soulié, Thibault 2018; Vigny 1995).

6.1 The Monts du Lyonnais – starting from buildings retrofitting

6.1.1 The inclusion of landscape in the energy transition process

In the CC Monts du Lyonnais an official and displayed concern for landscape arrived in connection with the SCoT development, started in 2011. The landscape component that needed inscription in this document was not developed enough “We were quite light on the ... characteristics and perception of the territory, all aspects of the landscape were treated in... an indirect way”¹ (SCoT project manager ML 2017).

At the end of 2012, this necessity led to the recruitment of a landscape architect to join the SCoT team for a mission meant to deepen and complete the SCoT analysis from the landscape point of view, and concurr with the orientation and objectives of the document. According to interviews conducted, many people remained unconvinced about dedicating even a small amount of funding to this complementary mission.

¹ “on était assez légers sur les... les caractéristiques et la perception du territoire, tous les aspects paysagers étaient traités de façon... détournée”

“And I remember, at the SCoT office, there were ten of us. Very few people convinced, who said, “Oh, dear! But we are still going to compel ourselves, it will be imposed on us with other things, when we are already struggling to impose certain things” [...] And the SCoT president was not very convinced. He said, “Well, it is again money that we will put in a study consultancy office, we are tired of paying a study consultancy office...” Well. And then we said, “Well we try anyway.” In fact, we set a small amount aside and we commissioned somebody”² (mayor, b.VP energy transition-ML 2018).

Finally, a landscape architect was hired and this first short landscape mission developed for SCoT framework went well where the process and results have been, generally speaking, appreciated/valued. Using the words of an elected representative:

“So we talked about cones of vision, we talked about ridge lines, we talked about things...but when she [landscape architect] explained it, it was...I discovered things, but yes, that's all, we don't realize it, we don't realize it, we don't see it, but she is absolutely right, and little by little we have been several to be convinced like that. To say “But yes, it is absolutely necessary, it is important”³ (mayor, b.VP energy transition-ML 2018).

However the landscape component of the SCoT composes just a small part of the document and did not lead to really deep explorations “We thought that we could go further, we had material to go further, and that would not pass [to be integrated] in the SCoT”⁴ (SCoT project manager ML 2017).

So when the call for project for the *plan de paysage* was launched in 2013 by, at that moment, the Ministry of Environment, Sea and Energy the elected representatives of the *communauté de communes* agreed to apply to the call at the suggestion of the person in charge of SCoT: “So we managed to convince the president who had been convinced, who thought that it was indeed a good thing to do. And thus, we got into this call”⁵ (mayor, b.VP energy transition-ML 2018). Concurrently, the triggering factor for discussing further landscape components of the territory was the financial chance given by the call for projects for the *plan de paysage* by the ministry:

“here it is ... after it is also a question of opportunity ... financial, obviously. We had this desire to go, but ... but, it should not require too many financial resources, so with a grant, there we go, clearly, we went there/we did that”⁶ (HG, SCoT project manager ML 2017). “And as a result, we pushed to do this plan de paysage. Indeed, also because there was an opportunity to do it, especially a financial opportunity.

2 “Et je m’souviens, au bureau du SCoT on était une dizaine. Y avait très peu de convaincus, qui disaient : “Oh là là, mais on va encore nous contraindre, nous imposer des choses, alors qu’on a déjà du mal à imposer certaines choses ». [...] Et le président du SCoT était pas très convaincu. Il disait : “Ah ben, c’est encore d’argent qu’on va mettre dans un bureau d’étude, on en a marre d’payer des bureaux d’étude...” Bon. Et on a dit : “Ben, on essaye quand même”. On fait, on met une petite enveloppe, et donc on mandate quelqu’un”.

3 “Donc on parlait de cônes de vision, on parlait de lignes de crêtes, on parlait de choses... mais quand elle [paysagiste] nous les expliquait c’était... moi je découvrais des choses, mais oui, c’est tout, on s’en rend pas compte, on s’en rend pas compte, on ne voit pas, mais elle a tout à fait raison, et petit à petit on a été plusieurs à se convaincre comme ça. À s’dire : “Mais si, il faut absolument, c’est important”.

4 “On s’est dit qu’on pouvait aller plus loin, on avait une matière pour aller plus loin, et qu’ça passerait pas dans le SCoT”

5 “voilà donc on a réussi à convaincre le président qui avait été convaincu, qui pensait qu’effectivement c’était une bonne chose à faire. Et du coup, on s’est lancé là-dedans”

6 “Voilà... Après c’est aussi une question d’opportunité... financière, clairement. On avait nous cette envie d’y aller, mais... mais voilà, il fallait pas que ça... ça demande des moyens financiers trop importants, donc, avec une subvention, ben voilà, clairement, on y allait”

The base of war is finances” (mayor, b.VP energy transition-ML 2018).

This point is well explained in the interviews where landscape was considered as an added value and the determination of the CC Monts du Lyonnais to engage in the process but how without external funding this would not have been pursued. This process is similar to the CC approach to engage and develop in the energy transition process. Undoubtedly a starting willingness occurs but not without the financial incentive from funding (see chapter 5), the *plan de paysage* would probably not taken place.

6.1.2 The advent of the theme of energy transition in the “plan de paysage”

The CC was awarded the call for project “plan de paysage” of the Ministry of Environment in 2013, and the same landscape architect hired for the SCoT was commissioned for the project (Isabel Claus paysagiste) However the study was deferred, starting in 2015, and was finalized in 2017.

Up until this point energy transition and landscape were not really developed simultaneously. The deeper exploration of this connection appears during the drafting of the *plan de paysage*.

The starting commission for the *plan de paysage* does not include a specific and clear demand to focus on energy transition development. Energy was a theme among others such as development of tourism, conservation area protection, etc. even if certainly energy transition was among the subjects the territory was engaged in, being in the process to define its TEPOS strategy.

The willingness to explore among themes holding priority, the energy transition from a landscape perspective first appeared during a public workshop in phase two of the document development process. The *plan de paysage* drafting phase one is dedicated to landscape and territory analysis, phase two has the goal to define main objectives and strategies that require translation into a series of actions for future development in phase three.

It is notable that in the “Diagnostic paysager” the analysis document at territorial scale, from the phase one of the *plan de paysage*, the theme of energy transition does not appear at all. The document focuses on the understanding of landscape mainly through urban and agricultural dynamics and their interaction, considered to be the major forces currently acting on the territory. The conclusion highlights how urban sprawl gradually marks increasing amounts of the territory’s landscape. Periurban development and the protection of certain areas from urbanization are considered central issues. This factor becomes even more important because of the constant co-visibility of the territory due to its low range mountain conformation. However the analysis does not include nor consider energy issues such as energy consumption by sectors, and nor does it create connections between territorial landscape and energy choices. Indeed the main graphical elements in the documents are photos, old pictures, old maps, qualitative and land use maps and schemas explaining landscape dynamics, but don’t include more quantitative energy statistical data.

7 “Et du coup, on a poussé à faire ce Plan de paysage. Donc, parce qu’ils avaient une opportunité de l’faire aussi, surtout financièrement. Le nerf de la guerre, c’est les finances”.

An energy theme appears in the phase two of the *plan de paysage* development during a workshop that was open to the participation of elected officials, technical services, inhabitants, external consultancy, etc. In this framework, 38 objectives about landscape qualities were given to participants, grouped by main categories such as energy, tourism, territorial identity/urbanism, ridge line protection/conservation of nature on a local and territorial scale, landscape diversity, natural areas, and development. These objectives were brought forward by the landscape architect in charge of the *plan de paysage* development, on the basis of the landscape analysis led in phase one, but also through exchanges and discussion with the technical service staff in charge of SCoT and TEPOS and elected representatives. Taking account the TEPOS goals for energy production and energy saving, the energy issue was almost an obligatory choice to be made when defining the objectives and strategies for the territory's future. During this workshop each participant had to choose among five objectives as priorities and five additional objectives where the energy category surfaced as most addressed. It scored about 49 objectives, followed by tourism 30, urbanism 29 (see figure 1). "And that's the way it is, it's a participatory workshop with elected representatives, and technicians and inhabitants, and asked them which is the priority objective that you want to see implemented? Well, the energy question has reappeared like that"⁸ (IC Ingénieure-paysagiste 2017).

The main objectives addressed in the energy category were photovoltaic implementation (12 votes), developing heating wood energy by local forest harvesting (7 votes), existing building retrofitting (10), developing biogas equipment (6 votes), developing micro hydroelectric powerplants (5 votes), planning slow mobility (4 votes), wood building construction (3 votes), adopting biomaterials (1 vote), and developing wind turbines (1 vote).

The first four most focused-on objectives that were highlighted on by participants were the principal strategies detailed in the TEPOS action plan. This phenomena may be due to the people participating were mainly elected officials and technical service personnel that know about the TEPOS strategies from the start.

However the landscape architect emphasized how this strong concern about energy issues was not obvious:

"What was interesting in this meeting, was that it was participatory so on a really horizontal scale and therefore elected representatives and members of the technical office in fact they were not necessarily very aware of the issue: make this link landscape and energy, and so I'll even say the president - from my point of view - said himself almost to be surprised at one point to be overtaken in fact... by social aspirations" (Ingénieure-paysagiste 2017).

Finally, the *plan de paysage* specifies as a first strategy to "créer une synergie paysage et énergie" [To create a landscape energy synergy] followed by three subsequent strategies: to host green tourism, to improve quality for the existing and all urban projects, to preserve landscape

8 "Et c'est comme ça en fait, c'est un atelier participatif avec les élus, et des techniciens et des habitants, et en leur posant la question de quels objectifs prioritaires vous voulez voir mettre en œuvre? Ben la question de l'énergie est réapparue comme ça"

9 "Et voilà c'était intéressant dans cette réunion juste, c'était qu'elle était participative donc à une échelle vraiment horizontale et du coup les élus et les membres du bureau en fait eux n'étaient pas forcément très sensibilisés à la question : faire ce lien paysage et énergie, et tout d'un coup j'dirai même le président – pour mon point de vue –, il s'est dit presque étonné à un moment donné de se voir dépassé en fait par une... par des aspirations sociales".



Figure 1. Participatory workshop to choose the landscape qualities as objectives for Monts du Lyonnais' plan de paysage development, 2015. Source: <http://www.isabelclaus.com/plan-paysage-du-scot-des-monts-du-lyonnais/>

topography/landform and agricultural landscape.

The energy strategy are articulated through four main objectives:

1. To develop photovoltaic and biogas energy production where landscape is taken into consideration
2. To engage in energy retrofitting for existing and heritage buildings to valorize traditional landscape.
3. To circulate differently (cycle and pedestrian mobility): used use as leverage to enhance landscape
4. To support sustainable and productive management of forests and woodlands by strengthening wood sector and timber frame construction

The actions include both energy saving and energy production, and are voluntarily based on actions detailed in the TEPOS report, defining synergies between the two documents, even if the *plan de paysage* does not cover all the TEPOS points. For example it excludes the action about

decreasing energy consumption in the industrial sector, since this is considered as less related to landscape topics and more about production mechanisms.

“Well, simply because if we recall the TEPOS strategies, there are RES [renewable energy sources], there are energy consumption controlling measures, and so there are the two. In the Monts du Lyonnais after, what makes more sense about energy consumption controlling it was...the bicycle path. [...] and there it was the whole question of energy retrofitting that was extremely important, and which is a... huge pillar of the TEPOS strategy for the Monts du Lyonnais. So after we formalized several actions in that direction”¹⁰ (Ingénieure-paysagiste 2017).

Once these main objectives defined and approved by the committee at that period, the “Syndicat Intercommunautaire des Monts Lyonnais” (SIMOLY), in the phase three, that consisted of the drafting of an action plan, three preparatory workshops, were developed by grouping elected representatives and technical service members. They consisted of: one on the topic of tourism, one about urbanism-landscape topography -agriculture, and one about energy. These following workshops had the goal to better define specific actions for each issue. At this stage the energy theme was officially inscribed into the *plan de paysage*.

Finally, the action plan chosen and approved by the SIMOLY committee detailed three actions plan:

1. To conduct pilot actions with volunteer farmers to couple wood-energy production with hedge maintenance and replanting
2. To launch a pre-operational study for the insertion and creation for photovoltaic panels, on the scale of the Monts du Lyonnais and of two pilot villages.
3. To lead an action to renovate an aging neighborhood. To connect this action with the requalification of the parcel boundaries (fences, hedges ...).

The first two actions concern RE production and the third the reduction of energy consumption, and this last one was directly connected with the TEPOS displayed goals referring to energy building retrofitting (see chapter 5).

The first connects with the landscape elements of the territory, the hedges, connecting energy production with the agriculture sector. This is believed to enhance the valorization and preservation of agricultural landscape characteristics. Indeed the modern mechanized agricultural system has largely destroyed the hedges structures. So the connection between hedges and possible income was seen as a way to encourage the reduction of fossil fuels for heating in the territory while preserving the emblematic landscape of the CC Monts du Lyonnais.

The second action about photovoltaic implementations focuses on a technical system and treats it in terms of its integration and possible localization on the extensive roof surfaces of industries or facilities. The third action is directly connected to energy building retrofitting, the most developed energy focused action implemented on the territory, and highlights how this energy-

¹⁰ “Ben tout simplement parce que si on reprend en fait la stratégie du Tepos, il y a des actions EnR [énergies renouvelables], il y a des actions MDE (modération de la consommation de l'énergie) [Maîtrise de la Demande en Énergie], et donc du coup les deux. Dans Les Monts du Lyonnais après, c'qui faisait le plus de sens en MDE c'était les... les pistes cyclables. [...] et il y avait toute la question de la rénovation énergétique qui était extrêmement important et qui est... l'énorme pilier de la stratégie Tepos pour les Monts du Lyonnais. Donc... donc après on a décliné plusieurs actions dans ce sens-là”

saving measure could, through exterior thermal insulation and façade cladding, combined with photovoltaic panels on the roof, etc., relay change for the built environment appearance. Each action plan details issues and goals (e.g. citizen mobilization), general advice about possible location choices, a sequence of steps for implementation, possible funding opportunities, similar inspiring projects, and a general cost estimation. These action plans are about two/three written pages long and do not include any graphical elements such maps or graphic spatialization designs. The actions are derived from landscape consciousness and give some written insight about possible spatial locations (roofs for photovoltaic panels, etc.) but they do try to develop landscape/spatial scenarios, nor do they show hypothetical photovoltaic panel implementation design appearance nor redevelopment schemes for hedges structures for wood energy production. The result of the *plan de paysage*, starts from the landscape knowledge, of its dynamics and tries to ground energy actions coming from TEPOS goals, into actions based on the territorial characteristics. However even if recognition of the articulation between these actions plans and landscape is sharpened, this document remains as advice and suggestions for project initiation and implementation. It suggests for example, organizing meetings with farms to raise awareness about wood energy potential, to contact and cooperate with the “Centre régional de la propriété forestière” [Regional center for forest property, a public body providing technical support for forest owners], about photovoltaic panels implementation where it suggests promoting citizen cooperatives for financing and developing projects, etc. So this *plan de paysage* is not a design oriented document where energy landscape design principles are enunciated and spatially organized on the CC, but it seems to be more conceived as a guide for social mediation and advice.

6.1.3 Is the “plan de paysage” a shared tool?

It is explained thoroughly in the *plan de paysage* document (p. 25) that there is no financial agreement offered by the local institution to develop the different detailed actions. For this reason actions are voluntary connected as much as possible with other current ongoing projects in the territory in order to be attached to an existing budget. This is the case for the energy actions directly referring to TEPOS goals. The lack of proper backing for the implementation phase is highlighted by an elected representative:

“I find that there is a lack of support for the implementation. [...] Equally, we have backing by the CAUE [Architecture, urbanism and environment advice] for all that concerns urbanization, we have the support of the DDT, we have the support of SCoT, but the support/accompaniment for landscape concerns, I think that we haven't it”¹¹ (mayor, b.VP energy transition-ML 2018).

Another limitation of this document is that it is not compulsory but remains very much discretionary. Its suggestion can be followed but even there, this will be difficult to impose counseled imperatives on others. Verily one of the elected officials highlights how “well it is not

11 “je trouve qu'on manque d'accompagnement pour la mise en œuvre. [...] Autant, on a un accompagnement du CAUE pour tout c'qui est urbanisation, on a accompagnement de la DDT, on a l'accompagnement ben du SCoT. Mais l'accompagnement sur le paysage, je trouve qu'on l'a pas.”

prescriptive. So it is recommendations, therefore each one takes what it wants. [...] Afterwards, it's also complicated to implement it. And I having participated really close to the core, of the thought. Ah well I realize that even myself, I have a hard time to implement it"¹² (mayor, b.VP energy transition-ML 2018).

Moreover, it seems that the *plan de paysage*, since its development has not been used and considered as a tool to draw support from a landscape perspective for the implementation of energy transition actions. The technical service of the CC Monts du Lyonnais working on energy transition strategies and implementation affirms its knowledge of the existence of the energy component inscribed in *the plan paysage*, even some of them has participated in the workshops for the development of the plan itself. For example, the person in charge of TEPOS strategy affirms knowing that "in the *plan de paysage* there is an action plan dedicated to energy"¹³ (TEPOS project manager-ML 2017). She confirms some content is related to her work interests, "From the *plan de paysage* came the interest of... identifying activity areas, that are in fact, ugly. Well, we'll say it like that... there are not red tiles, well, it's steel roofs, etc. And so, there, the idea, is to consider photovoltaics as a means of requalification"¹⁴ (TEPOS project manager-ML 2017). However most of the interviewed agents don't know the content of the final document: "I do not know much about this landscape plan, I do not know it in detail"¹⁵ (PCAET project manager-ML 2017). And even if there is a specific action plan about energy building retrofitting, as an opportunity to restore esthetic qualities to recent urban developments the project manager in charge of Parc Eco Habitat affirms :

*"The strategy of...well, I don't know the strategy of the plan de paysage of Monts du Lyonnais, but for me it's... to keep what constitutes the Monts du Lyonnais' identity with these small villages situated, and to be careful that we do not have the urbanization of villages and that it sprawls everywhere"*¹⁶ (responsible energy transition service, Parc Eco Habitat-ML 2017).

Moreover other agents that were interviewed which work on the transition process in the territory, even if they participated or acknowledged the existence of the *plan de paysage* and could directly connect their work to it, were unable to further articulate change with its guidance, but consider "it's rather recommendations, points of vigilance to have...[in mind]"¹⁷ (Technical animation regional center of forest property-ML 2018). And the personnel interviewed working from the Rhone agriculture chamber, even if associated with the document development, highlights how while developing their actions there is not a conscious connection with the *plan de paysage*. Using the interviewed words:

12 "Voilà ce n'est pas prescriptible. Donc étant des préconisations, après chacun se l'approprié comme il veut. [...] Après, c'est compliqué aussi de le mettre en œuvre. Et moi ayant participé à vraiment au plus près de la chose, de la réflexion. Eh bien je me rends compte que même moi j'ai du mal à le mettre en œuvre"

13 "dans le plan de paysage, y a un plan d'action dédié à l'énergie"

14 "Du plan de paysage était ressorti l'intérêt de... d'identifier les zones d'activités, en fait, qui sont moches. On va le dire comme ça... Enfin, là, on n'a pas de la tuile rouge, enfin, c'est du... des toitures en acier, etc. Et donc, là, l'idée, c'est d'envisager le photovoltaïque comme un... un moyen de requalification"

15 "j'ai pas trop connaissance de ce plan de paysage, j'le connais pas particulièrement"

16 "La stratégie du... alors, moi je ne la connais pas la stratégie du plan de paysage des Monts du Lyonnais, mais pour moi c'est de... de garder c'qui fait l'identité des Monts du Lyonnais avec ces petits villages situés, et faire attention à ce qu'on n'ait pas une urbanisation des villages et que ça s'étale de partout"

17 "C'est plutôt des recommandations, des points de vigilance à avoir..."

*“I think that there is a certain number of actions that we are leading ... well those are coherent with that [plan de paysage] but that was not developed to be necessarily coherent with that [plan de paysage]”¹⁸
(Rhône agricultural chamber energy adviser 2018).*

Other interviewees were oblivious of its existence, such the ADEME territorial advisor, who is aware of energy focused projects such as the TEPOS and the TEPCV, and during the interview once had discovered *plan de paysage*'s existence, wondered: “It’s a real question, so: why this [landscape component] isn’t something that emerges in the TEPOS?”¹⁹ (ADEME territorial referent 2018). This shows how people working on TEPOS do not make this connection and do not communicate enough about it.

These interviews do not represent a comprehensive view of all the agents that were or could be associated with the energy transition process since the number and transversal character of energy issues go beyond the possibility of this research work. However, the interviews developed here cover the whole of in-house technical services for energy transition and other key external people linked to specific energy projects in the territory, thus being a good sample. Within limitations their testimony shows that the technical service department, working for the *communauté de communes* on energy transition, and external consultancies are not fully informed about the *plan de paysage* and do not recognize it as something useful with an added value.

6.1.4 The example of the photovoltaic panel implementation

The ongoing development of extensive photovoltaic panels in the territory explains by its own example, the disconnection between the *plan de paysage* and the implementation of TEPOS actions.

Indeed the photovoltaic focused action plan is highlighted in the *plan de paysage* as a short term (2017-2019) priority. There were clear demands and expectations on the subject made by the elected representatives and the TEPOS technical service: “In fact, by having this 2020 objective [to maximize PV development] on photovoltaics and this reflection about landscape, ... how could we do without the energy issue in the *plan de paysage*, we absolutely had to ... put it in”²⁰ (TEPOS project manager-ML 2017). The CC Monts du Lyonnais launched since 2017 a study and a series of workshops, to raise awareness among local inhabitants on the photovoltaic topic and to choose suitable roof locations, while relying on a specialized associations to support participative projects by citizens for renewable energy (CoopaWatt).

However even if in the *plan de paysage* there is clear reference to citizen mobilization, and it includes advising about possible areas for their PV installation such as the economic/industrial zones but also single houses, it does not seem that this specific action plan was considered even if it was known:

18 “je pense que il a y un certain nombre d’action qu’on conduise ... voilà que sont en cohérence avec ça [plan de paysage] mais que n’ont pas été construites pour être en cohérence forcément avec ça [plan de paysage]”

19 “Mais c’est une vraie question, du coup: pourquoi ce n’est pas quelque chose qui ressort dans le TEPOS?”

20 “effectivement, en ayant cet objectif à horizon 2020 sur le photovoltaïque et cette réflexion sur le paysage, comment... comment on pouvait se passer de la question énergétique dans le plan de paysage, il fallait absolument qu’on...la mets dedans”

“well, yeah in the vague memories that I have of reading the action plan, I remember a recommendation about the integration of solar panels on buildings, which is kind of the usual principle when we talk about esthetics and solar panels. And even panels that have the color of tiles. Saying that it forgets that these cost ten times more. And so I think that there is a kind of theoretical outlook about that”²¹ (responsible projets CoopaWatt-ML 2018).

Highlighting how:

“at a second glance it [plan de paysage] said it would be good to develop a collective project on energy. But I found that really...general [...] and because suddenly without knowing more for me it is something that exists I do not quite understand where it’s going, what it is going to bring me, finally what it brings to a collective energy initiative. So here we have not ... well, I do not really intend to interest myself unless I am told: it is interesting for such aspect, but so, here, spontaneously no”²² (responsible projets CoopaWatt-ML 2018).

The landscape component of this energy focused action plan is not developed with strong design or planning principles, and also the advice for installation sites relies on very general principles: extensive roof surfaces on buildings such as hangars and stables needing renovation, shades for commercial parking areas, abandoned quarries unsuitable for natural and agricultural purposes, the well-exposed façades of facility buildings and volunteer spaces in the village meet sunshine technical criteria (*Plan paysage des Monts du Lyonnais* 2016, p. 28). However, in reality the choice of sites photovoltaic installation is mainly based on opportunity, leaving interested local people to put their roof forward, while a preference is kept for the large roof surfaces such those of stable or a company building, but there is not a defined spatial strategy at the territorial scale beyond the localization. Using one interviewed words:

“Well, when we choose the roofs in the Monts du Lyonnais, well, among the people who put forward their roofs, there is the Town Hall of Larajasse. Well, the Town Hall of Larajasse, it is a pioneer. It is important to say that we find that what you do is positive so we take the roof. Even if it is badly oriented, even if it’s annoying. There is another who proposed his roof, he is part of the group, he gave time, he is ready to donate a lot of money for the project, so it’s fine to accept his roof even if it is oriented to the west. That’s it, so there are compromises that are going on...”²³ (responsible projets CoopaWatt-ML 2018).

21 “Enfin, ouais dans les vagues souvenirs que j’ai de ma lecture des fiches actions, j’m souviens d’une recommandation sur l’intégration des panneaux solaires au bâti, c’qui est un peu le principe habituel quand on parle d’esthétique et de panneaux solaires. Et voir même de panneaux qui ont la couleur des tuiles. En disant ça, on oublie qu’ça coûte dix fois plus cher. Et donc j’trouve qu’il y a un peu un regard un peu théorique sur la chose”

22 “et un deuxième regard c’était d’dire ce serait bien de faire une démarche collective sur l’énergie. Mais j’trouve ça vachement... général quoi [...] et parce que ben du coup sans en savoir plus pour moi c’est quelque chose qui existe dont je saisis pas tout à fait là où ça va, qu’est-ce que ça va m’apporter, enfin qu’est-ce que ça vient apporter à une démarche collective d’énergie. Du coup voilà on n’a pas... enfin j’ai pas spécialement l’intention d’m’y intéresser à moins c’que on m’dise : là c’est intéressant pour tel aspect, mais du coup voilà, spontanément non quoi”

23 “Ben là quand on choisit les toitures dans les Monts du Lyonnais, ben parmi les gens qui ont proposé leur toiture, y a la Mairie de Larajasse. Ben la Mairie de Larajasse, elle est pionnière. C’est important de dire ben on trouve que c’que vous faites c’est bien donc on prend le toiture. Même si elle est mal orientée, même si c’est chiant. Y a un autre il a proposé sa toiture, il fait partie du groupe, il a donné du temps, il est prêt à donner pas mal d’argent pour le projet, ben du coup c’est cool d’accepter sa toiture même si elle est orientée à l’ouest. Voilà, donc là, y a des compromis qui s’font...”

This attitude comes from input through citizen implication, in some way “rewarding” the people involved, because the surface of PV implementation is leased. Here the roof’s owner receives additional income. The logic is clear but it does not take into account other planning and design principles, such as good orientation towards the sun, which is the basis for this technology’s optimal functioning. It is understandable for now, being the first pilot project and wanting to mobilize local inhabitants as much as possible. However this could be problematic on the long term, because now here are only just a few roofs, but if furthered implemented this lack of logic could lead to skepticism and opposition. Moreover, other technical principles will need to be taken into account such as the presence and the proximity to electricity network facilities. Unfortunately, the *plan de paysage* itself does not seem to provide landscape or spatial design principles nor create a framework for further implementation.

Moreover, in this example we can see a gap between the intention to include landscape considerations to try to maintain and improve landscape esthetic qualities, and the worry that these landscape considerations could be an obstacle/barrier to the energy transition objectives for the territory: “Knowing that, beyond the landscape constraints, we still have a certain number of technical constraints, anyway, to put in some... panels. So, as a final statement: if we reconcile the technical constraints to landscape constraints, we risk not putting in much of the photovoltaic panels”²⁴ (TEPOS project manager-ML 2017).

Landscape design is not associated with something that could conciliate esthetic and technical criteria. And this mismatch is questionable considering that the action plan was precisely chosen to associate these type of actions to ongoing projects “But for now, so, we have indeed rather picked up opportunities. That means, we had a project started in parallel and we tell ourselves: ah! That makes us think of that action plan”²⁵ (SCoT project manager ML 2017)

Summing up

We witness to a real gap between the goals of the *plan de paysage*, aiming to bolster from a landscape perspective various energy action implementations, and its practical impact on the implementation project itself. In the photovoltaic panel implementation case, the connection is almost absent and if there are some overlaps, they tend to be just a matter of luck or common sense. This exposes the limits of the *plan de paysage* document, that it is not compulsory, and is left to the free will of agents to take it into account. At the same time this inquiry also highlights the limits and a possible mismatch between what could be expected from this document and its current content, perceived as quite general and not of an immediate utility. This is questionable because the idea to introduce the energy actions in this document comes from the participatory workshop, and through discussion with the landscape architect and with the CC technical

24 “tout en sachant que, au-delà des contraintes paysagères, on a quand même un certain nombre de contraintes techniques, quand même, pour mettre des... des panneaux. Donc, bilan : si on concilie les contraintes techniques aux contraintes paysagères, on risque de pas en mettre beaucoup du photovoltaïque”

25 “Mais pour l’instant, du coup, on a effectivement plutôt fonctionné à l’opportunité. C’est-à-dire que on avait un projet lancé aussi en parallèle et on s’est dit : ah! ça nous fait penser à cette fiche action”

service department. Finally, even if there is an initial interest among agents, initial effort results in a non-mobilization of the *plan de paysage* document. This reveals a gap between the *process* for the *plan de paysage* development, which combined landscape analysis, participatory field visits and inclusive workshops, trying to understand the aspirations of stakeholders and the *content*. Indeed the *plan de paysage* content does not seem to be known and used by agents.

Maybe some content could evolve providing different ways to include the energy action program and introduce a more detailed spatial answer to the enunciated energy TEPOS goals. For example, developing more graphical elements such as maps that advise recommend possible siting areas or schemes/diagrams illustrating design principles.

Indeed the *plan de paysage* seems to arrive at the right moment considering the energy transition process of the CC Monts du Lyonnais, because even if the TEPOS actions are defined, many of them are just beginning and they are still not concretely implemented. To have a landscape prospective could reinforce implementing them in a more landscape conscious way, considering that except for building retrofitting, the other actions are not very advanced yet (see chapter 5). Moreover, the technical service for the energy transition is developing a compulsory PCAET that will orientate actions for the short (6 years) and long term (2050), so an articulation between the two could be an interesting option. However, for now this does not seem to happen.

6.2 CC du Thouarsais - starting from RE production

The CC Thouarsais is a TEPOS territory as the CC Monts du Lyonnais, but the former much more advanced in terms of renewable energy production, compared to the latter. In this territory landscape concerns arrive in a more advanced stage in reaching the TEPOS goals, and that could highlight different problems and potential, that enables our inquiry to be put into perspective.

6.2.1 The students pioneering study about renewable energy technologies

The landscape concerns for territory in connection with the energy transition process started in a concrete manner in 2013, through an “atelier pédagogique régional” [regional pedagogical studio] elaborated by students of the Versailles Landscape Architecture School, on the *Communauté de Communes du Saint-Varentais* (CCSV), a part of *Pays du Thouarsais*, composed by 9 municipalities.

The idea and the funding for the development of this study came from the “Conservatoire Régional des Espaces Naturels” [Natural area regional conservatory] (CREN) of Poitou Charentes that since 2005 has a partnership with several Landscape schools in France in order to promote design workshops and studies in its territory, launching a call for projects each year for the region, to raise awareness on the landscape issue.

In 2012 the call for project of CREN was oriented to examine renewable energy and its place in landscape. The *Pays of Thouarsais* were asked and decided to apply and then was awarded the call. Indeed, in 2012 there were several renewable energy technologies implemented in the territory that began to raise questions about their integration and visibility in the landscape:

“And so, we were in the middle of reflection, because there were the wind turbines of Versennes that had just been built, so. The biogas project, too. And we said: it would be good to have an analysis of their impact on the landscape of large renewable energy”²⁶ (Sustainable territorial management division director-CCT 2017).

In this APR framework, students from the Landscape architecture school were commissioned to develop a study in order to improve the landscape implementation of renewable energy facilities in only a portion of *Pays du Thoarsais*, due to a timing schedule. The CCSV was chosen for the study because, it has within its borders several renewable energy technologies, a wood-energy network, a biogas facility and in 2012 it opened an 18 wind turbine park that raised debate within the territory.

The resultant report “L’autonomie énergétique et la place des énergies renouvelables en pays thouarsais” (2013) [Energy autonomy and the place of renewable energy in Pays Thouarsais] showed/detailed how different parts of the territory with different characteristics and resources,

²⁶ “Et du coup, nous on était en pleine réflexion, puisqu’on avait les éoliennes des Versennes qui venaient de sortir, voilà. Les projets de méthanisation, aussi. Et on disait : ce serait quand même bien d’avoir un peu une analyse de l’impact sur le paysage des grandes énergies renouvelables”

such as the open-fields or plains dedicated to cereal production, the *bocage* hedged agricultural areas, and villages, should lead to different and specific renewable energy choices. For example, the *bocage* area is suitable to develop wood-heating facilities, due to the possibility of collecting local wood. Moreover, the report recommended several rules for the visual implementation of energy facilities such as wind turbines treating their installation according to a proportions system with existing elements such as hedges or quarries. This showed how impacts from different energy technologies were not the same in terms of transformation in these different landscape entities (*bocage* and open-fields) and how playing with existing landscape elements, such as hedges, could enhance suitable integration. Furthermore, it shows how long-term energy actions and their progressive implementation could create beneficial synergies able to allow the implementation and integration of new energy projects. For example, the progressive densification and maintenance of hedges for wood energy intentions could lead to the construction of new wind turbines parks thanks to the new distance in high proportions established between hedges and inhabited areas (figures 2 and 3).



Figure 2 (above). Proportion between the wind turbines and hedges to define wind turbine siting area . Source: L'autonomie énergétique et la place des énergies renouvelables en Pays Thouarsais (2013) APR-ENSP Versailles, p.182.

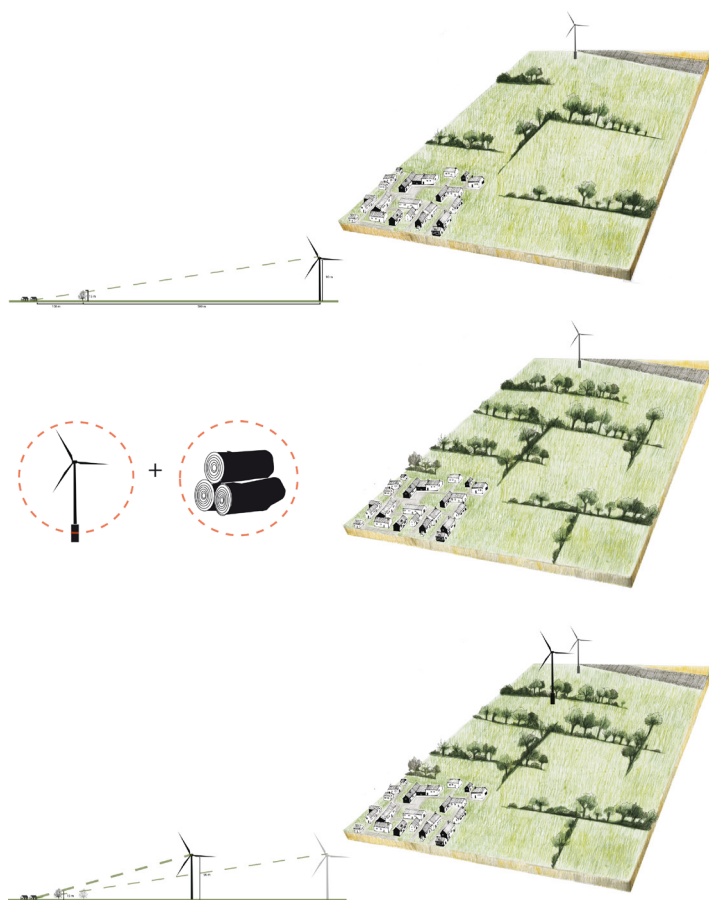


Figure 3 (left). Gradual implementation of hedges system in connection to wind turbine siting areas. Source: L'autonomie énergétique et la place des énergies renouvelables en Pays Thouarsais (2013) APR-ENSP Versailles, p.116.

This first exploratory work was a study and does not contain compulsory rules for the community, but it raised awareness on the landscape point of view of energy transition, even if from the only perspective of renewable energy technologies, leaving aside the energy saving possibility. The study has been appreciated by the elected members of the Saint-Varentais:

“And they did a great job, with a lot of drawings, situational exercises/ scenarios, and evolution proposals, and the points about landscape entity that are to taken into account when you have a renewable energy project. And, in fact, this work has been much valued in Saint-Varentais, and elected representatives liked it very much”²⁷ (Sustainable territorial management division director-CCT 2017).

Even if the elected officials sensitivity and interest in the landscape subject was not guaranteed as an agent of the energy transition technical service pointed out:

“I was very surprised by the attitude about the study report developed by landscape students, in Saint-Varentais. I didn't think that it was going to interest the elected officials so much, and then finally yes. And I think that it also increased receptiveness among the elected officials”²⁸ (Sustainable territorial management division director-CCT 2017).

Despite that it raised interest, this study does not seem to have induced further development of energy projects in the territory.

This landscape study has been valorized inside the TEPOS annual meeting of 2015, which took place at Thouars. During this event the students' work was presented during a specific landscape focused workshop “Faire du paysage une approche de travail pour construire un TEPOS” [Make landscape a work approach to implement/build a TEPOS] animated by the association *collectif Paysage de l'après-pétrole* (PAP), with the objective to promote landscape as a tool for linking territories, transition and inhabitants in a global and coherent manner. Furthermore, this workshop informed to a broader audience, both of the Thouarsais territory but also of other TEPOS territories about landscape's entry into energy transition topic, creating recognition of this territory as one of the frontrunners.

“And we had a workshop on it that was really interesting. And, so I would say that there was already a certain instruction accomplished about the post-oil landscape in the CCT”²⁹ (mayor, VP energy transition-CCT 2017).

6.2.2 The decision to develop a “plan de paysage”

It is not surprising that in the 2017 the CC Thouarsais applied for the call for project and funding by the Ministry for the *plan de paysage* development and was awarded the call. From the

27 “Et ils ont fait un super boulot, avec pas mal de dessins, de mises en situation, et de propositions sur l'évolution, et les points sur les entités paysagères à prendre en compte lorsqu'on a un projet d'énergies renouvelables. Et, en fait, ce travail-là a été très valorisé sur le Saint-Varentais, et a beaucoup plu aux élus”

28 “moi j'ai été très surprise de l'accueil du rendu de l'étude, là, sur le Saint-Varentais, des étudiants du paysage. J'pensais pas que ça allait autant intéresser les élus, et puis finalement si, quoi. Et j'pense que ça a sensibilisé aussi les élus”

29 “Et on avait eu un atelier là-dessus qui était super intéressant. Et donc, j'dirais qu'y avait déjà une certaine pédagogie de faite au niveau de la CCT sur le paysage d'après pétrole”

beginning the *plan de paysage* was developed in connection with ambitions for the territory to become energy positive. The landscape evolution due to the progressive implementation of the TEPOS actions was at the center of this commission.

In any case, the decision to elaborate such a novel landscape document came about for various reasons. First the local institutions were aware of the landscape topic, arising from the first APR, and by the PAP association that developed the landscape workshop at the TEPOS meeting. Second the CC needed to elaborate a new SCoT and a PLUi at the scale of the whole *communauté de communes*, which had to contain a landscape component within it and while maintaining the territory's ambition on energy too.

“Knowing that we want to write the SCoT without too many constraints, but nevertheless coherent with TEPOS objectives, but we are in a rural area with bocage landscape that we want to preserve as well. So [we'll] try to study this with the double objective: landscape preservation, while continuing to develop our TEPOS objectives”³⁰ (Project manager energy and climate-CCT 2017).

Accompanied by the will to include a specific OAP (planning and program orientation) about landscape and renewable energy in the PLUi:

“And in addition to the SCoT and the PLUi we decided to work on renewable energy in order to make an OAP [Orientation d'aménagement et de programmation] about renewable energy to try to pre-zone future areas where we could situate photovoltaic parks and wind turbine parks. We thought: it could be nice if we do it at the same time this zoning and the landscape analysis that goes with”³¹ (Sustainable territorial management division director-CCT 2017).

Thirdly, the fact that in the territory many renewable energy projects were implemented, and even if there is no strong local opposition, concern about it begins to rise, while considering intention by the territory to develop more of them in order to achieve renewable energy objectives by 2050.

“And then, well, today we arrive at the point where, well, we have many projects that got off the ground. Or even if there always was a consensus and very few oppositions, nowadays we feel that we reached a threshold effect, where people say: yeah, but non, well, now it is not bad/ it doesn't hurt, in landscape terms it begins to be visible and to have an impact. And we thought we had to anticipate this and that we lead a real reflection today on, well, the evolution of our landscape, well, since we have developed renewable energies. And so, well, what room do we still have to maneuver, to develop more without distorting our

30 “sachant qu'on veut écrire un SCoT sans trop de contraintes, mais quand même cohérent avec l'objectif TEPOS, mais qu'on est sur un territoire rural avec des paysages de bocage qu'on souhaite préserver aussi. Donc d'essayer d'étudier ça avec ce double objectif : préservation des paysages, tout en continuant à développer notre objectif TEPOS”

31 “Et comme en plus dans le SCoT et le PLUi on a décidé de mener un travail sur les énergies renouvelables afin de faire une OAP [Orientation d'aménagement et de programmation] énergies renouvelables pour essayer de pré-zoner les futures zones où on pourrait mettre des parcs photovoltaïques et des parcs éoliens. On s'est dit : ça serait bien qu'en même temps qu'on fait ce zonage, on ait l'analyse paysagère qui va avec”

*landscape? So here is, what leeway is left to develop more of them without transfiguring our landscape?”³²
(Sustainable territorial management division director-CCT 2017)*

This specific issue is also articulated in the TEPOS action report of 2015; it highlighted how “The opposition of the population is more and more felt. We must improve information and better supervise the development of wind energy”³³ (TEPOS CC Thouarsais 2015, p. 24).

It seems that the triggering point for developing a *plan de paysage* in connection with energy transition came from the concern about local acceptability of landscape changes due to RE technologies implementation. This shows a conservative attitude towards landscape. Clearly, even if not directly addressed during the interview, the financial opportunity given by the call for projects by the *plan de paysage* of the Ministry was a triggering factor for document elaboration for the CC Thouarsais. Indeed, the CC as highlighted in chapter 5 is facing a decrease in financial support from the State, so that every opportunity is seized. In a similar manner, the first landscape study developed by students came found support from regional funds.

6.2.3 “Plan de paysage” elaboration: from energy transition to broaden landscape topic

The drafting of the *plan de paysage* was commissioned to a landscape architect (Isabel Claus paysagiste) in collaboration with the association *collectif Paysage de l’après pétrole*, mainly through the contribution of two architects/urban planners, (Armelle Lagadec and Mathilde Kempf), that also supported the application for the Ministry of solidarity and ecological transition’s call for *plan de paysage* in 2017. The commission from the *communauté de communes* specifically focused on the energy transition implementation in the territory, according to the TEPOS and PCAET goals, whiw were under development at the same period.

The process for the development of the document is similar to the one developed in the CC Monts du Lyonnais, composed by the landscape analysis during a phase one, a phase two to understand and decide on the main strategies for future territorial development through participatory process and the phase three in which the objectives are chosen by priority and detailed in an actions plan. The *plan de paysage* normally contains these three phases, but in this case there are many similarities in the two processes because it is the same landscape architect that developed the document in both the embedded cases studied.

The choice of the landscape architect in this second case is not random, but one of the reasons

32 “Et puis, ben là, aujourd’hui, on arrive à un point où, voilà, on a quand même beaucoup de projets qui sont sortis de terre. Ou même si il y a toujours eu un consensus et très peu d’opposition, aujourd’hui on sent qu’on arrive à un effet de seuil, où les gens disent : ouais, mais là, bon ben, maintenant ça en fait pas mal, en termes paysagers ça commence à se voir, quoi, et à avoir un impact. Et on s’est dit qu’il fallait qu’on anticipe ça et qu’on mène une vraie réflexion aujourd’hui sur, ben, l’évolution de notre paysage, ben, depuis qu’on développe les énergies renouvelables. Et du coup, ben, quelle est encore notre marge de manœuvre pour pouvoir en développer plus sans dénaturer notre paysage?”

33 “L’opposition de la population se fait de plus en plus ressentir. Il faut améliorer l’information et mieux encadrer le développement de l’éolien”.

to choose her was that she has already written a *plan de paysage* with energy transition contents for the CC Monts du Lyonnais. The technical service of the CC estimated her previous experience was important concerning the energy transition point in question. This is revealing of the situation in France where it is difficult to find specific landscape architect offices that have worked on the issue on a large landscape scale, both for lack of commission work and not enough valorization nor communication on this kind of project by landscape architects themselves (this topic is further developed in part 3 of this research). This also shows the importance of the TEPOS network in exchanging information. When we chose the two French embedded cases, the landscape architect for the development of the *plan de paysage* in the CC Thouarsais was not chosen yet, so this was not a criteria of selection in this research. In any case, it permits inquiry into if and why there were differences in the document content and its development.

Because it was compatible with the research schedule, I participated as observer at several meetings during the drafting of the *plan de paysage*, it allows a better understanding on how this theme was approached, and evolved into discourse and its reception by agents and other stakeholders.

During the event organized for the launching of the *plan de paysage* (18 January 2018, centre Prométhée, Thouars), the president of the *communauté de commune* reaffirms the need to do a *plan de paysage* in order to anchor the energy transition process to the territory ground. Energy transition is considered one of the pillars for future development in the CC Thouarsais, and renewable energy production and energy-saving measures were equally encouraged and discussed as a focal point, since both are part of the TEPOS strategy.

Even if the commission of the *plan de paysage* is about energy transition and TEPOS objectives in a broader sense, so are both energy production and energy saving. It appears clear, during several meetings and especially at the beginning, on behalf of the CC Thouarsais' technical service for energy transition, that the expected focus should be the way to implement and integrate renewable energy production facilities, as explained above. At the same time the landscape architect and PAP members reemphasize the idea of "landscape's transversal character" and that a *plan de paysage* is not sectoral. The starting point for its development is the landscape, with its multiple facettes, of which energy is one. The designers try to make the broader interest of a *plan de paysage* understood, but this has been creating tension with the technical service of the *communauté de communes* about the treatment of energy issues. These focus on renewable energy technologies probably results from the high quantitative objectives stated in the PCAET, with an increase of +300% of energy production from photovoltaic panels and +926% from wind turbines (PCAET CC Thouarsais 2018). Wind energy production seems to be the topic that raises the most concern.

This reveals from the start, a particular attitude about the *plan de paysage's* focus on the integration of renewable energy facilities even if the general discourse expressed determination to address the energy transition in all its components, including energy-saving measures. This shows a gap between discourse and reality. Moreover, it leaves the landscape component of energy-saving measures in the background, where even if it could affect urban layout, housing forms and appearance, this aspect does not seem to be perceived as having a major landscape impact, nor believed to raise inhabitants' possible opposition.

However, this first renewable energy entry point evolved during the process. After the launch

event, the landscape architect and PAP members asked elected representatives of several CC municipalities to organize a field visit in key locations to share their knowledge of the territory, of its landscape and of its problems, that the *plan de paysage* could tackle. The participants in this field visit (19 January 2018) were mainly elected officials and agents and other stakeholders from several associations in the territory or chamber of agriculture, etc. with a total of 10 persons. The first stop highlighted mainly the issue of the center village revitalization and water storage problems. Only the last stop was specifically focused on energy, located on the site of a new wind turbine park project in Saint-Généroux on its agricultural *plateau* where there was an unobstructed view of several wind turbine parks all-around (figure 4). This view unleashed some reflections about their high number and the lack of global landscape project for their implementation. Their visibility presence seemed to be particularly annoying at night because of their red blinking lights that makes them look like a “Christmas wreaths” (elected representative participating to the field trip, 2018). During this visit, the energy issue about the visibility of renewable energy facilities in the landscape was raised. Though from the point of view of the several elected representatives present, it seemed that energy production was only one of the topics that they associated with the *plan de paysage* possibility, broadening to other topics with a big emphasis on water quality and storage. Nevertheless, the most critical point brought up on energy transition was the wind turbine implementation in the territory, as the most visible and impacting element on the landscape.



Figure 4. Field visit for the plan de paysage elaboration for a wind turbine park project in Saint-Généroux, 18/01/2018. Source: author

The importance of including other topics in *the plan de paysage* also appeared in the following phase: the workshop (9 April 2018) to define the major landscape strategies. Elected officials of the CC, but also internal agents of the CC, other stakeholders such as representatives of associations, the chamber of agriculture, etc. were invited to this workshop. Finally, 56 people of all stakeholder categories participated to the workshop.

The participants were asked to indicate among 10 given strategies, the three most important strategies and three of secondary relevance. The 10 strategies detailed by the designers in charge of the plan who conducted the workshop, issued from the phase of the territory landscape analysis were: (1) to develop sustainable management of the ground to protect water resources, (2) to develop better water storage capacity, (3) to protect and valorize value dry valleys, (4) to reopen the alluvial valleys, (5) to stop urban sprawl/dismantlement (e.g. sprawled urban extension), (6) to develop the valleys as a federator axes, (7) to qualify the large transition spaces between landscape entities, (8) to regenerate urban and industrial fringes, (9) to regenerate the urban fringes through energy transition, (10) to study the energy complementarities in favor of landscapes (wind turbines/wood energy hedges, PV/brownfield areas, etc.).

As could be seen from figure 5 the central issue arising from this participatory workshop (figure 6) is not energy but water management.



Figure 5. The ten landscape strategies and votes for plan de paysage elaboration, Thouars 9 April 2018. Source: author



Figure 6. Participatory workshop to choose landscape strategies for the plan de paysage elaboration, Thouars, 9 April 2018. Source: author

The main objectives highlighted are:

1. to develop sustainable management of the aquifer to protect water resources, 40 priority votes and 5 secondary,
2. to study the energetic complementarities in favor of the landscape, 22 priority votes and 19 secondary
3. to stop urban sprawl/dismantlement , 20 priority votes and 6 secondary
4. to qualify transition areas and urban fringes on all scales, 17 priority votes and 17 secondary votes

Energy transition as an issue is considered important enough to be treated in the *plan de paysage* but it is not highlighted as the principal issue, as expected from the original commission. This is interesting outcome considering the larger number of stakeholders present and that were voting during the workshop (technical service department of the *communauté de communes*, elected representatives and other associations) acknowledged or knew about the ambitious TEPOS objectives for the territory.

Even if the energy transition topic remains central, the *plan de paysage*, broadens to other topics, that arose from the field visit, from discussion, from other planning instruments and their objectives (PLUi, SCoT) and from the participatory workshop process.

Furthermore, after this workshop the committee of elected representatives voted these four main objectives (June 2018), and on this occasion also chose 2 actions among several proposed for each objective. These two chosen actions will be included in the final *plan de paysage* document. The 10 principal actions for the energy objective:

1. To integrate wind turbines through a reasoned implementation of a hedge and tree network,
2. To conduct a global study a photovoltaic panels insertion on roofs of the village's, through a exchange with the French building architect (a State architect in charge of heritage

- conservation),
3. To increase quality of brownfields through the implementation of photovoltaic panels on them,
 4. To launch a feasibility study on the multi-functionality of hedges to produce wood-energy and agricultural ground soil conditioner,
 5. To study the wind turbine sites in connection with an understanding of the landscape and valleys,
 6. To study the feasibility of biogas power plants on a small scale,
 7. To develop slow mobility infrastructure, which would encourage the development of hedge networks,
 8. To launch a participatory action for renovation of declining and disadvantaged suburban areas and their landscape through a qualitative thermal renovation by exterior cladding,
 9. To launch a study for the development of the local agriculture and short food supply chains, to regenerate the urban fringes,
 10. To continue all actions that raise awareness about energy consumption and saving measures,

These actions include both those for energy production and energy saving, and take into account the elements highlighted in PCAET goals (see chapter 5). Indeed, all the renewable energy production objectives for each source of the PCAET are specified with a dedicated landscape conscious action. Concerning energy-saving measures, the questions of slow mobility development, part of future adjustments in transportation for people, and the question of residential sector retrofitting are affirmed.

From these 10 actions the elected representatives chose 3 actions for further development: (4) to launch a feasibility study on the multi-functionality of hedges to produce wood-energy and conditioning soils for agriculture, (8) to launch a participatory action for the rehabilitation of declining and disadvantaged suburban areas and their landscape through a qualitative thermal renovation by exterior cladding, (10) to continue all actions that raise awareness about energy consumption and saving measures. Only one is about energy production, through the development and reinforcement of a local non-technical characteristics in one landscape element: the hedge. The two others are connected to energy saving. This in a surprising aspect considering the main interest in RE technologies expressed by the energy transition technical service department of the *communauté de commune* and also the primary motivation about the *plan de paysage* development: optimal site identification and integration of RE technologies favors local acceptability, because of the PCAET and TEPOS goals. This is also a mismatch with the discourse made by agents and during the meeting, and the field visit where the energy issue is often pinned on wind turbines.

Finally, the two actions that got the most votes from the elected representatives in the committee, for which the specific action plan will be further developed, does not include an energy transition focused action:

1. to develop sustainable management of the soil and aquifer to protect water resources
2. to improve quality to the transition areas and urban fringes on all scales

This means that, even if energy transition was the origin of the commission and it has been explicitly addressed in the analysis part of the plan de paysage, as it was among the possible choices in the workshop and field visit, the plan de paysage will not include specific action plans either about renewable energy nor energy saving or other energy focused goals.

The choice making energy-saving action a priority and the choice of not detailing action plans about energy transition, could be due to the parallel development of a “landscape and energy” OAP focused on wind turbines in the landscape, to be included in the PLUi. Originally the landscape architect and PAP members, in charge of drafting the *plan de paysage*, were asked to review the OAP and not directly involved in the writing process. However, during the *plan de paysage* development, this changed and they were commissioned by the CC to elaborate the whole OAP, and were allocated an additional budget from the PLUi. Probably, from the local institution perspective, the fact of having a renewable energy focused OAP allowed to choose other subjects to widen the range of action in the *plan de paysage*. Indeed the expectations on the OAP were high according to several agents in the CC’s technical service as clearly cited in the interview: “The goal is that... as we do a renewable energy OAP, with a map, but it has also orientations, and so, what I told you, these recommendations, I want them to be in the OAP”³⁴ (Sustainable territorial management division director-CCT 2017).

However, the resolve to develop an OAP about wind energy and not detailing any further an energy focused action in the *plan de paysage* shows, on the one hand, the determination to broaden the action range behind energy transition and the numerous issues that are attached to landscape quality, emanating from participatory process. On the other hand, this also shows that from a landscape perspective the most principal matter of concern towards energy transition remains renewable energy, and chiefly wind turbines. Once this is treated other subjects don’t seem to attract much attention, or be a matter of great concern even if the local community has undertaken many actions in TEPOS and PCAET goals that surpass wind turbine operations alone.

Nevertheless the landscape architect affirms not to be really surprised by the choice of energy-saving action in the *plan de paysage* and the lack of further energy focused action plans:

*“For me it is the goal of the plan de paysage, to widen attention and therefore leave the RES question and to anchor energy transition in a global policy and so to make them understand also that this RES... the issue about RES that are developed in a rather industrial and also financial way, you can’t hide it. And besides... it would overlook a true territorial policy, of a true territorial community in a transition with a big T, which includes sustainable development, etc.”*³⁵ (Ingénieure-paysagiste 2017).

However the landscape architect recognized that the presence of a renewable energy focused OAP supported the widening of the issues to be treated in the *plan de paysage*: “It is true that we

34 “le but c’est que... comme on fait une OAP énergies renouvelables, avec la carto, mais c’est que aussi des orientations, et qu’du coup que c’que je t’ai dit, ces préconisations, moi j’veux, du coup, qu’elles soient dans cette OAP”

35 “pour moi c’est plutôt le fin du plan de paysage, d’élargir et du coup de sortir quelque part de la question des ENR et d’ancrer la transition énergétique dans une politique globale et du coup c’est leur faire comprendre aussi que ces ENR... sur les ENR que sont mobilisé de façon assez industrielle et aussi financière il faut pas le cacher. Et en plus ...il vas faire passer à cote d’une vrai politique du territoire, qu’elle est vraiment d’une collectivité territoriale dans la transition avec un grande T, qu’inclue le développement durable etc.”

had this OAP, which held a very concrete question to address RES in a parallel way to the *plan de paysage*”³⁶ (Ingénieure-paysagiste 2017).

Probably the commission of these two documents also permits, from the perspective of the urbanism and energy transition technical services of the CC, to be less binding in the initial commission about detailing principles for integration of renewable energy in the *plan de paysage*. Nevertheless, from the landscape architect perspective, the goal of the *plan de paysage* was to broaden examination beyond energy focuses, highlighting other sensitive topics through the participatory process. Indeed, this is what happened in particular resulting in the subject of water management.

This also shows how the participatory workshop and the visit organized with elected officials and stakeholders, during the drafting process for the *plan de paysage*, called attention to other sensitive subjects about landscape that were not considered at the beginning of the process. This pertains primarily to water management, not perceived as problematic at the beginning. This participatory process influenced the *plan de paysage* of CC Monts du Lyonnais to treat energy as a major concern. Instead, in the CC Thoursais where energy transition concerns were commissioned from the beginning, modified them progressively to secondary level concerns. But again, this is probably due to the parallelism between the elaboration of the *plan de paysage* and the OAP for landscape and energy, without which at least one action plan would concern RE facilities.

6.2.4 The “*plan de paysage*” contents: energy a topic among others

During writing of this research, the action plans and the final draft of the *plan de paysage* were not yet completed, their finalization was scheduled for the second half of 2019. This does not allow to further inquiry about their content. However, the provisional version of the territory landscape analysis document was already elaborated, showing that energy issues were treated and developed. The document includes a specific chapter that directly inquires about energy transition policy developed in the territory and its landscape connection. It introduces statistical data about energy consumption by sector and energy production from each renewable energy source, integrating and considering directly the energy production and saving goals issued by the PCAET for 2030 and 2050. This feature lacks completely in the same document of the CC Monts du Lyonnais, probably because there is not specific energy entry commissioned from the beginning, arising from the need to include landscape analysis in the SCoT. The *plan de paysage* questions landscape evolution in respect with renewable energy, and even if the visual impact of wind turbines remains paramount, other subjects are discussed as well. The wood energy sector is questioned in connection with the local forest and hedges management, so are large scale biogas facilities using local residuals, and optimal design of large scale photovoltaic parks. At the end a short section addresses mobility and the observation that single car use is still prevalent, and information on energy saving in buildings.

However, landscape analysis goes beyond energy transition topic, by defining and describing

36 “c’est vrai que on avait cette OAP qu’était vraiment aussi une question très concrète en fait d’aborder des ENR en parallèle du plan de paysage”

four landscape entities: the vineyard in the north, the Thouet river valley, the agricultural plain and the low hill *bocage*. Moreover, it details structural elements of CC Thouarsais such as the dry valleys to be revalorized and how urban sprawl dismantles the landscape and how fringes among urban, rural and industrial areas and among the different landscape entities need to be thought and designed.

Energy issues are broadly discussed in the analysis and the only action map developed in the document is named “landscape & energy transition”, seen in figure 7.

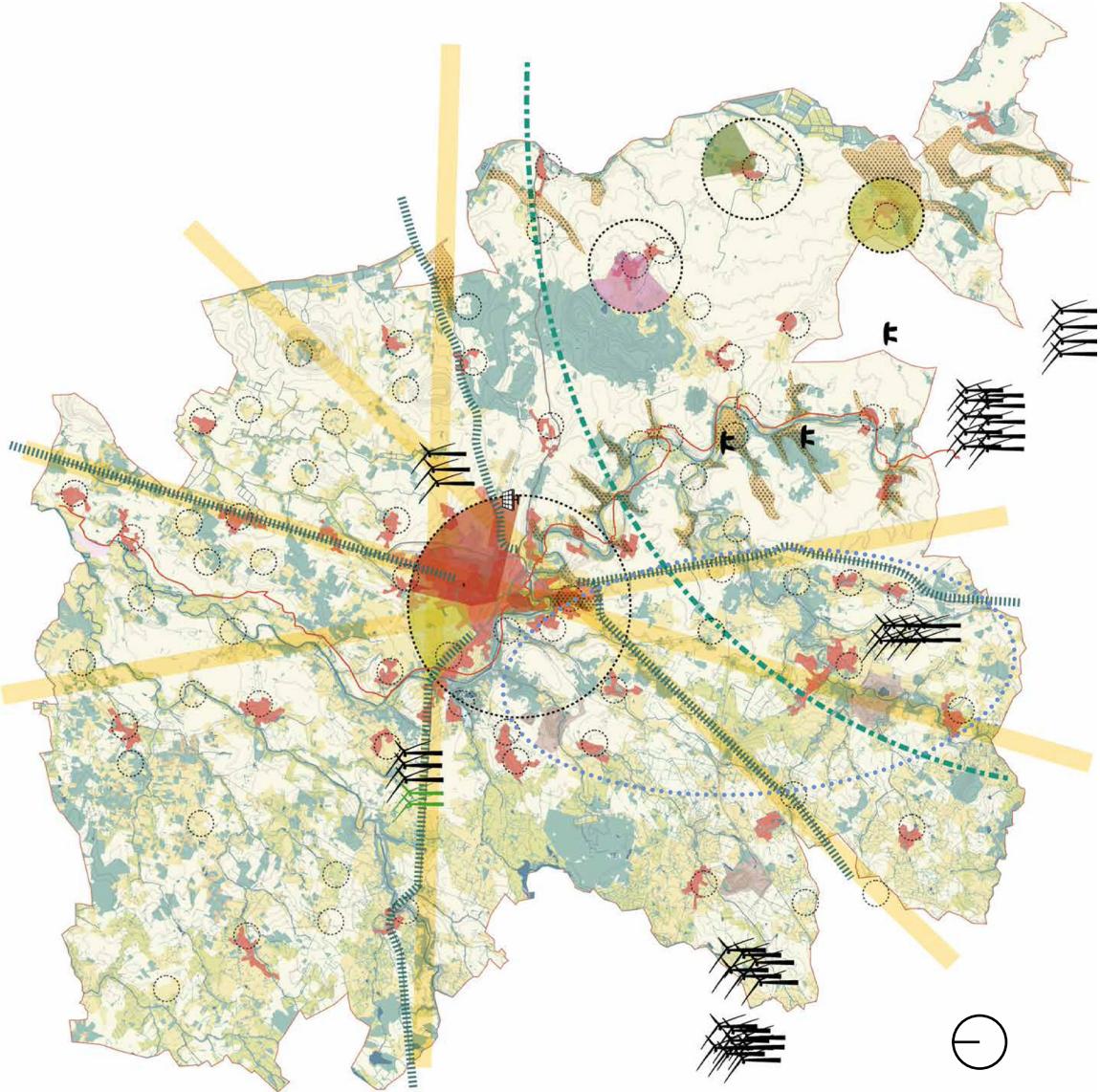


Figure 7. Map action plan CC Thouarsais “Landscape & energy transition”. Source: Plan de paysage de la CC Thouarsais. Diagnostic. Provisional version. 2018., pp. 28-29. Schema translated by the author.

CRÉER DES ÉLÉMENTS MULTIFONCTIONNELS

En lien avec l'eau :

- VALLÉES SÈCHES : créer un parcours thématique sur l'eau . Y mener une politique de gestion modèle des sols agricoles et de l'eau
- SECTEUR DE PLAINES SUD-EST : secteur où privilégier les plantations de haies arborées ou arbustives (fonctions : qualité de l'eau, agronomie des sols, intégration d'éoliennes, bois-énergie, structures paysagères). **A localiser**
- ANCIENNES CARRIÈRES : Poursuivre la valorisation technique et pédagogique de des anciennes carrières comme niche écologique et lieu privilégié de l'infiltration de l'eau.
- VILLAGES ET BOURGS : Au sein de chaque bourg, créer un parcours de l'eau visible dans les espaces publics au travers d'aménagements favorisant l'infiltration de l'eau.

En lien avec les franges et transitions

- FRANÇOIS-URBAINE NORD-OUEST de Thouars: secteur privilégié de plantation de haies pour qualifier la frange urbaine et produire un bois-énergie utile localement (à destination des agriculteurs, des collectivités ou des particuliers)
- LISIÈRES : Etudier les lisières de chaque bourg et de chaque site industriel pour développer une filière de bois-énergie. Qualifier leurs lisières en intégrant un usage doux limitant les déplacements de véhicules.
- Créer des modes doux entre les centres-bourgs et ses périphéries pour limiter l'usage véhicule.
- AXES VITRINES : planter d'un double alignement les axes vitrines du territoire, liaison entre des entités et corridor écologique potentiel. Accompagner ses axes de modes doux lorsque utilisables. z
- Développer des CHEMINS THÉMATIQUES associant les sites mégalithiques et les pelouses sèches ou landes, l'histoire et l'écologie.
- LISIÈRE ÉNERGÉTIQUE nord-Est de Thouars à conforter, paysager et diversifier.
- LISIÈRES ALIMENTAIRES de Briè, Oiron à conforter : en créer de nouvelles, notamment maraîchères ?
- LISIÈRE VÉGÉTALE de St Jouin de Marnes à conforter + du nord-ouest de Thouars à créer
- Créer une boucle pédestre au sein de chaque entité et des chemins de liaisons entre ses boucles, valorisant les vallées comme élément fédérateur des entités.
- Etudier un parcours mode doux entre chaque bourg et les vallées les plus proches

Eoliennes

- Préserver des axes de préservation des cônes de vision depuis les axes vitrines du territoire. Zone excluant potentiellement l'implantation d'éoliennes.
- Conforter le champ de Mauzé-Thouarsais de 2 éoliennes supplémentaires.

Méthanisation :

- Développer des METHANISATEURS à échelle familiale pouvant conforter l'élevage et alimenter en digestat les productions céréales. Privilégier la zone de transition entre bocage et plaine.

APPORTS POUR LA TRANSITION ÉNERGÉTIQUE

					BAISSE D'UTILISATION DE FUEL, D'ENGRAIS MINÉRAUX ET DE PRODUITS PHYTOSANITAIRES / DURABILITÉ DES SOLS AGRICOLES / QUALITÉ DE L'EAU EN AMONT
					BOIS-ÉNERGIE / QUALITÉ EAU / INFILTRATION / INTÉGRATION ÉOLIENNE / DURABILITÉ ET PRODUCTIVITÉ DES SOLS AGRICOLES / BAISSE ENGRAIS
					QUALITÉ EAU / INFILTRATION
					QUALITÉ EAU / INFILTRATION / MODES DOUX
					BOIS-ÉNERGIE / QUALITÉ EAU / INFILTRATION / MODES DOUX
					BOIS-ÉNERGIE / MODES DOUX
					MODES DOUX
					ENR - ÉOLIENNE, MÉTHANISATION, PHOTOVOLTAÏQUE
					AUTONOMIE ALIMENTAIRE
					QUALITÉ EAU / INFILTRATION
					MODES DOUX
					EOLIENNES
					MÉTHANISATION, VALORISATION DE L'ÉLEVAGE / BAISSE DE PRODUITS PHYTOSANITAIRES ET D'ENGRAIS MINÉRAUX

This map gives a spatial overview of very general principles for possible sites for energy actions, such as installing wind turbines. It also highlights strategies for hedges development on the villages' fringes in order to reinforce the organization of wood energy production. Energy actions such as the ones connected to hedges are related to the issues beyond energy, ultimately creating benefits in terms of biodiversity and water management. This shows how the *plan de paysage*, even if this map focuses on energy transition, is broadened to other ecological aspects, where energy concerns could establish synergies or be coupled together. Access created by energy transition themes from a landscape point of view could reinforce creating these connections. Beyond renewable energy production, some areas for development of slow mobility and pathways are given, but no other energy-saving measures appear, such as identifying areas for building retrofitting. Moreover are included actions focusing on improving water management, or preserving historical megaliths, including in this way other sensitive subjects for the territory. This kind of map was not included in the *plan de paysage* of the Monts du Lyonnais, even if the same landscape architect developed both of them. This shows that a *plan de paysage* content can be very flexible, and that behind the need to include landscape analysis, landscape objectives and some action plans, the number of which is variable, the way to accomplish this and the graphical representations are in free form. Secondly, the landscape architect changed the way content was dealt with, composing a more detailed overview of landscape strategy for the CC Thoursais, compared to the CC Monts du Lyonnais.

Even if in the *plan de paysage* there will not be any specific energy action plan, general concerns and some spatialized design principles about energy transition are sketched in this map.

6.2.5 Is the “*plan de paysage*” a shared tool?

In the CC Thoursais, as the *plan de paysage* was in progress during the inquiry period for this research, it is not possible to understand if the energy transition technical service and external agents really appropriated and used this tool, or if the final content matches their expectations. However, during the interviews conducted in parallel with the *plan de paysage* draft work itself, we asked if they participated in some step and/or if they saw an interest and an interface with their work.

It emerged from the interviews with the CC technical services that all acknowledged the plan and participated in participatory meeting for its elaboration, having precise operational expectations from its outcome:

“You see, what I’m expecting from the plan de paysage, it is to have recommendations. If you install a PV, photovoltaic park, in that sector, pay attention to such landscape entity, pay attention to such view cone... maybe it is necessary to provide hedges to hide it, in order to break the view of churches, you know, things like that”³⁷ (Sustainable territorial management division director-CCT 2017).

The in-house technical service associated with the transition process seemed interested in the

37 “Tu vois, moi, c’que j’attends du plan de paysage, en fait, c’est qu’on ait des préconisations. Si vous installez un parc PV, un parc photovoltaïque, dans tel secteur, attention à telle entité paysagère, attention à tel cône de vue... Peut-être que il faut prévoir des haies pour cacher, pour briser la vue en lien avec l’église de machin, enfin, tu vois, des choses comme ça”

subject, each saw a connection with his/her work topic, even if it more or less strong. The person in charge of the TEPOS agriculture and company project saw a connection with the wood-energy development in connection with agriculture:

“So, no after, I think that all the actions, finally all these actions -perhaps a little less the company-, but in any case farmers and in the wood sector, it necessarily affects the landscape, so... to see what, behind, they will tell me in the action program, but I think that... in any case about wood energy, there is a path where... not only wood energy, about wood in general way, to have a biodiversity facet or what, about that, there is matter to work”³⁸ (TEPOS agriculture and company project manager CCT 2017).

The connection to wood energy is also shared by the energy and climate project manager that is working on the PCAET and has a more global vision about its goals, also adding the RE technologies integration, but totally omitting energy saving:

“For me the most concrete/tangible means, it remains the wood sector, because today we are in the process... so, we put in place programs for planting hedges [...]. So, we propose them management plans to know how to maintain them over time, and behind we also try to see how this wood resource could be used as energy. [...]. Moreover, I think... that there are points of vigilance to respect about the development of future renewable energies. I’m thinking about wind turbines in particular, which has the greatest impact on the landscape. And so, we could certainly make links between landscape areas that we would like to preserve even more and where we would go, may be, well areas to preserve from wind turbines too”³⁹ (Project manager energy and climate-CCT 2017).

Renewable energy integration is also highlighted by the TEPOS project leader: “I think anyway to be associated with it because we are working on a wind turbine and so mainly this project... well, of the landscape impact of the projects. So, yes, I will follow what will be decided, what will be said in relation to the PLUi, etc. the SCoT”⁴⁰ (Cit’ergie and TEPOS project manager-CCT 2018). The same interest is voiced by the elected members in charge of the energy transition at the CC, highlighting how the *plan de paysage* could “express the feelings of the population, the need of the community concerning the development of renewable energy”⁴¹ (mayor, VP energy transition-CCT 2017).

A renewable energy developer working in the territory sees an equally possible impact on their

38 “Donc, non après, j’pense que toutes les actions, enfin toutes ces actions-là – peut-être un peu moins les entreprises –, mais en tout cas agriculteurs et filière bois, ça touche forcément au paysage, donc... À voir ce que, derrière, ils vont me dire dans le programme d’actions, mais je pense que... En tout cas sur le bois énergie, il y a une partie où... Pas que l’bois énergie, sur le bois de manière générale, pour avoir un côté biodiversité ou quoi, là y a matière à travailler”

39 “Pour moi, le plus concret, ça reste la filière bois, parce qu’aujourd’hui on est en train de... donc, on a remis en place un programme de plantation de haies [...]. Donc, on leur propose des plans de gestion pour savoir comment les entretenir dans le temps, et derrière on essaie aussi de voir comment cette ressource bois peut être utilisée comme énergie. [...]. Après, je pense que... il y a des points de vigilance à avoir sur le développement des futures énergies renouvelables. Je pense à l’éolien notamment, qui a le plus grand impact sur les paysages. Et donc, on pourrait certainement faire des liens entre des zones de paysages qu’on voudrait encore plus préserver, et où on irait sur, peut-être, ben, des zones à préserver de l’éolien aussi”.

40 “Je pense quand même être associé du fait que on travaille sur l’éolien et du coup surtout ce projet de... ben, de l’impact paysager des projets. Donc, oui je vais suivre ce qui va se décider, c’qui va se dire en lien avec le PLUi, etc. le SCoT”

41 “exprimer le ressenti de la population, les besoins de la collectivité sur le développement des énergies renouvelables”

future projects: “So, for me, this *plan de paysage* is to be driven in parallel with, their wish to define where wind turbines or solar projects will be on the territory. So we, if we will develop other projects on the territory... well I think we will be affected”⁴² (wind turbine project manager, WP-CCT 2018).

From the interviews emerges that the landscape RE technologies integration and the hedges implementation for wood-energy sector are the most expected topics associated with the *plan de paysage*. The importance given to the wood –energy sector connects with the strong presence of the characteristic *bocage* system in the south and in the west of the CC and the primary rural characteristic of the territory where agriculture dominates. From the chamber of agriculture, a representative participates in several meetings, and saw the possible connection between their actions and the *plan de paysage* even if it remains on a general level. Using the interviews words:

*“I hope, yes, that the Agriculture Chamber will be able, from this work, to propose actions... You see, for example, in our workshop, we talked a lot about partnership with farmers, and it’s true that the Agriculture chamber could be a proposal force on this”*⁴³ (Project manager local development of agriculture chamber Deux-Sevres-CCT 2018).

And some farmers elected at the chamber of agriculture participated in some *plan de paysage* steps, one of them affirming that “I found it interesting to have a global vision, to look at things in a global way, to say afterwards: well, in our actions what to do and what not to do. And at the limit, it was a basis ...for me it is the basis of work”⁴⁴(farmer bocage-wood-energy boiler-CCT 2018); but at the same time, she highlights the feeling of a gap between possible action and the impact on the farmers that could implement it: “But afterwards, when we talk about the dry valleys, of alluvial valleys, of things, we have to improve them... yes, yes we have to valorize them, but that are the farmers that will have to do the work. Maybe for nothing, moreover. Yeah well. It’s that too much, we also have to find compromises”⁴⁵ (farmer bocage-wood-energy boiler-CCT 2018).

Indeed, to indicate and be able to mobilize the right actors is one of the barriers in the application of the actions detailed in the *plan de paysage*. So in order to convince people to implement these actions, they need to bring an wider understanding of their spill-over and/or added values. For example, for the farmers the management of *bocage* or cultivation for wood for energy could add the value of an additional income.

On the contrary the person interviewed from the ADEME, which accompanies and supports the RE projects promoters in the CC Thouarsais, be they private companies or local institutions did

42 “Et donc, pour moi, ce Plan de paysage est aussi un peu à mettre en parallèle avec ben leur souhait de définir où seront les projets éoliens ou solaires sur leur territoire. Donc nous si on développera d’autres projets sur le territoire... enfin je pense on sera concerné”

43 “j’espère, oui, que la Chambre d’agriculture va pouvoir, à partir de ce travail, proposer des actions... Tu vois, par exemple, dans notre atelier, on a beaucoup parlé de partenariat avec les agriculteurs, et c’est vrai que la Chambre d’agriculture pourrait être force de propositions là-dessus”.

44 “Moi, j’ai trouvé intéressant d’avoir une vision globale, regarder les choses de façon globale, pour après dire : ben voilà, dans nos actions qu’est-ce qu’il faut faire, qu’est-ce qu’il ne faut pas faire. Et, à la limite, c’était la base du... Pour moi, c’est la base du travail”

45 “Mais après, quand on parle de vallée sèche, de vallée d’alluvions, de machin, faut les mettre en valeur... Oui oui, faut les mettre en valeur, mais il faut que ce soit les agriculteurs qui fassent le boulot, quoi. Peut-être pour rien d’ailleurs. Hein, bon, voilà. C’est ça aussi qu’il faut arriver à trouver aussi des compromis”

not acknowledge the plan development. Moreover, he saw few connections with it, considering it a subject unrelated to the actions he was leading: “Finally, it is an interesting topic, this is not the issue, but beyond we have to be able to focus on the topic that concerns us more directly. It’s true that it is possible to have some connection with the *plan de paysage*, but it remains quite light”⁴⁶ (ADEME territorial referent Deux Sevres - CCT 2018). The interviewee is not the only person of ADEME collaborating on the energy strategy of the CC Thouarsais, so maybe other people of another ADEME pole were aware of the *plan de paysage*. However, this interview has been chosen after suggestions by the energy and urbanism technical service of the CC Thouarsais, as a person with whom with the CC has worked at length so some connections could be expected. In any case, his absence of knowledge about the *plan de paysage* content was surprising.

All the people we interviewed were familiar with the *plan de paysage*, except for the people from the ADEME. This probably depends on the snowballing techniques of asking technical services for other possible interviewees, etc. but for the goals of this research it is important because we were able to question them about their interest and possible connection that they see with the work they are leading. Perhaps some interviewee knows little about the *plan de paysage*, because at the time of inquiry the document was not finalized yet, so maybe its diffusion could happen over time. As it was pointed out for the CC Monts du Lyonnais case, interviews of the agents involved in the energy transition process were not exhaustive. However, they constitute a good sample covering the CC technical service for energy transition and climate change as well as other key external people linked to the specific energy transition project of the territory, highlighted in the TEPOS goals.

Considering the *plan de paysage* document, no one during the interview drew attention to a real connection with actions for energy saving, such as building energy retrofitting. Nevertheless, we found two actions in the primary landscape objectives (see above), probably explained because RE technologies actions were introduced in the OAP. Indeed, these interviews were led in parallel to the *plan de paysage* development and the OAP as well, so the choice of not including specific energy action plans in the *plan de paysage* was not known, yet. So this could partially explain the apparent mismatch between the expectations and the results.

However, in the finalized landscape objectives we also found the wood energy sector development, an issue very much underscored during these interviews, which is directly connected to the *bocage* landscape preservation. This aspect is based in the agricultural sector and prevailing agricultural land uses in the territory.

Surely the fact that these actions will not be detailed in the *plan de paysage*’s action plan does not mean that they will not be implemented. Including them in the *plan de paysage* could only add some vigilance point or suggestion.

46 “Enfin, c’est des sujets intéressants, ce n’est pas le souci, mais après il faut que nous on arrive à se concentrer sur les thématiques qui nous concernent plus directement. C’est vrai que sur le Plan de paysage, il peut y avoir quelques liens, mais ça reste assez léger quand même, quoi”

Summing up

For the CC Thouarsais in some way we observe a mismatch between the energy transition focused initial commission and the final document, considering that no energy action plan will be elaborated in the final document of *plan de paysage*. This could be due to the parallel development of a specific wind turbine energy OAP. The OAP takes on the wind turbine landscape integration in the territory that seemed to be one of the biggest concerns of local institutions contemplating the high number of planned installations. In the end, the RE production technologies topic from a landscape perspective is treated, but in another document. The act of developing a landscape and a energy OAP, is, however, a “brave” choice of the CC Thoursais, because of their regulatory nature, compared to the *plan de paysage*.

The commission and content mismatch could also be due to the decision by elected representatives of addressing other subjects perceived as more important. Indeed, several other concerns, beyond energy transition, raised during the analysis, the field visit, the workshops, etc. it was the case for water management. Indeed the participatory and collective process through which the *plan de paysage* was elaborated could lead to this kind of situation. And according to the landscape architect and the PAP collective one of the goals of the *plan de paysage* was to create awareness about issues that were not necessarily understood nor addressed. Indeed, this very same process brought energy transition subjects to be integrated into the *plan de paysage* of the CC Monts du Lyonnais.

At the same time the decision to not include energy focused action plans, considering the initial commission is also revealing: the more problematic point of view on energy transition from a landscape perspective remains the implementation of RE production facilities, while energy savings are not perceived as priorities to be included in the *plan de paysage*.

6.3 Goeree-Overflakkee – starting from wind turbines development

In previous sub-chapters we described and discussed two French embedded cases, that even if they have differences also have similarities, according to the same national framework. In this part the inquiry continues in the Netherlands, that put the French approach into perspective. From the spatial landscape aspect in Goeree-Overflakkee case, the process described in chapter 5, was combined by the commission on landscape analysis and spatial scenarios for the island, supporting and guiding the energy transition choices on different steps. Spatial impacts and landscape characteristic were taken into account, or at least have been explored, during different steps of the energy transition process. This is true both at the municipal and the provincial level. We are going to explore them in a more detailed manner.

“Landschapsontwikkelingsplan”

A “Landschapsontwikkelingsplan” [Landscape development plan] (LOP) was developed in 2003 on the whole island, which at that time was still subdivided in 4 municipalities, containing a very deep analysis of island spatial structures and explaining landscape evolution through its polder history. However, if some images in the document represent wind turbines, no reference to them and nor possible principles for their implantation are present in the text, neither in connection with other RES facilities or energy-saving measures. The action program included focused on the preservation and valorization of natural and historical elements, mainly for tourism and recreational goals. Indeed, in 2003 there were only a few wind turbine parks functioning in the municipality (see table X, chapter 5), and the energy transition was not on the top of the list in the agenda of local institutions, therefore not leading to consideration about energy transition as an issue for future development. During the interviews, only a few of the municipal technical services knew about the LOP, and they did not associate it with the ongoing energy transition process. Since the engagement of local institutions in the energy transition process no further LOP has been developed. However, the very deep landscape analysis of Goeree-Overflakkee contained in the document has been since used as a basis for the following landscape reports that are quoted and made reference to this first study.

6.3.1 The first landscape energy transition development: student assignment

A first insight on the subject of energy landscape for the island was explored in 2011 through works developed by students of the master studio “Designing and Planning Sustainable Energy Islands Atelier” coming from landscape architecture, spatial planning and cultural geography disciplines at Wageningen University. This collaboration between the municipalities of Goeree-Overflakkee and the university was financially supported by the project “Beleef het op Goeree-Overflakkee, duurzaam recreëren in een energielandschap” [Experience it on Goeree-

Overflakkee, sustainable recreation in an energy landscape] part of the national program “Mooi Nederland” [Beautiful Netherlands]. The project aimed to explore landscape pathway in order to combine tourism and recreation on the island with the development of renewable energy. They designed an energy conscious landscape while considering ecology, recreational, historical aspects of the island. According to the policy adviser on environment and sustainability, on that occasion “we tried to think of an energy landscape as a whole, not only wind turbines, etc. but the whole island system” (sustainability policy adviser-GO 2017). The projects developed by the students raised awareness on landscape issues and increase the interest to explore them: “we were aware of the landscape importance for energy transition, but this work showed us how far this connection could go and would be useful for the island” (since 2017 account manager of energy transition in Stedin, before Program manager for sustainability and innovation GO 2017)

6.3.2 Landscape scenarios for an energy neutral Goeree-Overflakkee

Almost immediately after this first exploration, in 2012 ISGO commissioned the Dutch landscape architecture firm HNS to develop several spatial strategies that were able to communicate the meaning of the island’s ambition that they were formulating in the “Energienutraal Goeree-Overflakkee 2030” report, in terms of landscape.

This resulted in the report “Goeree-Overflakkee. Duurzame energie in het landschap” [Goeree-Overflakkee. Sustainable energy in the landscape] (2012), that focused on renewable energy production infrastructure, that combined a mix of wind, photovoltaic, biomass, geothermal and tidal energy, in order to supply to the electrical energy requirements that were estimated at about 533 GWh. The report starts from this energy estimation, sharing it among different RE facilities and spatially situating them across the island.

“We gave them an assignment to translate the energy neutral 2030 discussion into landscape. What kind of landscape is going to work out? Which are the best places to work with wind turbines. Do you want to make one dense new landscape or you want try to put them everywhere a little bit and have more open spaces. What is the combination between wind and solar? All these kind of questions” (since 2017 account manager of energy transition in Stedin, before Program manager for sustainability and innovation GO 2017).

The report develops first an analysis of the island and its landscape structures and qualities, combined with the survey with the local inhabitants, and a working session with them. On that basis the landscape architects developed four very different design principles: opportunistic, pragmatic, monumental, and narrative which combine energy production in different manners more or less concentrated and spatially developed, led mainly by initiatives or spatial characteristics (figure 8 and 9).

The opportunistic principles combine a high energy production sprawl through the island with a low spatial control, in which everybody could develop single energy initiatives, possibly leading to the dangerous result of a “wild growth” (Goeree-Overflakkee. *Duurzame energie in het landschap* 2012, p. 40) of small projects. This pragmatic scenario is based on the thinking of practical/ useful placements for energy projects, based on different criteria according to the different kinds of sources. For instance, this could be to build a photovoltaic park near urban areas or expand an existing wind turbine park.

The monumental vision is characterized by a high-energy production concentration in one large spot of the island, and a highly spatial control that could develop a strong impact “energy landscape” leaving “free” the remaining areas of the island. The last vision named “narrative” follows the logic of telling a story according to the difference between places, for example highlighting more windy places, or biomass production to accentuate the old ring polder. These organizing principles or visions were used as a basis for discussion with the inhabitants and agents, and pushed them to reflect on “How they want to develop renewable energy in relation to spatial quality, the quality of the landscape” (HNS landscape architect 2017). Moreover, as stressed by the landscape architect himself these were indicative principles:

“we acknowledged that it is not... very good... or really suitable to keep one principle and stay stuck to it for every energy source, because different energy productions from different sources could fit better in one or the other of these principles. But these principles started the discussion and made them think about it...” (HNS landscape architect 2017).

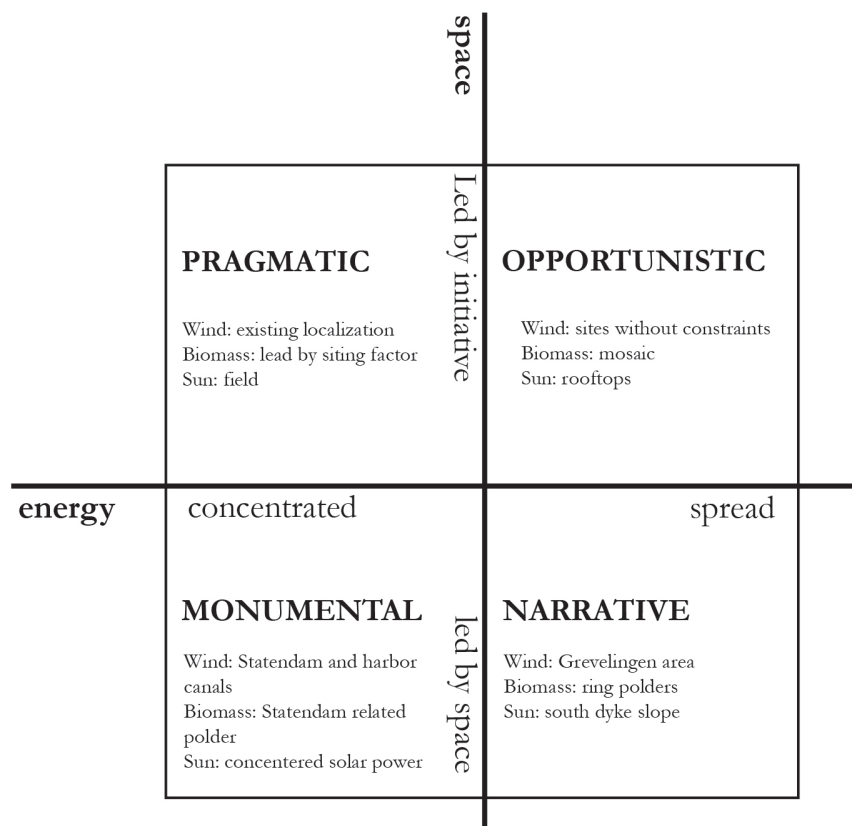


Figure 8. Schema of the 4 design principles combining energy and space. Source: HNS Landschapsarchitecten. 2012. Goeree-Overflakkee. *Duurzame energie in het landschap*, p. 39. Schema translated by the author.

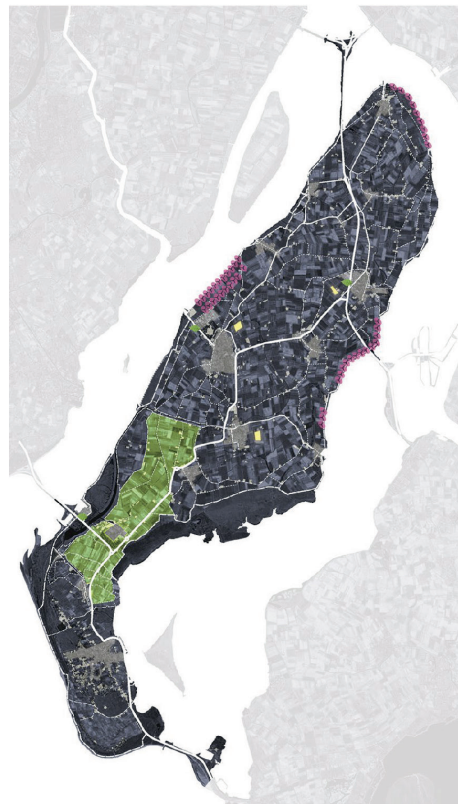
OPPORTUNISTIC



NARRATIVE



PRAGMATIC



MONUMENTAL



Figure 9 (left page). The four scenarios associated with the four designing principles combining energy and space. Source: HNS Landschapsarchitecten. 2012. Goeree-Overflakkee. Duurzame energie in het landschap, p. 40, 41, 42, 43. Legend translated by the author.

OPPORTUNISTIC



NARRATIVE



PRAGMATIC



MONUMENTAL



Figure 10, Images representing the four scenarios associated with the four designing principles combining energy and space. Source: HNS Landschapsarchitecten. 2012. Goeree-Overflakkee. Duurzame energie in het landschap, p. 40, 41, 42, 43.

It is interesting to notice that in the schema (figure 8) about the different scenarios, the word used is “space”, “ruimte” in Dutch, not landscape. Whereas the scheme that summarizes the four designing principles combining energy and space and the details of the four scenarios is in a chapter named “Thinking about sustainable energy production in the landscape” [Denkrichtingen over duurzame energieopwekking in het landschap]. So landscape remains the main goal, but an affirmed difference seems to exist between space and landscape. “Space” makes reference/is connected to choices made on a two-dimension surface plane that is behind landscape and results in a potentially very different three dimensional landscape. Indeed, we find again the word landscape in some perspective representations, for each scenario. Their goal is a better three dimensional understanding of the perception that these scenarios create in the landscape (figure 10). This is a distinction that we do not find in the French cases, where the reference was always to landscape. For sure these differences also come from the two different languages, but it seems important to be clarified. Also even if the perspectives are different they are not easily associated with one of these designing principles.

Energy-saving is not mentioned in the report, because there was a precise commission by ISGO of focusing on RE production, where wind turbine energy production was the principal concern at the time, because of national and provincial goals. However, in connection with RE production and the four design principles, it seems to lack arguments and representations, likewise in the maps, about the electricity network. Indeed, each scenario, considering the very different spatial distribution of the RE technologies that it implies, results in a very different and more or less extended electric network. For example the “opportunistic” scenario could lead to some problems with regard to the associate network, because of the high dispersion of RE technologies on the island, if there is the need to connect them to the national grid. In the map, the RE technologies seem to be independent from one another with no connection.

However the goal of this study seemed to be reached, to be “used for us [local institutions] to design and think of the best ways of thinking about sustainable energy in the landscape, so it was more in that... like inspiration, not compulsory”, trying to think “how we can made meaningful landscapes and not industrial areas” (since 2017 account manager of energy transition in Stedin, before Program manager for sustainability and innovation GO 2017).

Interestingly the landscape architect working on this first energy case focused report highlights on how he felt the lack of a commission asking to include a more global perspective on energy transition issues, widened from the only energy production:

“They just wanted to have a scan of the possibilities of generating renewable energy, wind energy, solar energy, bioenergy etc. so this was the first thing we did for them, for the whole island and for all the different kinds of energy production. Focusing on production by the way, not necessarily focusing on transportation or saving or storage of energy that for us are equally important, but that was the commission...” (HNS landscape architect 2017).

This shows that from his point of view, based on practice, several aspects of the energy transition could be addressed through landscape designing, but at the beginning of the process the local institutions were not still interested in the subject.

6.3.3 The Provincial landscape and energy scenario

The spatial landscape investigation about the energy transition process was explored also on provincial scale. The province of Zuid Holland set up a “onderzoeksagenda Ruimte en Energie” [research agenda for space and energy] and in 2013 published the report, “Zuid-Holland op St(r)oom! Ruimte voor de energietransitie” [Zuid-Holland on power! Space for the energy transition]. This document explored at provincial level the energy-space subject in order to achieve a better understanding of the topic to be integrated in the *structuurvisie*. Several Dutch design and planning offices, in architecture, spatial planning and landscape architecture, contributed to the research, working each on one specific area in the province.

The province has been divided in four different areas each one similar in terms of characteristics: external areas, urban areas, a green harbor, a main harbor.

As it can be seen in figure 11, these areas try to retrace the main characteristics of the Zuid-Holland, making a distinction between more rural and less densely populated areas and the urban high density of the cities of Rotterdam, the Hague, Delft, Leiden and the harbor characterized mainly by industries and stock and logistics areas. The subdivision is quite evident, it is sufficient to compare with an aerial photograph to understand the logic, the different characteristics that guided the choices that are not really explained. What is evident is that there is a very general subdivision that, does not seem to take into account specific local and landscape characteristics. For example, the island of Goeree-Overflakkee is mainly agricultural with lower population densities, but its polder characteristic differentiates it strongly from the other green areas identified on the map, located in the province hinterland. In any case, the subdivision is a general attempt to spatialize and think of different energy strategies according to the general different characteristics of the places.

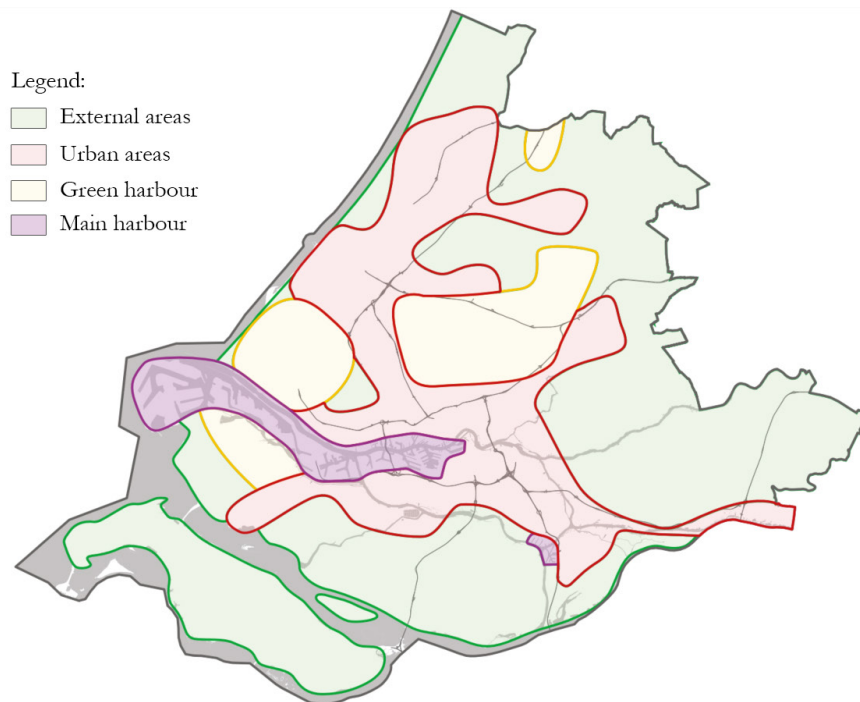


Figure 11. Map of the four areas associated with four energy perspectives. Source: Province Zuid-Holland (2013), Zuid-Holland op St(r)oom! Ruimte voor de energietransitie, p.23. Legend translated by the author.

Goeree-Overflakkee is grouped in the “exterior areas”, which recognizably cover 58% of the province surface, but consume only 0,04 % of the energy, for which different actions are proposed. For the island, the primary energy action is the RE production from wind turbines, combined with the development of a smart grid in order to connect the villages on the island and supply energy for nearby urban areas that lack enough space to implement RE production. It seems that the most valuable characteristic of the island is its broad surface with a low population density, which has great potential for RE implementation, compared to the dense urban center, where heat network for energy cascading and synergies seems to be most appropriate.

This question of the contraposition between rural and urban areas is a delicate one but raises subjects about energy transition that could lead to a vision of rural areas as maintainer of urban ones. This report takes the whole province area and energy actions for both into consideration and tries to overcome this problem.

In the report however, once stated that exterior areas have a lot of available surface for RE production, is mentioned how “the change of Zuid-Holland landscape is a very sensitive topic and it raises resistance from practically everyone, so projects need to be sought that create multiple values”⁴⁷ (*Zuid-Holland op St(r)oom!* 2012, p. 26). The report promotes energy projects that accompany the induced landscape changes with added value, creating symbiosis with the environment and creating local economic benefits in order to establish support from the local population for their implementation.

For Goeree-Overflakkee, indicated as a major location for wind energy production, the added value proffered came from the possibility of local financing and local use for the produced RE in order to lower energy bills. This was believed to encourage local inhabitants to accept it. In this way “wind energy when it is associated with a local population and common vision can lead to a new landscape quality”⁴⁸ (*Zuid-Holland op St(r)oom!* 2012, p. 77).

However, landscape analysis, designing landscape principles and spatial scenarios are not developed in this report for Goeree-Overflakkee, it remains more on a general suggestion level where the only wind energy production is discussed. No further investigations about other energy strategies were considered or explored.

6.3.4 Landscape perspective for a renewable energy exporter Goeree-Overflakkee

Another key document inquiring about space and landscape was realized when the municipality committed to supply surplus energy in 2030. It is the first municipality in the Netherlands to establish this objective, so that the *Ministerie van Infrastructuur en Milieu*, the province of Zuid-Holland and the Goeree-Overflakkee municipality commissioned an architecture and urban planning firm, studio MarcoVermeulen, to explore from a spatial perspective these new energy objectives for the island, in which the municipality is a forerunner. This new ambition, still

47 “Zuid-Hollandse landschap is echter een zeer gevoelig thema en roept bij praktisch iedereen weerstand op, daarom moet er gezocht worden naar projecten die meervoudige waarde creëren.”

48 “Windenergie zou dan zelfs kunnen leiden tot een nieuwe landschappelijke kwaliteit wanneer er gezamenlijk met omwonenden wordt gewerkt aan een gedragen visie”

ongoing, raises several new questions:

“We are the first one to experiment, what is the next step. What if you really want to go off the grids, what is going to happen? When everything is achieved, you may make more energy than is used on the island, but what are you going to do with the surplus. It just goes in the net? do you keep it here? We have big cables all connectors... what happens if you say well we are on our own. Is that good for the island, is that bad for the island? Is it good for the island and bad for the Netherlands? How you position yourself? But nobody knows the answers. So this is our first exercise, what is next?” (Policy adviser spatial development-GO 2017).

This inquiry results in the report, “Energieproducerend Goeree-Overflakkee. Scenario’s voor de verduurzaming van de energievoorziening tot 2030” [Energy producing Goeree-Overflakkee. Scenarios for making the energy supply more sustainable until 2030] published in 2017. It proposes three different scenarios, focusing on primary energy consumption through the lens of the *trias energetica* (1) reduce energy use, (2) use residual flows, (3) use renewable sources. These principles are combined giving more or less emphasis to one or the other in different visions. Moreover, even if the study was led by the design studio Marco Vermeulen, a collaboration has been developed with BLOC, a creative development agency that supports in the developing concepts turning them into business, and TNO (Netherlands Organisation for Applied Scientific Research).

From the province’s perspective, this further step needs to be examined carefully from the spatial point of view over Goeree-Overflakkee for, stressing the problem of energy transport:

“They have enough electrical power, sun and wind, but they don’t have geothermal assets, and they are an island, so whatever they need to transport from the island to the mainland or vice-versa, they really need thick cables. So the question is what to do with the extra electric energy, how to... what solutions we have for our heating problems? and can we make a new... do we have a new perspective for the island. And we made three scenarios and they are built on the heating criteria. Because that was the question that was mostly important for Goeree to solve” (project leader space energie-PZH 2017).

The first scenario “all-electric” (Figure 12), as the title suggests, wants to separate all the buildings of the island from the gas network for 2030, in order to do that the way heat is supplied must be changed and based on individual heat pumps. This needs to be combined with energy retrofitting for all the building stock, both residential houses, services facilities and industrial buildings, all need to be labelled A+, to implement energy saving measures, and to be well insulated. However, combined with energy saving, the development of RE production is still underscored because heat pumps will increase energy demands. The action to undertake is to replace outdated wind turbines with one with better performance, to build new wind and photovoltaic parks, also those that combine energy production on a building level, such as photovoltaic panels and solar heating on the roof. Moreover, when considering the expansion of RE on the island and the request to direct the surplus of produced electricity to the rest of the country, the expansion and improvement of the electrical grid becomes pivotal too. The mobility question is treated with the aim in the scenario to switch to 45% of all vehicles to electric, with the additional objective to store electricity.

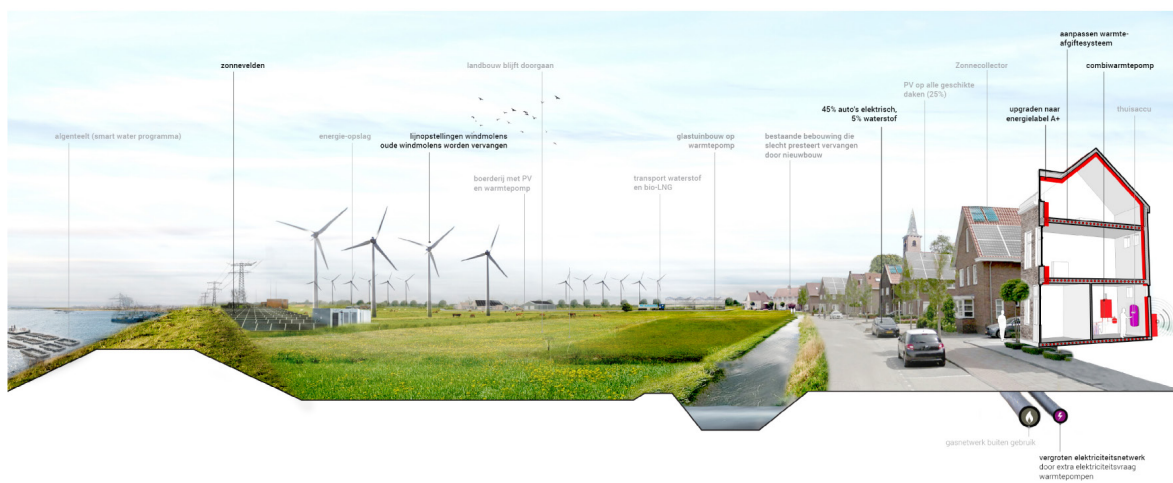
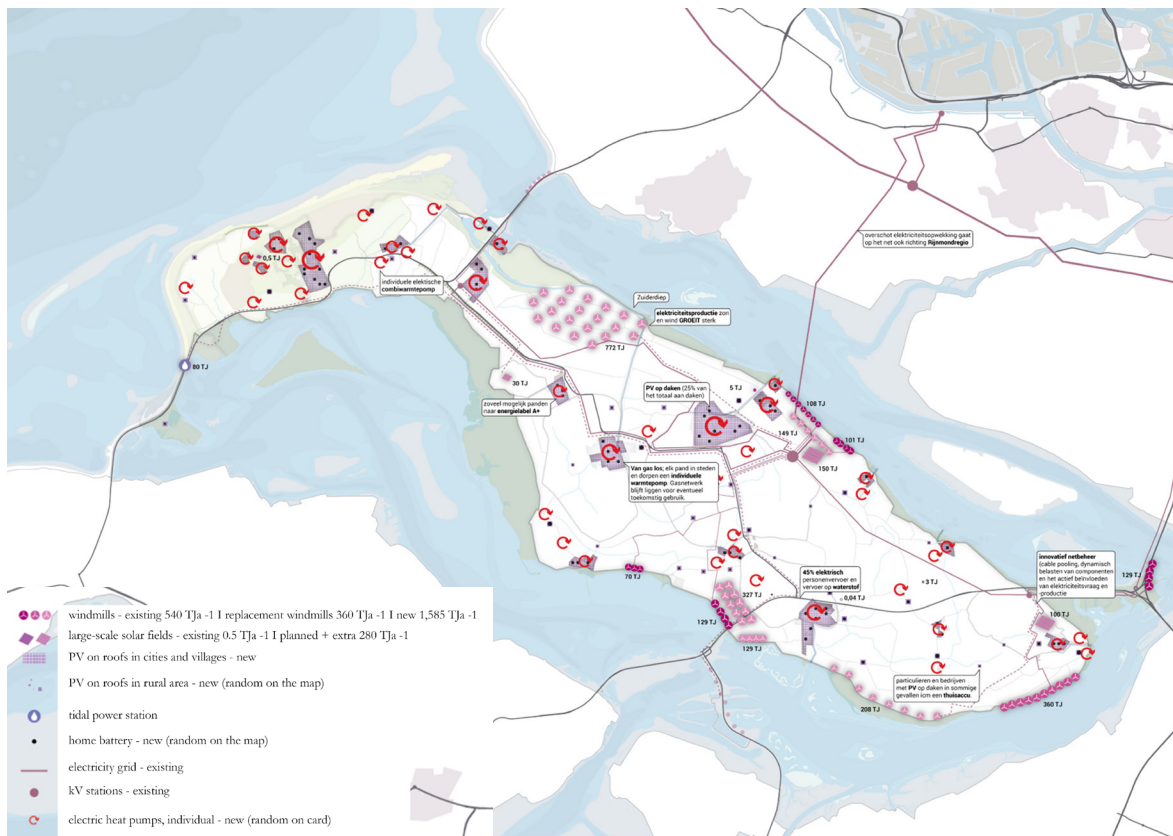


Figure 12. First scenario “all-electric” Goeree-Overflakkee map and perspective rendering. Source: Energieproducerend Goeree-Overflakkee. Scenario’s voor de verduurzaming van de energievoorziening tot 2030., p. 50-51, 52-53. Legend of the map translated by the author.

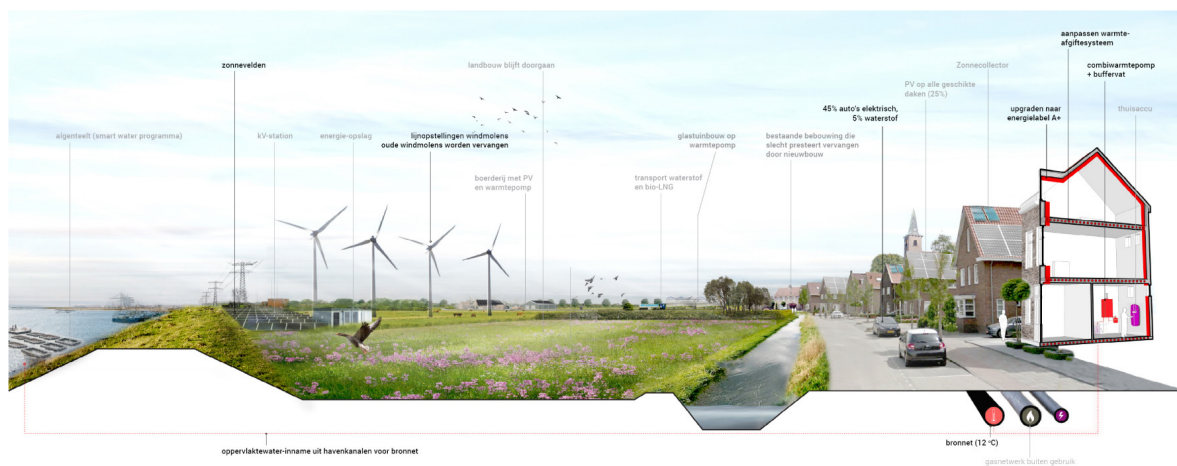
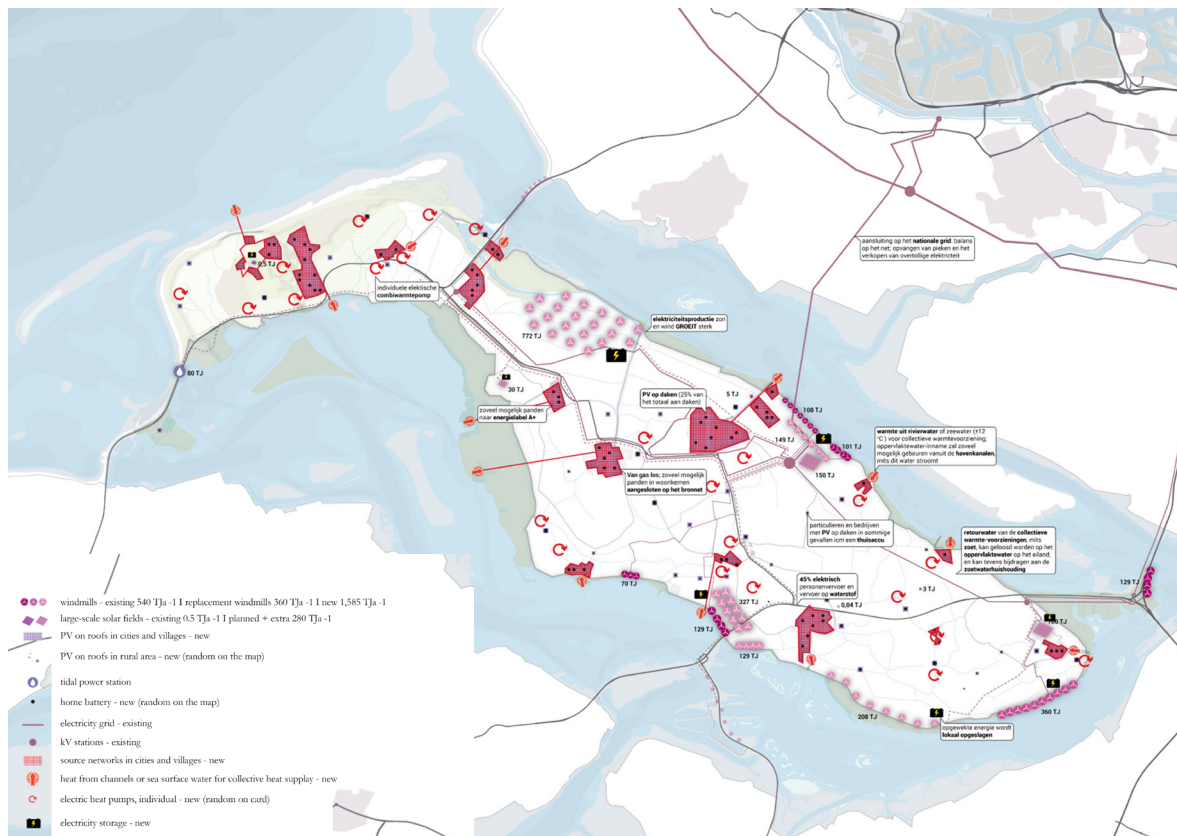


Figure 13. Second scenario “collective heat”, Goeree-Overflakkee, map and perspective rendering. Source: Energieproducerend Goeree-Overflakkee. Scenario’s voor de verduurzaming van de energievoorziening tot 2030. 2017., p. 62-63, 64-65. Legend of the map translated by the author.

The second scenario is named “collective heat” (figure 13), and it hybridize electricity sources and heat production. Also in this case there is the intention to detach all buildings from the natural gas network, to develop energy-saving measures and building insulation in the same way as in the precedent scenario. However, to produce heat energy this variant wants to employ the potential created by the water surrounding the municipality. The idea is to implement collective heat pumps that extract heat from the surface water.

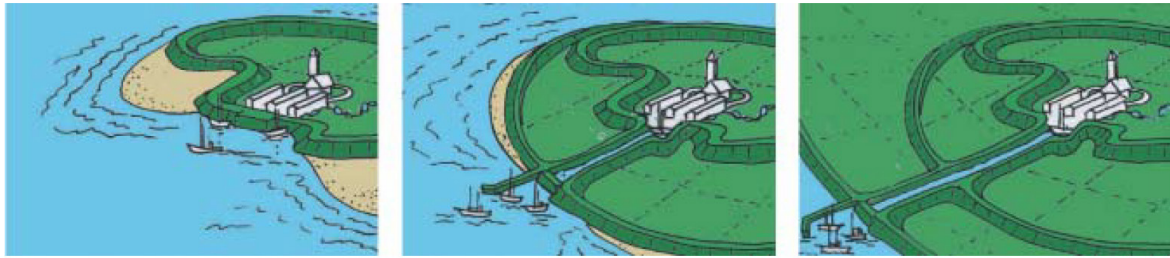


Figure 14. The construction of the harbor channels on Goeree-Overflakkee. Source: LandschapsOntwikkelingsPlan Goeree-Overflakkee. 2003. p.23.

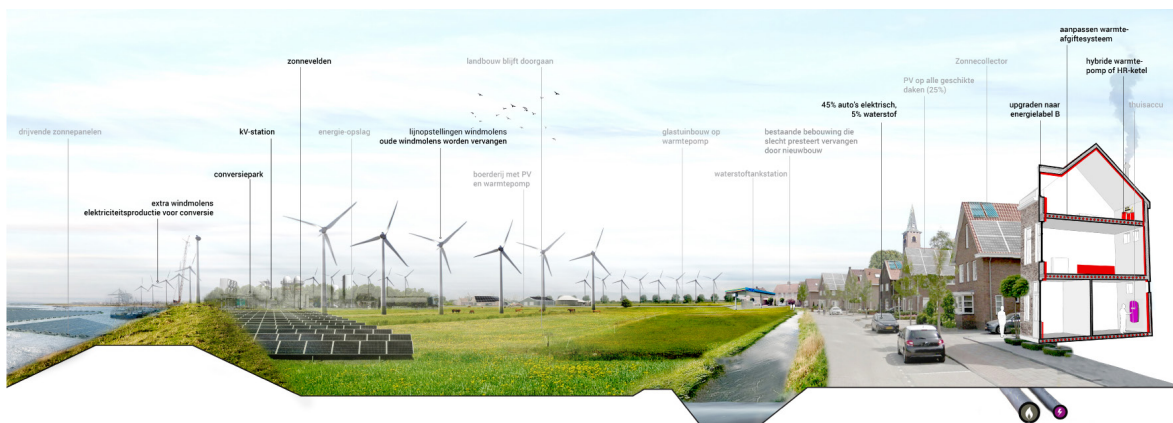
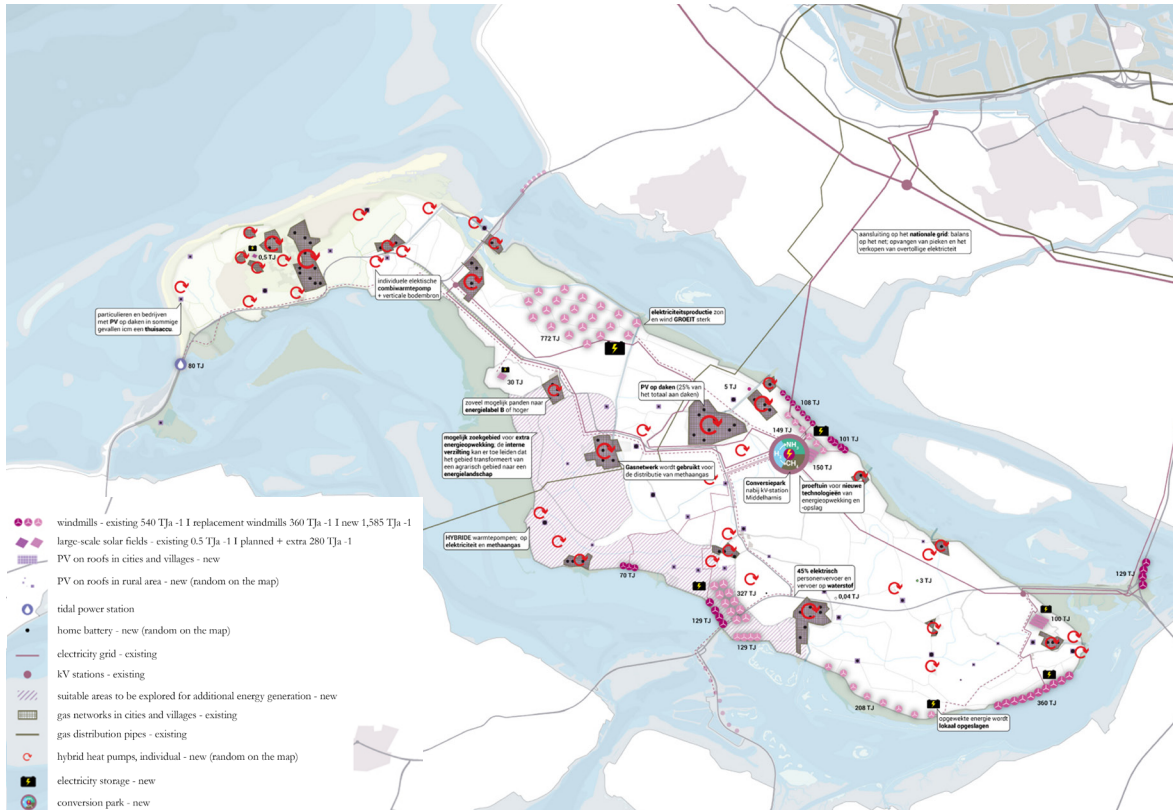


Figure 15. Third scenario “conversion” Goeree-Overflakkee map and perspective rendering. Source: Energieproducerend Goeree-Overflakkee. Scenario’s voor de verduurzaming van de energievoorziening tot 2030. 2017. p. 74-75, 76-77. Legend of the map translated by the author.

Particularly the idea consists in applying the historic harbor channels created in order to retain the connection between the villages with the sea. Historically villages had direct access to the sea, but through the polder construction around them they were progressively moved away from the sea, so in order to maintain a connection with the harbor, water channels were dug and maintained. These harbor channels now have mainly disappeared or in any case they have lost their original function (figure 14).

This scenario, focuses not only on electricity and thanks to the use of individual heat pumps, it includes extra RE production through individual projects such as wind turbine or photovoltaic parks, but less so compared to the first scenario. In this second scenario, the need to improve the energy grid for electricity is highlighted but likewise the need to add a new underground network to transport heated water provided by the collective water-water heat pump.

Finally, the scenario three “conversion” (figure 15) develops a hybrid energy system based on electricity and methane gas that want to enable Goeree-Overflakkee to be known as an innovative and experimental island, that focuses on new technologies and to be taken for an example at international level. The energy production from renewable sources is encouraged and developed through large-scale wind or photovoltaic parks and, at an individual building scale, through photovoltaic panels on roofs, and combines it with the substitution of outdated equipment.

Surplus electricity production is converted into methane gas, hydrogen, methanol, ammonia and formic acid, in a dedicated conversion park situated on the island. This solution is considered appropriate to store energy by the conversion of these substances. They could be exported and used in the nearby industrial Rijnmond (Rotterdam region) or in other industrial areas in the Netherlands.

The methane gas, dispatched using the existing gas network, is used for house heating, alternating with hybrids heat pumps that function both on electricity and methane. The energy transport grid is central to this vision too, needing improvements both at the scale of the island and in connection with other parts of the country.

In respect to mobility, this scenario projects that 45% of all vehicles become electric, but combines this ambition with the construction of hydrogen filling stations to develop a pilot project of hydrogen powered public transport.

Energy-saving measures for buildings are indicated but are less ambitious, compared to the other scenarios, they target buildings to have a label B, which requires less retrofitting modifications and efforts.

This document, such as that developed by HNS of 2011, starts from a quantitative energy portrait of the island and for each scenario provides a quantitative estimation of energy production and energy consumption reduction in order to understand the amount of energy that could be effectively exported.

These quantities are finally spatialized, through the development of a map of the municipality specifying the energy actions and their location. Moreover, photomontages are included, giving a three dimensional schematic vision of the action, that lead to a visual understanding of their possible repercussions, both for urban and agricultural areas, even if they are not site specific. Indeed, this report is developed through collaborations, made more broad than with designers only, it includes engineering expertise that supports technical aspects regarding energy.

Moreover it is not developed by a specialized landscape architecture firm but the Marco Vermeulen office which defines itself as a “design agency for architecture, urban design, landscape and design research”⁴⁹ through a collaboration with designers coming from a broader range of environmental disciplines. As in the HNS study, we found the term space was used for the placement and organization of energy actions on the territory of Goeree-Overflakkee, and the maps. While the word landscape appears in connection to the integration and visualization of these actions in photomontages or diagrams. However, both terms are used and the limits between them remains quite unclear.

Observing the action map of the second scenario (figure 13), we can see that it is abstract and geometrical, constituted by symbols and textures on a white layer, highlighting no connection with the geography of the municipality. Only the water areas are indicated in light blue. Energy management dominates the rest and even if this layer makes the locations of the actions explicit, it does not reveal the reason for the placement choices and whether there is some connection with territorial characteristics.

However well the first and the third scenarios are demonstrated and shown spatially, they seem less connected and inspired by island characteristics. It seems that the second scenario is the one most grounded on the territory, using the historical harbor channels, one of the peculiar landscape structure of the island, to produce heat, while assigning a new meaning to these structures through a tailor-made solution. It is not surprising that the landscape architect collaborating to the projects considers the second scenario as the most interesting “Because the channels are a bit lost nowadays. They don’t have... often they are closed, so they do not have a purpose anymore. They are not being taken into account in spatial concepts or urbanization concepts or something, so this concept is about trying to combine energy building and spatial quality into a new concept” (project leader space energie-PZH 2017) and at the same time she remarks about the third scenario that “the prospective for the international level it’s not really Goree implemented It’s not really landing into the landscape yet. So we need to do a lot more design there” (project leader space energie-PZH 2017).

These scenarios develop a more global vision of energy transition for the island, compared to the previous reports, taking into account energy production, energy saving also for building retrofitting, and mobility. Moreover, the topic of energy efficiency is also addressed through the will to change outdated wind turbines with more performant ones. Besides in the previous landscape reports the topic of infrastructure for energy transport, such as the high voltage lines for electricity was not addressed in the text, nor represented in the maps, nor in 3d renderings. Instead, this energy network subject is recognized in this last report by representing it both in the maps and in the perspective drawings according to the differences in the energy actions proposed by scenario. For example for the first and second scenarios, where the idea is to produce and export electricity, it could be seen high voltage lines represented in figure 12 and 13 (on the left), while in the third scenario, based on the idea of generating hydrogen from surplus electricity and RE sources, these lines are not represented (see figure 14). Moreover, as seen from all these renderings (figure 12-13-14) the idea to place the different pipes for transport of gas or other underground is represented. So in the energy transition context, the infrastructure

49 <https://marcovermeulen.eu/office/2/studio/>

needed to transport energy is now addressed as a challenge for the years to come, because of the wider distribution of RE technologies in territories see (e.g. Friedl, Reichl 2016). This for Goeree-Overflakkee municipality is particularly connected with the aims of local institutions to export energy that brought up the spatial concerns for energy transportation.

Moreover, this report addresses more the question of mobility, since on an island where there is no train and people's primary method of transit is the car, remains a big issue.

In this report we see a more global vision of the island conveyed, considering both agricultural "free" land for renewable energy production and urban areas, analyzing potential for each and establishing synergies between them. There is an improvement on the way energy transition issues are dealt with compared to the first study. For sure, this evolution cannot be attributed only to the designers, but also to local institutions that are extending their knowledge and ambition to create a more global energy transition process. However, designers follow local institution closely in these new aims that lead to a more complex design process, where many more subjects and variables have to be integrated.

6.3.5 The ongoing "Regionale Energie Strategieën"

This last report and the three developed scenarios are used as a basis "in the framework of the Dutch "nationaal klimaatakkoord" [national climate agreement] of 2018, for the elaboration of the "Regionale Energie Strategieën" [regional energy strategy] that is now under development. The primary ambition that the municipality of Goeree-Overflakkee wants to reach in this program, is to supply RE for 2030. However in its definition the *Regionale Energie Strategieën*, supporting the development of energy goals is recognized as an important instrument for "spatial organization" and how the "provinces and municipalities are strongly committed to make the *Regionale Energie Strategieën* (in a qualitative and quantitative manner) spatially possible"⁵⁰ (*Klimaatakkoord* 2019, p. 214) (see chapter 4 for more information). So from a spatial point of view, it is among the important subjects to explore to plan well and implement the energy strategy. The local institutions of Goeree-Overflakkee seem to have been mostly interested in the third scenario developed in the "Energieproducerend Goeree-Overflakkee", seen as exploratory input for the *Regionale Energie Strategieën*'s elaboration. The municipality signed an agreement covenant with the national and provincial level in order to launch the experience for the production and exportation of green hydrogen thanks to the surplus RE production (*Convenant Groene Waterstofeconomie Zuid-Holland, proeftuin Energy Island Goeree-Overflakkee (H2G-O)* 2017). However, the process is still ongoing and the research period as detailed on its roadmap has not been not finalized yet.

50 "De provincies en gemeenten zetten zich nadrukkelijk in voor het (kwalitatief en kwantitatief) ruimtelijk mogelijk maken van de RES"

6.3.6 Landscape documents as a shared tool for the energy transition implementation?

Everyone interviewed about Goeree-Overflakkee knew about the landscape report developed by H+N+S and the reports developed by Marco Vermeulen firm, except the farmer that is less involved in the global energy transition process of the island itself even if contributing to with its biogas equipment.

However the last report, developed by Marco Vermeulen firm was still under development during the period of the interviews (2017) so the results and the scenarios were still unclear and not defined, so we could not deeply question people about it or inquire about its appropriation. Concerning the first report about “Goeree-Overflakkee. Sustainable energy in the landscape” (H+N+S) the person in charge of sustainable policy at the period of its development reminds how “It is really good, because is nice to have an ambition, but we have to try to envision what the ambition is going to be like” (since 2017 account manager of energy transition in Stedin, before Program manager for sustainability and innovation GO 2017) and how it has been a source of inspiration for wind turbines installation areas. This was reaffirmed by the current sustainability policy adviser that highlights how:

“there was a lot of debate in the beginning in whether you want to cluster windmills or whether you want to spread them out alongside infrastructure or alongside natural lines in the landscapes. So do you want a sort of ring around the island or do you want a cluster and another cluster. And that study helped us to understand our options” (sustainability policy adviser-GO 2017).

One elected representative also highlights how “the plan was used to understand new spatial perspectives, if you don’t think about that you could not be sure about the results that could be awful. And wind turbines are so visible and Goeree is so much flat!” (municipal councilor innovation and sustainability-GO 2017).

The island local wind energy cooperative Deltawind knows about the landscape report: “Yes. it has been taken into account, and to start they were looking to historical aspects, in the way that this island is originally... originally it was two spots of land in the sea and then they were built villages and around the villages they made dykes in which the ground was used for agriculture... and it was very nice they start from history, our history, for our future!”. Considered as a valuable support tools, “yes I really think that is useful, because there are so many aspects to take into account, and there are so many stakeholders with different beliefs, different in what they want, what they have as reasons. It helps to structure the thinking of all those parties. So that’s why I think that [this tool] is very useful.” (Director Cooperative Deltawind-GO 2017). Moreover she emphasizes how it has been part of the wind turbine siting decision on the island: “the local government used it to finalize their ideas about where they want the turbines to be built, then the *structuurvisie* [strategic planning document]” (Director Cooperative Deltawind-GO 2017). So the report indeed has a practical application:

“because after we made that project we also made a structural vision, or a more like appendix to what is the structural vision that they developed for the island, focusing on wind energy. So starting from the results of these previous study, we made a new study focusing on wind energy and in that study, we determined

where the location for wind energy should be in the future” (HINS landscape architect 2017).

Some limits to this study are also recognized “About some of the scenarios we said ‘this is going to be worked on and this is a really nice way to design landscape’, but at the same time, you are going to have the practical aspect that you are not the owner of all these areas, and you need people there to want to do something with energy in that area...” (since 2017 account manager of energy transition in Stedin, before Program manager for sustainability and innovation GO 2017).

So according to the interviews the report is perceived as useful, because it supports people to understand what a quantitative energy aim means in terms of landscape implementation, it supports making a decision. Indeed, its usefulness is demonstrated when it was taken into account for the installation for wind turbines on the island. Even if this report contains several RE technologies what the interviewees mainly stress and associate the report’s usefulness with is about wind turbines. This is not surprising in light of in the initial energy transition process of Goeree-Overflakkee focused on wind turbine implementation, because of the imposition from national and provincial level. The choice of sites for the wind turbines was the primary concern for local institutions, and more details about it in the planning instrument, and the use of this report are discussed in the chapter 7.

Interest and expectations were also expressed by agents for the most recent report “Energieproducerend Goeree-Overflakkee” (2017) as mentioned by the person in charge to advice about sustainability policy: “For sure we’ll look and use the report when it’s done. Now they are developing the *atelier energieruimte* [energy space workshop] so the decision are not made yet” (sustainability policy adviser-GO 2017).

These landscape studies and scenarios, developed in the province’s territories, among them Goeree-Overflakkee, are acknowledged and valued by the interviewees at a provincial level where the project manager for energy transition affirms:

“yeah, I know that they exist. You know... well we are responsible for telling local governance you can... you may, you are allowed to erect wind turbines here and they have to do it together with the local community or with developers. So... we allowed them the space to do it and they have to make sure the results come, so it is important to have landscape analysis, they have to be encouraged to maintain high quality landscape” (energy transition program manager-PZH 2017).

Knowledge is also shared by the landscape architect working at the Zuid-Holland province as “Projectleider energie en ruimte” [Project leader energy and space] who follows mainly the ongoing report about energy export. The introduction of this job position “Project leader energy and space” in the province of Zuid-Holland, since 2016 is quite revealing about the importance given to the energy transition from a spatial perspective. This is not a professional position that all Dutch provinces possess, but it has been a clear choice for this province. As the landscape architect herself explains about this position:

“In the Province... there is a team of designers and there is also a huge team of experts on energy, but they talk of quantities, and goals and never make this spatial so... so we have decided to take on that subject and province defined me as project leader of energy and space, energy and design, energy and regional strategies. It’s all these kinds of things. [...] I’m not their boss or something and what we do... we are

looking and searching for guidelines, but we are at the beginning of that, we have guidelines and criteria in our provincial vision, but they're not... we need to renew them, because they are yet very conservative" (project leader space energie-PZH 2017).

Moreover part of the mission is also supporting the organization the “workshop energieruimte” in the seven *regio* [territories]composing the province of Zuid-Holland, in order “to help them [PZH *regios*] to take space into mind when thinking about energy transition” (project leader space energie-PZH 2017), in the ongoing process of the *Regionale Energie Strategieën* program elaboration.

However, the position connects “energie en ruimte” [energy and space], where *ruimte* is not synonymous of *landschap*. *Ruimte* is more linked to a quantitative extended surface area, but considered from the point of view of the landscape architect in charge of this professional position “landscape is incorporated into spatial design, because we could not think of spatial design independently to its associated landscape qualities” (project leader space energie-PZH 2017). This, again as seen in the reports, shows the complexity of using the word and its associated meaning. Even if landscape is considered as integrated into the *ruimte*, in Dutch context the use of these two words can be tricky. However, it seems that energy transition is, first of all, a matter of understanding the spatial and quantitative need for energy transition actions and implementation, and secondly understanding other landscape elements such as visibility, cultural or its ecological aspects.

Summing up

For the Goeree-Overflakkee case we assist the evolution in the way energy transition is addressed from a spatial/landscape perspective, where the first two reports focus on renewable energy production, and then the followings reports arrive at a broader vision while integrating energy saving, efficiency, and energy transport.

Moreover, there seems to be a consistency between the content and the commission, where the first is estimated as useful and valued for its guidance and its support on the energy transition roadmap by a broad range of agents.

6.4 A crossed perspective on landscape components towards energy transition

It was presented and discussed the landscape focused documents and the way they connected with the energy transition process, for the three embedded cases. The process and the results are quite different in the three cases because they depend on local socio-economic, and geographic systems. Nevertheless, some common topics, problematic points, similarities and differences can be discussed and put into perspective in order to draw lessons from them. However in this “lesson learning” approach it is important to keep in mind that each territory is different and needs tailor-made solutions, according to its characteristics in order to develop energy transition strategies from a landscape perspective.

6.4.1 Students work as preliminary and exploratory research on the subject

Both in the CC Thouarsais and in Goeree-Overflakkee, students from landscape universities (ENSP Versailles and WUR) were the first to address energy transition through landscape perspectives in the territories and provide an energy conscious landscape design. Even if these experiences remain on a pedagogical and communicational level, it seems to have raised interest in the topic, and it has encouraged further more deep exploration into the framework of planning instruments. In both cases funding was provided by external institutions to support these projects. The work of students, even if developed somehow by a commission from local institutions and led thoughtful discussions with local agents and other stakeholders, grounded in their context, allowed more exploration and freedom to create visionary ideas on the subject. These projects being developed in a pedagogical framework do not make local agents and stakeholders to feel threaten by them but instead raise constructive discussions pointing out both problems and potential solutions, that could encourage local institutions to initiate further explorations.

6.4.2 Landscape exploration in the energy transition schedule

However, after these first studies table 6.1 shows how landscape conscious concern in connection to energy transition come relatively late when compared to the engagement in the energy transition process and the beginning of its implementation in the French cases. And one of the trigger points to prompt the development of a *plan de paysage* has been the allocated funding by the ministry of ecological and solidary transition.

Table 6.1. Comparative overview of the three embedded cases concerning landscape considerations.
Source: author

	CC Monts Lyonnais	CC Thouarsais	Goeree-Overflakkee Province Zuid Holland
Nation	France	France	Netherlands
Entity	<i>Communauté de communes</i>	<i>Communauté de communes</i>	Municipality (reference to province)
Surface	400 Km ²	620,18 km ²	422,34 km ²
Density	91 hab/km ² (INSEE 2016)	59 hab/ km ² (INSEE 2016)	188 hab/ km ² (CBS 2018)
Start of energy transition process	- 2006 awarded of “pole excellence rural” (building retrofitting) -2013 committed to TEPOS goals	- 1984 solar swimming pool - 2010 commitment to TEPOS goals	- 1996 1 st wind park - 2010 global ET engagement
Energy transition goals	energy positive in 2050	energy positive in 2050	- energy positive in 2020, - energy exporter in 2030
First global ET landscape displayed action	2011 in connection to SCoT development	2013 students’ projects about RE facilities in landscape	2011 student design studio
landscape document concerning energy transition	- 2015/2017 <i>plan de paysage</i>	- 2018/2019 <i>plan de paysage</i>	- 2012 report “Goeree-Overflakkee. Sustainable energy in the landscape” - 2013 report “Zuid-Holland on power! Space for the energy transition” - 2017 report “Energy producing Goeree-Overflakkee. Scenarios for making the energy supply more sustainable until 2030”

On the contrary, in the Dutch case energy transition is explored through a landscape perspective almost at the same time that the energy transition goal was defined for 2020. When the commission from the province of Zuid-Holland defined an amount of onshore wind turbines this triggered the engagement of the island to become energy neutral, and almost at the same time local institutions commissioned a landscape architecture firm to develop *scenarios* to support decision-making and understand of their energy ambitions through a landscape framework. The province of Zuid-Holland itself developed a report (“Zuid-Holland op St(r)oom!”) in order to study and better define which energy strategy to develop and where, according to the different characteristics in the province’s areas.

Moreover, the *plan de paysage* in France seems to be connected to the necessity to include the landscape component during the update of regulatory planning instrument (SCoT), where a landscape point of view is required. We find this connection to planning documents also within the Netherlands, where the first report developed by HNS office was used to elaborate

the *structuurvisie* at municipal and provincial levels specifically for locating wind turbine in the municipality. So in both the French and Dutch cases seem that landscape documents have been linked with the regulatory planning system. An inquiry about the modalities of this connection is developed in the next chapter 7.

The territory that has the biggest temporal gap between its engagement to become a TEPOS and the integration of landscape perspectives in France, seems to be the CC Thouarsais. Here landscape concerns arrive when many renewable energy production facilities have been implemented, without any landscape strategy at a territorial scale. One of the trigger elements seems to be the fear for a possible development of local opposition to RE facility implementations that are planned for future years, in order not to experience Not-In-My-Backyard (NIMBY) opposition, that raised in many places in connection to wind turbine projects (e.g. Wolsink 2000). In the end a specific OAP about landscape and wind turbine integration has been developed in parallel with the *plan de paysage*, in order to answer this problem. While in the *plan de paysage* seems that energy transition is put a little aside if we consider that there will be no energy focused action plan, the fact of developing an OAP that is a regulatory document and part of the PLUi, shows the CC's interest of the CC in linking energy and landscape, even if only connected to the wind turbine issue.

Another similarity associating the CC Thouarsais and Goeree-Overflakkee particularly, is that one of the reasons cited to develop landscape studies, is to facilitate local inhabitants' acceptance of new RE production projects, especially wind turbines, by trying to connect them with other added values, economic, aesthetic, etc. For now this is an aspect lacking in the CC Monts du Lyonnais, where the RE facilities projects are three biogas power plant. It seems that in this case, where the visual changes in landscape affected by the energy transition were perceived less, with no compulsory obligation to develop wind turbines or other RE projects, the discussion for the *plan de paysage* elaboration was less consensual and the energy transition topic was not in the initial commission. It seems that the RE facilities implementation and their visibility in the landscape remain the trigger point that raises interest about landscape in the energy transition process, and it is something that has been observed in other research studies (e.g. Nadaï, Labussière 2015). This RE technologies focus is observed at least at the beginning of the process, but after the topics broadened to other energy transition strategies, in our cases, both the French *plan de paysage* and the report of 2017 of Goeree-Overflakkee included both energy saving and energy production.

In comparison to the CC Thouarsais, the CC Monts du Lyonnais elaborated a *plan de paysage* upstream considering the low number of RE technologies implemented projects on the territory (see chapter 5), beyond energy retrofitting for buildings. However according to the interviews, it does not seem that this document is really used, for example establishing a connection with the PCAET that is under elaboration, or with other ongoing energy projects such as photovoltaic implementation, for which a specific action plan was elaborated in the *plan de paysage*. So even if there is a potential connection it does not seem to be explored any further. The question of the utility of the *plan de paysage* towards energy transition could be raised for the CC Thouarsais too. In the discourse that interviewees developed, they seemed to have a shared expectation towards this plan, as a tool that they can use or refer to guide some actions they lead in their work. Nonetheless in the end the choice is made to develop an OAP for wind energy siting and

integration into landscape instead of developing it in the *plan de paysage* where finally no energy action plan will be integrated. This choice could show a limit in the perception of the *plan de paysage* possibility to really guide the further development of the subject that mostly worried the local institution: further wind turbine implementation. The fact that the *plan de paysage* is not regulatory and binding, in some way can limit the take into account and implementation of its guideline, leaving it up to individual choice.

On the contrary landscape perspective reports developed in the Netherlands are valued and considered to be useful. Beyond the interviews, this is proven by the fact that the first report, “Goeree-Overflakkee. Duurzame energie in het landschap” has been used to support the siting of wind turbine areas on the island. And it is also proven by several successive reports that have been commissioned by local institutions to accompany steps towards energy transition, both at municipal and provincial level. For the Dutch case we explored three landscape focused reports, while for the French case the only *plan de paysage* exists.

It seems that the process developed in Goeree-Overflakkee of addressing landscape in a proactive way is something unusual according to other research exploring local communities successful in their development of energy transition in Europe, where it is highlighted how landscape considerations were not developed at the beginning of the process (e.g. Dobigny 2016). Moreover, often even when landscape is addressed the discussion is mainly centred on the environmental impact of RE technologies (de Waal, Stremke 2014), even if in some territories such as Samsø, a more proactive attitude has been observed, where for example inhabitants have been involved at the early stages of the energy transition process to site wind turbines (Olwig 2011). Moreover there are territories such as South-Limbourg in the Netherlands where local institutions are experimenting with approaches combining quantitative modelling of energy potential on the territories along with qualitative spatial insights (Oudes, Stremke 2018). Compared to these territories our results also show a progressive opening towards the establishment of connections between landscape and the reduction of energy consumption, an energy transition strategy that will probably increase in importance in the future and needs to be addressed and thought out carefully.

However things are changing fast and more and more territories have set targets for their energy production and reduction of consumption and national policies are encouraging territories to take a landscape perspective for energy transition, as explained in chapter 4. Future research could explore a broadened sample of cases to understand if changing attitudes can be observed.

6.4.3 Similarities and differences between the French and Dutch landscape focused documents

The attitude and the degree of appropriation by agents towards the *plan de paysage* and the Dutch landscape report is different in the two nations. This could depend on several factors, such as landscape planning and designing tradition, but also on the differences in contents and end products in the documents. Even if found to have similarities, these documents are quite different in the two national contexts. Table 6.2 illustrates the comparison between the French and Dutch landscape documents, showing differences and similarities.

Table 6.2. Comparative table of the focused landscape documents within the three embedded cases.
Source: author

	“Plan de paysage” CC Monts Lyonnais	“Plan de paysage” CC Thouarsais	Report “Energy producing Goeree- Overflakkee”
Normative	Not compulsory	Not compulsory	Not compulsory
	Not normative binding	Not normative binding	Not normative binding
Process	Energy is not in the initial commission	Energy is in the initial commission	Energy is in the initial commission
	Including participatory process	Including participatory process	Including participatory process
Content (general)	Flexible in its content	Flexible in its content	Flexible in its content
	Landscape characteristics analysis (e.g. topography, structures etc.)	Landscape characteristics analysis (e.g. topography, structures etc.)	Landscape characteristics analysis (e.g. topography, structures etc.)
	Project/designing objectives	Project/designing objectives	Project/designing objectives
Content energy transition focuses	RE production and energy savings in objectives and in two <i>action plans</i>	RE production and energy savings in the objectives (no energy focused action plan)	RE production and energy savings for three alternatives scenarios
	Addressing RE production and reduction of energy consumption	Addressing RE production and reduction of energy consumption	Addressing RE production and reduction of energy consumption
	Including other topic not connected to energy (e.g. water management, tourism etc.)	Including other topic not connected to energy (e.g. water management, tourism etc.)	Energy focused
	No energy quantification data mentioned	General description of quantitative energy targets; not spatialized energy quantification data	Spatialized descriptive energy quantification data
Graphical representation	- Descriptive landscape analyses	- Descriptive landscape analyses - Map spatializing strategies	- Descriptive landscape analyses - Map and photomontages of spatial/landscape alternatives for a quantity of RE production and energy saving (RE, network etc.)

6.4.3.1 Similarities: addressing a participatory process

Similarities in both French and Dutch documents are that they both have a deep landscape analysis inquiring into its history and its ongoing dynamics that are acting and transforming it. Their development process also has similarities in terms of participatory workshops where the discussion and progressive detailing and adjusting of actions and a constant collaborative approach is conducted among agents. Participatory strategies have been the object of debate and controversy about their ability to lead benefits for RE technologies siting (e.g. Devine-Wright 2011) and some researchers suggest the need to explore of new way of co-creation (e.g. Oudes, Stremke 2020). In the cases analysed however, it seems that the results were satisfying, even if for the French case the participants in the meeting were local agents and not local inhabitants, so reducing the number of persons involved simplifies the task.

6.4.3.2 Similarities: not binding

These documents also have in common not to be regulatory in nature, meaning that their contents are not to be followed in a compulsory manner. Besides there are no specific rules defining what the exact contents for these documents are. Even if for the *plan de paysage* three components are expressly requested: an assessment/description of the landscape, the formulation of quality landscape objectives and the definition of some specific actions able to answer the landscape objectives. These contents remain very generic and flexible. For example this is illustrated by the fact that in the *plan de paysage* of the CC Thouarsais there is a map displaying sites for energy transition actions, while there is not in the *plan de paysage* of CC Monts du Lyonnais. This flexibility and possibility of adaptation is perceived as something positive by the landscape architect who drafted them:

“The plan de paysage tool is great because it is not regulatory, it is flexible... it is adaptable. There are some rules, you must have quality landscape objectives, you must have fiche actions, you must have participation... but otherwise, we can... and so with... during the plan de paysage, we chose without hesitating to modify the original methodology, to... reconfigure along the way, so it's a kind of interactive method. That's it. Thing that is not possible in a PLU, in a PLUi, in a SCoT. And there, there is this participative dimension... it's the flexibility, the flexibility of the tool.”⁵¹ (Ingénieure-paysagiste 2017)

However even if flexible, that fact that it is not binding could lead local institutions or other energy transition agents to choose not follow the proposed landscape strategies, putting into jeopardy their implementation and expected results.

51 “L’outil Plan de paysage est formidable parce qu’il n’est pas réglementaire, il est souple ... il s’adapte. Voilà y a quelques règles, il faut avoir les objectifs de qualité paysagère, il faut avoir des fiches actions, faut faire du participatif... Mais sinon tout, on peut... Et du coup avec... pendant le Plan de paysage, on a choisi allègrement de modifier hein la méthodologie initiale, de... de reconfigurer au fur et à mesure, donc c’est une espèce de... de méthode itérative. Voilà. Qui n’est pas possible dans un PLU, dans un PLUi, dans un SCoT, voilà. Et là et puis voilà y a toute cette dimension aussi participative la souplesse, c’est la souplesse de... de l’outil.”

6.4.3.3 Differences: French “plan de paysage” includes topics not connected to energy

Although we studied two *plans de paysage* that display connection with energy transition, such documents are not thought to develop only this relation. The goal of a *plan de paysage* is explained as “to understand landscape evolution through time and to define the framework of this evolution. [...] it is to acquire the means to implement a quality territorial project”⁵² (Ministère de la Transition écologique et solidaire 2015, p. 8). As we have seen, a *plan de paysage* concerns different topics such as water management, tourism, etc. according to different territorial characteristics, and energy could be among them. And this differentiation of subjects and representation is perceived as one of the main characteristics and strengths of these documents (Follea 2001). For the CC Monts du Lyonnais energy transition was not even in the initial commission, it appeared as a subject of interest during the *plan de paysage* elaboration process. Instead, the reports analysed for Goeree-Overflakkee were explicitly commissioned and focus on the energy transition topic, although they are not united by a specific kind of recognized document such as the *plan de paysage*.

6.4.3.4 A need for the “plan de paysage” to evolve according to the new energy transition challenges?

Concerning the energy transition topic, even if the primary goal for all these documents is to support the process and actions from a landscape perspective, the contents are very different for the French and the Dutch case.

The Dutch documents develop maps spatializing the energy actions in the municipality, developing and showing possible alternative scenarios, based on designing principles and grounded in the island’s characteristics. Map development starts from a GW amount of production and /or savings that is subsequently transposed, on RE facilities sites, or locating energy saving measures, etc., thus combining quantities and space/landscape, in a designing process. The landscape focused documents are mainly oriented towards landscape designing. And the energy actions are affirmed and showed in landscape and spatial terms.

The French *plan de paysage* includes a designing component too, since they require the establishment for landscape quality objectives and demand further development of specific action plans. However, the designing actions remain quite general and they do not transpose any quantity of energy production for example with a possible spatial details for implementation. Moreover, they do not develop alternative landscape scenarios. For the CC Monts du Lyonnais and CC Thouarsais, the quality landscape objectives are enumerated, with a short written explanations, but not further spatialized on the territory. For the CC Monts du Lyonnais, in the energy focused action plans some landscape designing principles, such as suggesting the installation of photovoltaic panels on big surfaces of well oriented roofs and defining some suitable potential areas (in the text) are defined, but without a graphical apparatus such as maps

52 “c’est appréhender l’évolution des paysages dans le temps et définir le cadre de cette évolution. [...] C’est se donner les moyens de construire un projet de territoire de qualité”

spatializing them nor photomontages giving a glimpse of possible visual results.

However, both in the French and Dutch documents, initial setups for the economic and social organization of energy projects and strategies are described in order to ensure further physical implementation. For example, in the documents, mobilizing citizen for a participative financing of photovoltaic projects are encouraged (e.g. *plan de paysage* Monts du Lyonnais).

In the CC Thouarsais, a map that spatially defines several energy actions, combining it with other subjects, such as water, was elaborated. This map has some similarities with the maps developed for Goeree-Overflakkee. However even if it shows some possible locations for actions to be carried out, it does not start from a defined energy quantity production amount, or energy saving, developing specific possibilities for energy transition on a map, for example defining the site for a certain number of wind turbines or photovoltaic panels. Moreover, no energy focused actions plans will be developed further. It is also true that the last report inquiring about the energy export potential of Goeree-Overflakkee involved collaboration with engineering experts, which supported in energy choices. Indeed, addressing energy topics also requires technical competence and necessitates to deal with quantities. The *plan paysage* of the CC Thouarsais includes PCAET energy ambitions in terms of quantities, and so it shows the knowledge about them, although they are not transposed in spatial and landscape terms. The *plan de paysage* is recognized in France as being an ally in order to encourage a development project for a territory based on its characteristics and resources (Gorgeau 2001). So maybe a closer connection between these two documents, PCAET and *plan de paysage*, could reinforce the *plan de paysage's* role for a territory in the energy transition process, allowing a better acknowledgment of the meaning of energy ambitions of the CC, making them understandable from a landscape perspective, and presenting the information in a coherent manner.

For example in the CC Monts du Lyonnais, the *plan de paysage's* content relevance is questioned, since it is believed to remain on a theoretical level. As seen in the interviews developed with ADEME territorial referents for the two CC, they were not aware of the *plan paysage* and its energy transition components. The ADEME is a French state operator supporting the change in development model towards low energy consumption and a less polluted environment, so that close collaboration could be expected for the elaboration of this kind of document when energy is at stake, reinforcing its feasibility and technical point of view.

Maybe in relation to energy transition topic some adjustments could be made in the *plan de paysage* content. The expertise of envisioning new spatial/landscape situations seems to be not fully developed in the *plan de paysage*. Of course, energy production and energy savings from the landscape point of view are quite recent subjects to be addressed in this kind of instrument. People are probably less familiar with these topics, experiencing more difficulties in the understanding of repercussions on the environment and assessing how the spatial characteristics could drive energy choices; the potential and usefulness of addressing the topic from a landscape perspective is not yet fully understood and shared. Indeed, in the Dutch interviews, what has been principally addressed as useful in the document, is that it gives (them) a spatial and landscape understanding of (their) energy quantitative goals, while providing recommendations for implementation.

However, the cross-topic view of the *plan de paysage*, broader than just energy transition, also have a potential. Indeed, energy transition actions in this way could be connected and find

synergies with other subjects, such as tourism, water management, agriculture. An example is the development of hedges that could be beneficial for biodiversity, water retention for agricultural and energy-wood sector development and at the same time support the conservation of a territorial identity element.

Maybe a specific landscape energy transition focused document could be thought up in addition to the *plan de paysage*.

Indeed, many more similarities could be highlighted between the Dutch LOP and the French *plan de paysage*. They are composed by the same sections: a broad analysis of landscape and its dynamics, the definition of landscape objectives and a program detailing several actions. Besides that, the LOP is transversal and touches several topics among which energy can be included. However, the municipality of Goeree-Oveflakkee, after the development of the LOP in 2003, has not updated it nor developed a new one to include the energy transition ambitions of the island. Energy transition focused reports that develop scenarios were chosen instead. This could also be because there was no more funding for LOP.

Several reasons could be given for the lack of relevance perceived by the French agents about *plan de paysage* however if we consider the progressive engagement of territory in energy transition, the idea of representing and spatializing quantitative goals on the territory could be useful, both for decision making and for defining possible design guidelines for the implementation phase. Energy transition is a quite new topic to be addressed for landscape architects and other environmental designers, so evolution in the practice could be necessary (This issue is further explored in part 3).

6.4.3.5 French and Dutch contexts

Differences between the degrees of utility acknowledged by French and the Dutch energy transition agents towards the landscape documents could come from different traditions towards the way of treating and conceiving landscape that are also connected to the geographical characteristics of the two nations. In France landscape has for long had a strong connotation connected to nature and heritage (Donadieu 2012), a point of view that also exists in the Netherlands where because of its “lack” of space it is associated to a strong planning and designing approach in territories (e.g. Luginbuhl 2012; de Jonge 2009). It seems that this attitude towards landscape is still maintained by Dutch agents in the energy transition process.

6.4.3.6 Implementation phases as a challenging step

In any way for both nations, a weakness, within landscape document tools, is the implementation phase that is cross-sectoral, touching many agents and very much left up to free will of to integrate it. And the capacity of these volunteer landscape documents have much to do with the active involvement of local agents and other stakeholders (Baas, Groenewoudt, Raap 2011) that have to see these documents not a constraints but as a resource. Difficulties could also appear because the actions and strategies stated in these documents go against the quantitative energy goals to be implemented as stated by local institutions or because the development of certain strategies are more expensive and require additional time if landscape is to be addressed.

Box 6. Contribution of chapter 6 to the part 2 research question

In this chapter are explored the landscape focused documents which are connected to the energy transition process developed for the three territories of study. Differences could be highlighted between French and Dutch cases both in the way energy transition agents perceive and use the documents than in the characteristics of the documents themselves. These two points could possibly be connected to one another.

For the French cases, the landscape documents arrive after a gap of many years, compared to the beginning of the engagement of the territory in the energy transition process and seem to have gained recently in importance. In the Dutch case, the landscape documents are developed concurrently each time local institutions (municipal and provincial) set energy targets for the territory, where they seem to value the landscape perspective to support decision making and the understating of its feasibility (e.g. necessary surface for the energy actions).

This could be due to the Dutch geographical characteristics of high populated areas, so the matter of how much space is needed to achieve the energy goals is of primary importance. This difference could have roots in the different traditional attitude towards landscape for the two nations, where in France, landscape has been for long associated to nature and heritage, while in the Netherlands this attitude it is recognized to coexist with a strong planning and design attitude.

Moreover, Dutch landscape documents have a stronger and a spatialized design energy focused component, while *plan de paysage* is not energy exclusive but addresses several different topics (e.g. tourism, water) without connection to energy. This certainly is a useful approach in order to include other topics of importance to the territory, but at the same time it results in more general documents, that because it not binding could escape the attention of energy transition agents.

CHAPTER 7: Are planning instruments moving towards integration between energy transition and landscape?

The previous chapters explored the rise of landscape concerns in energy transition in the three territories and how and to what extent landscape is taken into account in connection with the energy transition process in landscape focused documents.

In this chapter we explore whether and if to what extent the articulation between landscape and energy transition goals (*plan de paysage* in France and landscape reports in the Netherlands), has been translated into compulsory planning instruments in those territories.

Spatial planning policy when addresses the issue of landscape refers mainly to the protection of scenic aesthetics or emphasizes landscape dynamics and links with the ecosystem services (Selman 2008). Our research explores which of these or other approaches towards landscape are addressed in the energy transition framework.

The guiding questions are: in planning documents when addressing energy transition process is landscape considered mainly in its visual and esthetical component as something to be preserved? Or is landscape addressed as an evolving and dynamic entity to be planned and designed? Do planning documents include specific energy-conscious landscape design actions?

Previous research highlighted how current territorial planning instruments in France fail to take fully landscape into account (Labat 2011). The need to include energy transition in territorial planning instruments both in France and in the Netherlands could be a new opportunity to include landscape topics, potentially establishing a closer connection between territorial planning and landscape. This is even more significant considering how energy transition implementation is as sensitive landscape subject for local community (Frolova, Prados, and Nadaï 2015). Moreover, from a planning perspective, the analysis and monitoring of local initiatives could be a useful way to disseminate and to upscale knowledge and practice for policy makers (de Boer and Zuidema 2016).

In the following, we inquire about the notion ‘landscape’ in connection with energy production or energy-savings. Our analysis includes energy conscious spatial design principles that are not necessarily directly associated with the notion of landscape, but could lead landscape change. A point of attention and interest is given/paid to energy actions in the agricultural sector. This is due to the character of the three territories where the primary use of land is for agriculture (see chapter 5). Actions made in this sector with respect to energy transition could concern and affect landscape.

The two territories in France under study are in different phases with regards to the articulation and implementation of planning instruments; not all of the documents could be compared. The changes introduced by the LTECV date from 2015, so that the local institutions during the research period of this work were elaborating and updating several of their planning documents. The Dutch case also was in a phase of transition concerning planning instruments, where some evolution will affect them, considering that a new “Omgevingswet” [environmental act] will be probably applied in 2022. I analysed the documents approved and in force and when possible,

for the French cases, also few documents that were still under development.

Towards the end of this chapter, a crossed perspective is developed pertaining to the studied territories and national contexts, in order to discuss the effectiveness of documents and to use this basis to learn for future developments.

7.1 The CC Monts du Lyonnais

In the CC Monts du Lyonnais, the SCoT was approved in 2016, and so was a voluntary PCET in 2015. A compulsory PCAET been under the drafting and decision process since 2017, and is meant to be finished by the end 2019. No PLUi exists at the scale of the whole CC nor has there been any show to develop one, for now. As explained in the previous chapter (six) the *plan de paysage* has been developed between 2015 and 2017, so it could be integrated or taken into account for the SCoT. This connection between the *plan de paysage* and the SCoT was considered since the beginning, moreover some links with the ongoing PCAET could be equally thought. At regional level a SRCAE exists and also a SRE, which define general potential and goals at regional level even if it will be soon integrated and replaced by a SRADDET.

7.1.1 Regional energy focused documents: SRCAE and SRE

In the Rhône-Alpes region a “Schéma régional climat air énergie” (SRCAE) exists since 2014. As explained in chapter 3, after ratification of the law NOTRe (2015) entailing a new planning document the SRADDET substitutes for the SRCAE and other existing documents, and merges them all in the same document. Moreover, this new document covers the larger surface of the new region Auvergne-Rhône-Alpes, created by the merging of the Auvergne region with Rhône-Alpes region. This occurred because a territorial reform enacted by the same law merged the regions together and reduced their number. However, the SRADDET that is now being elaborated should be finalized for 2020. It sets up a new global and coherent vision for the region since it is based on the existing SRCAE and should include elements such as the energy-saving measures and the development of RE and recovered energy. Clearly, the SRCAE is an important document that on a regional scale sets the orientation for reduction of greenhouse gas emissions, and implementation of renewable energy and energy-saving measures.

Exploring the SRCAE is pertinent while waiting for the SRADDET finalization, because meanwhile the SCoT has taken into account the existing SRCAE measures of which many elements will be also incorporated in the new document SRADDET.

Landscape term appears only in the part that explores the “wind turbine energy potential” and refers to the “wind turbine regional scheme” (SRE). It emphasizes how the wind potential has been estimated and distributed in different areas according to a “method based on the weighting of birds, chiropteran fauna, and landscape issues”¹ (“SRCAE Rhone-Alpes” 2014, 116). Further it is explained how “Between exceptional natural landscapes that are often very touristic and located in densely populated territories, the Rhône-Alpes region is characterized

¹ “méthode basée sur la pondération des enjeux avifaunes, chiroptérofaunes et paysagers”

by a high number of issues from the landscape point of view. For any project, including the installation of wind turbines there is a need to be vigilant” (“SRCAE Rhone-Alpes” 2014, 117). Finally, landscape appears a third time linked to RE facilities and predominantly photovoltaic parks on the ground explaining how “their integration in the landscape should be carefully studied”² (“SRCAE Rhone-Alpes” 2014, 122).

This affirmation seems to call for an idea of landscape preservation and integration of facilities more than a design principle to develop their deployment, and only from RE production strategies of energy transition.

The SRCAE estimates potential goals for 2020 on renewable energy production at the regional level. The production objectives for wind turbines is about +2 300 GW and considering this huge increase probably could deserve a thought from a landscape point of view. However, the RE production potential goals also concern increasing hydroelectric development (about + 600 GW), although landscape questions are not brought up at all even if this kind of facility has quite an impact, in visual, ecological and also cultural and social terms. Moreover, the higher contributions are estimated from the wood energy sector as supplied by local wood production (about + 8 410 GW). This could affect the forest by cuts and new plantation on the territory, that lead to changes possibly the re-opening or closing of landscapes from the visual point of view. These changes also could have an ecological impact. Moreover, considering that the main use of land in the territory is agricultural, development of wood energy could be encouraged by planting trees and hedges between agricultural parcels of land, potentially reshaping the agricultural landscape of CC Monts du Lyonnais.

Energy saving is also highlighted as part of the regional strategy across all sectors (residential, industrial etc.). In the document there is a specific chapter which explains principles integrating energy saving and low carbon measures in urban and territorial planning such as: to develop compact urban forms to limit energy consumption and develop careful design for energy effectiveness at a neighborhood scale to optimize solar gains, and promote adequate vegetal space to reduce the heat island effect. Also added is the possibility to condition future urbanization with obligations on high energy performing buildings, or connections to heat network. Besides it is stated the idea of promoting slow mobility and public transportation. (“SRCAE Rhone-Alpes” 2014, 29).

As stands, energy saving is not yet associated with a landscape change. But landscape concerns, often in visual terms, are associated only with RE technologies, and exclusively with wind turbines and photovoltaic panels.

In the SRE of Rhone-Alpes (2012), are defined suitable areas in the region for wind turbine implementation combining meteorological data, ecological data concerning birds and bats and other protected wildlife areas, heritage and cultural landscape protected areas, and other technical constraints (e.g. distance from the airport). In addition to a section on suitable areas, the document contains a part about wind project implementations and recommendations and the fifth one is “to develop a wind turbines project as a landscape project”. It advises “not to reason *a posteriori* in terms of landscape impact, but to integrate landscape thought in very early,

² “Leur intégration dans les paysages devra être étudiée avec soin”.

from site choice all along project development, until the implementation phase”³ (“SRE Rhone-Alpes” 2012, 39). It also recommends extending landscape concerns to all other associated equipment (technical buildings, etc.) and to hire a landscape architect very early in the site choosing phase for the park in the territory.

As seen in figure 1 that marks suitable areas for wind turbines on a regional level, requiring further exploration for each CC and municipality, the CC Monts du Lyonnais appears to be considered, for an extended part of the territory, as a suitable area for wind park development. However, these possibilities do not seem to have been expressed through goals fixed at the CC level, where in the PCET and TEPOS targets for wind turbines are considered very secondary RE technology to be implemented. According to interviews with the TEPOS project manager, the very scattered urbanization that characterizes the CC left few areas far enough from inhabited areas to be suitable for their installation. This shows a mismatch between the two governing levels, regional and CC, where regional goals and potential for wind energy are not transposed into the CC document, apparently because the regional study is not accurate enough

³ “de ne pas raisonner seulement a posteriori en terme d’impact paysager, mais d’intégrer la réflexion paysagère très en amont, dès le choix du site et tout au cours de l’élaboration du projet, jusqu’au chantier”.

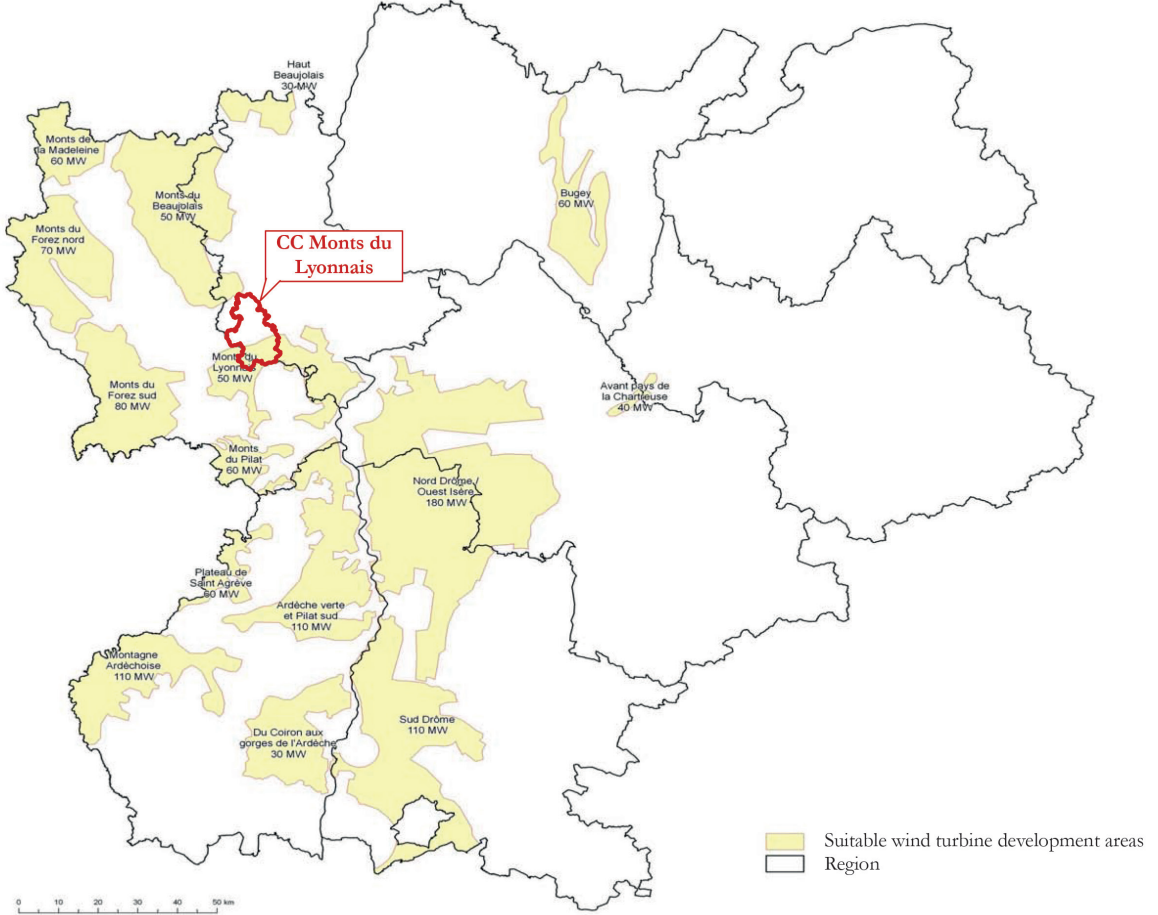


Figure 1. Suitable areas for wind turbine implementation in the Rhone-Alpes region and CC Monts du Lyonnais. Source: elaborated from SRE Rhone-Alpes. 2012. p.38. (translated by the author)

from a spatial/landscape perspective. However it is likely that other reasons for this lack of transposition exists.

7.1.2 The energy focused planning instrument at the “communauté de communes” level: PCET and PCAET

The PCET now it becomes the PCAET, defining strategic and operational goals for mitigation and adaptation to climate change, of which energy transition is a prominent part.

The CC Monts du Lyonnais, developed a PCET voluntarily, in which the word *landscape* appears twice, once in the energy climate analysis of the document where it referred to the landscape natural value of the wetlands as it exists in the territory (p. 83) and a second time in description of TEPOS actions (p.170). The term's second appearance it is connected to the action lines for RE production, referred to the feasibility study of possible wind turbine implementation and highlights how it is necessary to “verification of the protection of the architectural and landscape heritage (classified sites and monuments, the topography and views taken into account ...)”⁴ (“PCET SIMOLY” 2015, 170). So *landscape* as a term appears in connection with a preservationist point of view, linked to wind turbine facilities. The document undeniably includes a deep quantitative analysis of the current state of affairs concerning energy consumption, renewable energy production, and greenhouse gas emissions, followed by an analysis of potential for future development in both energy saving and RE production. However, in the analysis section, data and specific maps about territorial geography or land use characteristics in the territory, fail to appear. The primary focus remains on diagrams; about quantification of energy consumption and production, calculated on the scale of the entire territory. Nevertheless, some small references do link energy consumption with the characteristics of the territory, appear in few cases. For example, high energy consumption in the transport sector is partially linked to the scattered formation of urban settlements.

The document also estimates the potential goals to increase renewable energy production essentially from wind turbines (+192 GWh), biogas facilities (+104 GWh), photovoltaic energy production (+74 GWh), and hydroelectricity (+37 GWh).

Similar to SRCAE, landscape concerns are stressed only for wind turbines and for none of the other RE technologies, neither in terms of the general landscape impact nor possible ways of choosing sites and achieving integration. We found this lack of consideration for the spatial/landscape dimension also in the way renewable energy potential is estimated. It is calculated on the basis of existing studies of energy field potentials on a regional scale for each sector, wind energy, solar, biomass, without precise insight about their location choice and spatial insertion. For example, the estimation for photovoltaic potential is based on the regional study for solar energy development in Rhone-Alpes (2011) where is considered the roof surface according to a minimum required surface, the orientation and that excludes listed heritage buildings. Information for wind turbines is directly taken from the regional SRE. These studies remain

4 “Vérification de la protection du patrimoine architectural et paysager (sites et monuments classés et inscrits, prise en compte du relief et des vues...)”

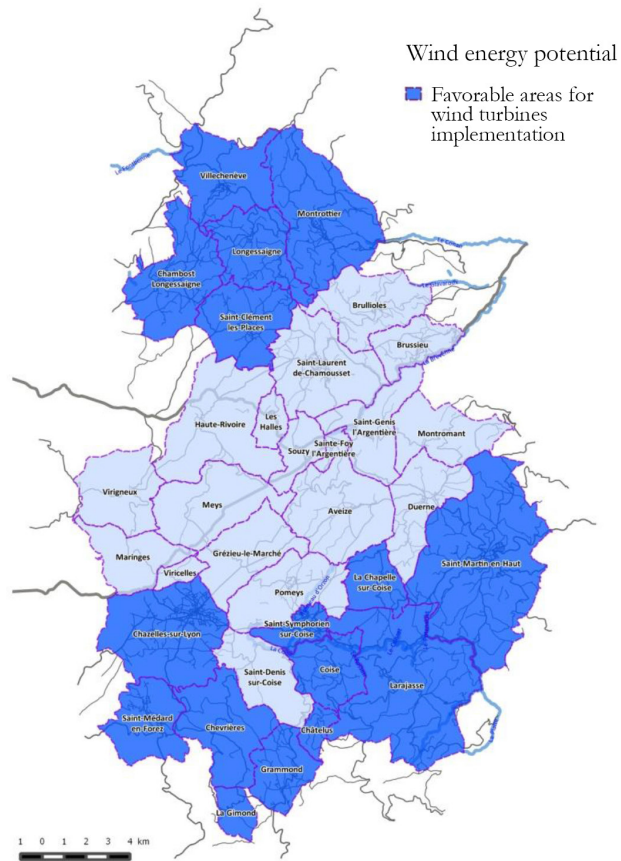


Figure 2. Favorable areas for wind turbine implementation in Monts du Lyonnais. Source: PCET-TEPOS Simoly Monts du Lyonnais. 2015. p.56. (translated by the author)

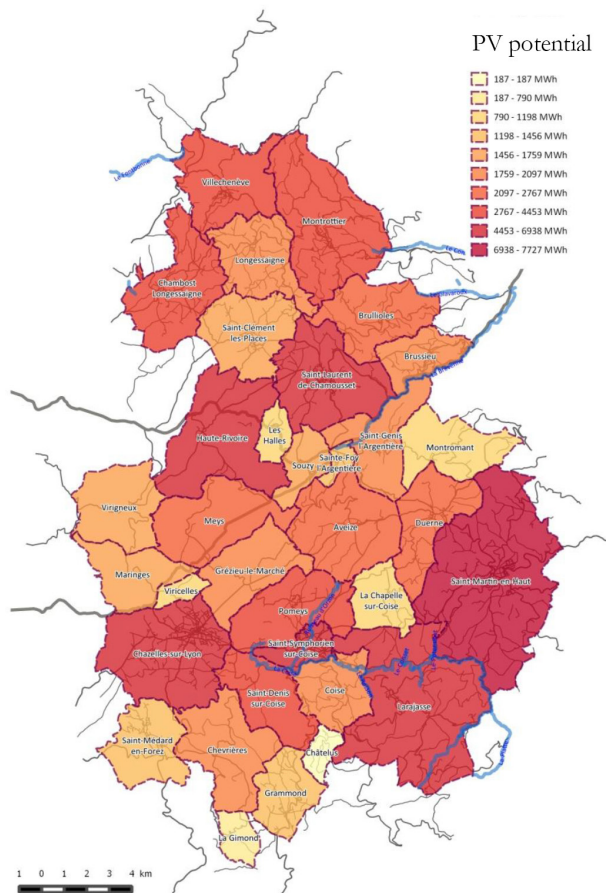


Figure 3. PV potential in Monts du Lyonnais. Source: PCET-TEPOS Simoly Monts du Lyonnais. 2015. p. 48. (translated by the author)

quite general. However, maps are drawn showing the quantitative energy potential for each renewable source entailing each municipality, and lead to a spatial visualization for possible distribution in the territory at the municipal scale, as shown by figure 2 and 3.

In reference to PV potential, about 9.000 new photovoltaic installations were estimated in the territory over a surface of about 847.655 m² (“PCET SIMOLY” 2015, 47). Not negligible amount of surface covered in terms of quantity, that could deserve to be measured beyond only this quantitative estimation.

However, the potential goal of the document seems to remain very discretionary. For example, CC Monts du Lyonnais institutions have not started wind energy development in the territory and in the TEPOS goals it remains very secondary. This happens even if the wind energy potential has the high estimated potential compared to other sources, and many municipalities of the CC Monts du Lyonnais seem to have suitable locations for its development. Indeed at the regional level the SRE indicates a large surface of the CC as a suitable area for wind turbine implementation. This shows also that regional documents seem to give a very general framework, but don not have a very strong impact on the local level and the PCET remains a prospective tool that does not impose many constraints.

Finally, in the SCoT it is written that local study about wind potential concluded that “Monts du Lyonnais does not have an area really favorable for wind park implementation” (“Rapport de Présentation- SCoT Monts Du Lyonnais” 2016, 108).

However at the moment it was being drafted, the PCET was a voluntary choice for local institutions, while the PCEAT on the contrary, which is now under development and substitutes the PCET, is compulsory and it requires an action roadmap and a monitoring tool. So perhaps decisions and potential goals that were estimated will be more concretely implemented.

The capacity estimation of energy savings potential for each sector (residential, tertiary, industrial, transport) is not represented through maps or other visual documentation not showing from a spatial perspective what potential exists in the territory. However, for each sector some general energy principles as guidelines are sketched, and these potentially could impact landscape even if the connection is never brought forward. For the residential sector the need for compact urban form in order to reduce heating and transport energy is featured, as is the implementation of high energy performance in buildings, and retrofitting of old building stock. In the services sector the last two points are taken up again from adding the need for geographical allocation through the territory in order to reduce energy expended for mobility. For transportation it is written that it necessary to develop mixed areas, where services, habitat etc. are grouped in proximity in order to reduce energy on singular movement, and develop slow mobility pathways, carpooling and public transport systems.

For the CC Monts du Lyonnais a PCAET, that replaces the PCET after the LTECV, is under elaboration. So it is not yet possible to see if and how landscape and spatial design principles will be integrated into the final document. However I participated as an observer to a participatory workshop (7 November 2018), set up to think about energy transition issues for the territory, and this allowed inquiries about landscape, if it was mentioned and how. Elected officials, associations, companies and other stakeholders of the CC Monts Lyonnais were called to give their advice on defining an action roadmap. At the beginning of the workshop, some insights about renewable energy production, energy saving and CO₂ reduction goals were presented,

without any maps or references on the territory's landscape or geographical characteristics as a basis for their development. This was followed by four discussion periods, each one concentrated on a subject: (1) reduction of energy consumption (in all sectors), (2) the economical aspect of energy transition (3) making energy transition a territorial project (the importance of communication and involvement), (4) adaption of territory to climate change. Landscape was mentioned once during point 4 when discussing the idea of banning external thermal insulation on traditional buildings, because as expressed by a person: "vernacular architecture it is also part of landscape". So landscape appeared in connection to possible modification that the application of an energy-saving measure could lead in the territory, from a preservation point of view. The connection to building retrofitting could have been brought up because it is the most prevalent energy strategy in the territory, whereas RE production facilities are very few. In addition some energy spatial actions were listed during the workshop such as: the limitation of urban sprawl and the development of eco-neighborhoods. However the PCAET was not finalized so it is not possible know if and how landscape and spatial implications will appear. However, in this participatory workshop the landscape component was almost absent, and probably it will be also absent in the final document. However the project manger of PCAET development in the CC see connections between landscape and PCAET affirming that:

"in any case, we do a lot of connection with the planning urbanism service/department, which has the goal of not letting urban sprawl continue, not letting landscape be deformed"⁵, and emphasizes how spatial component "it's transversal...it could be through, through the control of energy consumption, that's mean to encourage compactness in urban areas...for, well, when you have a building...which...or several buildings that are adjacent to one another, the energy consumption, is less, because the apartments heat each other somewhat"⁶ (PCAET project manager-ML 2017).

However, as seen in chapter 6 the same person in charge of the PCAET affirms not knowing the *plan de paysage* content very well, showing a knowledge gap between these two documents. For the PCAET goals mainly oriented on quantities probably the *plan de paysage* or landscape aspect is not considered something useful to be taken into account. This could lead to some problems because the quantitative energy goals stated in the PCAET about MW production or savings, have a concrete spatial and landscape repercussions. So some insights could be included in the PCAET. Yet again some energy actions could be derived from a deeper analysis of landscape and its physical environment.

7.1.3 The planning instrument: SCoT

The elaboration of the SCoT (2016) at the beginning asked for specific landscape architecture contributions, and it has a dedicated chapter to landscape analysis. This includes a detailed

5 "de toute manière, on fait beaucoup le lien avec le service aménagement urbanisme, qui lui a des objectifs de pas s'étendre plus que ça, de pas déformer les paysage"

6 "ç'est transversal... ça peut l'être à travers, à travers des maîtrises de la consommation d'énergie, c'est-à-dire... encourager la compacité sur des... des zones urbaines...pour, ben en fait, quand t'as un bâtiment... qui... enfin plusieurs immeubles qui s'collent, les consommations, en fait, elles sont moindres, puisque en fait il y a les appartements se chauffent un peu mutuellement"

analysis from a historic point of view of territorial landscape structures, and dynamic forces that are now acting upon it, such as urban residential development. However, no reference is made to the energy question in any form. It is found as a completely separate chapter “Relever le défi énergétique” [address the energy challenge] where TEPOS actions and energy focused analyses (energy consumption sector by sector, etc.) are detailed, but it does not make any connection between them, and only treats them as separate subjects. In this energy focused chapter, several energy conscious actions concern sectors such as agriculture, encouraging biogas projects, as well as the residential and service sectors through building retrofitting, that could lead to major landscape changes, although does not seem to be a matter of concern.

Although in the “projet d’aménagement et du développement durable” [planning and sustainable development project] (PADD) we do not find landscape mentioned in connection to energy transition topics, but found it mentioned in the “Document d’orientation et d’objectifs” [Orientation and objectives/goal document] (DOO). The PADD is the document fixing the strategic goals of the territory as considered in the SCoT, but it is not opposable. The DOO transcribes the qualitative and quantitative PADD orientations as prescriptions and recommendations, therefore it constitutes the regulatory framework to achieve the PADD’s goals. In the 3rd axis of the PADD “ménager le capital environnemental des Monts du Lyonnais, répondre au défi énergétique et au changement climatique” [To take care of the environmental capital of the Monts du Lyonnais, to answer the challenge for energy and climate change], we found three specific strategic actions:

1. To respond to energy and climate change by saving resources and developing renewable energies
2. To preserve resources and prevent risks and disturbances.
3. To learn about and recognize biodiversity on a daily level and the richness of natural habitats in order to preserve them.

The first action is based on TEPOS goals for 2050, integrated in the SCoT. It details several energy design strategies:

1. To promote compact construction design less energy consuming and to limit urban sprawl
2. To encourage existing building energy retrofitting and high energy performance for new buildings
3. To integrate projects for slow mobility (pedestrian and bicycle paths) into spatial planning and construction projects
4. To develop renewable energy production projects favoring an energy mix within the territory
5. To raise awareness and encourage more individual energy-saving behavior

Landscape is not mentioned yet the first four actions are energy-conscious design principles that affect the spatial organization of a territory and could impact visual component of landscape, both through the implementation of RE technologies and energy saving actions in urban and agriculture areas.

The term *landscape* itself does not appear in the section that focuses on energy transition. Landscape as a term appears in the actions connected to the development of tourism for which the idea of enhancing value is stressed and also in connection with biodiversity. Landscape needs to be protected in order to preserve biodiversity. So landscape appears associated with its “visual” component, and peoples’ perception of it, primarily associated with its “natural” imagery. The acknowledge of landscape design components in association with energy transition topics seems lacking.

The DOO document, which includes TEPOS goals, in a dedicated chapter about “Répondre au défi énergétique et au changement climatique en économisant les ressources et en développant les énergies renouvelables” [to answer the energy and climate change challenge, through resource savings and renewable energy development] prescribes the reduction of energy consumption to be inscribed within the PLU/PLUi in order to ensure to functional mix in towns, to develop urban form and new construction with low energy consumption, and to develop possible alternatives and sustainable solutions for single car use. So it reaffirms the PADD actions, with spatial design principles, but does not outline possible landscape changes in urban areas, connected with these principles.

Instead landscape is mentioned in recommendations about the action “to promote renewable energy” where it is described how: “local planning documents should pay particular attention to the landscape integration of renewable energy production equipment, where there is preference for solar panel integration on the roofs and on façades and not overhangs for the heat pumps”⁷ (“DOO, SCoT Monts Du Lyonnais” 2016, 95).

The document also recommends structuring and developing sectors, such as wood energy, biogas, geothermal, and hydraulic, but it does not include further details about possible spatial and landscape integration. Moreover in the prescribed action, *landscape* is not mentioned, stating only one rule on how “renewable energy production facilities may be authorized in specific sectors defined by local planning documents, provided that these installations are done in sterile and / or polluted areas ”⁸ (“DOO, SCoT Monts Du Lyonnais” 2016, 95). This seems important in order to prevent the use of agricultural land for energy production and relating conflict with agricultural production. So in an indirect way they highlight connection to agriculture landscape. However as recognized by the project manager of SCoT development, beyond the connection between energy transition and landscape, the prescriptions about energy transition itself are few and quite general:

“and on some subjects we have not gone far enough, I think, and especially the ... integration in urban planning, rules of the TEPOS strategy” (HG, SCoT project manager ML 2017), drawing attention to how “It is written in a very...rather vague way, rather unclear in the rules of the orientation and

7 “Les documents locaux d’urbanisme devront porter une attention particulière à l’intégration paysagère des équipements de production d’énergie renouvelable en privilégiant notamment l’intégration à la toiture des panneaux solaires et en façade et non saillant pour les pompes à chaleur”.

8 “Les installations de production d’énergie renouvelable peuvent être autorisées dans des secteurs spécifiques délimités par les documents locaux d’urbanisme, à la condition que ces installations se fassent sur des espaces stériles et/ou pollués”.

9 “et certaines thématiques sur lesquelles on n’est pas allés suffisamment loin, je pense, et notamment la... l’intégration dans des règles d’urbanisme de la stratégie Tepos”

objectives document [DOO] of SCoT, because we have...actually there are...fields... of topics that we have to explore, that we are obliged to explore in a SCoT, but afterwards, in terms of prescriptible rules, well, we have a small margin for maneuverability we can...we have few possibilities to impose things on the municipalities. And so, typically, about energy issues, we are still quite limited”¹⁰ (SCoT project manager ML 2017).

The SCoT is endorsed by the elected representatives of the municipalities in the area covered by SCoT (*communauté de communes*), so the written rules are, generally speaking, not too restrictive, and thought to leave room for action when planning in the territory. The fact to try to include too many restrictive rules in the SCoT could lead to non-approval of it. For example, on the subject of landscape and how it is to be treated in this document, the project manager of SCoT explains how “we thought that we could go further, we had material to go further, and that would not pass [approval] in the SCoT”¹¹ (SCoT project manager ML 2017). This is also because the SCoT covers a big surface, including areas with different characteristics, so “we define a general rule, that must be applied to each of the municipalities”¹² (SCoT project manager ML 2017).

The SCoT, indicates both energy saving and renewable energy production measures in line with the TEPOS goal for the territory, even if in simplified form. Moreover, even if the possibility of a connection exists between the landscape project/ and energy transition, this link remains at a very general level in terms of energy transition planning actions. The articulation between landscape and energy transition issues are almost absent, remaining in a fuzzy level about landscape integration for RE facilities. While the energy saving spatial design principles, such as those to develop a compact urban form, etc. are not associated with potential landscape impacts. Concerning these planning documents and in particular the PCAET, the danger of over-planning compared to actual implementation is pointed out, by several interviewed agents part of the technical service of the CC. This also occurs because often the local community needs assistance from an external consultancy office for the development of certain parts of the planning instrument. Also when initiating development of the SCoT’s landscape component, the technical service department needed to hire a landscape architect. This requires a budget. The project manager of the PCAET elaboration stresses how:

“for the local communities, it [PCAET] has a cost. Put 10 000 €, 15 000 € on an [environmental] assessment rather than invest them in a project...for renewable energy development or this kind of thing, well. But so...there are many, many, many strategies but finally... there are territories where there has been a lot of planning on one side...but no action. And there are other territories where it is the opposite, where...well, there is an idea of the plan...for strategies, etc. but what is needed is developing projects, because projects bring money, move money, and allow to

10 “C’est noté de façon très... assez vague, assez floue dans les règles du document d’orientation d’objectifs du SCoT, parce qu’on a peu... en fait il y a... des terrains qu’on..., des champs, ...des thématiques qu’on doit explorer, qui sont obligatoires à explorer dans un SCoT, mais après, en termes de règles prescriptibles, eh ben, on a peu de marge d’action, on peut... on... on a peu de possibilités d’imposer des choses aux communes. Et donc, typiquement, sur la question énergétique, on est assez limités quand même”

11 “On s’est dit qu’on pouvait aller plus loin, on avait une matière pour aller plus loin, et qu’ça passerait pas dans le SCoT”

12 “on définit une règle générale, il faut qu’elle puisse être appliquée à chacune des communes”

development for others, that's it"¹³ (PCAET project manager-ML 2017).

7.1.4 Summing up

In these documents landscape is associated with renewable energy production facilities while it is not directly associated with energy-saving measures. Moreover even if RE technologies are associated with landscape, the one most addressed remains wind turbines, even if there are no wind turbine park projects realized or in the development phases in the territory, where they remain a very secondary action. So it seems to be a mismatch between planning instruments and energy goals underscored in the TEPOS. Perhaps this could also be due to different time schedule and a need to update documents. Nonetheless, wind turbines from a landscape perspectives seem to raise more apprehension, due to their visibility, than other RE facilities even if they generate landscape changes.

Moreover it seems that the SCoT refers little to the *plan de paysage* on the energy transition topic, even if one of the reasons to develop the *plan de paysage* was, according to the interview, to include it in a broader way in the (SCoT) planning document. Indeed in the *plan de paysage*, three action plans are developed: about photovoltaic parks, the wood energy sector and energy building retrofitting from a landscape perspective. So it covers both the renewable energy production and energy saving measures. Nevertheless, just a very general connection is found about landscape for photovoltaic parks. The connection of other planning documents with the *plan de paysage* could not be explored since these documents precedes it.

Moreover in the PCET, as well as in the PCAET, the energy goals and actions strongly depend on the territory's resources and its configurations (e.g. forest, water, urban forms, presence of water, mountains or plains, etc.), that characterize its landscape. Vice versa the energy stated goals could greatly affect landscape but no insight about that is given.

However, even if analysis of the potential resources exist through spatial treatment on maps, landscape perspectives seem almost completely lacking. Spatial and landscape perspectives, both could play a role for analyzing potential for defined goals, and when assessing the design component in the process toward goal implementation.

13 "Bon, pour... pour les collectivités voilà, ça a un coût. Mettre 10 000 €, 15000 € sur une évaluation [environnementale] plutôt que de les mettre dans un projet de... de... développement d'énergies renouvelables ou ce genre de choses, bon. Mais du coup... y a beaucoup, beaucoup, beaucoup d' stratégie, mais finalement... Enfin, il y a des territoires où en fait il y a énormément de planification d'un côté...mais pas d'actions. Et il y a d'autres territoires où c'est l'inverse, où... ben voilà, on a une idée de... de plani... de stratégie, etc. Mais c'qu'il faut, c'est développer des projets, parce que les projets amènent de l'argent, brassent de l'argent, et permettent d'en développer d'autres et voilà"

7.2 CC Thouarsais

The CC Thouarsais is in the process of drafting and revising several planning documents. The SCoT and the PCAET were finalized at the end of 2018 and were waiting for /approval; the PLUi is under a finalization process during 2019. So during the research elaboration it was possible to analyze them even if they would undergo further modifications.

7.2.1 The regional energy focused document: SRCAE and SRE

A SRADDET is now under elaboration for Nouvelle Aquitaine, a new region that merges several regions together including Poitou-Charente where CC Thouarsais is situated. This because of the ratification of the law NOTRe (2015), as explained for the CC Monts du Lyonnais.

A SRCAE for the Poitou-Charente region exists that will be integrated in the SRADDET even if it will probably undergo changes and adjustments because of broader perimeter for the new region. The date for SRADDET finalization is early 2020, so the SCoT, the PCAET and the PLUi of the CC Thouarsais took into account the existing SRCAE documents so its analysis is interesting to see its articulation on the CC level, knowing that several topics could changes soon because its integration in the SRADDET.

In the SRCAE *landscape* is mentioned in the chapter on “sustainable agriculture” in connection with the wood-energy sector development. This orientation promotes the enhance of wood biomass for heating, and so the planting of trees and hedges for this purpose highlighting how these plantations “also contribute to the enhancement of landscapes: hedges, agroforestry, discontinuity planting at the edges of the plot”¹⁴ (“SRCAE Poitou-Charentes” 2013, 80). So landscape appears in connection with the development of natural elements on agricultural territory even if in the document there are affirmed goal for 2020 to implement broad RE facilities, mainly from photovoltaic panels (about +928/+1631 GWh/year) and onshore wind turbines (about + 3600 GWh/year), along with solar heating, wood energy, biogas, agro-fuel, geothermal implementation with the desired global energy production to increase between 25% and 33% (“SRCAE Poitou-Charentes” 2013, 55). All these could have broad impacts on landscape and deserve careful thought about landscape resources, characteristics but also in terms of land use consumption and competitions with other uses such as agriculture.

Moreover, energy production comes along with energy-saving goals of 20% for 2020. There is a specific chapter about this goal that highlights principles to increase energy-saving measures through the spatial organization of the territory, such as promoting an urban compact form, promoting mixed-function areas, , promoting slow mobility and the use public transport, enhancing local networks/channels for food production and distribution (“SRCAE Poitou-Charentes” 2013, 63). So landscape does not appear in connection to energy-saving measures, but its spatial organizational component is recognized.

Nevertheless landscape concerns are very much present in the SRE of Poitou-Charentes that estimates wind energy potential and shows a map at very broad scale (1/500 000) that presents

¹⁴ “lesquelles participent également à la mise en valeur des paysages : les haies, l’agroforesterie, les plantations discontinues en bord de parcelles”.

suitable areas for wind turbine implementation in the region on the basis of ecological constraints (e.g. ZNIEFF etc.), wind potential, heritage and landscape considerations (e.g. exclusion of listed sites). The map (see figure 4) shows how a vast surface of the CC Thouarsais is considered suitable for wind park implementation, even if more detailed analysis needs to be undertaken at smaller scale in order to better determine the exact site for the park.

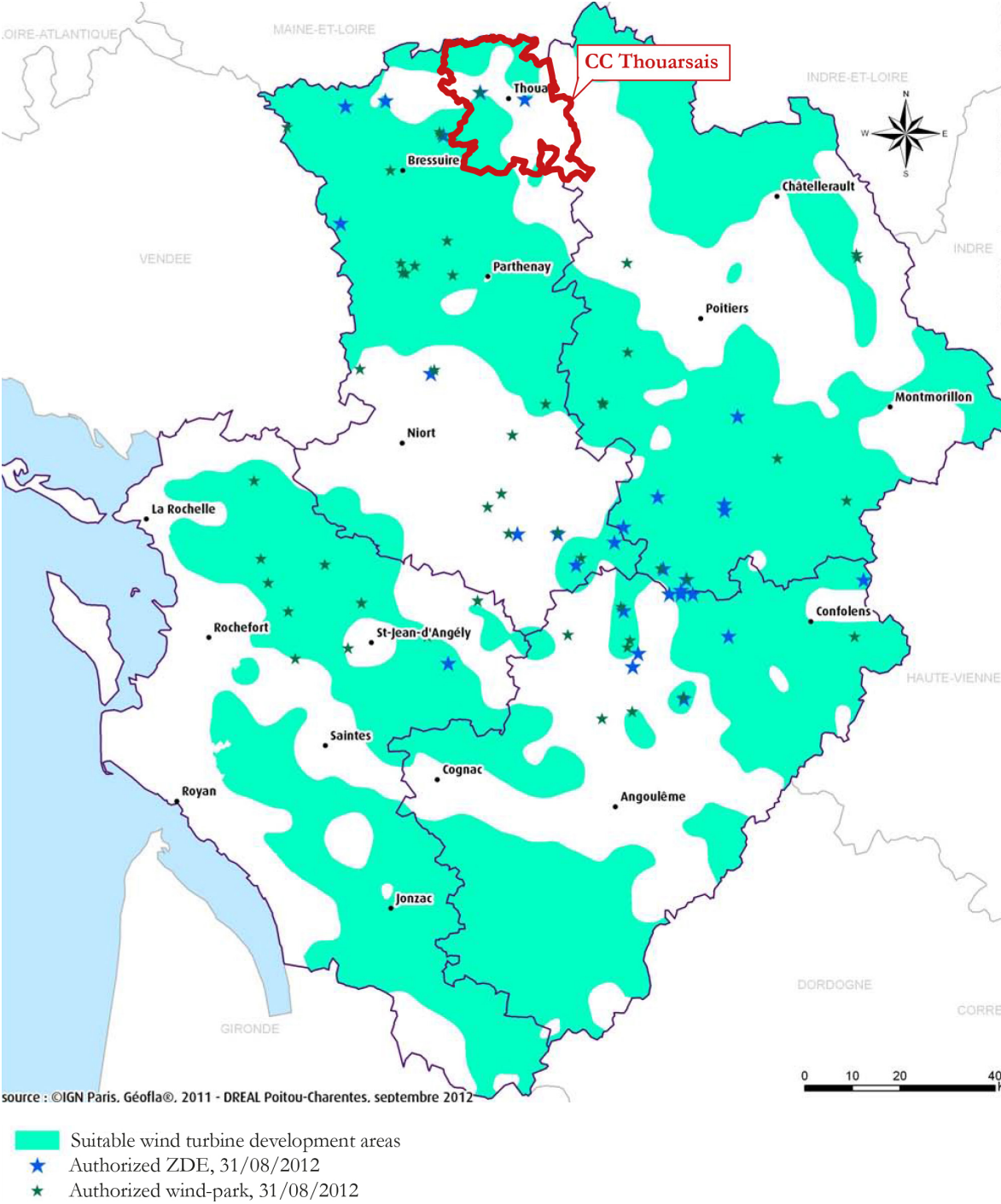


Figure 4. Suitable area for wind turbine implementation in Poitou-Charente region and CC Thouarsais. Source: elaborated from SRE Poitou-Charentes. 2012. p. 77. Translate by the author

In the SRE there is a dedicated chapter “landscape recommendations” (“SRE Poitou-Charentes” 2012, 83) that details a certain number of principles outlining the need to correctly implement in order to not “saturate” the territory through a careful co-visibility study. It is expressively emphasized how in addition to the protection of a natural and heritage site the “ordinary landscape” should not to be neglected either. Consequently several general principles are listed for what is advised as correct “landscape integration”: (1) to take into account the capacity of a landscape site to “absorb” wind turbine implementation from a social perception standpoint (2) to use existing lines of force from the surrounding landscape (e.g. ridge lines), (3) to develop a homogenous composition among the different wind turbines in the park, (4) to provide and plan transition spaces between the wind park and nearby areas, (5) to avoid wind park landscape saturation, (6) to limit the sprawl of wind park projects in order to avoid landscape banalization (7) to carefully consider the point of view from the road towards wind park, since it is among the viewpoints for landscape discovery.

These principles are based mainly on the visual impact that the wind park could enchain and the point two and seven have been specifically detailed in the wind energy OAP of the CC Thouarsais.

7.2.2 The energy focused planning instrument at “communauté de communes” level: PCAET and PCET

The technical service department of the CC Thouarsais, finalized the PCAET in November 2018, and approved in May 2019. The version accessed for this research work, due to the timing is the one finalized, but that could experience small changes in its approved version. The document defines goals and provides a roadmap for objectives of energy focused action in the territory over a period of 6 years.

The analysis section of the PCAET, similar to the PCET of the CC Monts du Lyonnais, details from a statistical and quantitative viewpoint, energy consumption and greenhouse gas emissions at the scale of the entire CC, for sectors, and energy production from renewable sources. However there are no maps providing spatial insight about energy details, and there is no data at municipal level. However, landscape is mentioned in the analysis describing existing renewable energy in the territory, about wood energy potential. The existence of four “zones paysagères” [landscape areas] are brought to attention: the vineyard in the north, the openfield plain at east, the *bocage* (hedge system) in the west and the intermediary area between the last two. And it is expressed how in “these 2 landscapes [*bocage* and intermediary zones] that we found most of the wood as hedges and small woodlots”¹⁵ (“PCAET CC Thouarsais” 2018, 65). So an explicit connection is made between specific landscape element characterizing these parts of the territory and their potential for energy production. A bit further in the same analysis part we found concerns about the project for further wind turbine park implementation in the CC affirming that “the territory wishes to control their [wind turbine] implementation in order to

15 “ce sont dans ces 2 paysages que l’on retrouve le plus de bois sous forme de haies ou petits boisements”.

preserve its landscapes”¹⁶ (“PCAET CC Thouarsais” 2018, 67).

Subsequently, landscape is mentioned several times in the strategy section of the document, in the chapter devoted to “renewable energy production development”. In connection to PV implementation (+60 GWh of production) it is mentioned how “a new project, particularly on the ground, will be accompanied to minimize environmental and landscape impacts”¹⁷ (“PCAET CC Thouarsais” 2018, 98). And for the wind turbine implementation (+250 GWh of production), which represents the highest contribution to renewable energy production, is expressed how an “OAP will also define the landscape integration criteria for wind turbines, which must be taken into account for each project”¹⁸ (“PCAET CC Thouarsais” 2018, 99). Landscape appears in safeguard terms. However in the same chapter other renewable energy production goals are stated such as those that signal increases for biogas production (+90 GWh) through the implementation of a new biogas power plant, or solar heating systems (+10 GWh), but landscape concerns are not mentioned, even if it could be impacted by them. Agricultural landscape, which represent the major part of CC’s land use, could be affected by biogas production, which for example could induce new types of agricultural crops, or different types of management for agricultural parcels as well as new power plant in the territory and a network to distribute the gas. This lack of concern about other RE technologies is similar to the CC Monts du Lyonnais’ PCET where landscape is associated only with wind turbines and PV parks. Concerning the control of energy consumption in connection with urbanism, very general action are written to encourage them in the residential sectors about building retrofitting and highlighted with increasing inhabitant awareness. In the transport sector energy saving by planning slow mobility is found at territorial levels as well as the call to develop more sobriety practices such as carpooling. For these energy principles no connection is made with landscape although repercussions could unfold.

This document seems to focus on the quantitative aspect of energy savings and renewable energy production by estimating and defining quantities of MW to be produced or reduced. Explanatory maps which give insight about spatial distribution of energy production or consumption are totally absent. Some maps were found that represent the site choices for existing wind turbines and in projects, but without background territorial information, which express no connection between the territory’s characteristics and their sites for example.

So in this ‘energy-air-climate’ focused document, there is no obligation to include landscape analysis or concerns. However some small references appear, but in relation to renewable energy production: PV and wind turbines. It is interesting to see the reference made in the PCAET to the four different landscapes in the CC, although they are very short.

However, we assist an evolution while addressing landscape in connection to energy transition in this PCAET compared to the voluntary PCET. The latter was elaborated under the framework of the “Contract local initiatives climat” [Local contract climate initiatives] in 2010. This exploratory PCET, affirmed the long-term goals for an energy neutrality in this territory towards 2050 and

16 “Le territoire souhaite maîtriser les implantations afin de préserver ses paysages”

17 “Les nouveaux projets notamment au sol seront accompagnés afin de réduire au maximum leurs impacts environnementaux et paysagers”.

18 “une OAP permettra également de définir les critères d’intégration paysagère des éoliennes dont il faudra tenir compte pour chaque projet”.

set actions for the period 2010-2013. However, landscape as a word does not appear at all nor does it appear in the territorial analysis neither in the goals, nor the specifications for actions. Even if general energy saving measures, such as retrofitting buildings, or renewable energy implementation, through biogas, wind turbines, etc. were already included in the document. This shows evolution, by a progressive rise in awareness about the landscape perspective in energy transition although it remains “timid” in the way it is was addressed in the PCAET. The landscape concerns seem to have increased in parallel to the gradual implementation of renewable energy production and its resulting visibility in the territory.

7.2.3 The planning instrument: SCoT, PLUi and OAP

Three planning documents are explored in this section, that are not energy focused but could include the topic also in connection to landscape.

7.2.3.1 The SCoT

The SCoT of CC Thouarsais was finalized at the end of 2018 but was under appraisal and waiting for approval while this research was conducted, so some minor additions and adjustment may have been made to the document compared to the documents here analyzed.

In the territorial analysis of the SCoT, landscape is treated in a dedicated chapter “Ambiances et dynamiques paysagères du Thouarsais” [Atmospheres and Thouarsais landscape dynamics], where the different zones of the CC are characterized by different types of landscape, plains, hedge systems, vineyard cultivation and the Thouet river valley, urban areas. This information was specifically taken from the landscape inventory developed by the Poitou-Charente region, but not from the ongoing *plan de paysage*. This could be due to a scheduling issue, since the landscape analysis of the *plan de paysage* was developed late when compared to the finalization schedule of the SCoT. However a sub-chapter dedicated to the particular qualities found in the CC Thouarsais landscape, recognize renewable energy, wind turbines and photovoltaic panels, as “territorial marking elements”¹⁹ (“Diagnostic Urbain et Territorial- SCoT CC Thouarsais” 2018, 18). They are recognized as visible elements in the landscape that testify for the TEPOS engagement lead by local institutions, but also as something to which look carefully to develop further implementation. In this analysis of the SCoT there is not a chapter dedicated towards energy transition that details existing projects and actions, but there are some short references throughout the documents. For example, describing the agricultural systems in the CC Thouarsais it is explained how manure or other wastes coming from agriculture contributes to renewable energy production. However no explicit connection is made with the existing landscape not if and how it could be affected by these energy actions.

Nonetheless, in the PADD document energy transition was found in the chapter detailing the directives to “support local economic development and innovation”²⁰ where the directive three is specifically about energy transition mentioning the ambition: “to be the reference territory

19 “marqueurs du territoire”

20 “Soutenir le développement économique local et l’innovation”

about positive energy, energy transition and adaptation to climate change”²¹. The chapter that, refers to PCAET goals, explains how local institutions want to develop energy-saving measures through existing buildings by energy retrofitting them and to create conditions to improve slow mobility by limiting single car usage. However, the primary focus is on renewable energy production deployment through wood energy development, biogas or geothermal facilities, photovoltaic parks, solar heating, and wind turbines. And it is in relation to renewable energy that landscape is mentioned, affirming that “that the development of renewable energy will continue while reconciling with agricultural, landscape and biodiversity issues”²² (“PADD-SCoT CC Thouarsais” 2018, 28).

In line with the PADD, in the DOO, there is a specific chapter about energy transition and climate change subdivided into rules about RE technologies implementation and energy saving. In respects to RE technologies production it states that:

- The choice of sites for new renewable energy projects will be defined by the planning instrument, which will also ensure that ecological, landscape and architectural components will be taken into account during their installation,
- The creation of a RE production system is encouraged in all domains: habitat, economy, public facilities, agriculture, tourism, etc.
- In order to preserve agricultural land, photovoltaic park implementation is allowed only on brownfield areas and on roofs.

Stated measures for energy saving are:

- To encourage retrofitting actions on the existing building stock,
- To encourage development of highly innovative and thermally performing, energy producing, and low impact greenhouse building,
- To promote slow mobility (cycle paths), and public transport systems,
- To ensure adaptation to climate change for existing and new buildings (e.g. vegetated / green roofs)

Again in the SCoT and in its different documents composing it, landscape concerns seem to be associated only with RE development. Energy saving principles are highlighted by recognizing the spatial implications and their contribution to energy transition, but they are not addressed concerning landscape.

We found energy principles with possible impacts on landscape also in other sections of the document. Particularly important, considering that the main land use in the CC Thouarsais is agricultural, is the chapter dedicated to agriculture in the PADD and translated into the DOO. It details how the transformation of the agricultural production has to contribute to local energy production through either a biogas process, or the appraisal and maintenance of hedges

21 “Être le territoire de référence en matière d’énergie positive, de transition énergétique et d’adaptation au changement climatique”

22 “Le développement d’énergies renouvelables se poursuivra tout en le conciliant avec les enjeux agricoles, paysagers et de biodiversité”.

and woods for the development of wood-energy sector (experimentally), and other renewable energy production (“DOO, SCoT CC Thouarsais” 2018, 34). All these actions could spread deep transformational changes in a rural territory characterized by an agricultural landscape identity, such as modifications in agricultural production, lot or parcel dimensions and forms. Nevertheless they are not overtly pronounced.

7.2.3.2 The PLUi

The PLUi of the CC Thouarsais was still under work during the writing period, but thanks to the collaboration of the technical service department in charge, I could access to the working document. This document even if it is not finalized is quite advanced at the moment I analysed it (beginning 2019), having started in 2015 with the goal for approval in 2020. This allowed partial exploration about energy transition and landscape articulation.

The first insight is that in the PLUi analysis the link to the *plan de paysage* is more evident than with the SCoT, since it includes maps directly extracted from the plan itself. This was probably compatible with the PLUi time schedule compared to the one for the SCoT, for whom elaboration started earlier, juxtaposing its procedure later with the *plan de paysage*, not allowing deep interactions. For example, the part of the *plan de paysage* that connects existing landscape for the CC Thouarsais to its energy choices is not included, even if the *plan de paysage* will be attached to the final PLUi. Nevertheless in the PLUi, we find the some chapter defining renewable energy as CC Thouarsais landscape’s specificity and reaffirming how their development does not have to take place at the detriment of landscape (“PLUi CC Thouarsais, Provisional Version” 2019, 12).

The PADD of the PLUi defines the general orientation of planning policy at the territorial scale, fixes its goals and planning strategies on a 10 year timeline. The PLUi of CC Thouarsais is structured around the principal point and the topics covered by the SCoT. The chapters have the same names in order to secure a direct link to facilitate comprehension. The chapter about the theme referring to the development of CC Thouarsais as a reference territory for energy transition, details the same point made in the SCoT, and according to the goal stated in the PCAET while adding some detail.

In order to reduce energy consumption several principles are listed:

- Spatial organization and the mobility scheme needs to reduce car use, through the strengthening of connector polarities , urban retrofitting and reducing urban sprawl, and the promotion of slow and public transport mobility,
- Construction aims to moderate energy consumption through the choice of urban forms that consume less energy (urban density, orientations, etc.) and high energy performance buildings
- Energy performance improvement of old building stock

Development of local energy sources to answer to the energy objectives of the PCAET and TEPOS:

- To continue implementation of large scale renewable energy facilities (wind turbine parks, photovoltaic parks, biogas facilities, etc.), while making reference to the OAP “landscape and energy” in order to conciliate with agriculture, biodiversity and landscape issues,
- To develop small scale renewable energy facilities, musing about their integration in vicinity to heritage buildings and in relation to landscape in the territory.

So even if some general energy focused principles also refer to the spatial form of urban settlements, they leave landscape to associate only with renewable energy.

Besides in the PLUi, similar to the SCoT, direct reference is found to renewable energy implementation and landscape in the chapter dedicated to agricultural actions. It is written “The development of renewable energy on agricultural land holdings is part of the TEPOS goals and the *plan de paysage*. It is necessary to conciliate these two concerns by ensuring the facility’s landscape integration”²³ (“PADD, PLUi CC Thouarsais, Provisional Version” 2019, 30) while preserving agricultural land. So, after connecting the agricultural land issue and landscape to RE facilities the document forbid the implementation of ground photovoltaic park in agricultural areas.

Moreover, it is highlighted how the development of the wood energy supply chains and the subsequent added value of *bocage* and tree plantations will add income for farmers “while contributing maintaining of breeding areas and *bocage*”²⁴ (*ibid.* p. 30). So the development of an energy production action is directly connected to the preservation and enhanced value of a typical landscape characteristic of the territory, going beyond the integration of a RE technologies. This *bocage* landscape preservation and enhanced value was an issue often debated during the workshop for the *plan de paysage* development and that we found in the final document itself that seems to have percolated to the PLUi.

This connection between energy and agricultural landscape seems more affirmed in the planning document of CC Thouarsais compared to the CC Monts du Lyonnais, where it was almost absent.

Moreover the PLUi has a section on regulation that subdivides all the territories in zones: urban, to be urbanized, agricultural, natural and forest. For each zone the PLUi states rules that are compulsory and need to be followed, defining strictly what is possible and impossible to build and how to implement them. Here energy focused recommendations are found. For example, for new building construction in urban areas, there is the need to study the installation of new construction in order to guarantee sun exposure for higher solar energy gains and to promote/ foster the use of renewable energy (“Reglement PLUi CC Thouarsais, Provisional Version” 2019, 33). Moreover the PLUi states exemption to the rules stating that construction has to be placed at least two meters from the dividing lines concerning the installation of external insulation, and the installation of solar collectors and sun shades on existing buildings. This is stated in order not to obstruct buildings overall improvement in performance. An exemption exists for the installation of photovoltaic panels on the roof that prohibits the use of shiny materials.

23 “Le développement des énergies renouvelables dans les exploitations s’inscrit dans l’objectif de territoire à énergie positive et dans le Plan de paysage. Il devra concilier ces deux préoccupations en veillant à l’intégration paysagère des installations”.

24 “tout en contribuant au maintien des sites d’élevage et des zones de bocage”

Moreover for all new buildings for residential and office use, it is recommended to cover 50% of the final energy consumption through renewable energy. (“Reglement PLUi CC Thouarsais, Provisional Version” 2019, 72). Some recommendations are expressed in terms of integration for photovoltaic panels in existing buildings, stating that the photovoltaic panels need to be grouped together on the roof, and that the integration of renewable energy facilities need to be carefully inserted on the roof and façade. Nevertheless, even if this recommendation expresses quality thinking the significance of “careful” remains vague.

All these rules outline possibilities to be included in the PLUi, that were introduced by the LTECV in 2015, that the CC Thouarsais chose to write into the PLUi considering their ambitious energy goals for 2050. Actions that could help at the building scale the production of renewable energy or the reduction of energy consumption, are promoted. The document was not finalized for all the concerned areas, during the research period, but it reveals a concern about the urban areas, where rules and visual aesthetics elements are allowed to change in order to promote the energy transition process.

The CC Thouarsais, as already mentioned in the precedent chapters, decided to include an OAP, about landscape and energy in the PLUi, who’s contents are detailed in the next section.

7.2.3.3 The “landscape and energy” OAP

The OAP is named “landscape and energy” even if for now there is only the “wind turbine component”. The effort of local institutions is to include other subjects in further revisions of the PLUi such as photovoltaic panels. The OAP topics to be included in a PLUi are decided by the local community. There is not any compulsory OAP to be developed, but once approved it becomes opposable by urban planning authorizations. This is one of the differences of this OAP from the *plan de paysage*. This document was expressively requested by the technical service department dealing with energy transition and urbanism, and it has been elaborated along with the *plan de paysage*.

The OAP has been developed by the landscape architect in collaboration with the PAP members that oversee the *plan de paysage* elaboration. However, their implication in the OAP elaboration evolved over time. In the beginning contract they were to play a supporting role by reviewing the document elaborated by third parties. But finally they elaborated the document from A to Z. Indeed, as the *plan de paysage* developed, particularly the sections devoted to landscape and its dynamic analysis, the connection with the goals of this OAP became evident. So the CC’s technical services department decided to commission the entire OAP to landscape architect and PAP members. Nevertheless, being a specific PLUi document the budget used for its draft came from the CC, not from the money given by the Ministry of ecological and solidarity transition for the *plan de paysage*. This economical effort of the CC seems to show the real importance put beyond the elaboration of an OAP on the landscape and energy topic.

However wind turbines site choices were already determined:

“In the OAP, the potential/ suitable areas, don’t come from landscape choices [...]. While there are other methodologies that are often [employed] in the PNR [Regional Natural Park]. We talk about landscape we talk about areas to be excluded and others that could potentially accommodate wind turbines and there

is a pre-zoning that is done and after it is subjected to concertation dialog. While there, we began from the elected representatives concertation that resulted in this map, then cross-referenced it with environmental data, Natura 2000 etc. that excluded several areas and starting from what remains a landscape filter is produced”²⁵ (Ingénieure-paysagiste 2017).

So the map of the figure 5, was predetermined before the development of the OAP and the wind turbine locations were decided by cross-checking several criteria: respecting a distance of 500m from buildings, to be placed outside the protection perimeter for historical buildings and classified forest areas, environmental protection zones and those constraints accorded to technical facilities (180 m around main roads, railways and power lines). Finally, the resulting areas were chosen in the municipality where a favorable approval by elected members was found for developing wind turbine projects.

Even if these locations are pre-determined in the OAP, design principles are defined for the implementation of the new wind turbine parks in these areas. Principles are detailed at the territorial scale and applied to the entire CC Thouarsais, as show the map represented in figure 6. This map of the CC draws the main force lines (dashed lines) of the territory, resulting from

25 “Dans l’OAP les zones potentielles, elles ne sont pas issues d’un choix paysage [...]. Alors qu’il y a d’autres méthodologies que sont souvent dans les PNR. On parle de paysage on parle d’aires à exclure d’autres que peuvent potentiellement accueillir l’éolienne et il a un pre-zonage que c’est fait et qu’il est après sujet à concertation. Alors que là on part de vraiment la concertation élue qu’a donné cette carte ci, plus le croisement des données environnementales, natura2000 etc. qu’excluent pas mal des zones et à partir de ce qui reste il y a un filtre paysage qu’est donné”

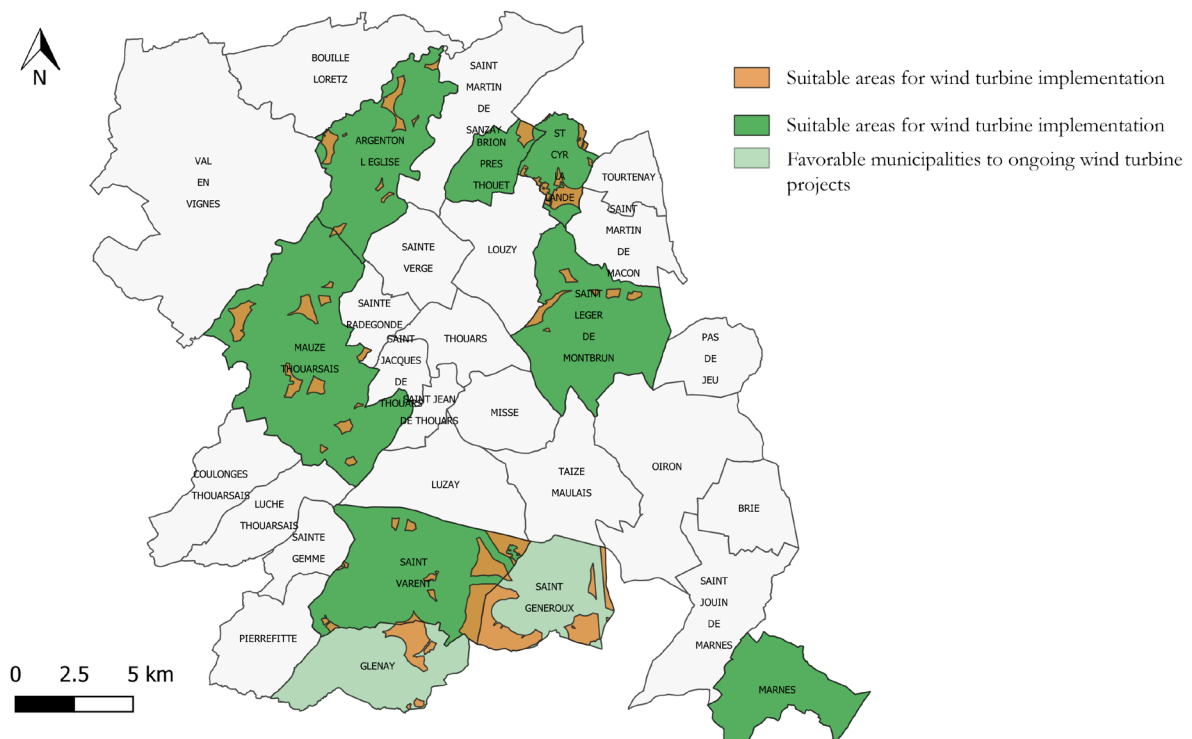


Figure 5. Suitable areas for wind turbine implementation in municipalities favorable to the project. Source: OAP “Paysage & énergie” dans le Thouarsais. Volet éolien. 2019. p.16. Translated by the author

the most important landscape structures in each landscape unit. These force lines need to be used for the wind turbine site plan, such as the topography for the alluvial valley, the axes of the dray valley along the river, the curved lines of the small hills that spot the plain.

These principles rely heavily on the topography of the territory. But it is added to the question of co-visibility between wind parks mainly from the main road axis, as represented in figure 7. So the implementation of new wind parks has to be studied from the roads viewpoint through successive sections, in order not to hide, but to limit, their visual impact and reduce the impression of terrain saturation from wind turbines.

If these are the general principles employed at the CC scale for each landscape unit, as presented in the *plan de paysage* more specific principles are detailed for the predetermined site areas. Figure 8, shows the possible layout for further implementation of wind turbines on the plain and Thouet valley. For example, they can be located along the same axes as the dry valley crossing the Thouet river in order to make these topography readable from far way, grounding them in existing landscape structures.

Finally, the document details at the “pedestrian scale” explicitly affirming the use of specific design principles elaborated in the document developed by the students in 2013 (see figure 2 and 3 in chapter 6.1), where specific proportion are calculated between existing elements such as trees, valleys and wind turbines. These consider distance between inhabited areas and wind

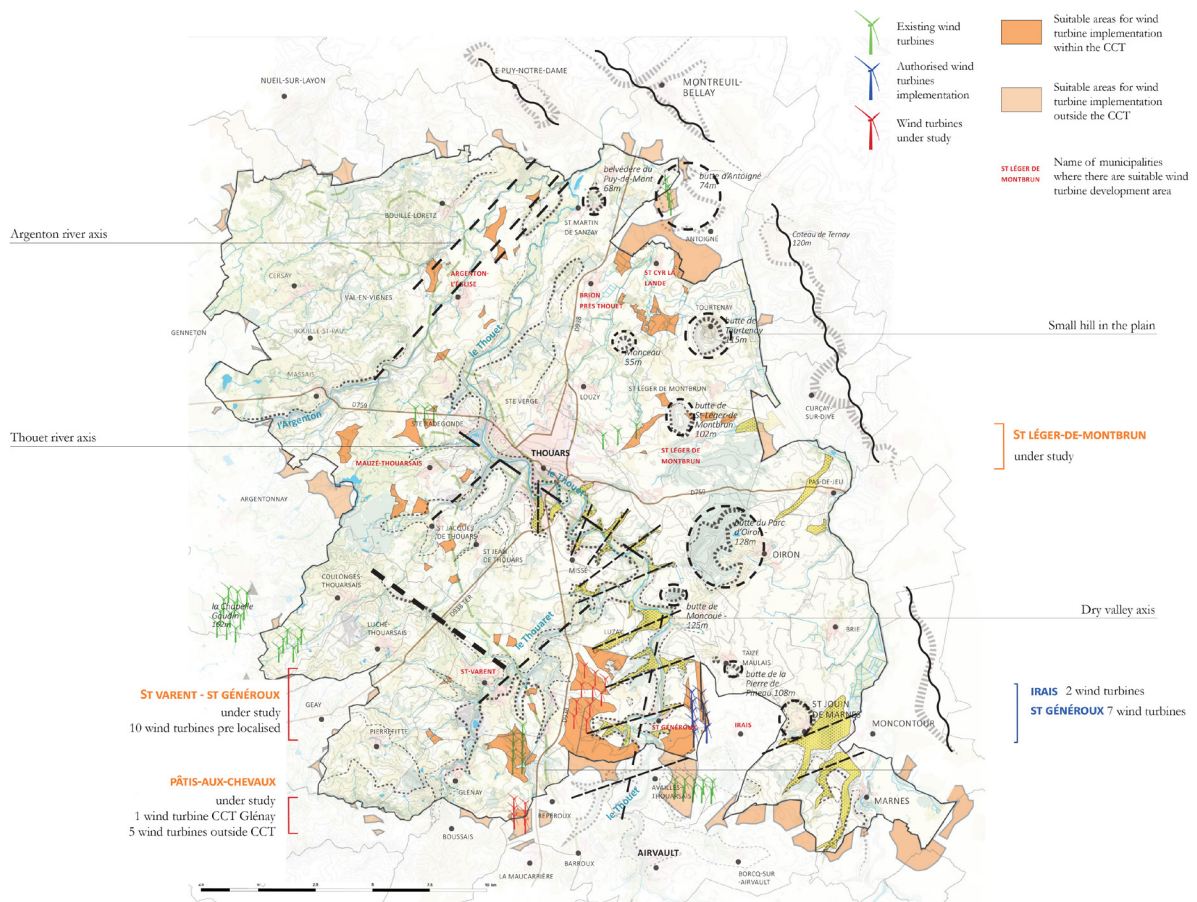


Figure 6. Designing principles at CC scale in order to be able to show the landscape force lines. Source: OAP “Paysage &  nergie” dans le thouarsais. Volet  olien. 2019. p.7. Translated by the author

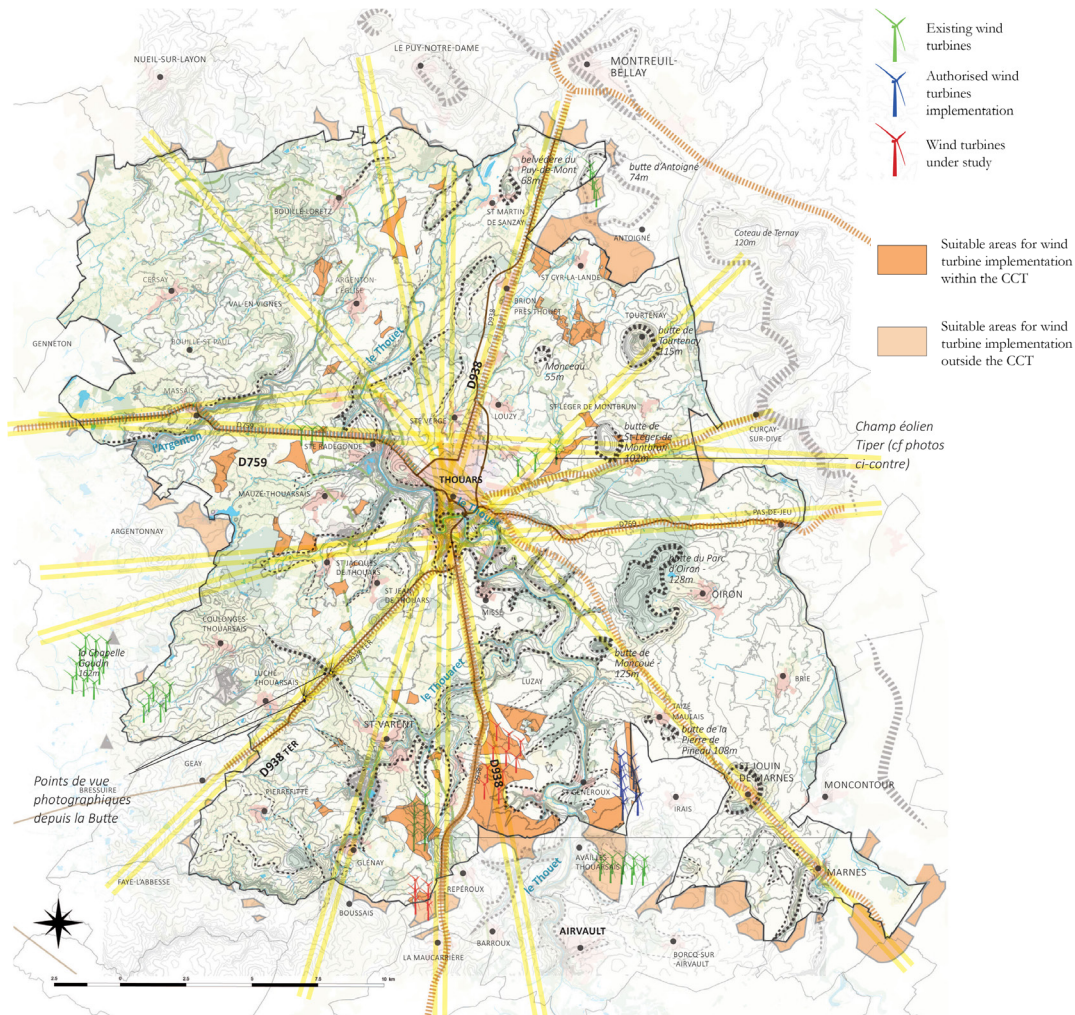


Figure 7. Design principles at the CC scale in order to preserve the view from main roads. Source: OAP “Paysage & énergie” dans le Thouarsais. Volet éolien. 2019, p.8. Translated by the author

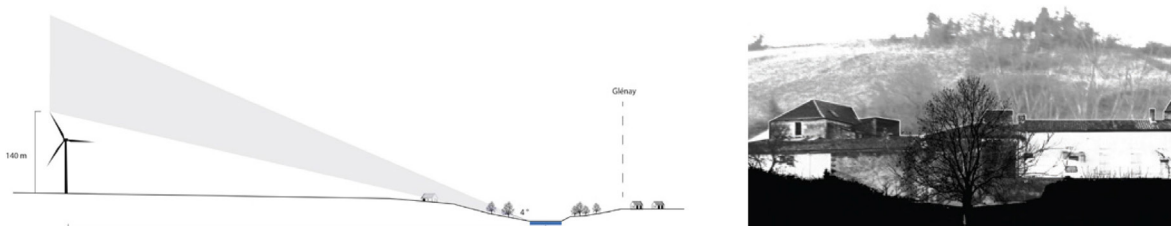


Figure 8. Design principles for wind turbines layout in the plain and Thouet river valley. Source: OAP “Paysage & énergie” dans le Thouarsais. Volet éolien. 2019, p.12 ; original source: APR-ENSP L'autonomie énergétique dans le Thouarsais. 2014.

turbines in order that these wind turbines result at same level as trees and hedges, so that wind turbines are installed in such a way that they are not visible from the bottom of the river valley and its slopes.

7.2.4 Summing up

In the planning instrument of the CC Thouarsais, like the planning instrument for the CC Monts du Lyonnais, landscape is addressed several times in connection to implementation for renewable energy facilities but not to energy saving measures. This connection is often raised in connection to wind turbine implementation, found on this territory to be already largely developed. Indeed a specific OAP has been formulated about wind turbine landscape integration, leaving aside all the other RE facilities. This OAP, which is binding shows that the CC Thouarsais sees a benefit in developing the link between energy and landscape. Moreover compared to the CC Monts du Lyonnais, more connections are established with agricultural landscapes, mainly because the characteristic *bocage* landscape in the territory. The development of a local wood energy sector is mainly associated with the *bocage* landscape area and this sector development is seen as a way to safeguard and enhance its value, both at regional (SRCAE) and at CC scale (PCAET). In these documents, when compared to the CC Monts du Lyonnais, it seems that some point mentioned in the *plan de paysage* are quoted and integrated into planning documents, even if in a light manner. The PCAET for example, lacks a deep landscape discourse, as well as energy goals addressed from a landscape and spatial perspective. However, alongside the landscape connection to wind turbines and photovoltaic panels, it also makes references to the *bocage* landscapes as possibilities to develop a wood energy sector. The PLUi incorporates almost the entire landscape analysis found in the *plan de paysage*, but it does not seem to integrate it further by making connection to the energy focused actions that are listed in the document. So landscape is not addressed by its design component even if the *bocage* is connected to the wood energy sector as highlighted in the *plan de paysage*. The subject seems to have some small spillover, at least it is quoted in the analysis of the PCAET and PLUI.

7.3 Goeree-Overflakkee

In order to provide a better understanding of the articulation between landscape and energy transition in Dutch planning instruments, we examined processes for choosing sites for wind turbines in Goeree-Overflakkee. This is relevant considering that the implementation of onshore wind turbines has been the moment when the local institutions started to articulate concerns and commit the municipality in a more global process of energy transition. It is also relevant considering the fact that wind turbines are, to date, the most developed RE technology on the island, and raise several problems through their implementation, in terms of space that remains for further implementation and the possibility that local opposition may arise.

This part is followed by a more general inquiry into the content of the main planning documents at the municipal level. Afterwards, the Zuid-Holland provincial document is examined,

considering the top down functioning of certain energy transition policies in the Netherlands. Anyhow, this provincial inquiry is needed to be consistent with the French case studies, where the higher level of administration documents are examined too.

7.3.1 The planning process for wind turbine site choices: from planMER to “bestemmingsplan” and “structuurvisie”

Following the agreement “Duurzame energie op Goeree-Overflakkee” (19 December 2012), to implement 260 MW of onshore wind energy, a revision of the *regionale structuurvisie* (dated 2010), was required. This *structuurvisie* is in this part called ‘regional’ because the four municipalities of the island of Goeree-Overflakkee were in the process of merging. The document is now called municipal *structuurvisie* and is still in effect. The objective of this revision for the province and the municipality was to agree on a location for the wind park on the island, in order to achieve the 260 MW target.

In 2003, the Zuid Holland province adopted for the first time the “Wervel note” - a policy document where “desired” locations for wind turbine parks from the provincial point of view were shown. Back then, they were mainly located in the Rotterdam harbor and on Goeree-Overflakkee. The energy goals increase ever since, and further revisions and documents have been adopted. However, in 2009-2010 because of the European Directive 20-20-20 and the SER with the Dutch national objectives to produce 6.000 MW from onshore wind turbines, 735,5 MW of wind were assigned to the Zuid-Holland province (see chapter 5).

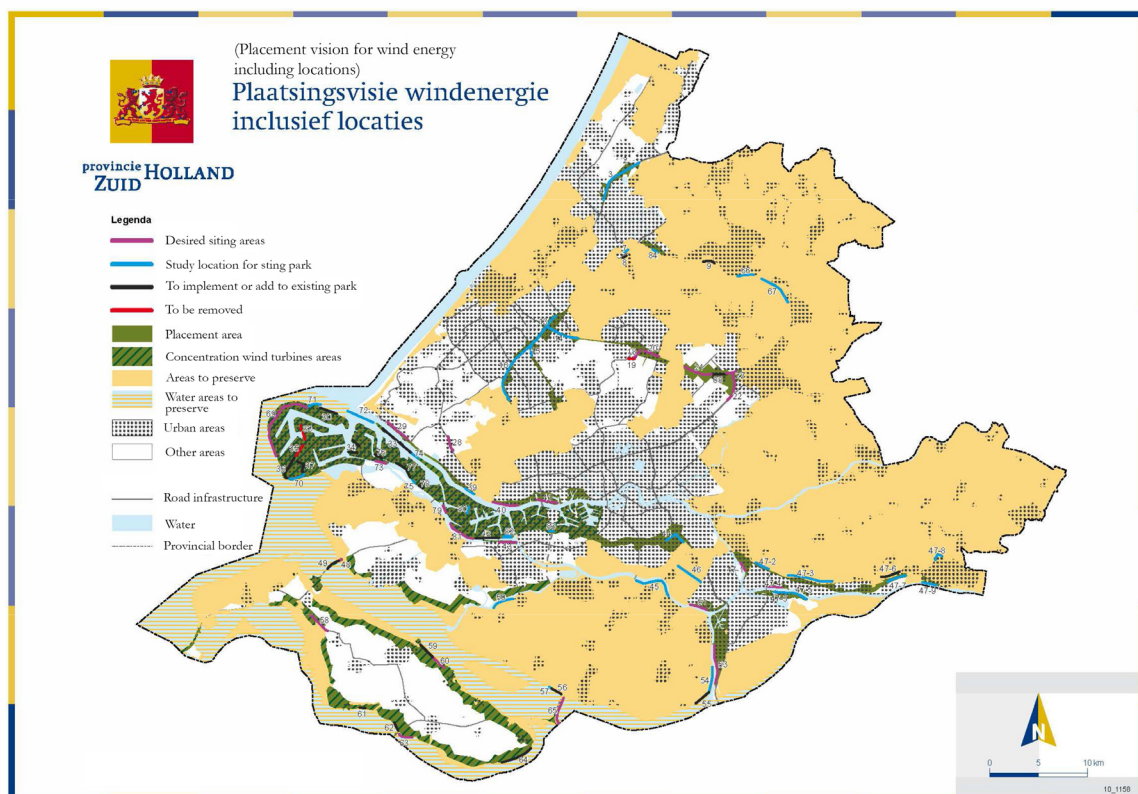


Figure 9. Vision for the site locations for wind turbines. Source: Province Zuid-Holland. 2010. Nota Wervelender, p.29. Translated by the author

In 2010 the province developed a document “Nota Wervelender” to reconsider and update the “Wervel note”, in order to begin about wind turbine site locations in the province after the compulsory increase for wind energy production goals (see figure 9).

Figure 9 shows how the eligible areas for large-scale wind park implementation are concentrated in the Rotterdam harbor and in the edges surrounding Goeree-Overflakkee. This document does not mean that wind turbines will be implemented in all the indicated areas, but it is a possibility to be further explored. A dialogue and the exploration of alternative locations could be elaborated for municipalities and *regios* that consider the proposed site options as unsuitable. Following the publication of this document and the temporary introduction of these areas for wind energy implementation in the provincial *structuurvisie*, that also forbids the development of single wind turbines. Single wind turbines are only allowed in large-scale industrial sites in order to better control their implementation in the territory and prevent sprawl.

Following this “temporary” site choice, the municipality of Goeree-Overflakkee together with other stakeholders involved in wind energy development reacted:

“And we said as Deltawind, it must be terrible to be in a cage. So we thought that there must be another solution and then we made contact with all initiatives on the island and we said: “let’s make one plan”. One plan in which we can search for the best solution of it. [...] in 2012 there were so many initiatives and we got them around the table with that question to “make one plan” and the results could be that you are not allowed to build but let’s make the plan together”(MS, Director Cooperative Deltawind-GO 2017). *“But we said to the Province of Zuid Holland, our province, we don’t want it because if you do that at a certain point everywhere you stand you will see windmills”* (sustainability policy adviser-GO 2017).

The province and the municipality commissioned a “PlanMER” (Milieueffectenrapportage) [Environmental Impact Assessment-EIA], in order to study the whole island and decide on the locations for the large wind turbine parks to be integrated in the revision document of the municipal and provincial *structuurvisie*.

The study was conducted in 2013 by an environmental/technical consultant office (Pondera consultant) specialized in renewable energy projects in collaboration with HNS landscape architects who developed the document “Goeree-Overflakkee. Duurzame energie in het landschap” (2012) (chapter 6.1).

In the *planMER*, six possible site scenarios for wind energy (developed from a landscape perspective) are examined, based explicitly on the HNS report from 2012 and its opportunistic, pragmatic, monumental and narrative design concepts:

1. To develop wind turbines by concentrating them in one cluster in the center of the island, issued from a monumental design concept.
2. To develop wind turbines in lines along the island edges, issued from an opportunistic (using current initiatives, in this case the existing provincial plan in the “Nota Wervelender”)
3. To develop clusters in the external areas of the island, issued from both the pragmatic (expanding existing wind farms) and narrative concepts (accentuating existing landscape structures/telling a story)
4. To develop clusters in the internal areas of the island (issued from both pragmatic and narrative concepts)

Two more scenarios were added to these four options:

5. To develop wind turbine parks in the water surrounding the island
6. To develop wind turbines near dams and dykes.

According to the HNS report, Goeree - the Western part of the island (named *kep* that means *head*) - is excluded from the wind energy implementation areas, because of its peculiar dune landscape, classified as cultural heritage and because it has vulnerable areas from an ecological perspective.

These 6 scenarios were further examined through four topics: living environment, ecology, energy yield and landscape. Living environment (*leefomgeving*) considers the distance (450 m), noise and other effects that could affect nearby built areas; ecology (*ecologie*) the possible impact on birds, bats and other fauna and flora; energy yield (*energieopbrengst*) considered average wind speed and other variables affecting the efficiency of the wind turbines; landscape (*landschap*) considers both impact reflection on cultural and heritage aspects (the proximity to old villages and ancient polders are considered negatively), or the visibility from built-up areas, and design concepts. The latter means finding sites for wind turbines through meaningful and clear concept (can it tell a story?), which connects them with the existing landscape and gives an internal order.

Table 7.1, Assessment of the six scenarios. Green: favorable, red: not favorable, yellow: possible Source: elaboration and translation by the author from Pondera. 2013. *PlanMER Windenergie Goeree-Overflakkee*, p. 7. Translated by the author.

	Living environment	Ecology	Energy yield	Landscape
1. One large cluster	Yellow	Green	Red	Yellow
2. Edges lines	Yellow	Red	Green	Red
3. Clusters external areas	Yellow	Yellow	Green	Green
4. Clusters internal areas	Yellow	Green	Yellow	Red
5. Clusters on water	Green	Red	Green	Yellow
6. Clusters near dykes/ dam	Yellow	Red	Green	Green

Table 7.1 shows the summary of the scores for each category leading to the choice of the option three, which locates the wind turbine projects in clusters around the edges zones of the island. From a landscape perspectives this is considered a good option (green color), because clustering the wind turbines in precise areas allows otherwise views of free horizons. Moreover, the influence on the cultural heritage areas is limited, because the ancient polder and the historical center are mainly inland. Moreover, the option three is recognized as developing a clear design concept that “tells a story”, highlighting the land-water border of the island and creating an open but defined framework on the surrounding landscape.

So the landscape perspective considers the “impact” on cultural heritage, value assigned to natural reserves etc. However, this point of view is combined with another coming from landscape design, that provides insight based on landscape composition, going beyond the use of only “void” as space opportunities for wind turbine projects. Indeed, it has been a choice of

local institutions to rely on the landscape report, “Goeree-Overflakkee. Duurzame energie in het landschap” to support choices for wind turbine sites. They see an interest to consider and refer to the report, since there is no obligation to consider these design insights mentioned in it. On the basis of the cluster on the edges concept (scenario 3), several specific location possibilities were explored further and led to the development of two alternatives, one with 7 large clusters (about 12 wind turbines) and another with 12 smaller clusters (with about 5 wind turbines each). The specific location was decided by overlapping on a map the nature sensitive areas, the ancient heritage ring polder with a distance of at least 450 m from the park and the inhabited areas. The remaining “white” areas on the edges were considered suitable for wind turbine park implementation, while still maintaining an alternation between solids and voids (figure 10).

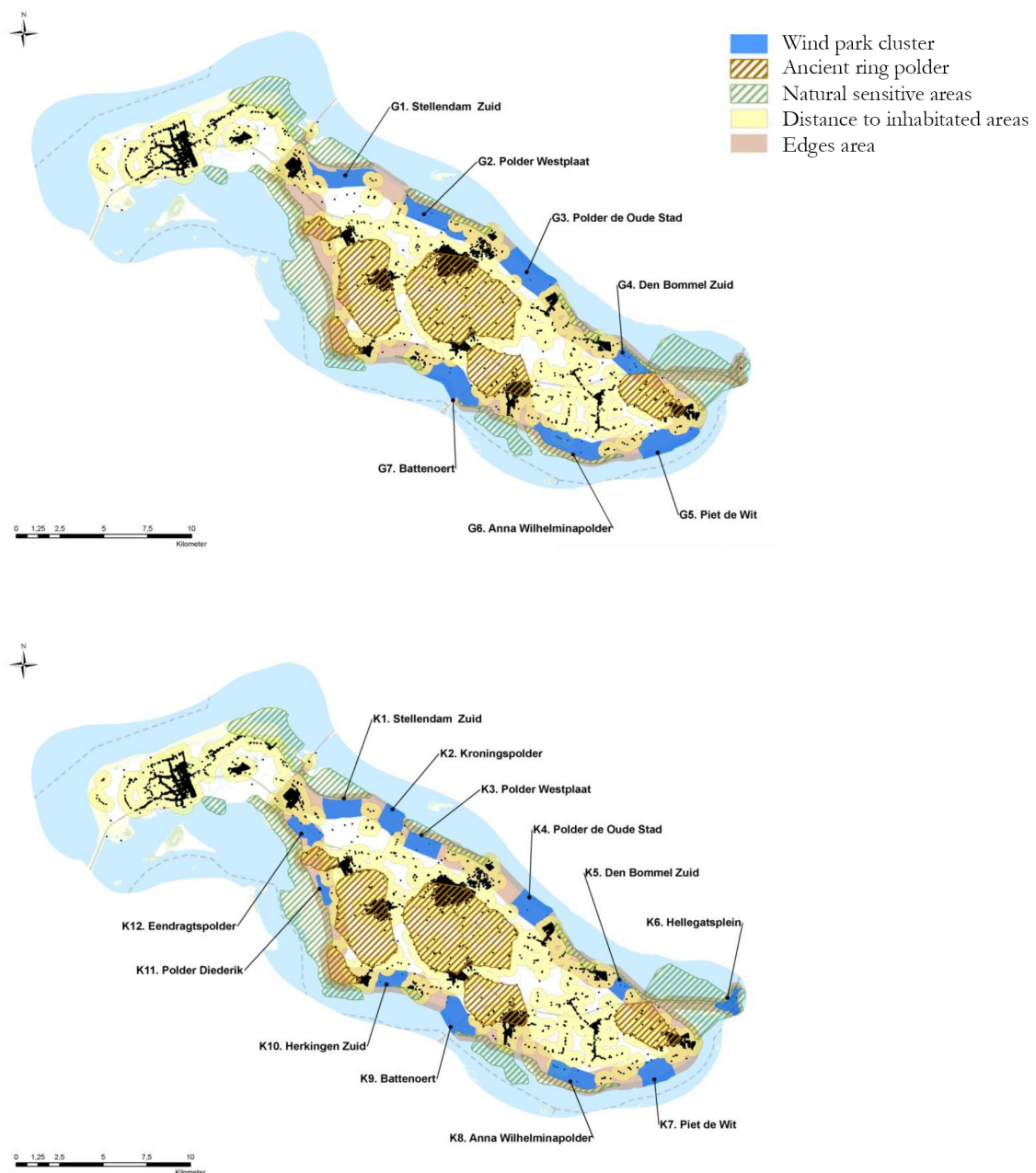


Figure 10. Large clusters (top) and smaller clusters (bottom) for wind turbines. Source: Pondera. 2013. PlanMER Windenergie Goeree-Overflakkee, p. 4.

Eventually, the option with larger clusters was chosen, and further explored in detail:

“then when they had to research in the MER they said we’ll try ...we researched a few different things, what if do in a lot of small spots, and what if we do it in larger spots, what is the effect on the landscape, and then they chose to build in few larger spots. Otherwise it would have been twelve small parks and now we will have 5 larger parks” (Director Cooperative Deltawind-GO 2017). The decision was not really easy, behind it was also economical aspect: “So we want to pack them closer together. So if you stand here you see 53 windmills, but if you stand over here you don’t see any. So we want to keep them separated. [...] And of course the parties that have a lot of land that goes through... in small stripes through the landscape they want to spread it out, and if you are big farmer and you have this big amount of land that you have never used because it’s too sandy or too dry, of course, you want to put all of them [wind turbines] together! I mean there is always somebody who gets the money” (sustainability policy adviser-GO 2017).

At the end of the negotiations, where figure 11 represents the map with the final decisions, areas in both alternative scenarios (larger and smaller clusters) were combined. This is partially due to the process for the three wind turbines in Herkingen Zuid and the four ones in Hellegatsplein which had already started and were advanced in the process at the moment the decision was made. Even if the design concept of alternating solid and void areas on the edges to underscore the island’s land border with water remains, the dimension of the cluster is variable, both larger and smaller ones, due to other external forces such as the advanced procedures for some projects, economic interest of some groups, etc. so in essence, meeting opportunity criteria.

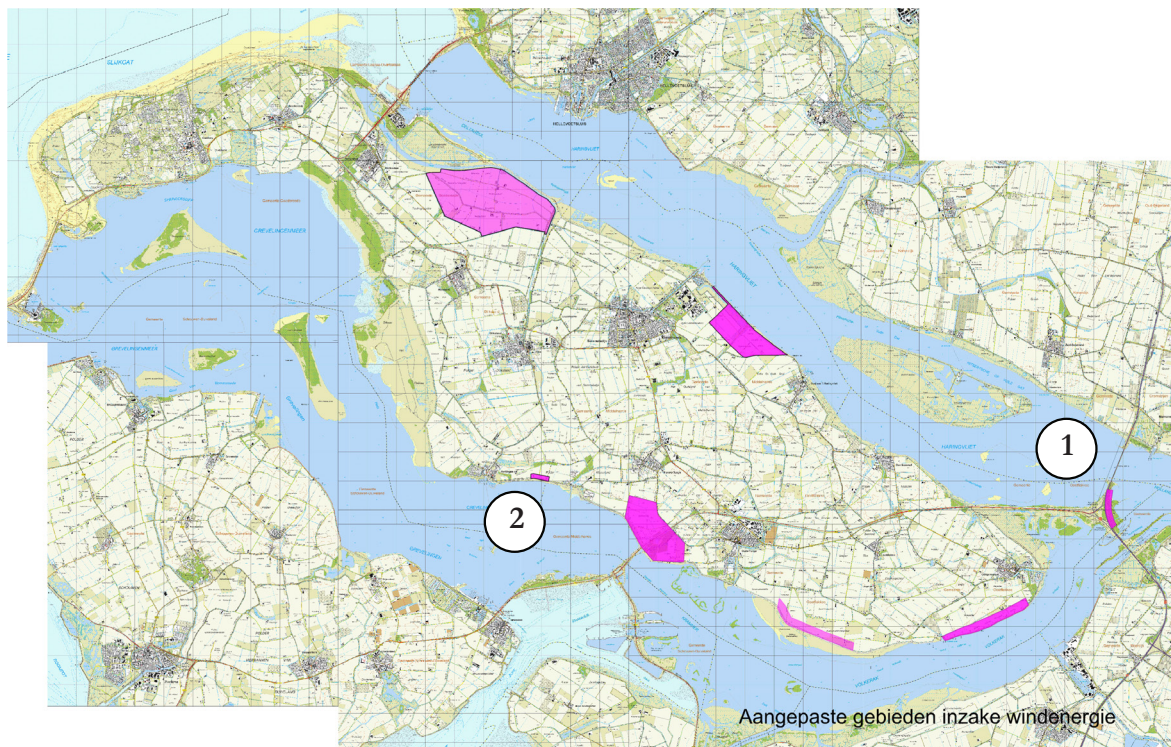


Figure 11. Wind turbine areas implementation (rose) Source: Structuurvisie Goeree-Overflakkee windenergie. 2014.(1) Herkingen Zuid and (2) Hellegatsplein.

These final locations for wind parks were finally integrated in the revision of the *structuurvisie ruimte and mobiliteit* (2014) at provincial level, by including them in the “verordening ruimte” [spatial regulation/ordinance] section shown in figure 12 where the areas perfectly correspond. Once integrated in the document they become compulsory, meaning that wind park implementation are permitted nowhere else. “Then the *structuurvisie* was confirmed from then on. When the *structuurvisie* was confirmed it was certain where you can build and where you cannot put them” (Director Cooperative Deltawind-GO 2017). Finally, these areas have been inscribed in the *bestemmingsplan* [zoning plan] of Goeree-Overflakkee, that legally defines possible the land uses for the municipality.

Moreover, because of the agreement “Duurzame energie op Goeree-Overflakkee” (2012) between the province and the municipality, Goeree-Overflakkee has to implement the wind projects conducive to reaching the 260 MW goals for 2020 in these areas.

Through the wind energy procedures, that until now remained the most enhanced actions towards reaching the energy transition goals, we see that landscape considerations played a role in the determination of the implementation areas. Indeed, landscape architects contributed to the *planMER*. The landscape report was considered and used to shortlist possible locations. However, in the process other subjects and considerations entered the decision-making arena, resulting in some adjustments linked to opportunities and economic considerations.

Map 10 Wind energy

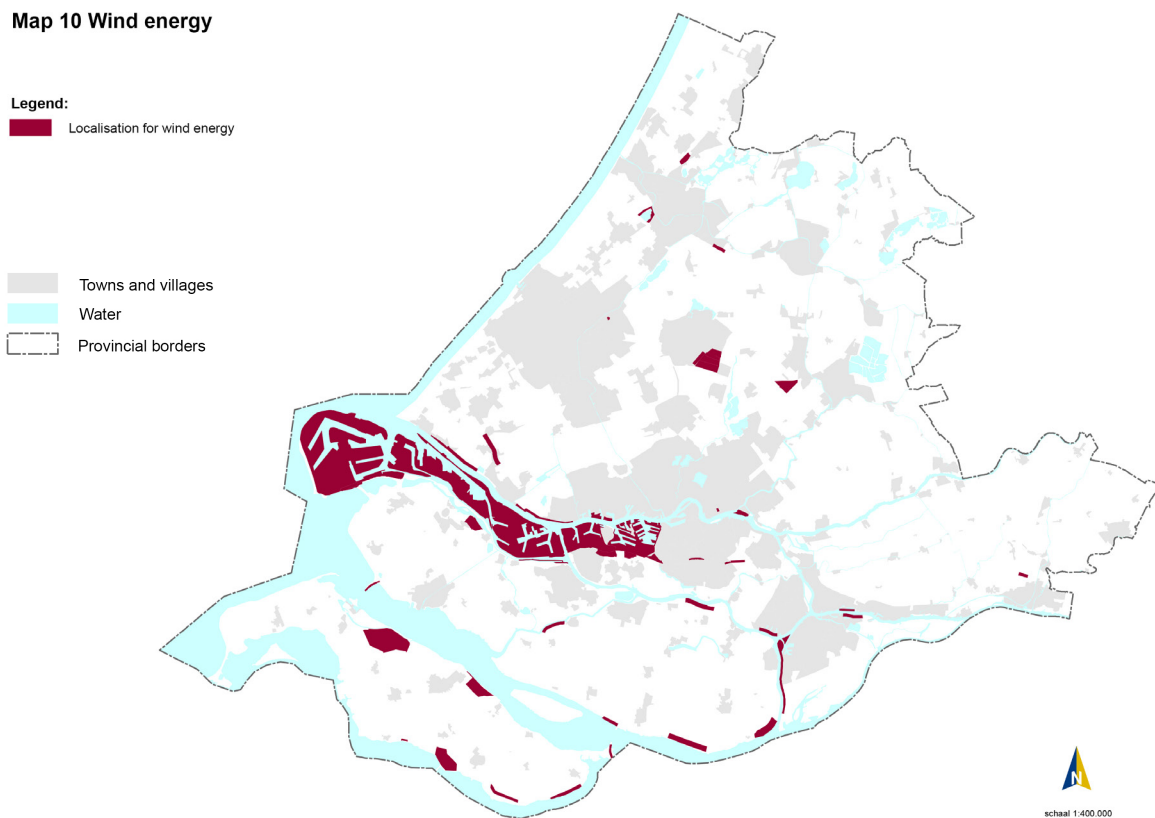


Figure 12. Wind energy location map. Source: Province Zuid Holland. 2014. Verordening ruimte. Visie Ruimte en Mobiliteit. kaarten, p. 10. Translated by the author.

7.3.2 Municipal planning documents: “bestemmingsplan” and “structuurvisie”

As stated above, the areas for wind turbine implementation have been introduced in the *bestemmingsplan* [zoning plan] of Goeree-Overflakkee legally defining possible land use. One of the energy conscious possibilities outlined by this document is to define areas for future renewable energy implementation. Moreover, the document defines the specific building rules such as that the maximal height for wind turbines (blades included) as being 150 m. However, there are not landscape specific rules for their implementation, even if it is specified that for the development of this kind of project landscape considerations need to be included in the application for a building permit. The areas for the development of photovoltaic parks are included in this document too, but these areas must be approved by the province before the PV park implementation. Photovoltaic parks are forbidden within the municipality, but four pilot projects have been approved by the local institutions in agreement with the province. Some of these on agrarian land have been already implemented, some are in progress. The goal is to learn from these experiences, that can be beneficial at the provincial level too.

Moreover, the *bestemmingsplan* includes, in its explanation (*toelichting*) sections, some recommendations about energy for buildings, allowing the possibility to integrate PV panels and solar heating collectors on the roof and heat pumps for renewable energy production. It also stresses the importance to carefully consider the correct orientation of building roofs in order to maximize solar gains and consider the form and orientation of surroundings buildings to avoid shadows on the PV panels. Finally, there are some indications that encourage choices for building material that have little impact on environment by considering their whole life cycle (pollution, air, energy). So, some specific energy focused recommendations concerning energy consumption reduction in buildings are highlighted just as the those stated in the PLUi of CC Thouarsais.

However, if we look at the *structuurvisie* of Goeree-Overflakkee, giving the strategic orientation for the municipality landscape and energy transition topics are found discussed in two different chapters named “Landschap, cultuurhistorie en natuur” [Landscape, cultural history and nature] and “Duurzaamheid en klimaat” [sustainability and climate], where the energy transition topic is addressed. In the landscape focused chapter, a detailed analysis of the landscape taken by the LOP (2013) is included, but with no reference to energy, which, lacked in the LOP document itself. Nevertheless, in the chapter about sustainability where energy transition is addressed, there is a subsection “Fonds energie voor landschap” [energy fund for landscape] where the accent is placed on how renewable energy production will need space and so compensations are required. In order to do so, the municipality wants establish a system in which energy producers contribute financially to “landscape development and strengthening of historical and cultural structures”²⁶ (“Structuurvisie Goeree-Overflakkee” 2011, 51). So the direct connection between energy transition and landscape appears as related to RE devices and their implementation.

The vision of energy mainly focuses on the RE production by a mix of sources (wind, sun, tidal, geothermal), and is considered as the major form of potential growth for the island also from

26 “landschapsontwikkelingen en versterking van cultuurhistorische structuren”

an economic perspective. When considering possible energy savings, just a short paragraph highlights how the municipality wants to build more energy efficient buildings. However, as seen in chapter 5 the trigger element that convinced municipal institutions to engage in energy projects was the need to generate renewable energy from wind. So is not surprising that the initial focus was on RE generation.

Concerning the agricultural sector, it could be found a small reference to energy in the same chapter about sustainability and climate. Here are promoted projects development by combining agriculture and energy production, such as biogas. However, the connection to possible landscape impacts inherent to this kind of project is not addressed. This could be questioning since the dairy farm, which could produce waste manure, are not the main kind of agricultural activity on the island where the cultivation of beets and potatoes is predominant.

It is interesting to point out how agriculture has no dedicated chapter but it is treated in a transversal way across other topics. Agriculture is mainly discussed in the chapter on landscape, showing how the polders and agriculture have shaped the landscape of the island over time. And, how nowadays it is connected to biodiversity and other ecological issues. This is different from the French cases, where the agricultural sector had a dedicated chapter.

However, when this vision has been developed the energy transition process for the island was at its beginnings and still under definition, so within the document the energy transition and its goals remain at a general level.

7.3.3 Provincial level: “Structuurvisie ruimte en mobiliteit PZH”

The “Structuurvisie ruimte en mobiliteit” contains the main spatial policy goals and actions for future development of the province of Zuid-Holland. Four main subjects are at the base of the document and discussed in order to provide desirable development perspectives: (1) to make better use and improve the existing, (2) to improve the attractiveness of the agglomeration, (3) to improve its spatial qualities, (4) to promote water and energy efficient society.

So this document directly address the point (4) the energy transition topic, putting it among the main subjects for the province’s spatial planning.

However in the *visie* part of the document, that explains the general strategic vision for the province, energy and landscape topic are addressed in two different chapters. The chapter about landscapes named “Quality of landscape, green and heritage” [Kwaliteit van landschap, groen en erfgoed] associates and discusses landscape mainly from a natural, recreational and heritage viewpoints. While the chapter “water, soil and energy” [water, bodem en energie] address the energy transition topic directly. Nevertheless, in the landscape chapter it is highlighted how, next to heritage and green recreation, the new quest for renewable energy is raising new demands on green spaces that need to be taken into account, but without further details (“Visie Ruimte En Mobiliteit. Structurevisie Ruimte and Mobiliteit, PZH” 2014). In the chapter dedicated to energy, we found the word “landschap” in the subsection related to the wind turbines siting explaining that “The locations are the result of a trade-off between wind energy demands

and landscape conditions and spatial quality”²⁷ (“Visie Ruimte En Mobiliteit. Structurevisie Ruimte and Mobiliteit, PZH” 2014, 81) and that “Location choice is excluded in vulnerable areas from a landscape, cultural, ecological and recreation point of view”²⁸ (*ibid.* p. 81). It is equally mentioned in the part about PV park development highlighting how “in principle, they have a clear influence on the landscape quality and limit space for food production”²⁹ (*ibid.* p. 82) so it emphasizes how their (RE) implementation in the province has to be carefully thought out while considering the scarce surface space available in this high density province. Even if there are other subsections about network improvements with the aim to recover residual heat from the harbour and other energy-saving measures, through building retrofitting, imposing new energy standards on new buildings and measures to encourage slow mobility, the word *landscape* does not appear. This situation is similar in attitude to the one we saw in the two French cases, where landscape is associated with RE production, mainly for wind turbines and PV panels implementation, but not (yet) associated with energy-saving measures.

A similar document structure and chapter names, that separates landscape and energy transition, is also used in the *Programma ruimte* [space program] part “Structurevisie ruimte and mobiliteit” where the operational goals and concrete measures and instruments to achieve them are defined. And as in the *visie*, landscape appears in the section about energy transition in connection to wind turbines and PV panels implementation addressing it in the same way, while it is not present in the section about the increase of energy-efficiency in buildings, geothermal heat extraction and heat network development. Moreover, in the landscape chapter, the energy transition topic does not appear anymore. There the cultural heritage and green recreational aspects of landscape are addressed.

Besides in the “*verordening ruimte*” (spatial regulations) part of “Structuurvisie ruimte and mobiliteit”, the provincial instrument that sets rules affecting the municipal *bestemmingsplan* (zoning plans), the energy transition topic is developed only regarding wind energy and is addressed in a specific chapter. In this chapter, the location choices for wind energy implementation (see figure 12, above) are defined, and some rules such as repowering existing turbines with new ones, at the same maximum height, are included. Landscape does not appear, but as saw in the previous section landscape design principles have been taken into account for the definition of the wind turbine zoning plan. The other energy-related topics, such as recommendations about low consumption of energy in buildings, does not appear in this part, leaving decisions to local municipal institutions.

Energy-related actions for the agricultural sector are not specifically formulated, similar to the *structuurvisie Goeree-Overflakkee*.

27 “De locaties zijn het resultaat van een afweging tussen eisen vanuit windenergie en voorwaarden vanuit landschap en ruimtelijke kwaliteit”

28 “Ebieden die vanuit landschappelijk, cultuurhistorisch, ecologisch of recreatief oogpunt kwetsbaar zijn, is plaatsing uitgesloten”

29 “Ze hebben in beginsel een duidelijke invloed op de kwaliteit van het landschap en beperken de ruimte voor voedselproductie”.

7.3.4 Summing up

In the Dutch case, similar to the French cases, landscape is mainly considered with regards to renewable energy technologies. Although planning documents highlight energy-saving measures that relate to changes in the spatial organization of functions and could affect landscape, the connection is not explicitly established. We found this connection only in the voluntary landscape report described in the precedent chapter (chapter 6), but it has not transcended into the territorial planning instruments yet.

However, contrary to the French cases, the landscape report for Goeree-Overflakkee was used to define legally binding planning documents, even if only for choosing the installation site of wind parks. Following the wind turbines site process, it was possible to see that landscape design principles have been mobilized. Indeed, wind turbines remain the most addressed technology in connection to landscape found in the studied documents both at municipal and provincial levels. This particular attention towards wind turbines (at that time) is probably related to the mandatory implementation due to national targets at the regional/local scale.

7.4 A crossed perspective in the planning instruments

The exploration of the connection developed between landscape and energy transition in planning instruments is important in order to understand the actual state of situation and how it is open to further integration. This could lead to an improved development for the documents in the future, to better integration and new commissions in landscape architecture. First it is important to remember that in the three embedded cases of this study the energy transition topic and landscape were shown to be important to be integrated in these planning instruments, especially for the French cases. Although they could not be defined as representative for other territories, the reason to choose them was: to inquire about possible “best practices” of what is feasible to accomplish. The result, however, draw attention to several limits on how landscape and energy transition are included in these documents.

7.4.1 Landscape and energy concerns in planning instruments

Table 7.2 sums up the results we found in the analyzed documents between energy transition, operational principles and their connection or not to the word *landscape*. I inquired energy principles which are defined both as operational principles which implementation could impact landscape changes, but also as spatial/landscape principles which, if implemented, could improve energy management (e.g. building orientation to maximize solar gains). In the table we divided RE production and energy consumption reduction, because they are each energy transition pillars for which distinctions appear in planning documents.

Table 7.2, Sums up the energy transition measures stated in planning documents in the three territories under analysis, highlighting their connection with landscape. We also included the *plan de paysage* and the Dutch landscape focused report. Green background color corresponds to the explicit connection between the energy action and landscape. The white background means that the specific measure could affect landscape but that such a connection (or others) is not established in the respective document. Source: author

	Renewable energy production	Reduce energy consumption
CC MONTS DU LYONNAIS		
SRCAE - 2014	Wind turbines and on ground PV implementation: landscape integration Hydroelectric, wood energy, biogas technologies implementation	Compact settlements form, building retrofitting, slow mobility, etc.: spatial design principles for low energy consumption
SRE - 2012	Integrating wind turbines in landscape from the site choice to their implementation phase: landscape design principles	/
PCET - 2015	Wind turbine implementation: landscape preservation Biogas, photovoltaic panels, hydroelectric technologies implementation	Compact settlements form, building retrofitting, slow mobility, etc.: spatial designing principles for low energy consumption
SCoT-PADD/DOO - 2016	- To develop a mix of RE technologies projects: landscape integration - PV implementation: landscape integration	Compact settlements form, building retrofitting, slow mobility, etc.: spatial design principles for low energy consumption
Plan de paysage - 2016	PV panels implementation and wood energy sector development: landscape design principles	Energy building retrofitting: landscape design principles
CC THOUARSAIS		
SRCAE – 2013	Development of trees and hedges for wood energy: landscape enhanced Wind turbines, photovoltaic panels, solar heating, biogas power plant, agrofuel, geothermal technologies implementation	Compact settlements form, building retrofitting, slow mobility, etc.: spatial design principles for low energy consumption
SRE - 2012	Wind turbines, landscape design integration principles and site plans	/
PCAET - 2018	- Implementation for wind turbines and PV parks: landscape preservation - <i>Bocage</i> landscape suitable for the development of wood energy sector Biogas, solar heating, geothermal technologies implementation	Energy building retrofitting, raising inhabitant awareness of territory inhabitants: spatial design principles for low energy consumption

SCoT-PADD/DOO 2018	RE technologies implementation to be reconciled with landscape issues	Building retrofitting, new high energy performance buildings, slow mobility, etc.: spatial design principles for low energy consumption
PLUi - 2018 (provisional version)	RE development in agricultural land holdings: landscape integration - Possible rules derogation for RE technologies implementation in buildings - Specific principles for PV integration in buildings.	Compact settlements form, building retrofitting, new high energy performance buildings, slow mobility, etc.: spatial design principles for low energy consumption
OAP landscape & energy – 2018	- Landscape design principles for wind turbine site plans - design principles for landscape integration	/
Plan de paysage – 2018 (provisional version)	- Energy transition landscape analysis - Wind turbines, photovoltaic panels, wood energy, biogas technologies implementation: listing of landscape design principles (there is no a detailed action plans)	Energy building retrofitting, slow mobility, local food production systems, raise awareness about sustainable behaviour: listing landscape design principles (there is no a detailed action plans)

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Structurevisie windenergie – 2014	Wind turbine site choice for implementation. Landscape design principles	/
Structurevisie Goeree-Overflakkee – 2011	Implementation of a RE technologies from a mix of sources (wind, sun, tidal, geothermal): possible landscape compensations	Energy building retrofitting, building by good solar orientation: spatial design principles for low energy consumption
Bestemmingsplan	- Principles/rules for wind turbines and photovoltaic panel facilities implementation. - Site choice for wind turbines and on ground photovoltaic parks.	Rules for energy-saving measures in building, to avoid sprawled settlement: spatial design principles for low energy consumption
Landscape report: “Goeree-Overflakkee. Sustainable energy in the landscape” – 2012	Landscape design principles for RE technologies implementation	/
Landscape report: “Energy producing Goeree-Overflakkee. Scenarios for making the energy supply more sustainable until 2030” - 2017	Several scenarios for RE technologies (wind turbine, photovoltaic panels, tidal, geothermal) implementation: landscape design principles.	Several scenarios for energy building retrofitting, high-performance new buildings, slow mobility: landscape design principles for low energy consumption
LOP 2003	/	/
PZH Structurevisie R&M. Visie (vision) - 2014	- Wind turbine implementation: landscape integration - Photovoltaic parks: landscape impact Geothermal implementation	Energy cascading from industrial, to residential, energy building retrofitting, high energy performance buildings, slow mobility, etc.: spatial design principles for low energy consumption

PZH Structureevisie R&M. Programma ruimte (spatial program) - 2014	<ul style="list-style-type: none"> - Wind turbine implementation: landscape integration - Photovoltaic parks: landscape impact Geothermal implementation	Energy-efficient buildings, heat networks, etc.: spatial design principles for low energy consumption
PZH Structureevisie R&M. Verordening ruimte (spatial regulations) - 2014	Wind turbines implementation	/

The first visible result is that landscape direct concern both in France and in the Netherlands is associated with wind parks. The landscape impact of RE facilities implementation remains the most debated landscape issue towards energy transition in France as in the Netherlands. Wind turbine implementation principles are directly related to their landscape impact most of the time. Here is where landscape is mostly addressed by a preservation point of view. This is followed by the landscape concerns around PV parks, often connected to preserving agricultural land. However, the majority of documents address several type of RE facilities implementation, but there is no direct connection with landscape characteristics in these cases.

We find this primary focus on wind turbines also because there are several specific planning instruments devoted to wind turbines, for instance, the obligatory SRE at regional level in France, or the OAP voluntarily developed in the CC Thouarsais, or in the Goeree-Overflakkee the *structuurvisie windenergie*. There are no other documents specifically developed about other RE technologies such as PV parks. However, in France, the LTECV introduces a new document the “schéma régional biomasse” [regional biomass scheme] with the goal to estimate biomass potential and its accessibility in the region in order to facilitate the development of RE production. This shows an enlargement, compared to the sole wind turbine SRE focus, but in the territories under analysis these documents were still under elaboration with no possibility to examine them. In the Netherlands it is possible to develop several *structureevisie* about different topics estimated to be of relevance for the territory. In Goeree-Overflakkee, regarding energy transition, only the one *windenergie* exists, showing that, as compared to other sources, their site plans and implementation remain the main concern. Indeed, the binding regulations of the Province Zuid-Holland in its *structuurvisie R&M*, relating energy transition concerns, addresses only wind turbines. It is also true that this focus on wind energy in Goeree-Overflakkee comes from the national and provincial obligation to implement several parks on the island and subsequently from the need to regulate their implementation. These decisions probably also result from the economic arguments, because for now wind energy is economically the most viable RE technology in France and the Netherlands (ADEME 2017), progressively followed by PV panels.

Considering table 7.2, another result identified is that in none of the French and nor Dutch planning instruments, is landscape associated with energy-saving measures, except for the *plans de paysage* and in the second Dutch landscape reports (2017) but they are not regulatory and binding. Compulsory planning instruments highlight principles that, from a spatial/landscape planning and design perspective, could encourage reducing energy consumption. However their potential landscape effects are not addressed at all, even if the changes required in urban areas could be extensive (e.g. external isolation, compact urban form). For the CC Monts du Lyonnais

case this shows a dis-connection with the landscape point of view developed in the *plan de paysage* about the energy retrofitting for an existing neighborhood, presented in one of its action plans. For Goeree-Overflakkee, interestingly, there is a direct connection between the landscape design emphasized in the first landscape report (2012) and the planning instrument *structuurvisie* and *bestemmingsplan*. The principles brought to attention in this report are used as a support to define the regulatory framework for wind turbines and their site proposals.

Some similarities could exist with the landscape and energy OAP, focused on wind turbines, in the CC Thoursais where a landscape architect in charge of the *plan de paysage* is directly involved in the draft of this document. Nevertheless, in reality the process is very different in each case because even if both consider the issues of ecology, distance from existing buildings, etc., in the OAP the site for wind turbine parks are pre-settled while for the Dutch case the *structurevisie* and the *bestemmingsplan* sites for wind turbines are chosen after a process that considers/includes landscape design principles.

For the French case, the PCAET document being energy-climate-air centered is a very relevant document for territory analysis and fixing energy goals. Nevertheless, it seems to lack explicit insight into spatial/landscape dimension that could be a significant and valuable support in establishing energy goals (e.g. exploration of available surface area and sites for photovoltaic or wind turbines) as well as the way to achieve them (e.g. establishing synergies among functions). An interesting tool could be the introduction of energy potential maps (e.g. van den Dobbelsteen, Broersma, and Stremke 2011) representing solar or wind but also biomass potentials as well as heat cold storage locations, that could be further exploited through a cascading process. Indeed this kind of representation requires reliable data at a local level, that are in many cases not available.

In the Netherlands there is not specific energy planning instrument (see chapter 3), even if specific *structuurvisie* could be dedicated to energy topic. However, a new instrument has been recently introduced through the Dutch *Nationaal Klimaatakkoord* (2019): the *Regionale Energie Strategieën*, that, as explained above, aims to define energy targets while considering its spatial component, for all Dutch *region* [territories] covering all the Netherlands. Unfortunately, this instrument is still at its beginning draft and no further exploration could be made during the research period. However, this shows how, in the Netherlands as in France, energy transition development is left less to the discretion of local institutions and strongly encouraged.

Another point that the Dutch and French planning documents have in common is that energy transition and landscape are developed in separate chapters (e.g. SCoT Monts du Lyonnais, *structurevisie* Goeree-Overflakkee), complicating the articulation between the two and showing how they are not easily associated.

Even if differences are shown between territories and nations, the general idea of energy transition in connection to landscape, when relevant in a specific-place, is very linked to RE production more than energy consumption reduction, emphasizing, generally speaking a prevailing perspective for landscape preservation. However, several spatial/landscape principles associated with energy transition such as RE technologies implementation, the development of a compact urban form, and the development of slow mobility have entered in the common vocabulary of these documents both in France and in the Netherlands, relying on the local level to translate and apply the general concept of energy transition. This common shift demonstrates

how planning concepts flow through nations (Healey 2012).

7.4.2 The need for quantitative disaggregated data for spatial planning and design

Another point of discussion is the accessibility of data for energy. The difficulties to access statistical disaggregated data on energy could be defined as an impediment for further insight about the spatial components of energy within territories. Indeed, it is needed in order to develop more spatial conscious and efficient projects that connect energy supply and demand. We acknowledge that for now, in France as well in the Netherlands, the electricity produced is injected in the main power grid, so the energy produced somewhere in a photovoltaic park could be used at a distance far away, and the grid handles fluctuations that are intrinsic to renewable energy production. Nevertheless, the idea to have a better comprehension of the local consumption and production from a spatial perspective is valuable in order to better answer the needs of the territory and to establish synergies among functions.

Several critical points could be stressed, in particular a difficult access to statistical data about energy at local scale. Not all territories have stats available on general energy production or consumption nor by sector for each municipality. For example, for CC Thouarsais, data about energy for the development of the PCAET is only at the *communauté de communes* (grouping many municipalities) scale, and lacks precise information about locations. The CC Monts du Lyonnais benefits from the more complete statistical open data provided by the region, “Observatoire Régional de l’Energie et des Gaz à Effet de serre” (OREGES), which provides energy data at municipal level as well as from a historic perspective. But the data remains incomplete and figures about industries are almost totally absent. The CC are using them to develop the PCAET. In the Netherlands for the province of Zuid-Holland, data are at the territorial (group of municipalities) level, and in some cases at the municipal level. However this topic has been directly addressed in connection with the development of the *Regionale Energie Strategieën* for all the Dutch territories and the construction of a database is in progress.

In order to better understand the topic I led a parallel investigation in order to find the energy data used for the planning documents, and see if other more local disaggregated data were accessible. I contacted the offices that backed the technical services departments of the territory under analysis and other accessible data bases, such as the regional office. One of the main problems is that for privacy issues the data on energy consumption for the industrial sector are not made public. This absence is, for example, mentioned in the PCET of CC Monts du Lyonnais that underlines this approximation (“PCET SIMOLY” 2015, 26) (some maps elaborating some energy data could be found in annex 16).

This difference in data disaggregated is found in the lack for example of maps in the PCAET of CC Thouarsais illustrating spatially local potential and consumption.

The need for disaggregated data on energy and their difficult access aligns with the results from other research that explored this gap, showing how the connection between local data on energy and territorial characteristics (e.g. building age) could actively support the definition of a strategy for energy consumption reduction (Pincetl et al. 2016). Some research also emphasizes the

need to access spatio-temporal dimension and how this data could be useful for environmental designers and urban planners to implement tailor-made energy strategies (Voskamp et al. 2016).

7.4.3 Sectors including energy goals and a landscape perspective

Throughout the studied planning documents, energy transition is addressed across sectors, housing, transport, agriculture, and industry. However, the connections between these sectors and landscape are few and not clearly established in the documents.

I noticed that all the actions regarding energy reduction consumption such as the implementation of external insulation in buildings or the implementation of paths and streets for low mobility are not directly associated with landscape.

The same could be said for the agricultural sector that, especially considering the rural character of the embedded cases, could play a major role toward achieving of energy goals, through biogas production, biofuel production, wood energy etc. For this sector, again connection with landscape are under-evoked. Yet all these actions could induce major landscape changes through possible changes in agriculture: the type of crop cultivated, new trees and hedges plantations, etc., beyond the installation of the biogas power plant itself. We found some association made to landscape in the CC Thouarsais's PCAET relating to the implementation of *bocage* for wood-energy sector development. However, the connection is absent in the regional planning instrument (SRCAE).

Landscape is mentioned in connection to agriculture when these documents explain how the implementation of PV parks should respect and preserve food production.

Beyond the landscape impact, some research has shown how a better analysis of biomass production for energy from a spatial perspective could lead to better choices in scale for implementation and improving positive social impact (van der Horst and Vermeulen 2011 b). Moreover it is explored how landscape viewpoint could back conscious choices on more suitable areas for biomass development (Howard et al. 2013).

Another sector for which landscape seems not be entered in the discussion is in industrial contexts. Even if the industrial sector is stressed in the French document, such as the PCAET, and in the Dutch ones there is no clear connection with spatial perspectives. The industrial sector is primarily connected to improvements for energy efficiency where machines are used to reduce energy demands, an aspect hardly connected with landscape. However, in the planning document some focus exists on identifying waste energy/heat to be re-used in other nearby manufacturing facilities, companies etc. For this energy cascade a spatial analysis of proximity among industries and areas could back the process.

However in the Dutch case, I found mentioned the idea of heat energy cascade from Rotterdam's industrial harbor to the residential areas in the landscape report at a provincial level ("Zuid-Holland Op St(r)Oom!" 2012). This gives prominence to the idea that these two topics are starting to be linked.

7.4.4 Energy conscious principles and concepts: an unconscious connection

In chapter 2 of part 1 of this thesis, we analyzed three concepts, *urban metabolism*, *circular economy* and *cradle-to-cradle*, and the spatial principles associated with them in scientific literature. In the planning instruments that were analyzed for this chapter we found several principles that were found in that first repertory of concepts, without a direct nor clear connection. In the planning and landscape focused instruments both renewable energy production, energy-saving measures and optimization of energy stream appear. These three energy transition strategies represent the framework used to classify energy principles associated with the concepts. In table 7.2, that summarizes the energy principles we found in planning instruments, we defined energy production and energy consumption reduction measure accordingly to the direct connection we found in the planning document themselves, where no direct reference to energy stream optimization was made. However, many indirect references to waste stream optimization exists, for example in planning documents we find connections made to the agricultural sector. Indeed, I found principles to use local manure or other agricultural waste for biogas production and local wood for energy development, principles also represented in also found in the table 2.1 (chapter 2). Moreover, proceeding with the comparison of tables 7.2 and 2.1 in the planning document, some principles are mentioned that refer to energy reduction consumption through spatial organization, for example through the development of more compact forms of settlement, or avoiding low density sprawled construction (e.g. SRCAE Rhône-Alpes 2014, PLUi CC Thouarsais-provisional version 2018). The improvement of energy management at a building scale is also considered and found in both tables (e.g. PCAET CC Thouarsais 2018, SCoT CC Monts du Lyonnais Structureevisie Goeree-Overflakkee 2011) and so also several principles for reducing energy and particularly fossil fuel in the transport sector, for improving the use of public transport and for slow mobility (e.g. SCoT CC Thouarsais, PZH Structureevisie R&M. Visie - 2014). Moreover, broader parallels could be founded between the principles associated to concepts and the principles mentioned in the planning instruments concerning the use of RE sources using local resources (e.g. SCoT CC Monts du Lyonnais 2016, PCAET CC Thoursais 2018, Structureevisie Goeree-Overflakkee 2011).

However, several principles found in the systematic literature review are not yet present in the planning documents, such as those concerning the control of embodied energy in use of material and building process as also the use of vegetation and water in order to cool down urban areas. The latter is connected to the so-called heat island effect in metropolitan areas, so for the territories analyzed, who are mainly rural in character this is not a matter of great concern. Moreover as mentioned also in the previous sub-chapter we found little reference to spatially relevant principles that are intended to improve energy management in the industry sector or more broadly in the built environment (e.g. energy cascading, industrial symbiosis etc.) even if a few exception exist (e.g. PZH Structuurvisie R&M. Visie 2014).

Even if the concepts discussed in scientific literature are not mentioned in territorial planning documents, it seems that several principles associated with them transferred to these territories, even if this connection is unconscious in nature.

Box 7. Contribution of chapter 7 to the part 2 research question

Planning instruments carry a project framework to shape the future of territories. In this chapter we explored the way they address energy transition and landscape together and what role is given to landscape design and planning from an institutional perspective in the energy transition process.

Generally speaking, from the French planning documents emerge a conservative, aesthetic vision about landscape, connected to heritage and natural beauty, which persists in connection to the energy transition /issues. The same attitude was found in some Dutch documents as well, however it is accompanied by with a landscape design attitude. In Goeree-Overflakkee, for instance, the designing principles developed in the first landscape energy report (2012) were used, and combined with other considerations, in order to define the choice of location for the wind turbine parks across the island.

Landscape planning and design in the field of energy transition play a role in connection to RE technologies and their site planning without explicit connection to energy consumption reduction. The understanding that spatial organization could affect the reduction of energy consumption is acknowledged but it is not directly connected to the idea that it could lead to landscape impact or change. And vice versa, the landscape viewpoint is not considered to be useful as leverage to improve energy saving.

CHAPTER 8: Energy transition landscape narratives – agents’ point of view here and now

In the previous chapter are analyzed the reasons and the process for landscape perspective’s entrance in the energy transition process of the territory: how this is developed in landscape focused documents and how this concern has been translated in the planning instruments of the three embedded cases. How and to what extent landscape planning and design participate in the energy transition process of the territory.

The analysis at the institutional planning level enables the assessment of both its strengths and weaknesses and gives insight for future developments thanks to the comparison on an international level and identified differences.

I now turn from the institutional level to the social perspective. I will explore the possibility of landscape as a sharable medium fostering decision making and knowledge synthesis among people of different backgrounds that have different perspectives in order to engage in a designing process and debate on a definite subject (Van Damme, Leinfelder, and Uyttenhove 2013; Kempenaar et al. 2016; Nassauer 2012), in our case energy transition.

On this basis beyond the institutional level, several researches have used the landscape medium to inquire about the social-relational connection between local communities and major energy producing artefacts such as big electrical facilities, nuclear power plants and dams (Bonin 2012) as well as the renewable ones (e.g. Frolova, Prados, and Nadaï 2015).

For social representations in this research I meant the analysis of social-relational imaginary (Devine-Wright and Devine-Wright 2009) of agents about energy transition implementation in/for landscape. The territorialized character of energy transition through decentralized RE production, but also through the reduction of energy consumption, bring the challenge to solve issues both of a spatial and energetic character that lead to new ways to see and value landscapes (Nadaï and van der Horst 2010). The goal of this chapter is to explore energy transition agents’ social representation of landscape in the energy transition context in order to understand to what they attribute attractiveness, positive feelings and sustainable criteria that, to use Selman expression (2010), enable “learning to love” these emerging landscapes.

Agents’ narratives analysis

In order to do that this chapter is structured by discussing the answers to three main questions addressed during the semi-structured interviews across the three territories using a replication strategy (Yin 2009):

1. Could you please give me an example of an energy transition project on the territory that was well done/successful in landscape/ spatial terms?
2. Is landscape important to be taken into account in the energy transition process? Why?

3. What does the notion of “energy transition landscape” evoke for you?

These questions go from a more tangible points of view, asking about real projects, then widening to more general open questions able to let interviewed agents free to describe and explain their points of view and bring out additional topics and issues.

These questions have been formulated in order to inquire about which representations and values are associated with projects that are considered successful from a landscape perspective, about possible reasons for taking landscape into account in the energy transition process of the territory, and finally which component of energy transition (e.g. energy production, energy saving, mobility, etc.) are associated mostly with landscape and if there are any omissions.

The answers to these questions are further coded (Miles, Huberman, and Saldaña 2014) to identify recurrent topics in order to define categories, able to result in knowledge about cultural values among others (Deming and Swaffield 2011). These categories are treated by putting into perspective within the context of the territory and the role and profile of the interviewed professional. Similarities and variations are highlighted, if they do exist, in the way this connection is perceived by the interviewer and among territories.

The semi-structured interviews are developed with agents participating in several ways and through several topics about the transition process of their territory. I chose to interview people having some notion about energy transition, even if they approached it by different sectors and points of view, in order to obtain information able to put forwards several facets of the topic, and likely advance more conscious development in the future.

The interviews developed in the three cases do not have the goal of being exhaustive, gathered from all the agents implied in the process of energy transition. The exhaustiveness, for a number of agents and with a complexity on a territorial scale goes beyond the possibilities of this research study. Nevertheless the interviews try to collect narratives from a multi-perspective set of key energy transition agents, grouping territorial technical services from local communities, elected representatives, external consultancy entities and three farmers (one for each territory) having implemented an energy transition project (see annex 7 for the complete list). This results in a total of 30 interviews (for more details about semi-structured interview method see chapter 5). So, results need to be appreciated considering these boundaries, although not having a statistic relevance, but are able to give insight about the research topic. Several quotes from the interviews are introduced in the text as representatives of an opinion frequently found or underlying a particular subject.

The agents are questioned using the word “landscape”, for the Dutch interviews and “paysage”, for the French interviews, letting them react freely to this notion. Landscape as a notion is fuzzy and often assimilated to other notions such as territory and environment (Donadieu and Périgord 2007; Dubost 1991; Toublanc 2004) and so we are aware that each agent probably has their own definition of landscape. The difference shades in meaning attributed to one word is something intrinsic to qualitative research and semi-structured interviewing methods where a broad range of people with different backgrounds are addressed (Miles, Huberman, and Saldaña 2014).

Authors have tried to define landscape categories. For example, Besse (2009) reviews and

defines what he calls the “the five landscape doors”¹, namely five possible entries to approach landscape: as a cultural representation, as a built and inhabited territory, as the material and living environment of human society (natural and human-social elements), landscape as a sensitive/phenomenological experience, landscape as a project. Selman (2008) tries to define the meaning of sustainable landscape through five dimensions: environment, economics, society, governance, aesthetics.

The goal of this research is not to give an account for nor list the landscape signification shades diversity but to bring out the landscape attitude towards energy development in the framework of the transition process. However, while drawing conclusions, some main attitude towards the perception of landscape are discussed, because they are believed to influence the agent’s attitude towards spatial/landscape energy transition process implementation.

To do that inspiration is taken from some of the above-mentioned categories, but not as a rigid framework but as a useful basis to assist the analysis of the agents’ vision.

Analysis frameworks across categories

After the definition and discussion of the categories developed for the three questions, in the last section of the chapter, transversal frameworks crossing these categories are developed. This is done in order to seize the agents’ point of view on three main topics that could support to understand potentials and difficulties to foresee desirable landscapes in energy transition context. Firstly, it is analyzed the awareness that agents have of the landscape consequences lead by the implementation of energy transition on territories. Researches inquiring social representation are developed, exploring RE technologies implementation (e.g. Nadaï and Labussière 2015; Cohen, Reichl, and Schmidthaler 2014; Wolsink 2017) and also high-voltage transmission lines infrastructures (e.g. Devine-Wright and Batel 2013). However, a general lack of analysis is noticeable on social representations of energy transition in landscape that explore the three energy transition strategies: reduction of energy consumption, energy stream optimization, and RE production. In this chapter the point of entry from a landscape perspective could lead agents to potentially speak of all three strategies, understanding on what extent they are acknowledged and recognized.

Secondly, the analysis wants to point out positive factors that agents’ representation attaches to energy transition from a landscape perspective, across three figurative approaches *ecocentric*, *technocentric* and *anthropocentric* (e.g. Sarrica et al. 2015). This could permit understanding if positive factors mentioned by agents cover all three figurative approaches, and if one is predominant over the others, potentially providing inputs for future implementations.

Thirdly, categories are analyzed through the framework developed by Stremke (2015) for planning and designing of “sustainable energy landscape”: (1) sustainable technical, (2) environmental, (3) economical, (4) socio-cultural. This allows to examine priorities from agents’ perspectives about which criteria they value and consider more or less pertinent for planning and designing of future landscapes. In the following sections the categories elaborated for the three questions are listed and discussed.

¹ “Les cinq portes du paysage”

8.1 Agents' narratives exploration

8.1.1 Project of energy transition successful in landscape term

The narratives of successful projects from a landscape perspectives on the territory give a quiet various overview both in terms of kind of project than explanation about the reason of the project appreciation from agents perspective. Even if the *visual aesthetic* appreciation point of view constitutes a broad part of the answers many explanations go beyond this allowing to list several categories. Moreover the aesthetic and visibility of projects bring several shades about points of view and reason. Some representatives project developed on territories analyzed mentioned several times as successful are also briefly described in order to better understand and contextualize agents' answers. We asked of projects that they appreciated on the embedded case territory in order to be able to visit them and to put their answers in perspective contextualizing what we observed.

Five main criteria are distinguished that characterize successful projects as highlighted during the interviews: aesthetic appreciation, multi-functionality, local character, context effect, high-energy performing. In the following part we discuss each category illustrating it through interview excerpts.

Table 8.1, categories for a landscape successful energy transition project from agent's perspective (question 1), illustrated with representatives quotes and with the number of interviews in which the role is mentioned. The table includes quotes selected as representatives of the main categories listed in the table, in order to provide a clear image of the contribution facets, but avoiding repetitions. A total of 30 interviews. Source: author from re-elaboration of the agents semi-structured interviews.

Category	Quote	Code
Aesthetic appreciation – 17 times	“I have the image of a beautiful biogas power plant, which so pretty, with a small wood biogas power plant [...] I think that ... well that it is nicely integrated in the landscape, with the wood and surrounded by the forest behind” ² (Rhone agricultural chamber, energy adviser-ML 2018)	GC1
	“What I like about Glénay, you see, is that they are in lines and they are parallel to the main road, there, there. So I think ...I think that it is nice” ³ (Sustainable territorial management division director-CCT 2017)	AC1
	“The police station there, that is down there. It is...it is a building that has an interesting architectural quality. The building, aesthetically, is beautiful	TR1

2 “J’ai l’image d’une belle unité de méthanisation, qui est jolie comme tout, avec une petite unité de méthanisation en bois [...] je trouve que... enfin qu’elle est joliment intégrée dans le paysage, avec le bois, et entourée de forêt derrière.”
3 “Ce que j’aime bien à Glénay, tu vois, c’est qu’elles sont en lignes et elles sont parallèles à la route principale, là, là. Donc, j’trouve... moi je trouve ça joli.”

and moreover it uses a lot of wood, so that stores the CO2 and that is high performing, that respects the...the future thermal regulation 2020, so that is in advance. Which will produce as much energy, if not more, than it consumes”⁴ (responsible energy transition service, Parc Eco Habitat-ML 2017)

“I’m thinking to architectural proposition, not completely crazy, but that fit in the environment, in the landscape, and may be not on the ridge of the hills, but lower, following the slopes inclination of the hills ...of the mountains.”⁵ (SCoT project manager ML 2017) HG1

**Multi-
functionality –
8 times**

“but it’s better than most it is the “Pallandt Polder” and energy landscape and they combine wind, solar nature and recreation [...]. I like because for the first time they thought about more than just energy, they try to make a total concept. And people could go there and see and understand.” (sustainability policy adviser-GO 2017) MvS1

“I think Pallantpolder...I may say yes because it makes really the effort to go beyond energy production only...they think at ecological connection zone...not to interrupt the connection for biodiversity, trees, waters... and along with bicycle paths and an area...a park for people to go and do activities...” (project leader space energie-PZH 2017) IS1

“Afterwards, I admit that the TIPER project, I like it because, in fact, it integrates with others renewable energy, with solar panels and wind turbines biogas, and this well reflect the energy transition.”⁶ (wind turbine project manager, WP-CCT 2018) ED1

**Local character
- 6 times**

“They set up two energy-wood boilers, they set up a wood energy platform in their municipality and suddenly they “master”, between quotation marks, the supply, they buy the wood cut locally [...], they have a real local supply. So that’ pretty interesting, because you have not high cost

4 “la gendarmerie là, qui est en bas. C’est un bâtiment qui a une qualité architecturale qui est intéressante, esthétiquement, est très beau. Et ensuite qui utilise beaucoup de bois, donc qui stocke le CO2 et qui est très performant, qui respecte la... la future réglementation thermique 2020, donc qui est en avance. Qui va produire autant d’énergie, voire plus, qu’il n’en consomme”

5 “Je pense à des propositions architecturales, qui ne sont pas complètement affolantes, mais qui s’adaptent à l’environnement, au paysage, et peuvent être non pas localisées sur les crêtes de collines, mais plus bas, en suivant l’inclination des pentes des collines...des montagnes.”

6 “Après, j’avoue quand même que le projet de TIPER, j’aime bien parce que, en fait, il s’intègre avec d’autres énergies renouvelables, avec les panneaux solaires et les éoliennes, la méthanisation, et ça reflète bien la transition énergétique.”

for transport and once you have the boiler...well you just pay the woods”⁷
(Technical animation regional center of forest property-ML 2018)

“Well, most of the citizen’s renewable energy production power plants. PJC1
Yes, which are developed by the people around, so that’s mean that at
some point they chose the solution that suited them most. So, which for
them was the best integrated as possible in their economic environment,
natural, etc.”⁸ (responsable projets CoopaWatt-ML 2018)

“I think that I see...at least, this question even if I turn it a little, because AK1
I don’t see what is the landscape impact, I look at what it brings more
widely to our country or to our territory. So yes indeed maybe you can
see a wind turbine in the landscape, but does that mean that it isn’t nice,
it bothers? When we see what it could produce. Is that an oil well six
thousand kilometers away from here better? I don’t think so, at least the
wind turbine produces locally the energy we need here”⁹ (farmer, biogas
project initiator, ML 2018).

**Context effect –
4 times**

“Well, I think that the photovoltaic panel fields that are next to you – IDD1
there...on the old grounds - I think that’s very good. In comparison to
what it was before, this brown field, and ... or these buildings, because there
were buildings, there were barracks that were falling ... well, which were
not nice, which were falling into ruin, finally ... well ... a little crumbling,
we’ll say, well I find that very well. Moreover when you go by the road of
the Trois-Moutiers you see it is well located in the plain... in continuity
with the slope of the hill. ”¹⁰ (Project manager local development of

7 “Ils ont mis en place deux chaufferies bois, ils ont mis en place une plateforme
bois énergie sur leur commune, et du coup ils « maîtrisent », entre guillemets,
l’approvisionnement, ils achètent des coupes en local [...], ils ont un vrai
approvisionnement local, du coup. Donc ça, c’est assez intéressant, parce que tu
n’as pas des couts élevés pour le transport et une fois que tu as la chaufferie...bé
tu dois payer seulement pour le bois.”

8 “Ben la plupart des centrales de production d’énergie renouvelable citoyennes.
Oui, qui du coup sont portées par les gens autour, donc c’est qu’à un moment
donné ils ont choisi la solution qui leur convenait. Du coup, qui pour eux était le
mieux intégré possible à leur environnement économique, naturel, etc.”

9 “Moi, je crois c’qu’je vois... du moins, cette question après j’la biaise un p’tit peu,
parce que je regarde pas que l’impact paysager, je regarde aussi c’que ça apporte
plus largement à notre pays ou à notre territoire. Donc oui effectivement p’t’être
qu’une éolienne ça se voit dans le paysage, mais est-ce que pour autant c’est pas
beau, ça gêne...? Quand on voit c’que ça permet de produire. Est-ce qu’un puits
de pétrole à six mille kilomètres d’ici c’est mieux quoi? Je ne le crois pas, au moins
les éoliennes produisent localement l’énergie laquelle on a besoin ici.”

10 “Ben, moi je trouve que les champs de panneaux photovoltaïques qui se
trouvent à côté de toi – là,... sur les anciens terrains –, moi je trouve ça très bien.
Par rapport à ce que c’était avant, cette friche, et... ou ces bâtiments, parce qu’il y
avait des bâtiments, il y avait des casernes qui tombaient... enfin qui n’étaient pas
belles quoi, qui tombaient un peu en ruine, enfin... un peu délabrées, on va dire,
ben moi je trouve ça très bien. Quand on passe sur la route des Trois-Moutiers
on le voit, et il est bien situé dans la plaine et en continuité avec la pente de la
colline. ”

“We succeeded ... we tried to launch an industrial production of renewable energies, while integrating it into a landscape where we didn’t take agricultural land, we did not take land where we could build houses finally ... It was a polluted area, that behind ... so that we have already cleaned up, so the action of saying we clean up a landscape it is anyway... it is anyway valorizing”¹¹ (TEPOS agriculture and company project manager CCT 2017) MLH1

“Finally, TIPER as a whole, because even the wind turbines nowadays are fine. In addition, they are...when we know the territory, at the end of the industrial zone. And that’s it, it is fully coherent. I would say: energy is produced where it is needed.”¹² (mayor and VP energy transition-CCT 2017) PR1

High energy performing – 2 times

“I would also call a farmer in Oude-Tonge, growing crops and they are busy with the project, stores the potatoes in a barn and in the barn he puts the solar panels with the solar panels is producing, how do you call it... hydrogenous! So he has a project where he can let the bus the transport bus, driving on energy from the solar panels, and it’s really good project, very energy performing...efficient.” (farmer GO 2017) JJR1

11 “On a réussi... on a essayé de lancer une production industrielle d’énergies renouvelables, tout en l’intégrant dans un paysage où on n’a pas pris de terrains agricoles, on n’a pas pris de terrains où on pouvait bâtir des maisons, enfin... C’était un site pollué, que derrière... donc qu’on a quand même déjà dépollué, donc l’action de s’dire on dépollue un paysage c’est quand même aussi... c’est quand même valorisant.”

12 “Enfin, TIPER dans son ensemble, parce que même les éoliennes aujourd’hui sont bien. En plus, elles sont... quand on connaît le territoire, sur le bout de la zone industrielle. Et voilà, c’est pleinement en cohérence. Je dirais : on produit l’énergie là où on en a besoin.”

In the following section each category of landscape architecture contribution in energy transition provided in the table 8.1 (above) is discussed, in order to detail the different facets of landscape successful energy transition projects.

8.1.1.1 Aesthetic appreciation

The most agents (17) highlighted “aesthetic” point of view with a successful project in landscape, so related to how the project itself externally appear and why they personally like it. Aesthetic appear quoted in all the three territories and by a wide range of agents directly involved in the definition of territorial goals, local elected members, external consultancy not being representative of one agent group. This is an expected results considering that landscape is very much linked to the visual aspect in people’s understanding and to the judgment of beauty.

The aesthetic perspective is most of the time associated with big RE facilities projects such wind turbines park, as expressed by the quote AC1 (table 8.1), that mentions their appreciation about their layout and siting in harmony with existing elements such a road. Moreover also biogas power plants are mentioned that through wood cladding is “nicely” integrated in the surroundings forest landscape (quote GC1 in table 8.1). These quotes show how are considered aesthetics positive aesthetically pleasant factors to use natural material (GC1) and site RE following a spatial logic grounded in the existent (AC1).

Some agents, however, also refer to small-scale facilities for renewable energy production, mainly photovoltaic panels on the roof building specifying how they have to be installed in order to be aesthetically pleasant as the following quote illustrate:

“There is...for example, solar panels on the houses, I think that this is not nice. It’s rarely successful. Or it could be, if there is all the roof. But when there is a single panel in the middle, I think that, in general, it is not nice”¹³ (Project manager local development of agriculture chamber Deux-Sevres-CCT 2018)

Besides even if RE facilities constitute a broad part of the answers about aesthetic, some respondents in the CC Thouarsais and CC Monts du Lyonnais highlights as successful projects in landscape terms high energy performing buildings that are also considered aesthetically nice, because of it material and form as the quote TR1 illustrates (see figure 1), but also because of possible integration in the surrounding topography (e.g. quote HG1, table 8.1) Indeed the higher number (five) of agents mentioning building is in the CC Monts du Lyonnais. This finding is not astonishing considering that their first action has been energy building retrofitting and that the RE production facilities are still few on the territory.

13 “Après, il y a des... Par exemple, des panneaux solaires sur les maisons, je trouve que ce n’est pas joli. C’est rarement réussi. Ou bien alors, s’il y a toute la couverture. Mais quand il y a juste un panneau en plein milieu, je trouve que, en général, ce n’est pas beau.”

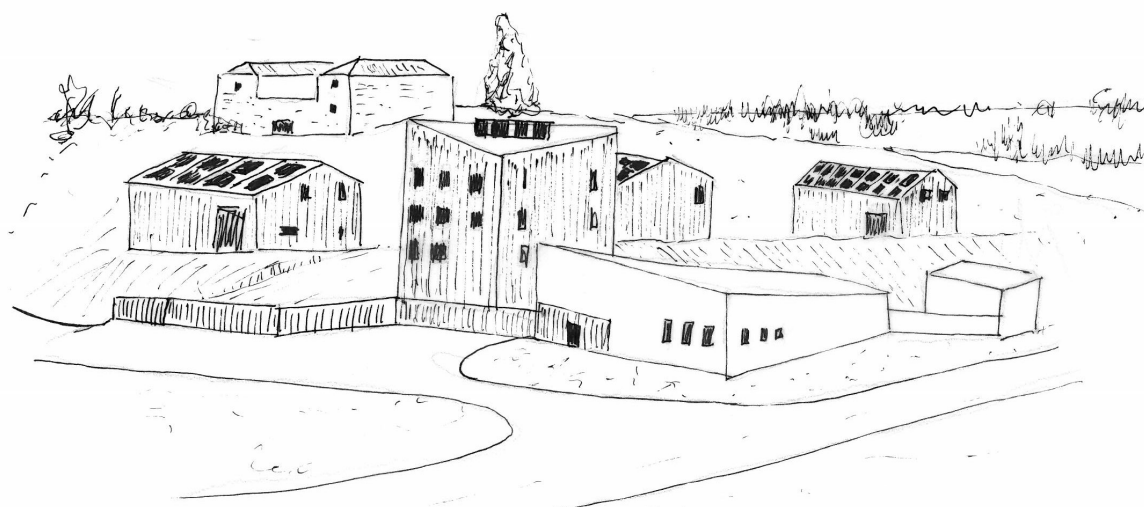


Figure 1. New building of the Gendarmerie in Saint Symphorien sur Coise and in the background a historical building of U farm, April 2018. Source: author.

Building projects category totally lack in Dutch answers. Indeed in Goeree-Overflakkee since recently the main accent has been put on the RE technologies and mainly wind turbines and ground photovoltaic parks that now characterized the identity and the landscape of the island. The energy building retrofitting has been implemented too and it is a dimension that has been introduced in more recent spatial report “Energieproducerend Goeree-Overflakkee” developed by the studio Marco Vermeulen in 2017 (see chapter 6), in any case this dimension does not seem to be to the landscape direct thinking in agents’ mind.

Interestingly are mentioned as successful landscape project biogas power plant located in urban industrial areas. This is the case for a biogas power plant in the CC Thouarsais as well as in the CC Monts du Lyonnais. In this case it is not about visibility or invisibility but about being located in a place associated with the same aesthetic vocabulary (see figure 2 and 3). The imaginary connected with energy production is often related to engineering processes of production and transformation and the facilities for energy production seems to be associated with the same architectural vocabulary of big industrial sheds. Using one agent’s words:

“On the contrary, the Cap’Ter [biogas power plant], that is on Saint-Varent, it has...it is perfectly integrated in an industrial zone, it is blended, actually, in the industrial landscape, with bocage in the foreground, and so well, it hasn’t modified landscape. The same could be said for the TIPER biogas power plant that is in an industrial area as well...”¹⁴ (Project manager energy and climate-CCT 2017)

Always in connection with aesthetic vocabulary in Goeree-Overflakkee particularly four agents highlight as well done the photovoltaic ground park in the “de Klepperstee” camping (see

14 “Par contre, celle de Cap’Ter, qui est sur Saint-Varent, elle a... elle est parfaitement intégrée dans une zone industrielle, elle se fond, en fait, dans ce paysage industriel, avec du bocage en premier plan, et donc voilà, elle n’a pas modifié le paysage. Le même est vrai pour le méthaniser TIPER qu’est dans une zone industrielle aussi”

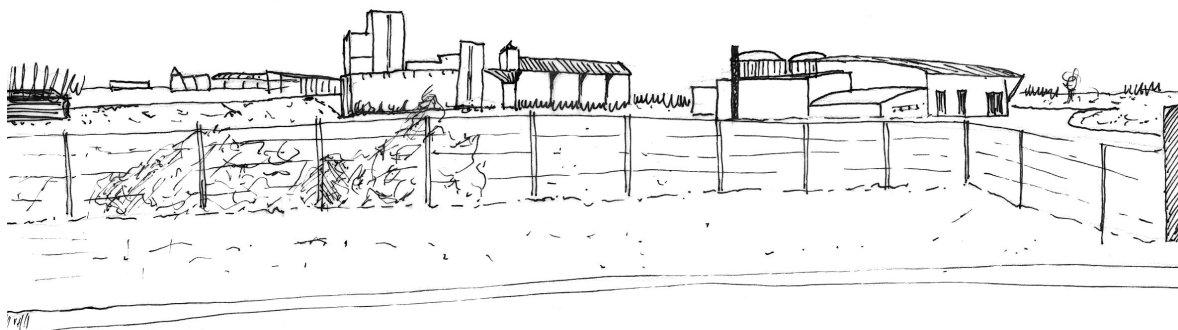


Figure 2. TIPER biogas power plant in the Thouars’ industrial area, CC Thouarsais. Source: author April 2018



Figure 3. Cap'Ter biogas power plant in Saint-Varent's industrial area, CC Thouarsais. Source: author July 2018

figures 4 and 5). It is the first photovoltaic ground park developed on the island inside camping in Ouddorp, the most touristic city of the municipality situated on the sea coast. Here what is considered successful is that to “hide” or “integrate” the park has been used sable dyke surroundings the whole park area. So it is not the fact that is hidden that it is appreciated, but how it is hidden, through these fake dikes made in order to be similar to the old real ones historically present on this part of the island. So the concept of using a cultural heritage element that uses an aesthetic known vocabulary of the island is appreciated, as the quote illustrates:

“Because it [the PV park] is not too big and is really positioned in the lines of the land...it's ... the walls, the dikes from sand, the concept comes from history, the history of this landscape. But they [the dikes] are original...new... in the landscape, but they are really good in hiding the installation for several meters and so it is really nice.” (Policy adviser spatial development-GO 2017)

However, about this very same project, the design of this false old dike become aesthetic artefact is seen as a critical issue by the landscape architect working for the Province Zuid-Holland as project manager space and energy. From a designer perspective this design concept it seems to be weak based on the external aesthetic of elements breaking with their original function and to conserve only the effect of “decoration” in the landscape.

“Nowadays these are new dikes around the sun park, so it's not heritage. They just made a new field next to this one and pretended that is also old. [...] They forgot well we have a fence here and again this side a double fence, we can't explain why... but this one is an insurance question. We need, to fence our solar parks, for insurance. But you can think to other concepts...better ones...not pretending to be old.” (project leader space energie-PZH 2017)

These differences in the consideration/appreciation of the same project show how different background and professional figure could attribute very different meaning to the same aesthetic element. Indeed when designing become only aesthetic losing connection with a function it has been the object of critics (e.g. Van Assche et al. 2013).

Indeed this is more broadly representatives of the difficulty to have a shared aesthetical appreciation of a visual project that, however, could very much be linked to subjective preference.



Figure 4. Ground photovoltaic park in the “de Klepperstee” camping, Ouddorp, Goeree-Overflakkee. Source: author July 2017



Figure 5. Ground photovoltaic park in the “de Klepperstee” camping, Ouddorp, Goeree-Overflakkee. Source: author July 2017

8.1.1.2 Multi-functionality

The other criteria to highlight a project as successful is linked to its landscape multi-functionality, meaning the capacity to make co-exist functions, allowing different activities (Selman 2009). Agents referred to projects that go beyond renewable energy production or energy saving including other functions, such as recreational activity or attention to biodiversity preservation. The project most representatives of this attitude and quoted three times is “Zonneweide van Pallandtpolder” in Goeree-Overflakkee. It is a planned project not implemented yet, situated in the inland (see figures 6 and 7) and that combines recreational function with an energy mix composed by wind turbines and ground photovoltaic park while watching over not to interrupt biodiversity corridor. The energy production dimension is not hidden, on the contrary, because

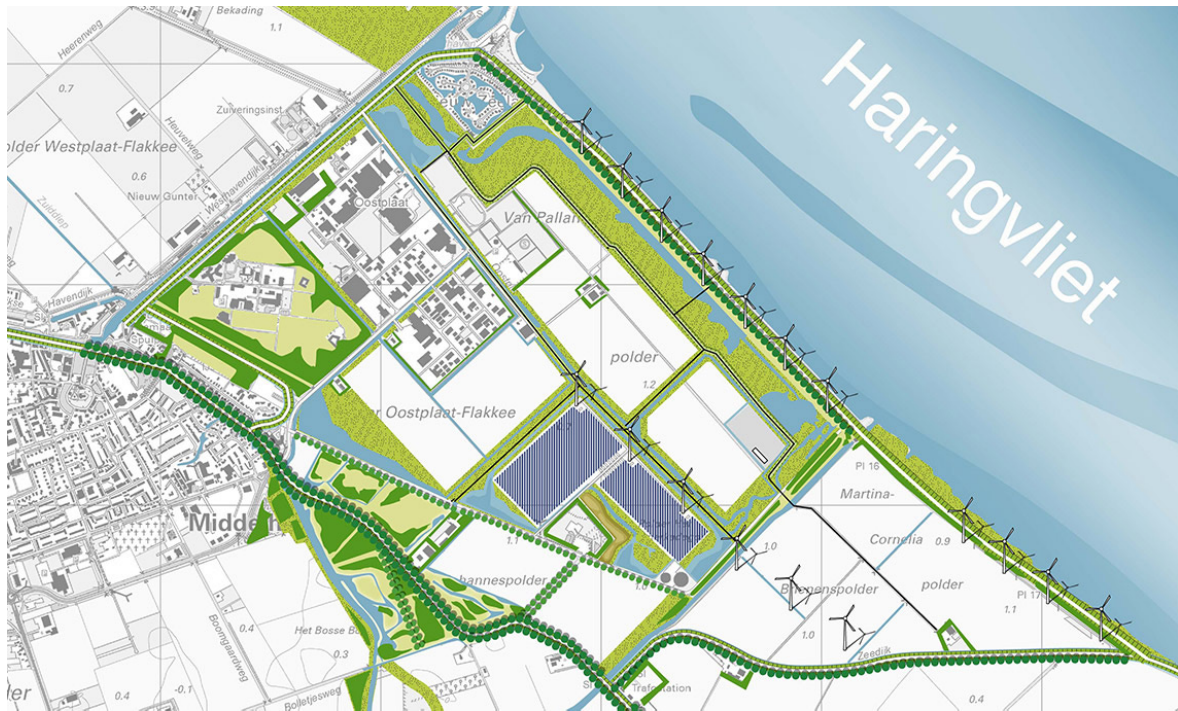


Figure 6. Plan of the project “Zonneweide van Pallandtpolder”. Source: <https://www.feddes-olthof.nl/landschappelijke-inrichting-zonneweide-van-pallandtpolder/>



Figure 7. Section representing the function of energy production with recreation activity (park) and biodiversity preservation. Source: <https://www.feddes-olthof.nl/landschappelijke-inrichting-zonneweide-van-pallandtpolder/>

the project has the ambition to go beyond this, making the space accessible and green, opening to other functions, allowing appropriation by inhabitants and preserving biodiversity. This principle of multi-functionality of the spaces intended for several uses is the aspect that makes agents appreciate it as the quotes MvS1 and IS1 express.

Multi-functionality as an added positive value is also connected to projects that optimize annex spaces/infrastructure such roads needed for the project management and maintenance. The TEPOS project manager of the CC Monts du Lyonnais explained:

“The Lienne’s woods, actually, there will be works...for improving access to services, actually, to allow access to the forest’s resources. And so the idea is to say: well if there are going to be these works, could we not have a common thought between these works for service access and the...works that will allow one day maybe wind turbines to arrive in these woods? Because the wind turbine transport you can’t imagine that,

but ...that could lead to deforest a little. And so it's the same, that's it, it is... it is really the ...question of...of landscape”¹⁵ (TEPOS project manager-ML 2017).

In the quote ED1 another positive point of view about multi-functionality is the production of RE from several different sources such as wind, sun and biogas, in a project, highlighting the importance of multi-theological component of the energy transition. In this case the TIPER project of the CC Thouarsais, described above (“context” section), is quoted as a good example by four agents. It remains a production focused project at large scale but the variety of equipment employed allowed to address the energy transition in a border way having also the function of a “beautiful display project for the territory”¹⁶ (PR, mayor and VP energy transition-CCT 2017) Even if how seen until here multifunction is mainly associated with renewable production project one agent of the CC Monts du Lyonnais also address as an added value multi-functionality referred to a building project. Indeed how explained above in the Monts du Lyonnais there are few RE production facilities projects and the main entry in energy transition process has been through energy building retrofitting.

“There is in the village center, behind the church, there have been... semi-detached houses construction with the retrofitting of the old buildings, a small building, there is social housing in the retrofitting, they preserve a small fountain, a small water well. I think they kept a public grassed common space quite important, with a paving where you could play bowls. That's a village's spirit...”¹⁷ (SCoT project manager ML 2017)

In this case the energy retrofitting of existing buildings has started a further renovation of the surrounding urban areas creating shared recreational areas improving the sense of community for the inhabitants.

The agents that mentioned these projects focusing on functions points of view are mainly involved in the piloting of the energy transition process of the territory, attached to local technical services. So they see several opportunities attached to the project going behind aesthetic able to support the implementation process.

8.1.1.3 Local character

Several agents (six) refer as successful projects stressing the fact that it is grounded on the local resource and people of a territory bringing local benefits.

Firstly, developing local project is considered positive because of the economic point of view

15 “Les bois de la Lienne, en fait, il va y avoir des travaux de... de desserte, en fait, pour permettre l'accès à la ressource forestière. Et donc, du coup, l'idée, c'est de se dire : bon ben, s'il va y avoir ces travaux, est-ce que on pourrait pas avoir une réflexion commune entre ces travaux de desserte et les... des travaux qui permettraient un jour peut-être à une éolienne d'arriver dans ces bois? Parce que le transport d'une éolienne vous imaginez, mais... ça peut impliquer de déboiser un peu quoi. Et là c'est pareil, voilà, c'est... c'est vraiment la... la question du... du paysage.”

16 “c'est une belle vitrine pour le territoire.”

17 “Il y a dans le centre du village, derrière l'église, y a eu des constructions de maisons jumelées avec un... de rénovations d'anciens bâtis, un petit immeuble, y a du logement social dans la rénovation, ils ont préservé une petite... une petite fontaine, un petit puits, j'crois, ils ont gardé un espace public enherbé commun assez important, avec un dallage où on peut jouer aux boules. Voilà un esprit village...”

as the quote MPT1 illustrates. The fact of use local resources as wood could reduce costs for transport and reduce costs for energy consumption, once the technology for resource transformation in energy is settled.

Secondly, the fact of having local RE production is associated with the idea of energy autonomy of a territory that is less dependent to external and faraway source represented by the quote AK1. This point of idealization of energy autonomy appears associated with the idea of energy disconnection/isolation in some narrative. Nevertheless, it has been argued that to be energy autonomous need to design a new network system not disconnect from it (Lopez 2014).

Finally, a successful project is connected to the engagement of local inhabitants to develop it, in this way the project is tailor-made for inhabitants will and necessity and so they like it, as the quote PJC1 express. In connection with this point, to encourage the inhabitants of a territory to some agents mainly implied in the technical service of the territory that is setting and encouraging the energy transition goals mention the importance of best-practice projects and their local benefits that could be displayed on the territory in order to encourage people to take the example and develop furthered projects. As one interviewee put it:

“And that [TIPER project]...it is anyhow well integrated in landscape, but that you could see too, so this allows to tell people to be less afraid, to say: you pass by every day so, you understand that, well, it’s not, it’s not dangerous, that it’s not... I think that is also a certain awareness too that makes it possible to move forward. To have created that landscape, it allows people to evolve about this topic and to allow the development of other projects faster.”¹⁸ (TEPOS agriculture and company project manager CCT 2017)

So a project is successful in landscape terms because it is developed by the local community and it fits necessarily their expectation and their need. The fact to share a project and see the interest of implanting allow to perceive it in a positive manner, also because of the possible economic benefits, to which could be added a sentiment of belonging that go beyond the subjective value judgment.

8.1.1.4 Context effect

Another perspective for an energy transition project to be successful is the context in which it is implemented. The contextual representation based on a specific place characteristic in which the project is implemented lead to a positive appropriation of a project that if realized in some places else would probably be rejected.

A specific example in which the context play an important role, mentioned four times by the agents of the CC Thouarsais, is the “Technologies Innovantes pour la Production d’Énergies Renouvelables” [Innovative technologies for renewable energy production] (TIPER) project, situated in continuity with Thouars. It is a project grouping several RE facilities, three photovoltaic parks on the ground, 3 wind turbines, a biogas power plant implemented in the nearby industrial

¹⁸ “Et qui... est quand même bien intégrée dans le paysage, mais qui se voit aussi, donc ça permet aussi de dire aux gens de moins avoir peur, de s’dire : on passe devant quotidiennement donc, euh... on se rend compte que, ben, c’est pas, c’est pas dangereux, que c’est pas... Voilà, j’pense, que y a une certaine sensibilisation aussi qui fait que ça permet d’avancer aussi. D’avoir créé ce paysage-là, ça permet aux gens d’évoluer sur ces thématiques-là, et de pouvoir permettre le développement d’autres projets plus rapidement.”

area started in 2005. Due to its large extension, the ground photovoltaic park is of 16 and 20 hectares, and its localization in the agricultural open field plane it is well visible and a global view of the project could be seen from the nearby plateau (see figure 8). The photovoltaic parks are built on the land of a dismissed polluted military area, ex ETAMAT, and this is seen very successful project, because it gives back an identity to a place that lost it (see quote IDD1, table 8.1), producing a lot of renewable energy without using fertile agricultural areas as the quote MLH1 (table 8.1) express.

In this case what we call the context of the implementation is also associated with the issue of possible land use competition between agriculture and large scale renewable energy production. Moreover, the quote PR1 illustrates its spatial proximity to the Thouars' industrial zone, high energy consuming, is considered another positive context element, which allowed to put close an energy production spot with energy consuming one, to reduce transport losses (see figure 9). TIPER project is highlighted as a successful one by a broad range of interviewed professional figures belonging to the internal CC technical service, elected representatives, agricultural chambers, wind turbine developers and everybody see it as a successful one. Many referring to



Figure 8. TIPER project from the plateau (wind turbines and PV park), April 2017. Source: author



Figure 9. Plan of TIPER project nearby Thouars. Source: author according to PCAET 2018.

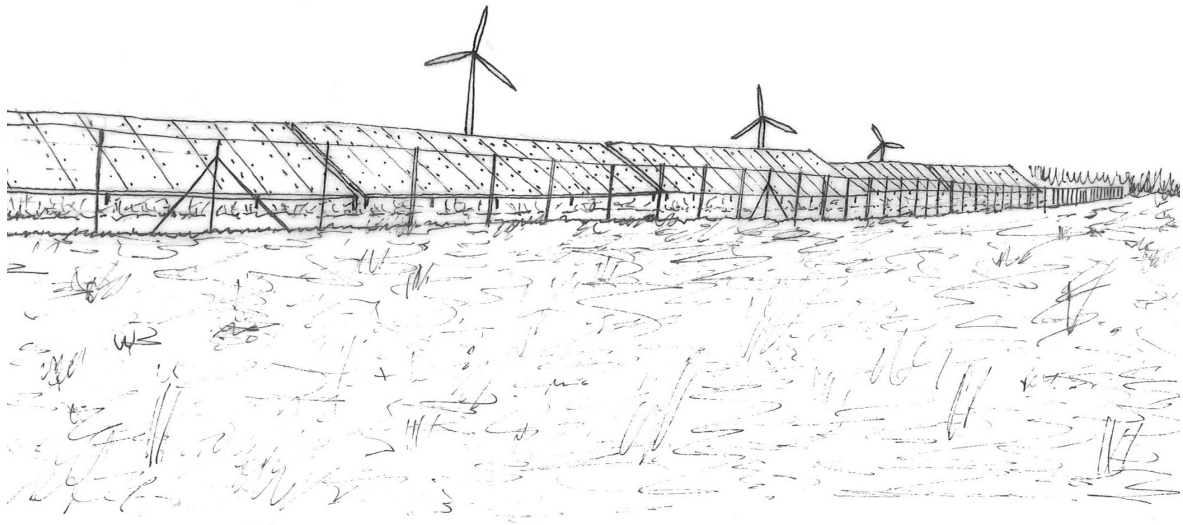


Figure 10. TIPER photovoltaic park and three wind turbines park, April 2017. Source: author

the good context employment and some also about its visual aesthetic point of view. Indeed this project is the most displayed by the CC and believed able to show the new energy transition exemplary identity that local institution is communicating about the territory. However when approaching the photovoltaic park we observe that the close surroundings do not seem to be the object of a particular designing thought beyond the clustering fence, compulsory for this kind of project (figure 10). Indeed in all answers the appreciation from the project come from its global far vision, never from a close perspective and its near surroundings.

8.1.1.5 High technological performing

The high energy performing in terms of production and/or saving was implicit in the projects all agents mentioned. However for two of them energy efficiency and technical high-performing point of view was the core of what they mentioned as a successful landscape project. This is pointed by two farmers, as illustrated by the quote JJR1 (table 8.1) that connect landscape to a technical component of energy transition process. This point of view is expressed by two farmers that have one in Goeree-Overflakkee developed a biogas power plant and a wood-energy heating boiler in the CC Thouarsais, so probably from their experience associates technology and efficiency to a successful project, that for sure is an important dimension to be considered. In particular the farmer in the CC Thouarsais explains:

“I do not know, I have nothing that let me say: I like it.” In the projects that are developed on the Thouarsais...No, because I do not reason in the way saying: “I like it or I dislike it.” I reason more

about profitability...efficiency...’’¹⁹ (farmer bocage-wood-energy boiler-CCT 2018)

She is the only agent unable to give an example of a project. It is interesting to highlight this answers because it seems to suggest that this farmer has an idea of landscape attached to aesthetic/visibility perspective that prevents her from give an answer of an “energy transition successful project in landscape terms” because aesthetic or a felling of affection and belonging is not an concern for her, compared to a more “practical” point of view. This is one of the difficulties we mentioned in the introduction of the chapter about landscape notion shades in agents’ mind.

However all the other agents how discussed until here, were able to give an answer attaching to a successful project in landscape terms.

8.1.2 Reason to take into account landscape in energy transition

The narrative analysis of agents allow to distinguish several reasons why it is considered important to take into account landscape. Nevertheless does not exist very specific attitude representative of a territory studied differentiating from the others. However it is possible to find similarities in the way of addressing the topic of several agents in some cases linked to the territorial characteristic they live in and work in and in other cases related to the work object of a specific professional category, such as technical service for energy transition or landscape architect.

The first result is that all the interviewed highlight landscape as something important to be taken into account in energy transition process, despite the different involvement in the energy transition process, background and nationality.

“ah well I think that landscape is paramount/primordial’’²⁰ (mayor, b.VP energy transition-ML 2018)

“On the energy transition aspects, we cannot lack of landscape. About renewable energy projects’’²¹ (Cit’ergie and TEPOS project manager-CCT 2018).

“yes really, I think so, it’s ...I think the way how windmills are experienced have a lot to do how they are placed in the landscape” (Director Cooperative Deltawind-GO 2017).

The respondents know about the subject of this research and that this has been developed in a landscape architecture school, so their answers could have been a bit influenced by this. However the fact of questioning them about the “why” allow to deep their insight encouraging to illustrate and clarify about the subject and not remaining on a “yes” and “no” level.

If all agents affirm the importance to take into account of landscape the reason enunciated for that are several. Some agents make references to several reasons, other highlights only one. In

19 “Je ne sais pas, je n’ai rien qui puisse dire : « J’aime bien. » Dans les aménagements qui sont faits sur le Thouarsais... Non, parce que je ne raisonne pas en... en dire : « J’aime ou je n’aime pas. » Je raisonne plus rentabilité... efficacité...”

20 “Ah ben j’pense que le paysage est primordial.”

21 “Sur les aspects de transition énergétique, on ne peut pas passer à côté du paysage, hein. Sur les projets d’énergies renouvelables...”

the following section the different categories are discussed.

Table 8.2 categories of reason why to take into account landscape for the energy transition process from agent's perspective (question2), illustrated with representatives quotes and with the number of interviews in which the role is mentioned. The table includes quotes selected as representatives of the main categories listed in the table, in order to provide a clear image of the contribution facets, but avoiding repetitions. A total of 30 interviews. Source: author from re-elaboration of the agents semi-structured interviews.

Category	Quote	Code
To preserve landscape aesthetic – 15 times	“And, indeed, I think that landscape is important. Then, not about the fact that it “play”, between quotation mark, on energy transition, but on the fact that it must be taken into account not to destroy our landscapes or for not changing them to the opposite extreme, etc.” ²² (Technical animation regional center of forest property-ML 2018).	MPT2
	“I was a part who said...who thought that on the contrary it was necessarily to integrate the school in the existing environment, but that isn't something that completely distort the...the existing landscape aspect, the surroundings construction. [...] And because the municipality is sloping we said that it must absolutely be integrated in the slope. So the way of doing that we chose, is to make it half-buried. So, being half-buried, we already lowered the building visibility compared to the rest. So the integration was already more interesting” ²³ (mayor, b.VP energy transition-ML 2018)	PG1
	“Except that I think that we cannot use only wood energy to heat everybody or to give electricity to everyone, otherwise we're going to end like in the Middle Ages with no forest. So, thus, we must not do anything/nonsense.” ²⁴ (Technical animation regional center of forest property-ML 2018).	MPT3
	“But, nevertheless, a beautiful biogas unit, covered by wood, etc., It is	GC2

22 “Et, en effet, moi je pense que le paysage est important. Alors, pas sur l’côté qu’ça va « jouer », entre guillemets, sur la transition énergétique, mais sur le fait que il faut le prendre en compte pour pas détruire nos paysages ou pour pas les modifier à l’extrême inverse, etc.”

23 “je faisais partie qui disait... qui pensait que au contraire il fallait intégrer cette école dans l’existant, mais que ça soit pas quelque chose qui dénature complètement le... l’aspect existant le paysage, la... les constructions alentours. [...] Et comme on est en pente sur la commune on a dit il faut absolument s’intégrer dans la pente. Donc la manière de faire qu’on a retenu, c’est de se mettre semi-enterré. Donc, en étant semi-enterré, déjà on descendait la visibilité du bâtiment par rapport au reste. Donc déjà l’intégration était plus intéressante.”

24 “Sauf que j’pense qu’on pourra pas utiliser que du bois énergie pour chauffer tout l’monde ou pour donner d’électricité à tout l’monde, sinon on va s’retrouver comme au Moyen Âge avec plus d’forêt. Donc, du coup, faut pas faire n’importe quoi, en fait.”

anyway more...well. It is anyway something more pleasant than a raw biogas unit”²⁵ (Rhone agricultural chamber, energy adviser-ML 2018)

“I know, there are things...I...I don’t know well, but there are things that speak to me, I know that there are wind turbines whose mast is wood. It could be not that, finally, somehow, this is something that allows a better integration in the landscape? That would satisfy a little more people or despite all it remains a wind turbine?”²⁶ (TEPOS project manager-ML 2017). AC2

**To facilitate
“appropriation”
and
“acceptability”
of energy
transition -
6 times**

“I think that it [landscape] is important for...to precisely facilitate the energy transition appropriation and the appropriation, and the acceptance, perhaps more than the appropriation, the acceptance of renewable energy sources. I’m thinking about wind turbines in particular, and it’s important to think where and how site and it could help if they follow the lines in the landscape...a hill ridge.”²⁷ (Project manager energy and climate-CCT 2017). DM1

“And actually, on the roof, they put photovoltaic, but the building is made [in such a way] that you do not see it. And so, that’s where energy transition is great, because finally you do not see it. So, this is great because it hasn’t an impact on the landscape, you don’t see it. Then, uh ... so it’s not good because people do not know it, and you see, it cannot bring awareness on the topic.”²⁸ (Sustainable territorial management division director-CCT 2017) AC3

**To preserve
landscape
identity and
belonging –
5 times**

“I think but this is my personal opinion, that the landscape is how you as a person defines where you are. [...] I think a lot of people unconsciously recognize their own landscape. That what it feels good. Maybe they never thought about it, and they just gone notice that they miss it, when it is PD1

25 “Mais, néanmoins, une belle unité de méthanisation, couverte de bois, etc., c’est quand même plus... voilà. C’est quand même quelque chose qui est plus agréable qu’une méthanisation brute”

26 “Je sais, moi, y a des choses... je... je connais pas bien, mais y a des choses qui m’interpellent, je sais que y a des éoliennes dont le mât est en bois. Est-ce que ça, c’est pas... bon, finalement, quelque part, quelque chose qui permettrait une meilleure intégration dans le paysage ? Qui permettrait de contenter un peu plus de monde ou est-ce que malgré tout ça reste une éolienne?”

27 “je pense que c’est important pour... pour justement faciliter l’appropriation de la transition énergétique, et l’appropriation, et l’acceptation, peut-être plus que l’appropriation, l’acceptation des sources d’énergies renouvelables. Je pense à l’éolien notamment et c’est important de décider où et comment les mettre et ça peut aider suivre les lignes du paysage...la crête d’une colline.”

28 “Et en fait, sur la toiture, ils ont mis du photovoltaïque, mais le bâtiment est fait [de telle manière] que tu le vois pas. Et donc, c’est là où elle est géniale la transition énergétique, parce que finalement elle se voit pas. Alors, elle est géniale parce qu’elle a pas d’impact sur le paysage, elle se voit pas. Après, euh... du coup, c’est pas bien parce que, du coup les gens l’savent pas, et tu vois, ça peut pas apporter son côté de sensibilisation.”

gone. So that's our job to protect, because landscape is also our culture.”
(Policy adviser spatial development-GO 2017)

“But I think that it's necessarily, well, to try to understand what is the affective/emotional bond that could exist with landscape and how, well, we could try to find thing that...that are suitable for everybody, finally”²⁹
(TEPOS project manager-ML 2017)

“The energy transition, is in a dynamic process and landscape too. For me, it's...not to preserve a landscape, it is more about support its evolution. That's it, it's not to make it static, but it about sharing a new identity that also speak about energy transition. But you have to not to disconnect it from the territory either...you have to start from it”³⁰ (SCoT project manager ML 2017).

To improve environmental dimension – 5 times “For hedges...well, if we consider landscape, we see that we have a lot of hedges, the *bocage* [hedge systems] so landscape is important because we could preserve hedges that could bring things for biodiversity...I mean improve biodiversity a lot.”³¹ (TEPOS agriculture and company project manager CCT 2017) MLH2

“Yes...yes, because if we look to the landscape maybe...if we have more trees and hedges we could store carbon dioxide ... we have to offset the greenhouse effect...”³² (farmer bocage-wood-energy boiler-CCT 2018) CJ1

To develop landscape grounded process – 3 times “Because, that's it, it's starting from our local resources. So using the landscape as productive assets. [...] For me yes it is a reference point/benchmark of ... of ... finally a reference point/benchmark of how we are able to use our local resource or how we are not below or on the side or

29 “Mais je pense qu'il faut, voilà, essayer de comprendre en fait quel est le lien affectif qu'il peut y avoir au paysage et comment, ben, on peut essayer de trouver des choses qui... qui conviennent à tout le monde, enfin.”

30 “La transition énergétique, elle est dans un processus dynamique et le paysage aussi. Pour moi, c'est... Préserver un paysage, c'est plutôt accompagner son évolution. Voilà, c'est pas le rendre statique, mais en faire partager une nouvelle identité qui parle aussi de transition énergétique. Mais il ne faut pas être déconnecté du territoire...en fait il faut partir de là.”

31 “Pour les haies...enfin si on considère le paysage, on voit qu'on a beaucoup des haies, le bocage donc le paysage est important parce que comme ça on peut préserver les haies que peuvent apporter des choses pour la biodiversité. Je veux dire que peuvent améliorer beaucoup la biodiversité.”

32 “Oui...oui, parce que si on regarde au paysage peut être... si on a plus des arbres et des haies on peut stoker du dioxyde du carbone... il faut compenser l'effet serre...”

superimposed.”³³ (Ingénieure-paysagiste 2017)

“So I think the landscape should be more instrumental to the energy transition. We should really use the landscape in all his components as an instrument to generate energy and to store carbon dioxide, etc. So I think that landscape itself should be much more active, again and not just a passive backdrop to the place where we live.” (HNS landscape architect 2017) JH1

³³ “Parce que voilà, c’est partir de nos ressources locales. Donc en utilisant le paysage comme bien productif. [...] Pour moi oui c’est un repère de... de... enfin un repère de comment on sait utiliser notre ressource locale ou comment on n’est pas en-dessous ou en deça ou on le superpose.”

8.1.2.1 To preserve a landscape aesthetic

The most quoted reason (15 times), in all the three territories about why taking into account landscape in the transition process could be referred to the idea of “preserving” landscape aesthetics. With this expression we mean that agents put forward the idea of analyzing and considering landscape before the changes that could be due to the energy transition implementation in order to study a way to reduce their impact as much as possible, maintaining landscape as they think to know it. So this category is linked to the idea of qualitative aesthetic landscape and the sentiment of beauty referring to the importance to consider landscape to preserve its aesthetical value. However some shades could be identified in the different answers’ motivation. Indeed this in line with the answers analyzed in the precedent section where we found many respondents referring to aesthetic criteria for successful energy transition project.

Negative aesthetic value/perception for technologies

Some agents remain in a very general level observing the visible impact of RE facilities and so the interest of thinking about landscape, but without expressing further considerations, as the following excerpts express:

“yeah and especially for wind. Wind turbines have lot of influence on the landscape.” (municipal councilor innovation and sustainability-GO 2017)

Respondents, as illustrated by the quote MPT2, are concerned about RE technologies considering landscape consideration important in order to not “destroy” and impact it too much in the process of achieving the energy transition goals. This highlights a protectionist/conservative point of view where energy transition process is seen as necessary but believed to impact negatively the landscape in visual terms. In these same quotes seem that energy transition is perceived as a technological engineering process that even if relieves human pressure on the living environment oppose the idea of landscape. Where landscape seems to stand for a passive static container receiving these new elements altering its “original” appreciated idea.

In any case one farmer highlights the contradiction intrinsic in the reject of the facilities of RE production, highlighting how in our landscape technical element for energy transport or other big equipment already exist since many years and are very visible in many places but about which nobody is complaining.

“We have seen occur electrification on the territory, so high-voltage, low-voltage lines that arrived. Did it cause a problem bringing a service, a lightening, a light? It was fantastic, I think at that time. [...] We live well together with other things, we don't even realize them. With oil station, with road networks, with supermarkets, with a lot of things...these...today we don't have a problem with that”³⁴ (responsible energy transition service, Parc Eco Habitat-ML 2017).

Indeed in some places the implementation of a high-voltage line to have risen local opposition and its insertion in landscape has been the object of conflicts, but not in the territories we studied.

Even if agents narrative remains very much about RE production one person, the mayor in a municipality and vice president duo about energy transition topics in the CC Monts du Lyonnais, mentions and explain what for him is a good way to take into account landscape for the integration of a new “contemporary” low energy consuming building. This is because he directly refers to the building of a new school in his municipality recently finished of which he followed the project and implementation steps as the quote PG1 illustrate (table 8.2).

Even if very secondary in the answers of agents, building architectural vocabulary is also an aspect that, remaining on the aesthetic point of view, is representative of a place cultural and aesthetic heritage and its modification could deeply affect for example a village image. However this does not seem to be entered yet in the common thinking about the equation energy transition and landscape to the extent of RE technologies.

A positive perception of natural elements in the landscape

Even if the main focus is on the impact of RE facilities several agents refer to landscape in relation to changes that could occur relating to natural elements such trees and bushes.

In the CC Monts du Lyonnais one person refers to the changes that the treatment of the forest for wood energy production could produce. Explaining that this could have a heavy impact if it is not carefully planned and managed (see quote MPT3 table 8.2). This explanation goes beyond the visual changes due to the insertion of new technological facilities, referring to the presence, or not presence, of natural elements as trees. The agent highlighting this point of view is the responsible for the forest management, so she directly refers to her working object of which she has a deep knowledge. The focus in this case is put on the renewable resource, the forest, not the infrastructure itself.

Interestingly we found the management of the forest for wood energy in other answers of

34 “On a vu apparaître l'électrification sur le territoire, donc des lignes à haute tension, à basse tension, qui sont arrivées. Est-ce que ça a posé problème en apportant un service, un éclairage, une lumière? C'é... c'était fantastique, j'pense qu'à l'époque. [...] On cohabite bien avec d'autres choses, on s'en rend même pas compte. Avec des stations essence, avec des réseaux routiers, avec des supermarchés, avec un tas de choses... Ça... aujourd'hui ça nous pose pas de problème.”

the territorial referent of the ADEME for the CC Monts du Lyonnais, having in her mission to support about RE, building and in some cases question related to urban planning. She is a agent having a good overview of the several energy transition components and the various possibilities for RE production. And also her answers go beyond just technological equipment to speak about the wood source itself:

“And then the landscape: are forest part of the landscape? And very clearly in energy transition project, one of the components is to develop wood energy. [...] That said, it doesn't prevent that clearcutting, it hurts a lot in the landscape”³⁵ (ADEME territorial referent 2018)

Both agents mentioning forest management work about the CC Monts du Lyonnais that compared to other territories has a stronger presence of the forest, so may be leading to an easier consideration of the question, because directly experienced on the territory.

Similarly the project manager for the agriculture sector for TEPOS in CC Thouarsais speaks about energy development associating to the positive effect of *bocage* development in landscape terms considering also the benefit that it brings for biodiversity.

“And to work on the hedge, well, the importance of hedges in a landscape, but not only about landscape, but also the contribution to biodiversity, it is anyway a resource, finally...it is...landscape is really important...and the bocage is useful and nice in the landscape.”³⁶ (TEPOS agriculture and company project manager CCT 2017)

For this natural resource elements, tree and bushes, usable for energy production their presence in landscape is seen positively and their absence negatively. This perception is the opposite of the one towards technological elements for energy producing that, generally speaking, is seen a priori to deteriorate landscape if their integration is not well thought. However *bocage*, goes behind its natural composition of natural elements, the hedges and trees, is an anthropic construct dividing the agricultural field that becomes part of the cultural heritage landscape in the CC Thouarsais.

The positive reference to “natural” element is also displayed as constructing material allowing to what is perceived as a better RE facilities integration in landscape. The use of wood is quoted twice, once for cladding a biogas power plant as illustrated by the quote GC2 and secondly for the construction of a wind turbine, quote AC2, as a natural element improving the insertion of technologies in landscape.

In this case the use of a natural element as wood is seen as positive from an aesthetic perspective lowering the impact of a technical element for energy production, in some way disguising them giving a more natural appearance that is believed to better fit in surrounding landscape.

Considering this is important to remind the context of the research that inquiries about rural territories where the most of land use is for agriculture, forest, etc. that even if strongly featured by man is very much associated with nature. Maybe answers could be different if done in a

35 “Et puis alors le paysage : les forêts font partie du paysage? Et très clairement dans les projets de transition énergétique, l'un des volets c'est de développer le bois énergie. [...] Ceci dit, n'empêche que quand on fait des coupes à blanc, ça fait très mal dans le paysage”

36 “Et pour travailler sur la haie, enfin voilà, l'importance de la haie dans un paysage, mais rien que entre le paysage, mais aussi l'apport de biodiversité, c'est quand même une ressource, enfin... C'est... Le paysage est vraiment important... et le bocage est utile et beau dans un paysage.”

different context such a very urbanized areas.

8.1.2.2 To facilitate inhabitants “appropriation” and “acceptability” of energy transition

Six agents directly mention the importance of landscape consideration in order to improve what they call “acceptability” or “appropriation” the energy transition projects, by local inhabitants as illustrated by the quote DM1. Moreover often “social acceptability” is connected to a low visibility of the projects, in order to impact less than possible landscape, as expressed by the following quote:

“But, sometimes, there were acceptability problems in relation to that [biogas power plant]. So in order to avoid acceptability problems, we still brought some... Finally, we insisted/ stressed upon the contracting authority/ project ownership and then the consultancy offices who were working on the project to ensure that the project be the better integrated as possible from a landscape point of view so that it leads to the lowest possible impact”³⁷ (ADEME territorial referent Deux Sevres - CCT 2018)

This point of view is addressed by agents directly involved in the definition of energy transition goals for the territories and accompanying energy project implementation such as TEPOS project manager. So one of their main concerns is the implementation phase of energy related projects in order to reach the set energy goals.

At the same times on interviewed in charge of the technical services of sustainable territorial development for the CC Thoursais, so directly involved in the setting and implementation of energy goals for the territory, puts forward the importance of landscape where RE technologies are visible in order to raise people awareness and progressively increase their appropriation of the topic as expressed by the quote AC3 (table 8.2).

Visibility and invisibility remain an open topic: to hide a project brings down the risk to raise a local opposition that could stop the project. At the same time to make the project invisible do not bring people to think about energy management and accustom about possible and future changes. The question remains open and it has to be weighed on a case-by-case basis.

The “social acceptability” it is recognized to be nowadays put forward by public decision-maker to answer to possible local opposition to RE technology (Fortin and Fournis 2014; Nadaï 2007), nevertheless it remains still fuzzy notion difficult of interpretation and object of criticism (e.g. *Ibid.*). In the research the notion of social acceptability is used, because directly mentioned by some decision-makers of the analyzed territories, and that mentions shows that results are in line with other researches.

The word “acceptability” or local “appropriation” are not directly addressed in the Dutch agents’ answers, where we could expect to find them considering the very great number of RE projects and mainly wind turbines implemented. However the topic of RE remains central in Dutch respondents discourse,³⁷ where the prominent reason for considering landscape remains

³⁷ “Mais, quelquefois, il y avait des problèmes d’acceptation par rapport à ça [méthaniser]. Donc, pour éviter en fait des procès problèmes d’acceptation, on apportait quand même quelques... Enfin, on insistait auprès des maîtres d’ouvrage et puis des bureaux d’études qui travaillaient sur le projet de faire en sorte que le projet soit le mieux intégré d’un point de vue paysager pour que ça ait le moins d’impact possible derrière, quoi.”

the correct integration of renewable energy project.

8.1.2.3 To preserve a landscape identity and belonging

In connection with what could be addressed as the socio-cultural point of view, five agents put forward the importance of landscape consideration in the transition process in order to maintain (or improve) the landscape identity in which people recognize themselves and feel a sentiment of belonging as the quotes PD1 and AC4 (table 8.2) illustrate. The first quote highlights a concern about the possible changes of traditional cultural landscape that energy transition could lead.

Nevertheless other two out the five agents highlight a different point of view that considers landscape as a dynamic entity, perceiving the relational connection between landscape and the subject experiencing it as in permanent evolution. According to the quote HG2 (table 8.2) energy transition implementation in landscape could lead to a new identity landscape for the territory. We found this point of view enunciated by three people in the case of the CC Monts du Lyonnais part of the technical service of CC working about the energy transition goals and action and that participated to several steps of the *plan paysage* elaboration, such as field visits, workshops, where the landscape architect in charge to relies the document has explained and supported them to understand and read the different dynamics acting on landscape, such agricultural practice or urbanism. This experience could have been influenced their vision of landscape, beyond a static postcard idea of it.

In connection with the dynamic landscape representation we found highlighted in three answers of Goeree-Overflakkee's agents, direct references to the importance of landscape designing principles for a thought and correct RE production implementation on the territory, able to give renewed identity to landscape. The three people highlighting design has been directly involved in the elaboration of the landscape energy scenarios on the islands or in the province so they seem to recognize the active role of landscape designing in the process, even if it remains on the topic of RE facilities. Using one responded word:

“What kind of landscape is going to work out? Which are the best places to work with wind turbines. Do you want to make one dense new landscape or you want to try to put them everywhere a little bit and have more open spaces. What is the combination between within wind and solar? You have to think to many design principles that could shape landscape them let talk about new stories for people to understand.” (since 2017 account manager of energy transition in Stedin, before Program manager for sustainability and innovation GO 2017).

8.1.2.4 To improve environmental dimension

Five agents refer to environmental motivation to why consider landscape in an energy transition process, meaning that landscape consideration could support the decrease of human activity/ impact on the living/natural environment for example improving biodiversity, as expressed by the quote MLH2 and reducing greenhouses gas emission stoking carbon dioxide as illustrated by the quote CJ1 (table 8.2).

Agents highlighting this point of view belongs all to the agricultural world, specifically the three farmers of the three studied territory and the person of the technical service in charge of the TEPOS strategies for agricultural sector in CC Thouarsais.

In this category of answers emerge a notion of landscape attached to its natural and ecological living component, highlighting how natural living landscape element will help reduce human pressure on nature. The third farmer refers to environmental reasons too, such as pollution reduction, but putting the accent more on the human factor and on its responsibility to make choices less environmental impacting, how illustrated by the comment below:

“I’m still convinced that it’s a bit like with our animals, our farms or our crops, if we have a consumption basin here, and we produce there and that we have to travel thousands of kilometers to supply, it’s not consistent. And if we take into account the landscape, and so our environment, then we understand that it’s not consistent, there are losses...it’s polluting.”³⁸ (farmer, biogas project initiator, ML 2018)

Maybe this connection to environmental reason could be related to the fact that agricultural sector is recognized as high greenhouses emitting, so maybe the persons working in the sector are more concerned to this particular point.

Indeed one farmer explicitly recognizes her professional practice as having a role to play in the energy transition through reduction the greenhouse emission. Using her words:

“I think that we have work to do, in agriculture, on the one hand, because we are big greenhouses gas producers, but we won’t be able to...we won’t remove animals to say: “Finished”. But we have work to do to offset this production of greenhouses gas. And I think we have work to do at the level of our cultures.”³⁹ (farmer bocage-wood-energy boiler-CCT 2018)

And another highlight possible contradiction between what we, generally speaking, like to see in our agricultural landscape associated to the idea of nature, “authenticity” and the reality of the need for energy production.

“for example, our cows are standing inside, and makes our farm to produce energy out of manure, but, when I see cows outside and grassing I think “this is really nature” so ...there are some struggles and there are some things which are opposite to each other’s. For example, cows inside you can produce energy, it is energy efficient with the power plant... it very good. Cows outside is more back to basic, so I’m not really sure how the future will look like” (farmer GO 2017).

This last quote shows a possible gap between what could be an expectation towards an energy transition landscape and reality, needed to improve the energy system through flow optimization.

38 “Je reste persuadé c’est un peu comme avec nos animaux, nos fermes ou nos cultures, si on a un bassin de consommation ici, qu’on produit-là et qu’il faut parcourir des milliers de kilomètres pour approvisionner, c’est pas cohérent. Et si on prend en compte le paysage, notre environnement, alors on comprend que ce n’est pas cohérent, il y a des pertes... c’est polluant.”

39 “je pense qu’on a du travail à faire nous, en agriculture, d’une part parce qu’on est producteurs de gaz à effet de serre de façon importante, mais on ne pourra pas... on ne va pas supprimer les animaux pour dire: “Fini.” Mais on a du travail à faire pour compenser cette production de gaz à effet de serre. Et je pense qu’on a du travail à faire au niveau de nos cultures.”

8.1.2.5 To develop landscape grounded process

Finally, it could be identified a reason for considering landscape related to the idea of using it to develop an energy transition grounded process based on the resources and characteristic of the analyzed territory. This is a reason specifically highlighted by the landscape architects that worked on the three territories of study in France and the Netherlands. For them landscape is the basis from which to start the transition process, supporting in choices and strategies as expressed by the quote IC1 (table 8.2).

Landscape architects, as illustrated by quote JH1 (table 8.2), differentiated from the other interviewed agents giving an active role to landscape, both as a source of knowledge able to support in the energy transition process and as designing arena, where intentional project could contribute to achieve energy transition goals. So they go beyond the aspect of visibility and site project integration that characterize many points of view of the other agents. Using one landscape architects words:

“These analyses of resources leads to understand the better energy solutions. So it’s for that I think is important and landscape has not to be thought at the end and for single small projects.” (project leader space energie-PZH 2017)

8.1.3 Representation of the “Energy transition landscape” notion

The third question asked about the notion of “energy transition landscape”, in order to understand directly in which terms agents perceived the connection between these two notions. This question was intended to understand if agents were able to highlight a more or less comprehensive assessment/vision of energy transition from a landscape perspective, and/or which aspect is mainly put forward and what it seems to lack of their discourse. And see what could be the strength point of a landscape entry.

For this reason we chose to ask about “energy transition landscape” and not “energy landscape” or “landscape of energies” or other notion where only energy appear that could allow people to speak about fossil fuel landscape or similar, making lose the focus on our research topic. The direct connection between landscape and (ongoing) energy transition could allow agents to responds from a broad point of view on the whole transition process, potentially combining energy production, energy saving, transport mobility, etc.

We are interested in seeing which are the main features attributes to an energy transition landscape and in a second time we explore the principles that agents give in their answers in order to understand to what extent their vision of energy transition is comprehensive or not.

From the analysis of content’s answers we established 5 categories of “energy transition landscape” as emerging by the main narratives. Besides an analysis of the energy conscious principles/actions highlighted by respondents allow to find out the most recurrent topic and the omitted ones.

Table 8.3 categories of “energy transition landscape” from agent’s perspective, illustrated with representatives quotes and with the number of interviews in which the role is mentioned. The table includes quotes selected as representatives of the main categories listed in the table, in order to provide a clear image of the contribution facets, but avoiding repetitions. Total of 30 interviews. Source: author from re-elaboration of the agents semi-structured interviews.

Category	Quote	Code
Renewable energy producing dominated landscape – 9 times	“In fact it comes to my mind the TIPER project...in fact... it represents energy transition landscape because there photovoltaics, wind turbines, biogas equipment...we couldn’t do the energy transition with only a single renewable source...so yes, yes for me this represents well the transition idea” ⁴⁰ (Project manager local development of agriculture chamber Deux-Sevres-CCT 2018)	IDD2
	“I do feel energy transition landscape is something that is now on a question how we design them, as something we are going to arise by the earth to produce more sustainable energy and the combination of wind energy and solar energy on the large level, this what makes for me a landscape of energy transition” (since 2017 account manager of energy transition in Stedin, before Program manager for sustainability and innovation GO 2017)	LS1
	“Well, the energy transition landscape, well, it reminds me the forest, but because, because well, because for me, actually, it’s [the forest] the best environment and which, for renewable energy production and construction wood production, that reduces the fossil energy, and that participates to landscape, in fact” ⁴¹ (Technical animation regional center of forest property-ML 2018)	MPT4
Multi-function integrated landscape – 7 times	“So an energy transition landscape it’s not just windmills. That’s a wind mill landscape. An energy landscape should have multiple façades, and look for a sort of optimum system. We talked about ecosystems service right? But also for example the cable for electricity transport, if you have wind and solar together you can make an optimum use of that and if you can add agriculture activities. To this it would be even better, and maybe we can also put some fermentation unit over there, where you can have the manure of the cows, it’s a form fermentation it’s possible. We already do it. So should be everything together and not just one thing.”	MvS2
	40 “En fait ça me vient à l’esprit le projet TIPER...en fait... il représente bien le paysage de la transition énergétique parce que il y a le photovoltaïque, l’éolienne, le méthaniseur... on ne peut pas faire la transition énergétique avec une seule source renouvelable...donc oui, oui pour moi ça représente bien l’idée de la transition...”	
	41 “Ben, l’paysage transition énergétique, ben moi, ça m’évoque la forêt, mais parce que... parce que voilà, parce que pour moi, en effet, c’est elle qui est l’milleur milieu et qui, pour la production d’énergie renouvelable et la production d’bois construction, qui limite du coup l’utilisation des énergies fossiles, et qui participe au paysage, quoi, en fait.”	

(sustainability policy adviser-GO 2017)

“Shouldn’t be about this mono functional landscape. So the search is what is this about. Is this about pure mono functional energy? or it is about a new ... subject a new concept that have to be taken into account in our design landscapes. So is this for me, I think in the Netherlands there would not be or hardly be any pure, landscape, mono functional energy landscape. So always we combine with, something else, we have to combine with something else” IS2
(project leader space energie-PZH 2017)

**A local
resource based
landscape –
6 times**

“So it goes through a reduction, and it goes through an autonomy, so a production on our territories. And somewhere I accept that we change our landscape without necessarily disrupt, with a maximum of concertation and ability, but it’s for that that I say: A wind turbine does not bother me, a photovoltaic panel, a biogas facility or a hydroelectric power plant don’t bother me, because anyway it’s necessary, and we have to quickly stop to get pumping oil with all the consequences that this lead.”⁴² (farmer, biogas project initiator , ML 2018) AK2

“He’s not going to ask himself the question...well, when he’s going to open the gas to cook some pasta, well, actually...the gas, he isn’t going to ask himself if it comes from Russia or from the North Sea. And this, well, it’s seems important to me to begin to raise awareness in people, to say that actually, non, energy, it is everywhere. It’s on my roof, it’s in my garden, it’s...well, it’s also in my car, it’s also on the wind turbines that I could see exiting from my hoe and I’m reassured seeing wind turbines and saying to myself: yes, non, but it’s good, the nuclear power plant, it’s good. Finally: in other people houses, it’s good”⁴³ (PCAET project manager-ML 2017) JPM1

“Finally, for me, it’s connected actually. Since, in any case about renewable energy, we speak about sources that come from the landscape, finally in any MM1

42 “Donc ça passe par une réduction, et ça passe par une autonomie, donc une production sur nos territoires. Et quelque part moi j’accepte qu’on modifie nos paysages sans forcément tout bouleverser hein, avec un maximum de concertation et d’habileté, mais c’est pour ça qu’je dis: Une éolienne ça m’gêne pas, un panneau photovoltaïque, une usine de méthanisation ou une centrale hydraulique ça n’me gêne pas, parce que de toute façon c’est nécessaire, et on se doit rapidement arrêter d’aller pomper du pétrole avec toutes les conséquences que ça peut apporter.”

43 “Il va pas se poser la question de savoir... Voilà, quand il va ouvrir le gaz pour aller s’faire un... pour aller s’faire des pâtes, ben, en fait...Le gaz, il va pas se demander s’il vient d’Russie ou d’la... des mers du Nord. Et ça, justement, ben, ça m’paraît important de... de commencer à sensibiliser les gens, à dire qu’en fait, non, l’énergie, elle est partout. Elle est sur ma toiture, elle est dans mon jardin, elle est... Voilà, elle est aussi dans ma bagnole, elle est aussi sur les éoliennes que j’peux voir en sortant d’chez moi et j’suis plus rassuré en voyant des éoliennes que en m’disant : ouais, non, mais c’est bien, les centrales nucléaires, c’est bien. Enfin : chez les autres, c’est bien.”

case ...that are there, that are presents. Typically, so, about wind turbines, the wind, we could only put it in regions or areas that are favorable with prevailing winds, etc. So inevitably, this has to integrate in the concerned landscape. About photovoltaic, we are in an area where, in the same way, which are rather interesting from solar point of view, that meet certain criteria too, so this corresponds to a certain kind of landscape and so it also has be considered its...its.. how to say it? Its implantation. And afterwards, we could decline that for all the other forms of energy...about biogas production, we are more on agriculture environment⁴⁴ (Cit'ergie and TEPOS project manager-CCT 2018)

Energy producing and energy saving landscape - 5 times

“And...it could be about management of energy. For example, a municipality that renovate/retrofit all its residential building, its... its municipality appearance, it will change, so the landscape of the municipality, it is going to change. And this municipality, it will produce energy too, may be on the roof of...of houses, so you don't use agricultural land.”⁴⁵ (responsible energy transition service, Parc Eco Habitat-ML 2017) TR2

“I think that we're going to need to produce energy – first to consume less; the idea would be to consume less first – to produce it and that...we have the resources to do it. And people with their choices could do that.”⁴⁶ (farmer bocage-wood-energy boiler-CCT 2018) CJ2

Landscape of energy stream optimization – 3 times

“I think wind is really a good one, only efficiency of wind is difficult, water would be better. And also I think collecting waste. For example, when you look at the production of food, then we can maybe eat the half of it, may be less and the rest of it we throw away. So when we can make the circle of food for example, may be the carbon and close the circle. I think when you can do that, then you reach efficiency and when you reach efficiency you have the best way. And with energy is the same, you can JJR2

44 “Enfin, pour moi, c'est un peu lié en fait. Puisque, en tout cas sur les énergies renouvelables, on parle de sources qui sont issues du paysage, enfin en tout cas de la... qui sont là, quoi, qui sont présentes. Typiquement donc, sur l'éolien, le vent, on peut forcément l'implanter que dans des régions ou des zones qui sont favorables avec des vents dominants, etc. Donc forcément, faut que ça s'intègre dans le paysage concerné. Sur le photovoltaïque, on est dans des zones où, de la même manière, qui sont plutôt intéressantes d'un point de vue ensoleillement, qui répondent à certains critères aussi, donc c'est certains types de paysages et donc faut aussi prendre en considération son... son... comment dire? Son implantation. Et après, on pourrait décliner ça pour toutes les autres formes d'énergie... Sur la méthanisation, on est plutôt sur des environnements agricoles.”

45 “Et... ça peut être sur la maîtrise de l'énergie. Par exemple, une commune qui rénove tous ses bâtiments résidentiels, son... son aspect de la commune, il va changer, donc le paysage de la commune, il va changer. Et cette commune-là, elle va produire aussi de l'énergie, peut-être sur les toits des... des habitations, comme ça n'utilise pas du sol agricole.”

46 “Je pense qu'on a on va avoir besoin de produire de l'énergie – d'en consommer moins d'abord; l'idée ce serait quand même déjà d'en consommer moins –, qu'on en produise, et que... On a les ressources pour le faire. Et les personnes à travers leurs choix peuvent faire ça...”

throw away the food, but you can also use the food as energy for example, so I'm not really...wind I don't think in 20-30 years the windmills will be as they are now, if they will be there or they will be less in 30 years. But using the waste as energy, will be more I think and certainly is always good.” (farmer GO 2017)

“Well it is a landscape of flows, energy ones... but not only...there is food and goods and they are all connected. And actually it is not something different from what we have now because it has to become a normal landscape where we produce our own energy and we use landscape's components to generate energy or think how to optimize its use and reduce it.” (HNS landscape architect 2017)

8.1.3.1 Renewable energy producing dominated landscape

The most (23) of the agents in all the three analyzed territories describes an “energy transition landscape” mentioning the RE production both in France than in the Netherlands. Moreover of these 23 agents 9 as illustrated by the quotes IID2 and LS1 focus the landscape description only on renewable energy producing. The answers mentioning this category of landscape are mainly focused on a technological perspective of the energy transition. However as the previous quotes show it is recognized the usefulness technological diversity/multiplicity to produce RE on the territory combining with turbines, solar, biogas, etc. even if wind turbine presence remains the most quoted in the answers (17 times).

The majority of these answers omit all other aspects that constitutes a landscape such as agriculture, urban, etc. component focusing on a very producing mono-functional landscape. This shows that the technical criteria is the most discussed in the answers, even if not always linked to sustainability. Indeed “renewable” and “sustainable” are not synonymous, even if both notions are related (Stremke 2015). Indeed sustainable also carries the idea of considers other qualities such as biodiversity, economy and in general quality of life, that we could not find associated with renewable projects. Indeed a photovoltaic park is renewable energy producing, but if it is placed on a big surface for example compromising food production or ecological corridors it could not be considered sustainable projects.

To strengthen this techno-centrist idea one agent elected members in Goeree-Overflakkee directly connect the image of an energy transition landscape as an industrial one, highlighting even more its technological producing point of view:

“It's like industrial ...it gives me a positive feeling because I know is necessary, but it has a relation for me with industry and ...that renewable production.” (municipal councilor innovation and sustainability-GO 2017).

Nevertheless, another interviewee, add some more context elements to the description to how these RE technologies are visible in the landscape and could be integrated in it, for example in a *bocage*:

“I see a beautiful bocage landscape with scattered small wind turbines, ... Why not a field of photovoltaic

*panels? And small houses with solar panels, wooden houses, uh ... that's it. For me, it's a landscape of energy transition.*⁴⁷ (Sustainable territorial management division director-CCT 2017)

Nevertheless, even if with some more context precision RE facilities presence remain the central focused elements, the surroundings are just a sort of background scenery.

Even if the majority connect to the technology for RE production few exceptions exist. The person in charge of forest management in the CC Monts du Lyonnais, as expressed by the quote MPT4 (table 8.3) describes a landscape characterized by forest as an energy transition one basing on the object of her professional practice, so putting the accent on the resource to produce renewable energy not on the technological device itself. However the forest remains seen from the very quantitative functional point of view not at all aesthetic or qualitative, even if it is a natural element.

Moreover another agent, an elected representative in the CC Monts du Lyonnais as well focus on renewable energy production but referring to the source forest wood or river without speaking about the technological device to transform in electricity or heating these elements. In his word:

*“A landscape here, so very green with curved lines and that produce energy. Where the energy production follows the curved lines of the landscape. It reminds me of that. The production, so how? Well it could be the forest simply, it's an energy production. We make wood. We produce wood that then will be used. This may be...ah well the use of water streams too. Because nowadays we have water streams.”*⁴⁸ (mayor, b.VP energy transition-ML 2018)

So in the social representation of RE production landscape is dominated by technologies, but with some connection to the resources needed to make these technologies works.

8.1.3.2 Multi-function integrated landscape

In seven answers, we found some mentions of other activities and functions composing an energy transition landscape, such as agriculture, to be added to the RE production, widening the notion. The quote MvS2 illustrates several RE facilities long with the idea of preserving ecosystem services and developing an “optimum system” mentioning also the infrastructure for electricity transports. Quote IS2, emphasize from a designer landscape architects perspectives the necessity of avoiding a mono-functional energy producing landscape. The description of renewable energy production with other sectors and the idea of a multi-functionality reappears in these answers, even if it also found in the answers to the previous analyzed question, showing to be a topic of concern for agents. This point of view appear with more strength in the Dutch answers where, probably due to the local characteristic of the country were high density population leads to think to make the most with a reduced land surface.

47 “je vois un beau paysage de bocage avec des petites éoliennes dispersées, des... Pourquoi pas un champ de panneaux photovoltaïques? Et des petites maisons avec des panneaux solaires, des maisons en bois, euh... voilà. Pour moi, c'est un paysage de la transition énergétique.”

48 “Un paysage de chez nous, donc bien verdoyant avec des lignes courbes et qui produit de l'énergie. Où la production d'énergie suit les lignes courbes du paysage. Ça m'évoque ça. La production, alors comment? Ben ça peut être la forêt tout simplement, c'est une production d'énergie. On fabrique du bois. On produit du bois qui ensuite va être utilisé. Ça peut être... Ah ben l'utilisation des cours d'eau aussi.”

Besides referring to multi-functionality two attitudes could be distinguished in the answers of this energy transition category.

One emphasizes the integration of RE with “natural functions” associated to a landscape, as illustrated by the following quote:

“It’s a more natural landscape, in which we integrate some small touches of modernity, through wind turbines and solar ground park that will illuminate this landscape without...bring a touch of modernity, while preserving its natural qualities”⁴⁹ (Project manager energy and climate-CCT 2017)

The second relates to the idea of the human landscape, with the idea of maintaining and integrate the function relating to the socio-cultural components needed by local inhabitants, as expressed by the following quote:

“[Speaking about Vorarlberg] and...and I think that there was...there is a good landscape integration of...well, of these energetic questions. And there is a beautiful...alliance, finally, compatibility in any cases of the traditions, finally of heritage, of its conformation and modernity – modernity in the energy transition sense”⁵⁰ (TEPOS project manager-ML 2017)

8.1.3.3 A local resource based landscape

Six energy transition representations put forward the idea of energy transition “local” landscape, meaning that their narratives empathize transformation in the everyday surroundings landscape, in order to implement energy transition as illustrated by the quotes AK2 and JPM1 (table 8.3). As the same excerpt express this local perspective is connected to an idea of spatial justice and responsibility for nature, future generations, as stated in the meaning of sustainable development. We found advocated a local landscape where RE production is re-located where energy is consumed. The message is clear: if we consume energy is right that we also pay the price to see changes in the landscape. At the same time these landscape changes are also seen as a reassuring, because are not perceived as dangerous and possibly interrupted in supply because of the world socio-political issues.

Moreover the idea of local landscape is also connected to the need to analyze and base energy transition strategies on the analyses of local resources as illustrated by the quote MM1, that emphasizes for RE production the need to be implemented where local characteristic of wind or solar radiation allow it.

A landscape architect that worked on the development of the *plan de paysage* for the French case also goes further advocating

In connection with the idea of energy production and consumption, two agents define an energy transition landscape as a one that is based and on its own resources and reflects them in

49 “C’est un paysage qui est plus naturel, dans laquelle on vient intégrer quelques petites touches de modernité, par de l’éolien et des parcs solaires au sol qui vont éclairer ce paysage sans... Lui apporter une touche de modernité, tout en préservant ses qualités naturelles”

50 “[Speaking about Vorarlberg] Et... et je trouve qu’y avait... y a une bonne intégration paysagère de... voilà, de ces questions énergétiques. Et y a une belle... alliance, enfin, mise en compatibilité en tout cas de traditions, enfin de patrimoine, et de sa conformation et la modernité – modernité au sens de transition énergétique, enfin”

its material component.

“To live with its resources. To live with its landscape resources. That’s it. So to get warm, to move, to eat, very basic things of our everyday life with our landscape resources”⁵¹ (Ingénieure-paysagiste 2017)

8.1.3.4 Energy producing and energy saving landscape

No answer refers to an energy transition landscape speaking only about energy saving, but five agents refers both to RE production and energy-saving measure. This illustrated by the quote TR2, which introduces the reduction of energy consumption through building energy retrofitting. This answer is highlighted by the person in charge of Parc Eco Habitat in the CC Monts du Lyonnais that support the energy building retrofitting, that in his description refers directly to the center of its professional practice.

However as expressed by the quote CJ2, the other four agents included in this category, even if in their answers refer directly to energy saving does not highlight how do that (e.g. improving mobility, etc.) and how a landscape choices could contribute to the energy consumption reduction or conversely how an energy saving conscious actions could impact landscape. So energy saving is acknowledged to be part of energy transition, but its direct/tangible connection with landscape is not described further.

8.1.3.5 Landscape of energy stream optimization

As the previous category in connection with the three main energy transition strategies, beyond renewable energy production, three agents a farmer, a landscape architect in the territory of Goeree-Overflakkee, and an ADEME territorial referent of CC Thoursais put forward the idea of energy efficiency, even if always in connection with RE production. They describe the need for an optimization of energy flows and reuse of waste for energy producing, expanding further the energy transition point of view as expressed by the quote JJR2. This quote is mentioned by the farmer that highlighting stream optimization idea considering waste, refers to something based on its own knowledge and experience, because he had implemented a biogas equipment to reuse the cow’s manure to produce energy at its farm scale. However in his answers the landscape or spatial aspect connected to efficiency is not really illustrated or clarified. The energy efficiency action is described but its tangible repercussion on landscape does not appear in previous quote but it could be found in the quote JH2, of a landscape architect, that speaks of “landscape of flows” and landscape as a superposition and interconnection of them, visible or invisible, constituting landscape and their optimization highlights a clearer connection with spatial point of view. Nevertheless in this case the need of optimization is mentioned but not described and concretized through a specific action to achieve it. This category of “energy transition landscape” remain very marginal in the answers analyzed, but is founded in very different agents professionals, showing that it is a topic of interest. This category has some

51 “Vivre avec ses ressources. Vivre avec ses ressources paysagères. Voilà. Donc se chauffer, se déplacer, manger, des choses très basiques de notre quotidien avec les ressources paysagères.”

similarities with “a local resource based landscape”, but the choice to make a category itself is motivated by a difference in the agent’s narratives perspective. For the category “landscape of energy stream optimization” the accent is put on the efficiency of stream management, while for “a local resource based landscape”, the main focus is about relying on resource locally available. The fact to encourage the use of local resource is in itself a way to improve energy efficiency, but it is less affirmed in the answers, so the presence of these two categories want to give an account of this diversity.

8.2 A shared vision about energy transition landscape?

We investigated the social representation of energy transition through the analysis of energy transition agents’ answers to three main questions: (1) the criteria associated with a successful energy project in landscape terms (2) the reason why it is useful to take into account landscape and (3), the notion of “energy transition landscape”.

The categories elaborated and discussed across the answers are obviously dependent by the kind of energy transition process and associated projects which exist in the analyzed territories, and the more territories that are surveyed the richer discussion becomes. In any case the differences in the three analyzed territories, the greater amount of projects focused on energy transition in the territory and the different temporality in paths to achieve transition goals, permits to find out quiet various points of view. In this section, the categories developed across the three questions are put in perspective and discussed transversally.

8.2.1 Common points through categories

Several categories that span the questions have similarities that point out several recurrent topics that seem to be particularly important in agents’ discourse linking the energy transition process and landscape.

At first the idea of multi-functionality is a recurring positive representation found throughout the questions and that define categories (e.g. “Multi-functionality” see quote MvS1, “Multi-function integrated landscape” table 8.1, quote IS2 table 8.3). The possibility for overlapping RE facilities on existing landscape is recognized as a possible “reconciliation” between the two (Schöbel and Dittrich 2010), and also, beyond energy transition realm, it is put forward as something important to achieve (e.g. Selman 2009). Other research, especially linked to RE technologies also points out positive feelings concerning *visibility*, *ownership*, *former utilization* (Jobert, Laborgne, and Mimler 2007). Our results also brings attention to a main issue linked to *visibility*, where RE projects for many are considered by most to be made the less visible as possible in the landscape (e.g. quote GC1 table 8.1). Nevertheless, maybe because of the progressive advancement of projects and energy transition discourse over the last several years and the fact that the interviews were developed with agents that are directly acting for energy transition implementation, some answers point out the advantage in educating people through a display of energy projects (e.g. quote AC3 table 8.2). *Visibility* is particularly linked to subject of *aesthetics* through the categories

and two categories are directly addressed, “aesthetic appreciation” table 8.1, “To preserve a landscape aesthetic” table 8.2. The aesthetic perception of landscape is a point of view that is broadly addressed and to which much attention is given especially for the development of RE technologies in order to “preserve scenic values” (e.g. Apostol et al. 2016) even if aesthetics and the sentiment of beauty is recognized to be something variable through time and space (Selman 2008), and energy landscapes make no exception (Pasqualetti and Stremke 2018). The question, as pointed out by Wolsink (2017) is not to confuse visibility and visual impact. A project could have high visibility but be perceived as having a low visual impact on landscape, being well fitted into the site and its surroundings. This should probably lead the discourse shift from the idea of visible aesthetics to landscape quality by addressing a broader range of landscape values (Oudes and Stremke 2020). The *former utilization* too, is something addressed in agents’ narratives and in this research it is generalized as *context effect*. It is emphasized in the interviews, especially through the TIPER project (CC Thouarsais), that is considered successful because it was implemented on a polluted brown field (e.g. quote MLH1 table 8.1). *Ownership* is something not very often addressed during the interviews, through our landscape prism, and it is included in the category “local character” where the main focus is more directed towards the use of local resources and possible economic benefits (e.g. quote MPT1 table 8.1). Nevertheless ownership of RE projects by local inhabitants is especially recognized by other research studies as an important factor for improving positive feelings around energy projects (e.g. Radzi and Droege 2013). This point of view could probably have been mentioned more often if we have developed interviews with inhabitants involved in this kind of projects in the territories.

Moreover, thinking about landscape seems to direct more attention to local issues especially on ideas about the use of local resources, a topic that appears across all categories developed from the answers to the three questions (“Local character” table 8.1, “To develop a landscape grounded process” table 8.2, “A local resource based landscape” table 8.3). The use of RE technologies and the development of reduction actions for energy demands draws benefit from available local resources (van den Dobbelsteen, Broersma, and Stremke 2011; Stoeglehner et al. 2016) and also locally distributes economic advantages (Hoppe et al. 2015) that could support local social “acceptance” of RE projects when promoted by local institutions (Devine-Wright 2008; Cohen, Reichl, and Schmidthaler 2014). However, as suggested in some interviews (e.g. quote AK1 table 8.1), the benefits should not to be seen just as compensation for the impact that energy transition projects could leave in landscape, instead the use of local resources leads to an idea of energy spatial justice through fair distribution of the costs and benefits (Miller, Iles, and Jones 2013). Moreover it is important not to forget that even if the use of local resources needs to be encouraged, connections among territories and cities need to be preserved and established by not focusing on the idea of energy autarchy (Lopez 2014), and this awareness does not seem to be pointed out in agents’ narratives.

This concern about resource proximity, of taking context into account that emerges when thinking about landscape, is a topic that is highly addressed by studies in territorial ecology (e.g. Buclet 2011; Barles 2014). This evolving disciplinary field is connected to the idea of territorial and urban metabolism (e.g. Barles 2014; 2010), where the flows of energy and materials over territory are the center of attention.

This section gives an overview of the most debated issues connecting energy transition and

landscape that can be found across agents' narratives, in the following sections transversal readings of these categories are developed.

8.2.2 Energy transition main strategies from a landscape perspective

Drawn from the analysis of the three previous questions it has been pointed out that agents put a primary accent on the energy transition strategy of RE production compared to the other two strategies that concern the reducing of energy demands, and the optimization of energy streams.

Answering question one, 25 agents mentioned RE projects when thinking about successful energy transition projects in landscape terms. About question two, the highest number of answers (24) mention RE facilities about the necessity of considering landscape, where the majority (15) speak about wind turbines in all three territories. Only three agents, one for each territory mention biogas power plants, and all three are persons directly involved in the implementation of this kind of project, in the agricultural sector.

And about question three, it has been already pointed out that the most (23) of the agents all describe an “energy transition landscape” mentioning RE production.

Interestingly, one interviewee explains that she is addressing especially this component of energy transition process because she considered that the reduction of energy consumption impacts landscape less. In her word:

“And after all the actions that are very important in energy transition are the actions concerning consumption reduction. And they, certainly, they have not... finally, the most of them do not have landscape impact, so... That's why I give examples of renewable energy. [...] They are in the aspect of behavior, to turn off the lights, to lower a little the heating. It is about insulating houses well in order to consume less heat, so you see it is going to be this kind of thing. So this does not necessarily have an impact on landscape. Unless, of course, if you are doing a huge retrofitting operation, you make external insulation, in this case yes, you could have an impact visually. But the most of the time no”⁵² (Sustainable territorial management division director-CCT 2017).

This outcome is in line with what was found through the analysis of planning instruments (chapter 7), where landscape in connection to energy transition is addressed because of the RE technologies installations.

8.2.2.1 Energy conscious principles from “energy transition landscape”

However, in order to better understand and obtain a clearer vision of the agent's awareness concerning energy transition strategies in landscape, we closely inquired about the “energy

52 “Donc... Donc, voilà. Et après, toutes les actions qui sont très importantes dans la transition énergétique sont des actions de réduction de consommation. Et elles, forcément, elles n'ont pas... Enfin, la plupart n'ont pas d'impact paysager, donc... C'est pour ça aussi qu'j'te donne plutôt des exemples d'énergies renouvelables. [...] c'est les aspects de comportement, d'éteindre les lumières, voilà, de baisser un peu le chauffage. Ça va être de bien isoler pour consommer moins de chauffage, enfin voilà, tu vois, ça va être ça. Donc, ça a pas forcément d'impact sur le paysage. Sauf si, forcément, tu fais de la grosse réhabilitation, tu fais de l'isolation par l'extérieur, là oui, ça peut avoir un impact visuel. Mais la plupart du temps, non.”

transition landscape” notion, as described by agents, “breaking” it down into constituent principles. *Principles* refer to abstract action/design statements that are taken into account in order to compose an energy transition landscape. We clustered the principles according to the three axes of *Trias Energetica* (Lysen 1996) and further adapted (Tillie, Rotterdam Climate Initiative, and Project Group Hart van Zuid 2009) because they represent the three principal strategies for implementing energy transition: (1) reduce demand, (2) optimize energy streams, (3) use renewable energy sources. In order to give a better understanding of the results we added “improving energy saving through mobility” that is part of the “reduce demand” category but shows more clearly how the mobility system is considered part of the transition process. Aspects that we found were highlighted in some planning instruments discussed in chapter 7. The figure 11 above, illustrates how producing renewable energy from facilities is the most highlighted and mainly from wind turbines (17 times), as mentioned in great number by agents of the CC Thouarsais and Goeree-Overflakkee. Indeed both territories are characterized by a large number of wind turbines’ park.

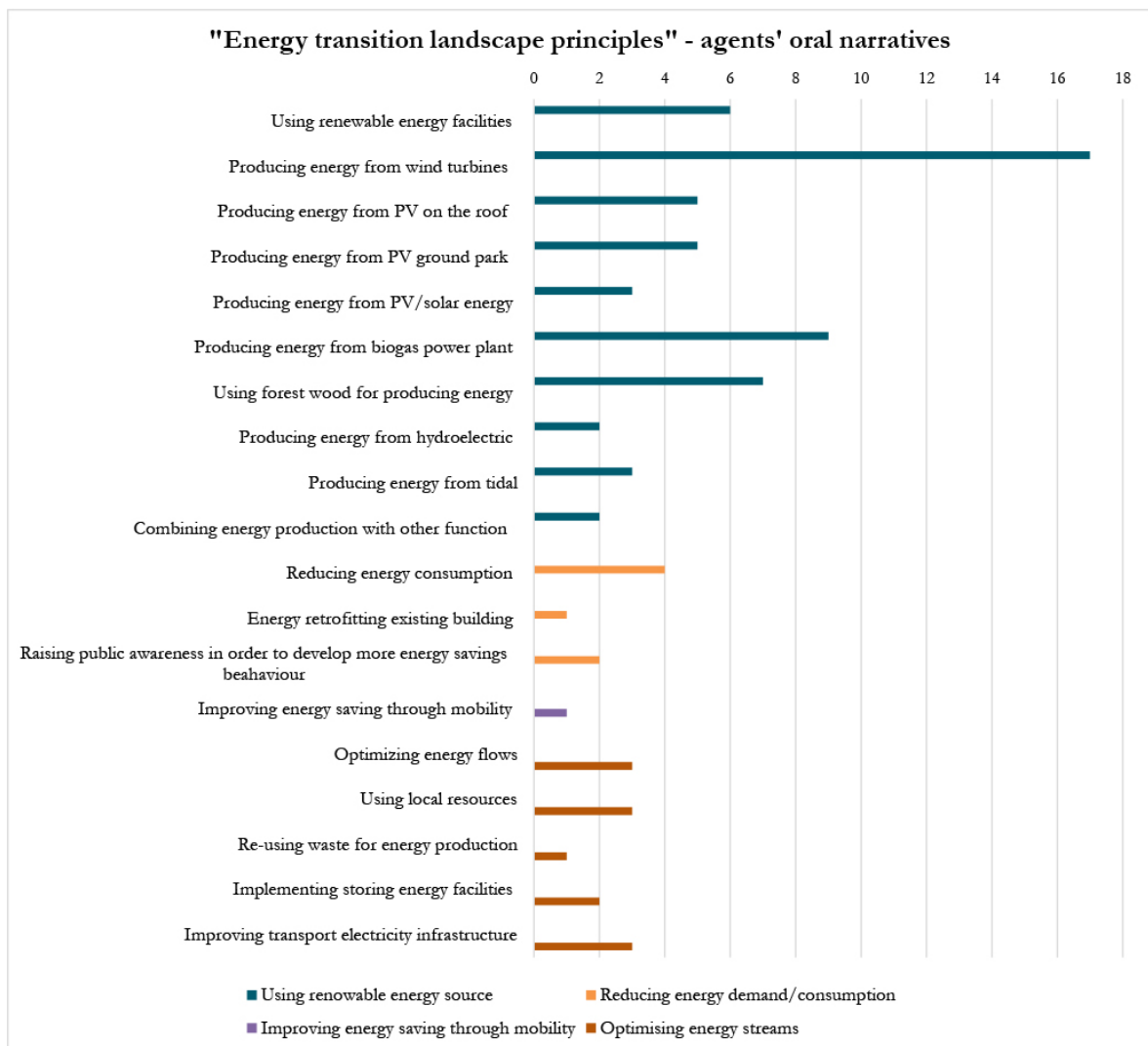


Figure 11. Number of time that one principle is highlighted by an agent describing an “energy transition landscape”. Source: author elaboration of data from interviews

8.2.2.2 Additional context information for RE siting

In some cases, additional information going beyond the simple presence or absence of wind turbines in landscape are brought forward too. As expressed by the following quote, they mostly specify the need for a controlled choice for wind turbines sites that do not have to be sprawled out everywhere:

“So should be everything be together and not just one thing. But I should also agree that it should be clustered so there should be cluster of energy hubs, and they shouldn’t be everywhere. They should be places where you can sit without seeing the next 16 windmills. So cluster and also think about, also storage conversion, and put it together.” (sustainability policy adviser-GO 2017)

However, many respondents also mention the use of photovoltaic panels for producing renewable energy (14 times). Interestingly, on the subject of photovoltaic panels, several agents also add details about their siting in the landscape. Five agents specify that PV panels should be installed on roof in order not to interfere with other land uses. For example one interviewee said:

“When you turn your head you can easily see...well solar panels on homes or on industrial buildings. It’s starting to show up, and this, I think it is very useful. It is also on the parking [lots’ roofs] in shopping centres that put...finally shade structures we can take advantage of these spaces that are of no use...”⁵³ (wind turbine project manager, WP-CCT 2018)

Four other agents describe PV panels parks on the ground, but all of them add complementary and compatible land-uses such as small animal breeding underneath them or highlighting the problematic aspect of competitive land uses, such as between land use for energy and land use for agriculture. Particularly, the representative of the agricultural chamber of the CC Monts du Lyonnais explains:

“Photovoltaic fields on the ground...even there where there was just scrubland before, may be rocks, things like that, we put a whole photovoltaic field...well. This ...the energy transition has to be developed respecting food [production] needs, when it comes to agriculture, but also landscape”⁵⁴ (Rhône agricultural chamber, energy adviser-ML 2018)

A similar attitude giving more details about the insertion of some elements into landscape is also observed in the narrative of one agent towards biomass facilities for the energy production. This principle was highlighted 7 times. Using one of the agent’s words:

“And that’s why I think the biogas device, the fact of being able to integrate it well, in upstream. To do things that are ...that integrate well in the landscape and where...well this...we end up with buildings that could be a little bit as agricultural building that finally do not shock the eyes. But not buildings...”

53 “Quand on tourne la tête on peut voir très facilement ben des panneaux solaires sur des habitations ou sur des bâtiments industriels. Ça commence à se voir, et ça, je trouve ça hyper utile. C’est aussi sur des parkings de centres commerciaux qui mettent enfin des ombrières et qu’on profite enfin de ces espaces qui ne servent... potentiellement à rien”

54 “Des champs photovoltaïques par terre... [...] même là où il y avait de la garrigue avant, peut-être des rochers, des choses comme ça, on met tout un champ photovoltaïque... Voilà. Ça... La transition énergétique, elle doit se faire en respectant les besoins de l’alimentation, quand il s’agit de l’agriculture, mais aussi les paysages, quoi.”

*the big industrial building in the open countryside*⁵⁵ (ADEME territorial referent Deux Sevres - CCT 2018)

Interestingly, the mention of a biogas facility appears only once, in the CC Monts du Lyonnais where it represents one of the main sources for renewable energy production, although we would expect to find more reference made to it.

Moreover, one agent describes the evolution little by little in his reflection about energy transition landscape by passing in review several RE facilities and coming to the conclusion that the best energy production solutions are the ones that are less visible and also where landscape is less changed.

“The barns and you put on them some solar collectors, this is not really a big change in the landscape. Wind is more difficult because they are high and big and you can always see them, when you put some into the water, using the power of the sea, you don’t see it. And it gives a lot of energy so it’s quite good. And I think collecting waste can be done in any place, you can do it really on a small scale in your own home, under the ground or in a little bag, so then I don’t think that landscape will suffer from it I think.” (farmer GO 2017)

8.2.2.3 Missing principles

From the analysis in figure 11, we also notice a certain number of missing principles of the energy transition process, which could impact landscape or be impacted by landscape planning and designing. Energy saving principles are almost completely absent, such as principles about reduction of energy consumption in urban areas, energy building retrofitting and the development of alternative slow mobility. The mobility question for energy transition is mentioned only once by the territorial agents ADEME of the CC Monts du Lyonnais, just as a topic among others connected to the transition process but with no additional details.

Another point debated little is the infrastructural system for electric transmission. Just two agents mentioned it and only once refer to the importance and necessity for design thinking. This is highlighted by the policy adviser on sustainability, who knew and participated in the discussion about the idea for Goeree-Overflakkee’s local institutions to export the surplus renewable energy production, for which a purpose in transmission infrastructure becomes a central point. In her words:

“but also for example the cable for electricity transport, if you have wind and solar together you can make an optimum use of that” (sustainability policy adviser-GO 2017)

Indeed, also concerning RE production, many RE facilities are highlighted a few times or not at all. Hydroelectric power appears 3 times and tidal energy appears once. Indeed, these are facilities that are not developed yet in the analyzed territories, even if a tidal power plant has been planned since long ago in Goeree-Overflakkee, so perhaps agents do not think directly

55 “Et c’est pour ça que je trouve que la méthanisation, le fait de pouvoir bien l’intégrer et tout, en amont. Faire des choses qui sont... qui s’intègrent bien dans le paysage et où... voilà ça... on se retrouve avec des bâtiments qui peuvent être un petit peu comme des bâtiments agricoles, quoi, finalement, qui ne sont pas choquants à l’œil. Mais pas des bâtiments... des gros bâtiments industriels en rase campagne”

about them. Surely agents while answering are influenced by the image that they have of their territory and see daily.

8.2.2.4 Mention of the three energy transition strategies

The predominate component of RE technologies concerning energy transition found in agents' narratives convergence with other research about social representation as lead in the UK (e.g. Devine-Wright 2011) and in Italy (e.g. Sarrica, Brondi, and Cottone 2014).

Generally speaking, the most frequently cited technologies are wind and solar (e.g. Devine-Wright 2008). However in this research several references are made to biogas power plants because of the rural character of the analyzed cases where the development of these technologies is consistent with territorial characteristics. And tidal energy too, is found in agents' discourse of Goeree-Overflakkee probably because there is a planned project of this kind on the island.

However the landscape prism allows going beyond the knowledge or lack of knowledge of these elements, where in some cases agents were able to take a step further explaining how they imagine good site choice and insertion of them in landscape.

Moreover in this research, thanks to the choice of the CC Monts du Lyonnais that started the energy transition implementation by focusing mainly on habitat energy-saving measures, allows the collection of social representation associated with built environment, beyond RE technologies. This shows that several criteria, such as aesthetics, multi-functionality, high energy efficiency performance are associated with RE facilities technology but also to projects concerning buildings, even if still less addressed upon compared to RE production. The reduction of energy consumption and optimizing energy streams in connection to landscape could be a point of view that deserves more attention in future research. This because landscape could both be impacted and possibly play a role supporting these two strategies, so further insight on social representation on these subjects could support further implementation.

Considering the differences between nations, cross comparing the answers particularly concerning the third question, we find a constant in a lower reference of energy-saving measures in the Dutch case compared to the French ones, even if Goeree-Overflakkee has set up these kinds of actions. However, agents in Goeree-Overflakkee refer more often to dimensions about reuse and optimization of flows, such as storage and waste, that are less highlighted in the French cases.

8.2.3 Ecocentric, technocentric, anthropocentric landscape representations of energy transition

In the previous sections (8.1.1, 8.1.2, 8.1.3) categories developed based on the answers of specific questions are each discussed. However, looking across the three questions and the elaborated categories, several common factors, identified as positive for the development of energy transition by the interviewed agents could be pointed out.

These positive and transversal factors to the categories, could be attached to three figurative approaches towards energy transition and referred to as *ecocentric* and *technocentric*, (Audet 2016;

Sarrica et al. 2015) to which Sarrica et al. (2015) also added *anthropocentric*. This framework enables each question and its associated categories, to be examined through the three figurative approaches of energy transition, and it reveals those mainly associated with positive representations feelings. The results could enhance a shared landscape vision able to support future dialogue among agents to select ways to develop energy transition processes in the landscape and future shared energy related projects.

The *ecocentric* group factors are based on the idea of transformations that comes from local territorial actions and an approach based on nature and its living components, by grouping the positive factors found in agent's narratives as: "to do with nature", "to do with geography". The first factor proceeds from the idea found in agents' narratives that renewable energy comes from resources we find in nature (e.g. quote PG p.331), but also that the use of natural materials such as wood for cladding biogas power plants (e.g. GC2, table 8.2) are seen as factors that improve energy transition implementation projects. With the expression "to do with geography" we refer to the idea about grounding processes in the territory and its characteristics such as topography and including both physical and cultural resources(e.g. quote MM1, table 8.3).

Technocentric refers to the technical perspective that characterizes energy transition implementation that requires as much by technological advancement for RE production, than the reduction of energy consumption and energy efficiency. This category empathizes the positive factors of "To use modern technologies for controlling energy production locally", "to mix different technologies for RE production", "To use highly efficient technologies". "To use modern technologies for controlling energy production locally" highlight the positive feelings that lead the idea of producing energy demands in the territory and being less dependent on energy imports (e.g. AK1, table 8.1). "To mix different technologies for energy production" refers to the positive factor of having a diverse RE production in the territory and by not focusing on only one technology, in order to address in a broader approach energy production implementation (e.g. ED1, table 8.1). "To use highly efficient technologies" puts the accent on the positive perception of a project that is highly efficient both for RE production than reduction of energy consumption, for example re-using wastes as energy (e.g. JJR2, table 8.3).

Finally, the *anthropocentric* refers to the idea of connecting energy with human built areas and behavior. This clusters the positive factors: "to integrate in human based backgrounds (e.g. industrial areas)", "to enhance interactions with human behavior". The first refers to the positive perception that agents express for energy related projects that are located in humans built industrial areas (e.g. PR1, table 8.1) or hidden by heritage elements (e.g. PD, text p.309). While "to enhance interaction with human behavior" illustrates the positive effect that the energy projects could support to accustom local inhabitants to energy transition subjects and lead them to have more energy conscious behavior (e.g. JPM1, table 8.3).

Table 8.4. Categories are put in relation to three figurative approaches for energy transition, associated with representative quotes. Dimensions representing the majority of interviewees are marked with “**”. If few acknowledge the factor it is marked “*”, and “-“ if this is not the case. Total of 30 interviews. Source: author from re-elaboration of the agents’ semi-structured interviews.

	Ecocentric		Technocentric			Anthropocentric	
	To do with nature	To do with geography	To use of modern technologies for controlling energy production locally	To mix different technologies for RE production	To use highly efficient technologies	To integrate in human based background (e.g. industrial areas)	To enhance interaction with human behavior
1 question – Landscape energy transition successful projects							
Aesthetic appreciation - 17 times	* GC1-8.1	** HG1-8.1	-	-	** TR1 - 8.1	** AC1-8.1 PD-text p.309	-
Multi-functionality - 8 times	* IS1-8.1	-	-	* ED1- 8.1	-	* AC- text p.311	* MvS1
Local character - 6 times	-	** MPT1-8.1	* AK1-8.1	-	-	* PJC1-8.1	** MLH-text p. 313
Context effect - 4 times	-	* IDD1-8.1	-	-	-	** PR1-8.1 MLH-8.1	-
High energy performing - 2 times	-	-	-	-	** JJR1-8.1	-	-
2 question – Why take into account landscape							
To preserve a landscape aesthetic - 15 times	** GC2-8.2 AC2-8.2	** PG1-8.2	-	-	* TR-text p.321	-	-
To facilitate “appropriation” and “acceptability” of ET - 6 times	-	** DM1-8.2	-	-	-	-	** AC3-8.2
To preserve landscape identity and belonging - 5 times	-	** HG2-8.2	-	-	-	-	* LC- text p.324
To improve environmental dimension - 5 times	** MLH2-8.2 CJ1-8.2	-	-	-	* JJR-text p.325	-	-
To develop landscape grounded process - 3 times	-	** IC1-8.2	-	-	-	-	-

question 3 – “ energy transition landscape” notion							
Renewable energy producing dominated landscape - 9 times	** MPT4-8.3	* PG –text p.331	-	** IDD2-8.3	-	-	-
Multi-function integrated landscape - 7 times	* DM-text p.332	* AC-text p..332	-	-	* MvS2-8.3	-	-
A local resource based landscape - 6 times	-	** MM1-8.3	** AK2 – 8.3	-	-	-	* JPM1-8.3
Energy producing and energy saving landscape - 5 times	-	-	-	-	-	-	* CJ2-8.3
Landscape of energy stream optimization - 3 times	-	* JH2-8.3	-	-	** JJR2 -8.3	-	-

Positivizing factors for energy transition

Table 8.4, make the connection among the developed categories for the three agents’ questions and positive factors that refer to these three figurative approaches for energy transition. The table shows that in the agents’ narratives in all the categories developed from agents’ answers to the three questions highlight at least one positive factor attached to one or more figurative approaches to energy transition. Just a few landscape representation categories refer to only one of the three energy transition figurative representations such as “To use highly efficient technologies” that is centered on *technocentric* representation (quote JJR1, table 8.1). Most of the categories elaborated are associated with positive factors that are attached to two or more figurative energy transition representations. For example, *multi-functionality*, covers positive factors that refer to *ecocentric* (e.g. quote IS1 table 8.1), *technocentric* (e.g. quote ED1 table 8.1), and *anthropocentric* (e.g. quote MvS table 8.1), approaches.

This illustrates that from the multi-perspective point of view from a large variety of agents (elected council members, project managers, wind project developers, etc.) it was possible to collect a broad range of positive factors from a landscape perspective in energy transition, while belonging to three very different figurative approaches.

However, the *ecocentric* representation remains the one that is mainly perceived with a positive perspective for good implementation of energy transition in and with landscape. Its positive factors about to do with nature and to ground to local resources and characteristics, are also the ones connected with a higher number of categories (13). We previously highlight (see figure 11) how renewable energy production made through technologies is the main strategy addressed on the energy transition by agents, nevertheless the more often addressed positive figurative representation of energy transition is the *ecocentric* perspective. This shows a sort of gap between what people think and imagine about energy transition landscape and what they would like it to be. However, it is not always a contradiction because *ecocentric*’s positive factors also refer to the way in which agents think is the best for choosing and siting RE technologies in the territory,

often hidden beyond *bocage* or trees or technologies clad with wood panels, trying to divest them of their technological appearance to one that is more nature based. This result could also be connected to the idea that agents have of landscape, that is sometimes associated with the idea of “natural environment”, forgetting or omitting its anthropic built component.

In any case table 8.4, also shows how 10 of the categories formulated for the three questions are associated with positive factors that belong to a *technocentric* representation, and points out how the use of modern technologies for RE production help reduce the use of fossil fuels and CO₂ emissions by regaining control on local energy production. So this shows that, if the use of technologies leads to environmental and local benefits and reduces waste and energy loss, is something seen as a positive factor for landscape, because the use of these technologies could result in a healthier landscape and living environment, even if “visually” impacted by new technological elements. This is a point of view found in literature where RE facilities could also be associated with positive values as a symbol of modernity (e.g. Warren et al. 2005; Jobert, Laborgne, and Mimler 2007) and our results shows that the same could be said about modern efficient buildings (e.g. quote TR1 table 8.1).

Concerning the *anthropocentric* perspective, its presence shows that the human and social components of energy transition are acknowledged and considered useful as well. This representation reflects two points of view: one that the changes due to energy projects such as RE technologies, fit better into built, industrial areas compared to those perceived as natural. It could be mentioned that agricultural fields are often perceived as “natural” and not human shaped landscape; the second refers to the idea that interaction with energy conscious projects by people could lead to more energy conscious behavior in the future. This is emphasized mainly about energy reduction consumption (e.g. quote JPM1 and CJ2 table 8.3), where indeed people’s behavior is nowadays recognized to have weight on improvements made to energy systems (e.g. Vainio et al. 2019). The *anthropocentric* dimension could deserve future exploration, maybe in highly built areas such as cities and metropolis in order to obtain a broader vision and insights into places less associated with the idea of “nature”. The fact that agents’ perspectives are associated in energy transition to *ecocentric* and *anthropocentric* representations could be revelatory that agents are acknowledged about local, social and human components of energy transition, broadening from the technical perspective that generally speaking is the one most put forward, since the most visible.

Looking at the different figurative approaches through the three questions it could be seen that in agents’ narratives from the first question (why a project is successful in landscape terms), positive factors are widely associated with all the three *ecocentric*, *technocentric* and *anthropocentric*, showing that all these representations are perceived and recognized when they referred to specific and tangible landscape energy projects that they know about. Instead the categories attached to question two (why agents think it is important to take landscape into account) mainly belong to *ecocentric* representation. Where landscape is addressed mainly through its natural and geographical components it is believed to provide better implementation for the energy transition project. *Technocentric* positive factors are almost absent in these answers to the second question, but we found them in answers to the third question about “energy transition landscape” notions.

It seems that more questions about landscape are somehow abstract, more figurative

representation are attached to its “natural” and “geographical” components, omitting the others. Moreover these differences in the three figurative approaches found in the questions’ answers seem to illustrate a sort of ambivalence between what landscape is believed to bring as added positive values in the energy transition of a territory (*ecocentric*) and in the end what the final expected landscape result is (*technocentric* mixed with *ecocentric*).

This shows the complexity in dealing with energy transition implementation in landscape from social perspective, for which a broad variety of variables need to be considered. However, this is also an encouraging find, because it illustrates the possibility on establishing a dialogue among agents, touching different registers that if carefully grounded and justified in context could support implementation for energy projects.

8.2.4 Main sustainable energy landscape dimension

Another transversal lecture of the analyzed categories could be made on the basis of the framework developed by Stremke (2015), which defines four dimensions for “sustainable energy landscape”: (1) sustainable technical criteria, (2) socio-cultural, (3) environmental and (4) economical, to which is always added a minimum technical criteria. These criteria according to different projects’ contexts could have different weights and importance. The analysis made through this framework, of agents’ narratives permits to better understand which criteria they mainly acknowledge and consider more prominent for developing a sustainable landscape and to inform, potentially, about future developments. *Minimum technical* criteria refer to the general need for technical dimension for energy transition projects, for RE production but also reduction of consumption and improvement of energy efficiency. For *sustainable technical* dimension it is meant to indicate the use of renewable energy sources, and for example to think about reuse and recycling of material needed for building technologies. *Socio-cultural* dimensions refer to the relation between people and their landscape, referring for example to the sense of belonging towards a landscape, of a community and aesthetic values, and a general understanding of a topic or a process. *Environmental* refers to the criteria that could support the reduction of energy consumption, the production of RE, the minimization of pollution, etc. and connect the idea of non-compromising ecosystem services. For *economical* the idea is to access affordable energy or the development of an equilibrium between local benefits and drawbacks.

Table 8.5. Categories are put in relation to four dimensions for sustainable energy landscape, and associated with representative quotes. Dimensions representing the majority of interviewees are marked with “**”. If few acknowledge the factor is marked “*”, and “-“ if that is not the case. Total of 30 interviews. Source: author from re-elaboration of the agents’ semi-structured interviews.

	Sustainable technical	Environmental	Socio-cultural	Economical
1 question – Landscape energy transition successful projects				
Aesthetic appreciation - 17 times	-	-	** HG1-8.1	-
Multi-functionality - 8 times	* ED1-8.1	** IS1-8.1	* MvS1-8.1	-
Local character - 6 times	-	** AK1-8.1	-	** MPT1-8.1
Context effect - 4 times	* PR1-8.1	** MLH1-8.1	* IDD1-8.1	-
High energy performing - 2 times	** JJR1-8.1	-	-	-
2 question – Why take into account landscape				
To preserve a landscape aesthetic – 15 times	-	-	** MPT2-8.2 GC2-8.2	-
To improve-facilitate inhabitants appropriation of energy transition - 6 times	-	-	** AC3-8.2	-
To preserve landscape identity and belonging - 5 times	-	-	** PD1-8.2	-
To improve environmental dimension - 5 times	-	** MLH2-8.2	-	-
To develop landscape grounded process - 3 times	* IC1 -8.2	* JH1- 8.2	-	-
3 question – “energy transition landscape” notion				
Renewable energy producing dominated landscape - 9 times	** LS1-8.3	** MPT4-8.3	-	-
Multi-function integrated landscape - 7 times	** MvS-8.3-8.3	-	-	-
A local resource based landscape - 6 times	* MM1-8.3	* AK2-8.3	* JPM1-8.3	-
Energy producing and energy saving landscape - 5 times	* TR2-8.3	-	* CJ2-8.3	-
Landscape of energy stream optimization - 3 times	** JJR2-8.3	-	-	-

Table 8.5, illustrates the categories and their connection to these four criteria for sustainable energy landscape. Firstly, it could be noticed that the most prominent criteria addressed by agents are sustainable technical (9 categories) and the socio-cultural (8 categories), followed by environmental (7 categories) and economical (1 category). *Economical* dimensions are almost completely absent in agents' narratives appearing just in connection to the idea of profitability and affordability, in reference to the harvest and use of local resources, such as wood, for energy production (e.g. quote MPT1- table 8.1). This lack of answers is surprising, considering the exploration made in chapter 5, where it is analyzed that local institutions especially for the two analyzed territories in France, decided to engage in energy transition seeing it as an opportunity to also boost the local economy. However, it seems that from a landscape perspective, agents do not mention the topic nor do they establish a connection between the two.

The *environmental* dimension, in agent's narratives can be found often across several categories and one category developed from question two, about why to take landscape into account, focuses directly on this dimension ("to improve environmental dimension", table 8.2). However the *environment* criteria which crosses narratives, it is not discussed from many point of view but it is addressed through two main criteria: one is the preservation and improvement of biodiversity (e.g. IS1, table 8.1 and quote MLH2, table 8.2) and the second is the reduction of greenhouse emissions (e.g. quote CJ1, table 8.2). Interestingly, considering biodiversity none refer to problems that could be connected to wind turbines or other renewable energy technologies and bird welfare.

The *sustainable technical* dimension is mentioned frequently across categories, but it mainly refers to the very general idea of energy resource use that does not deplete, such as wind, sun (e.g. quote LS1, table 8.3), wood/biomass if it is correctly replanted (e.g. MPT3, table 8.2), or manure from breeding activity (e.g. quote JJR2, table 8.3). There are a few agents that mention other additional criteria such as those represented by quote TR2 (table 8.3), highlighting how PV panels should not be installed on agricultural fields, but they are mentioned little. This could be due to a limited awareness about other criteria, such as on recycled material, but considering the sample of agents chosen who are actively involved in energy transition process of their territory, it is likely that to think and speak about landscape not lead them to further speak on the topic. Maybe speaking about landscape leads them to focus on what it is perceived as the more visible component of energy transition, namely RE technologies, and how they appear now in the landscape not projecting into future possibilities and changes.

Not surprisingly the *socio-cultural* dimension is frequently addressed, probably because landscape is very much associated with visual components, to the idea of an aesthetic experience (e.g. quote MPT2, table 8.2) or of sense of identity for a community (e.g. quote PD1, table 8.2). These components when mentioned in connection with the energy transition process, are always formulated as subject of concern about the fact that the "aesthetic" and "identity" landscape could be compromised by energy project's implementation in the territory. It is interesting to notice that *socio-cultural* criteria are decidedly addressed in agents' narratives pertaining to question two, showing the reasons why agents who think important to take landscape into account in energy transition, refer mainly to this dimension. However, referring to question three, about the energy "transition landscape notion", the criteria specified in higher number by agents belongs to the *sustainable technical* dimension.

This seems to show an ambivalence, a sort of perpetual struggle, between expectations for landscape in an energy transition process, able to exhibit qualities and values for cultural landscape to which agents are accustomed and what finally they see in an “energy transition landscape” that is dominated by a sustainable technical component more than a socio-cultural one. For example, nobody’s answers refer to an “energy transition landscape” as a beautiful and aesthetically pleasing. Interestingly this ambivalence seems to be less prominent when agents think in a more “tangible” manner about existing successful projects in landscape terms, in which all the criteria seem to be more balanced in agent’s narratives. Indeed some research about wind farms leads evidence that landscape modification after RE technologies construction tends to be progressively interiorized by people (Warren et al. 2005; Delicado, Figueiredo, and Silva 2016) that became more accustomed with their presence.

Similarities could be noticed between the previous framework for energy transition figurative representation and this one. Especially some parallelism could be seen between *anthropocentric* and socio-cultural and economical dimensions. However, the choice to explore both frameworks was made because the first was thought to be more descriptive of what agents perceive as positive factors while the second was design oriented and focused on the idea of sustainability. So even if possible overlapping exists, they emphasize different points of view and when combined, they provide a more comprehensive, detailed outlook of the topic.

8.2.5 Attitudes towards landscape through the energy transition perspective

In the previous section the representations agents have of the energy transition are mentioned. However, the other way around the defined categories across the three questions could also be read to understand by entering through the energy transition prism, which attitudes exist towards landscape.

First, it could be seen in the interviews that a **preservation attitude** towards landscape is the most prominent, linked mainly to the idea of preserving aesthetic values as expressed by the quote MPT2 (table 8.2) but also to preserve cultural identity and a sentiment of belonging as illustrated by the quote PD1 (table 8.2) or expressed by the following quote:

“Renewable energies have to be integrated into these landscapes, to sublimate them, without impacting them too much”⁵⁶ (Project manager energy and climate-CCT 2017)

In some interviews, a fear seems to emerge towards change made to landscape in which the visual aesthetic dimension it is a sign that merges with a feeling lack of appropriation, or perhaps a fear toward technologies etc. So for many, the landscape dimension remains very much associated to socio-cultural dimensions that leads to an attitude of protection. An attitude of protection for landscape could be challenged and be triggered by the emergence of new discourse and aesthetic codes about landscape as a result of RE technologies, especially wind turbine implementations (Nadaï and Labussière 2015).

⁵⁶ “les énergies renouvelables doivent s’intégrer dans ces paysages, pour les sublimer, sans trop les impacter”

Nevertheless, other attitudes emerge such as a **project attitude** that is mainly pointed out by landscape architects interviewed by emphasizing landscape as an arena that could be designed/transformed in order to better respond to the nowadays energy needs. It is mentioned in the quote JH1 (table 8.3) of the landscape architect that worked on Goeree-Overflakkee. Even if not as strong as the design perspective given by landscape architects, other agents mentioned the idea of dynamic landscapes that could be changed because of the need to implement energy transition (quote HG2, table 8.2). In this last agents' perspective, projects are put forward but in different terms than the previous ones highlighted by landscape architects. Agents have a more passive view, meaning that they see landscape as subjected to changes through projects, but they do not see it as an active entity, or as the basis to start to consciously design desired futures. Finally, an attitude towards landscape is found that could be referred as **spatial logic**, that puts forward the idea of changing spatial configurations, such as considering the idea of proximity for the location of energy production, as expressed by the quotes AK1 (table 8.1), omitting more socio-cultural dimensions, but focusing more on a quantitative bi-dimensional surfaces.

8.2.5.1 Landscape perception where subjectivity becomes a limit

Moreover, beyond these differences in significance shades that appear while looking at landscape through energy transition, another point that could be discussed is the question of subjectivity that could be associated with landscape. Five agents mention this point during the interviews and who highlighted the difficulty that could come from speaking about landscape in the transition process. This difficulty occurs from the subjective experience that each of us have about landscape and our judgment of beauty as the following quotes express:

“And then after the landscape question, at first it's a little personal, because a landscape isn't beautiful for everyone, and after that it's variable”⁵⁷ (ADEME territorial referent 2018).

This point is highlighted as a concern especially relating to the fact that a project, even if thought and designed in detail, could always experience some opposition:

“Because people will say to themselves: landscape, if we put in wind turbines it ruins/breaks the landscape, others will say: well it shapes the landscape of tomorrow, finally it's...we need to see the idea that there is behind the word landscape”⁵⁸ (TEPOS agriculture and company project manager CCT 2017)

And some agents involved in the transition process, affirm that even if they are in favor of transition and understand its utility could oppose to wind turbine projects if they became too visible in the territory or if they touched their “personal” landscape as the following quotes expresses:

“But myself, I think that I could over time for example, be opposed to wind turbine development if it begins to have a too strong an impact on the landscape. But all of this is very much subjective ...I'm very attached to bocage landscape that we found here, and so may consider with time there are too many wind

57 “Et puis après la question du paysage, d'abord elle est un peu personnelle, parce qu'un paysage n'est pas beau pour tout le monde, et après elle est variable”

58 “Parce que des personnes vont se dire : paysage, si on met des éoliennes ça casse le paysage, d'autres qui vont dire : ben, justement, ça façonne le paysage de demain, enfin c'est... à voir l'idée qu'il y a derrière le mot paysage.”

parks, for me it will be negative, whereas on other territories, I would say that we could still develop wind turbines, while the local inhabitants find that there is already enough of them and before their landscape didn't look like that.”⁵⁹ (agent 2017).

“It's the landscape controversy. Because we would like...we would like to predict and have the landscape that would make us happy and so the wind turbines, even if we totally agree with the idea of a wind turbine, we don't want it to be located in front of our home. I, from my house I have a very nice view, I like wind turbines, but I don't want them to have them there.”⁶⁰ (agent 2018).

Our results seem to point out that the idea of subjectivity and aesthetics in some way reveals reactions against change, that go beyond landscape itself but in which landscape seems to be used as a concept to express this resistance and local expression of opinion. The topic of local resistance to change, merging with a criticism of modernity or other topics, has been studied and conceptualized by some with the NIMBY syndrome, especially for wind turbine projects (e.g. Wolsink 2000), where people could be in favor of RE production, but not too close their living environment.

Landscape is a subjective entity, in which changes could be appreciated or not. In any case, when qualitative and landscape perspectives are considered at early stages of the transition, to guide the planning and designing of landscape for the years to come, opposition and rejection seem to be less common, especially when strategies for participation or co-creation accompany the process (Oudes and Stremke 2020).

59 “Mais moi-même, je pense que je pourrais à terme par exemple m'opposer sur du développement de l'éolien si il commençait à avoir un impact sur les paysages trop fort. Mais tout cela est tellement subjectif que... Moi, je suis très attachée au paysage de bocage que l'on trouve par ici, et donc peut-être qu'à terme trop de parcs éoliens, pour moi seraient néfastes, alors que sur d'autres territoires, je dirai qu'on peut encore développer l'éolien, alors que les habitants du coin trouvent qu'il y en a déjà largement assez et qu'avant leur paysage ne ressemblait pas à ça.”

60 “C'est la controverse du paysage, ça. Parce que on voudrait... on voudrait prévoir et avoir le paysage qui nous ferait plaisir et donc l'éolienne, même si on est tout à fait d'accord avec une éolienne, on n'a pas envie qu'elle vienne se coller devant chez soi. Moi, de chez moi j'ai une très jolie vue, j'aime bien les éoliennes, mais je n'ai pas envie qu'elle se mette là.”

Box 8. Contribution of chapter 8 to the part 2 research question

This chapter investigated social representations towards landscape in agents' energy transition framework involved in its process within three analyzed territories. A broad range of categories are elaborated from interviews while discussing (1) successful landscape projects, (2) why thoughts about landscape could be important in energy transition and (3) the "energy transition landscape" notion. Among these categories recurrent topics appears such as the idea of multi-functionality, of aesthetics and the sentiment of belonging and the use of local resources. Moreover across the categories, positivizing factors to implement energy transition in landscape could be identified that belong mainly to an ecocentric figurative approach, but also to a technocentric and anthropocentric towards energy transition. This illustrates quite a broad range of positive possible entry points into the subject that come from the multi-perspective of different agents and that can give an understanding that able to support a shared dialogue about landscape. Moreover, socio-cultural and sustainable technical dimensions towards landscape seem to be the most important ones in agents' perspectives. The first is mainly associated to answers about reasons why landscape is important, the second about the "energy transition landscape notion" and this suggests a sort of unresolved-balance between cultural landscapes as they are known cultural landscapes to come because of the progressive implementation of energy transition. This association of landscape with a socio-cultural point of view is still very strong and results in a more protective attitude towards landscape, and was only highlighted by a few agents a more active projects attitude towards landscape. Finally, agents highlight an awareness in connection to landscape for the three strategies of energy transition: reduction of energy consumption, energy flows optimization and RE production. The last strategy remains the most mentioned and incites the most concern, probably because of RE technologies visibility in landscape.

CHAPTER 9: Drawings as a doorway to understand the landscape representation of energy transition – agents perspective

In the previous chapter we inquired about social representation that agents have in the studied territories about energy transition from landscape perspective, through the analysis responses to three questions.

The current chapter continues to inquire into the social representation (Devine-Wright and Devine-Wright 2009) of landscape in the energy transition process of territorial agents implied in the process itself.

In previous chapter all agents describe the energy transition from a landscape perspective, especially with the last question about the notion of “energy transition landscape” we explored the awareness agents have of energy transition consequences on landscape, according to three main strategies of the *trias energetica* (RE production, reduction of energy consumption and optimizing energy flows). However the majority of agents mainly reiterated the RE production point of view. Particularly elements such as wind turbines and photovoltaic panels are the most mentioned as creating an energy transition landscape. While other dimensions of the energy transition process that, we found in the literature and planning documents, such as the question of improving energy for mobility, were almost absent.

I noticed this attitude and difficulties for agents to go beyond RE production when they speak about “energy transition landscape” after the first two interviews led in the territories. So in order to try to overcome difficulties I asked agents to hand draw on a white sheet of paper an “energy transition landscape”.

This chapter focuses on the analyses of these “energy transition landscape” drawings in order to access a more comprehensive vision and additional insights compared to the ones received through oral narratives.

Hand-drawings to deepen the understanding of landscape representations in the energy transition process

Visual research in the landscape architecture discipline has been discussed and encouraged both as a method of inquiry than as a way to present the research herself (Dee 2004).

In this chapter visual research is used as a method to understand the social representation of landscape in the energy transition process from agents’ perspectives, through the analysis hand drawings made by agents during the semi-structured interviews, in connection with the oral narratives progressively explaining the drawing.

The analysis of hand-drawing representations is an experimented method in order to better understand the socio-spatial representation of individuals (Ramadier 2003) and it has been employed by a wide range of disciplines (Giesecking 2013). For example, Lynch in ‘60 used the mind map method in order to understand the interaction between the city environment and the

observer, so as to evaluate their perceptions of city form (Lynch 1960). Hand drawing a mind map has been more recently used in participative processes in order to develop understandable mediation maps for local inhabitants (e.g. Hervé et al. 2014), and the usefulness of a drawing process with inhabitants or stakeholders to support territorial planning and design, has been put forward (e.g. Després 2018)

So considering the highly quantitative way to which energy transition is often address in terms of MW or the great focus on RE production, the use of visual methods that require agents to hand draw a landscape is believed to allow agents to better express social spatial-landscape representation in this transition context.

Moreover according to Sarrica et al. (Sarrica et al. 2015) few studies have explored social representation through visual research about the energy transition topic, despite the highly visual components associated with RE technologies. Some visual research focused on energy topics have analysed figurative representations of energy sustainability through people's choices among photographic data sets (Sarrica et al. 2015), and the perception of the changing electricity network technologies due to the increase in RE technologies, by asking people to draw them during workshops (Devine-Wright and Devine-Wright 2009).

Research addressing visual landscape representations of energy transition through its three main strategies, coming from *trias energetica* seems to be lacking. In this section we explore the possibility of landscape as a method employed to think about new emerging landscapes (Nassauer 2012), thanks to its ability to engage people with several backgrounds and perspectives to share a common topic. So the entry in energy transition topic through a landscape perspective, could lead agents to address all three strategies of *trias energetica*, because their implementation could lead changes in landscapes. The goal is to make people think about energy transition from a landscape perspective where they are “designing” their own energy transition landscape. By designing we mean that agents intentionally make energy conscious choices that compose their “energy transition landscape”. In other words, they make an act out of a landscape designing process.

That does not mean that all the drawings represent a global and completely new emerging transition landscape, but they could allow to find possible landscape alternatives, ideas for innovation and omissions. These could be helpful in future communication and projects on other territories, to give people and agents the maximum of tools/keys for a consciously planned and designed landscape that moves toward their energy goals, and not endured.

Method: collecting the drawings

The drawing exercise was developed at the end of the semi-structured interviews, and it has been carried out with all the agents interviewed. Everybody accepted it even if many need to be reassured about the fact that the objective was no to judge the graphic quality of the drawing but the content and the process. Then often after the characteristic “I’m not able to draw” or apology because “I don’t draw very well” people took between five and ten minutes to draw and some from 20-25 minutes. I did also a supplemental meeting asking to do the drawing exercise with the first two agents I interviewed, in order to have a complete series of sketches. Because when I did their initial interviews, the hand drawing was not yet part of the inquiry protocol,

and after the first two interviews and I had listened to the way they spoke about landscape and energy transition that the hand-drawn method was added.

Drawing as an action leads respondents to think about spatial and landscape perspectives (e.g. site characteristics, proximity of functions, etc.) through a sort of landscape designing exercise, impersonating somehow the role of a landscape architect. Moreover, the fact of visually seeing the drawn elements on paper supports agents understanding what is lacking, by adding on in an ongoing basis, generating a progressive complexity to the drawing.

For the purpose of our research we do not ask agents to draw their specific territory, but to make an abstraction drawing of an “energy transition landscape”. We used the same expression used in the question analysed in chapter 8, when we asked agents to explain orally what this notion evokes for them, in order to assure a comparability between the two answers. Obviously, people could take inspiration from their territories, but the goal of our request is to understand which representations are consciously associated with landscape changes or landscape designing, that maybe are not yet implemented in the territory where they work. We make the hypothesis that the drawing process assists them in giving more landscape/spatially focused and deeper answers, that could allow us a better understanding of what they connect to the energy transition from a landscape perspective.

Method: analysing the drawings

We both analyse the visual content by counting presence or absence and the frequency of certain drawn elements (Rose 2012). The images are analysed through a coding system according to the goal of understanding to what extent the three strategies of energy transition are considered to have a landscape relevance, through their inclusion in the drawings. Nevertheless a high presence of RE technologies is expected because of their “visibility”. However, through the drawings additional information on where and how sites are chosen could be grasped through the drawings, which obligates agents to locate somewhere the elements composing the landscape on the white sheet of paper.

In order to better acknowledge this last dimension, the drawing process itself it is analysed as well. Meaning to analyse the temporal sequence of drawn elements and determining if the drawing process has led some thoughts for example about the choice location of elements. This analysis is based on the narrative of agents who have been asked to explain what they were drawing while doing it, combined with notes took by the author at the same time. This allows to us to understand how and to what extent the composing landscape elements progressively represented allow agents to link spatial thinking. Moreover, the timing sequence through which landscape elements are drawn could give insights of the agents’ priorities. However, it should not be forgotten that the first elements drawn are probably also the most visible elements in the landscape.

Limits of the drawing exercise

Some limits to this exercise are acknowledged. First the drawing act leads people to focus on the material and visible aspects of energy transition landscapes, that could lead to omissions

of more hidden/invisible components, or elements that agents think difficult to graphically represent. It is acknowledged that the visual components of landscape provide only a partial picture (Lange 2011).

We tried to overcome this limitation by asking the interviewed to explain what they were drawing, allowing them to give explanations or to introduce energy transition components that they do not directly represent. These analyses of oral narratives explaining the drawing process also help overcome the difficulty that some elements are not drawn by agents because too complex and they are not able to draw them (Devine-Wright and Devine-Wright 2009).

Secondly, the very broad question of drawing an energy transition landscape could lead to a temporality gap. That means that people could represent what they think is changing or need to change in the energy transition process in the future, omitting components, which already exist and they think are not changing.

How specified for the previous section, the interviews has not a statistic representativeness but they allow to collect the multi-perspective point of view given by several key agents of the transition process of territories able to give an overview, each agent bringing his expertise. A limit to this drawing method is the number of persons interviewed and the fact that content is subject to an interpretation framework.

In this chapter, first the contents of the drawings are analysed, discussing the appearance of the drawings, and secondly the presence of the three strategies for energy transition, according to the *Trias Energetica* (reduction of energy consumption, energy stream optimization, and RE production), in order to develop comparable results for energy transition landscapes issued from the oral responses (chapter 8) presenting how the drawings have led agents to enrich their answers significantly.

Subsequently, the drawing process is discussed highlighting the differences found between the French and Dutch answers concerning their approach to landscape.

Finally, a general discussion and several topics that emerge from across the drawings results are put forward.

The complete series of drawings are inserted below, divided by territory. In the discussion, reference is made to these drawings as to some representative's excerpts of the interviews which are inserted in order to better understand the images, to give a more complete overview.

CC Monts du Lyonnais - agents' drawings



Figure ML1. Responsible energy transition service, Parc Eco Habitat in CC Monts du Lyonnais

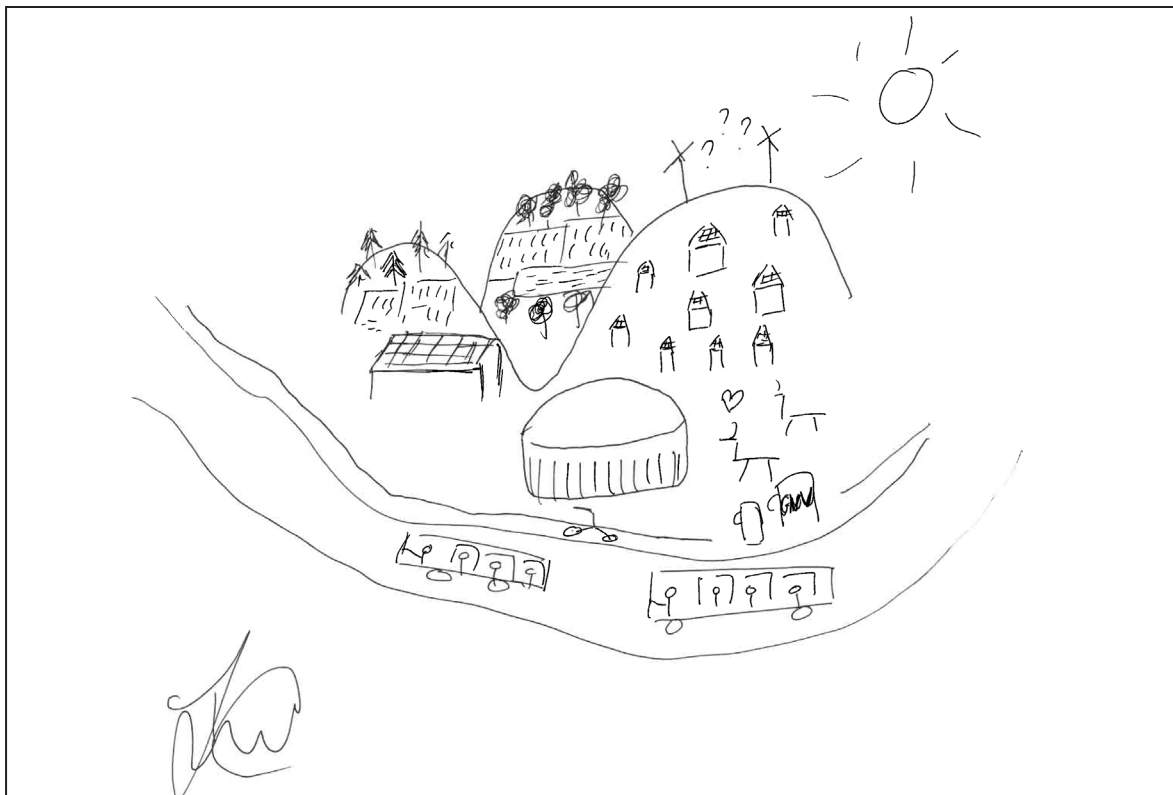


Figure ML2. TEPOS project manager in CC Monts du Lyonnais

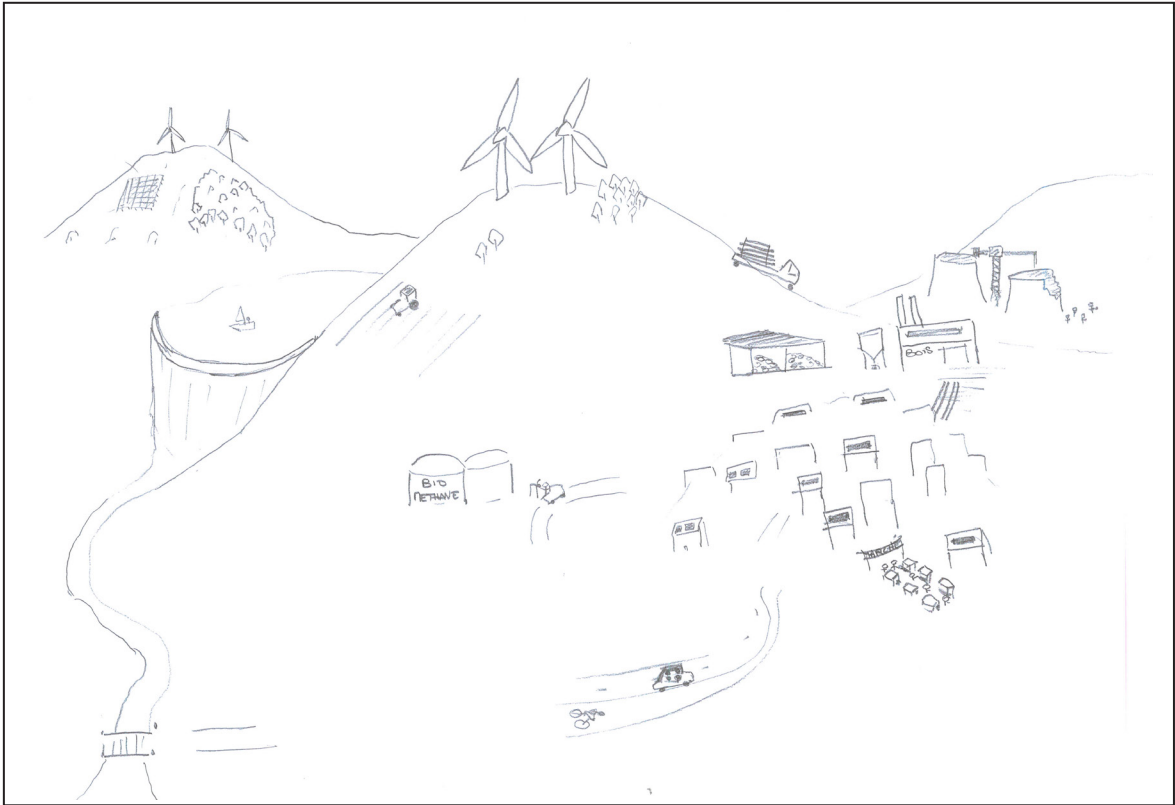


Figure ML3. PCAET project manager in CC Monts du Lyonnais



Figure ML4. SCoT project manager in CC Monts du Lyonnais

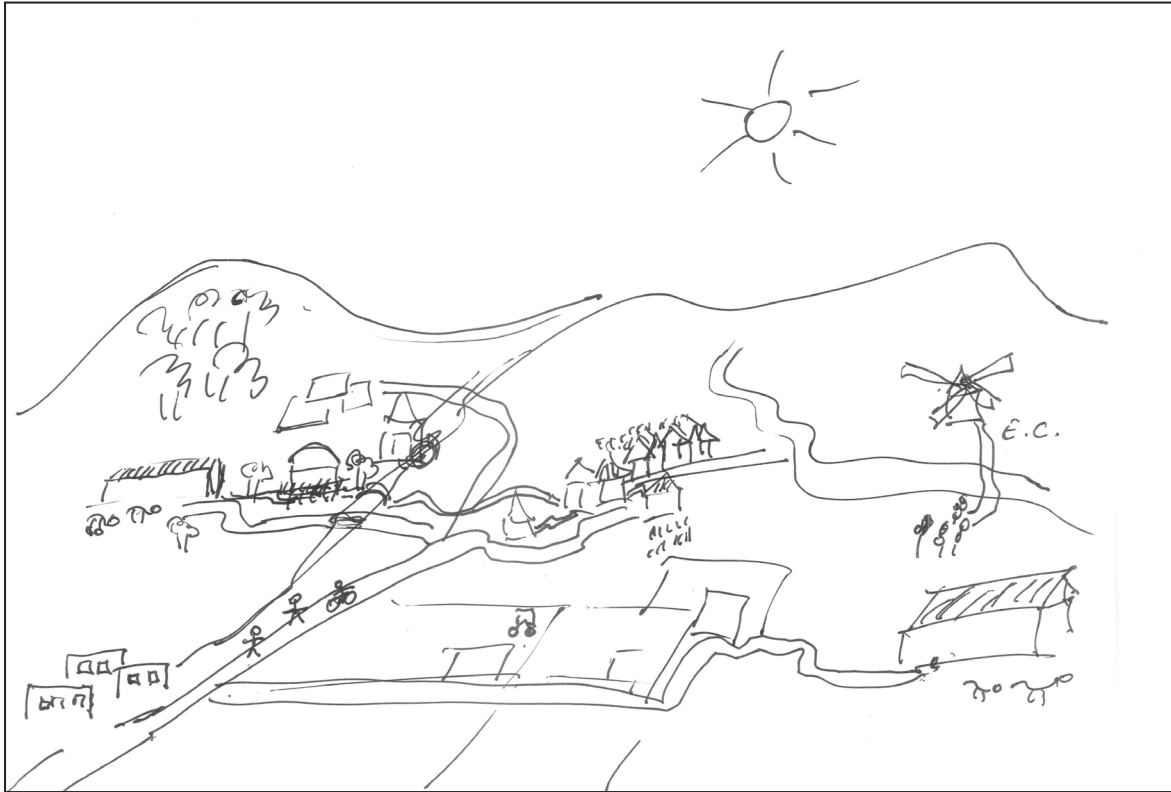


Figure ML5. Mayor of Meys, GIP President of Parc Eco Habitat, duo vice-president to energy transition in CC Monts du Lyonnais

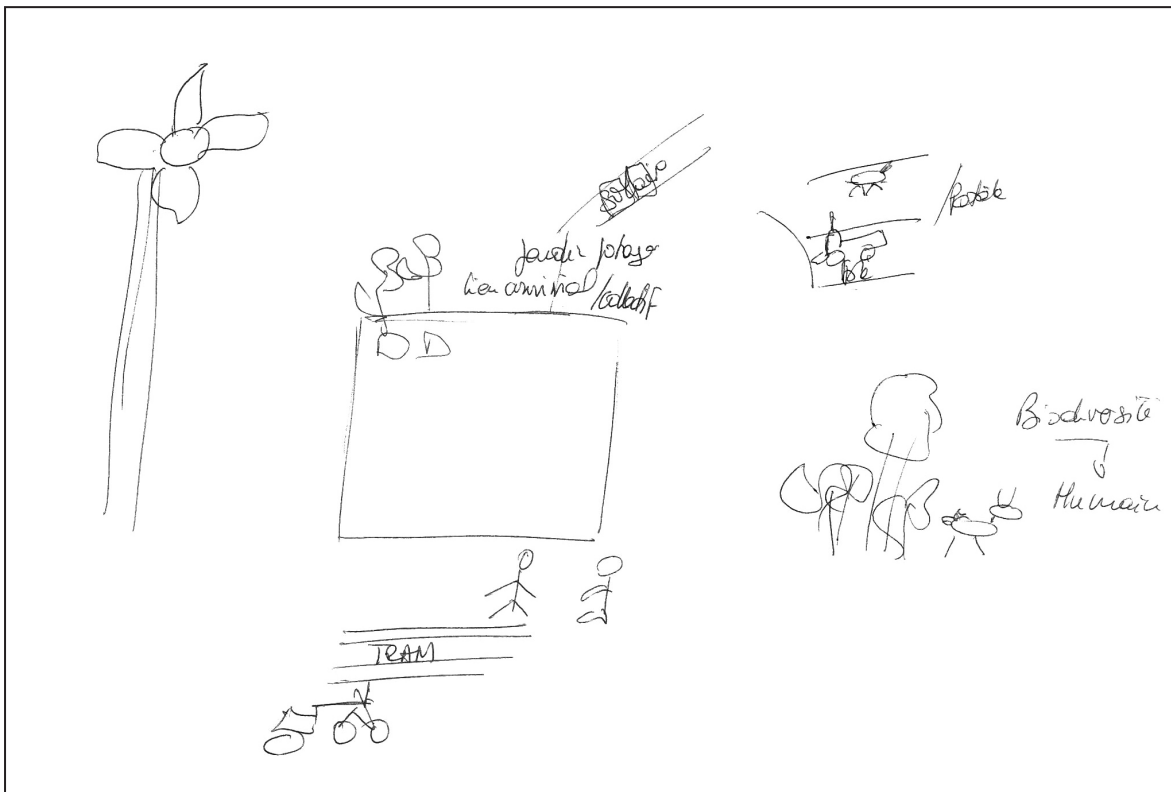


Figure ML6. ADEME territorial referent of Rhône-Monts du Lyonnais

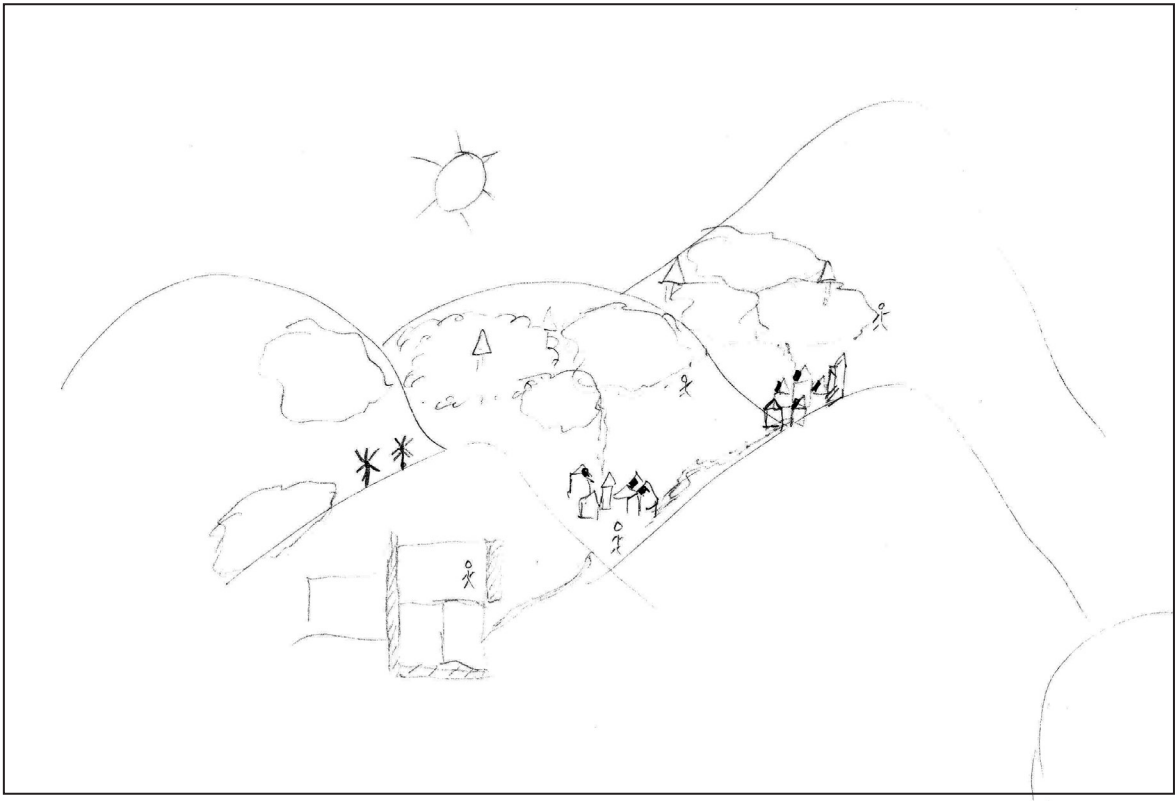


Figure ML7. Technical animation regional center of forest property Auvergne Rhône-Alpes region



Figure ML8. Rhone agricultural chamber, energy -biomass adviser

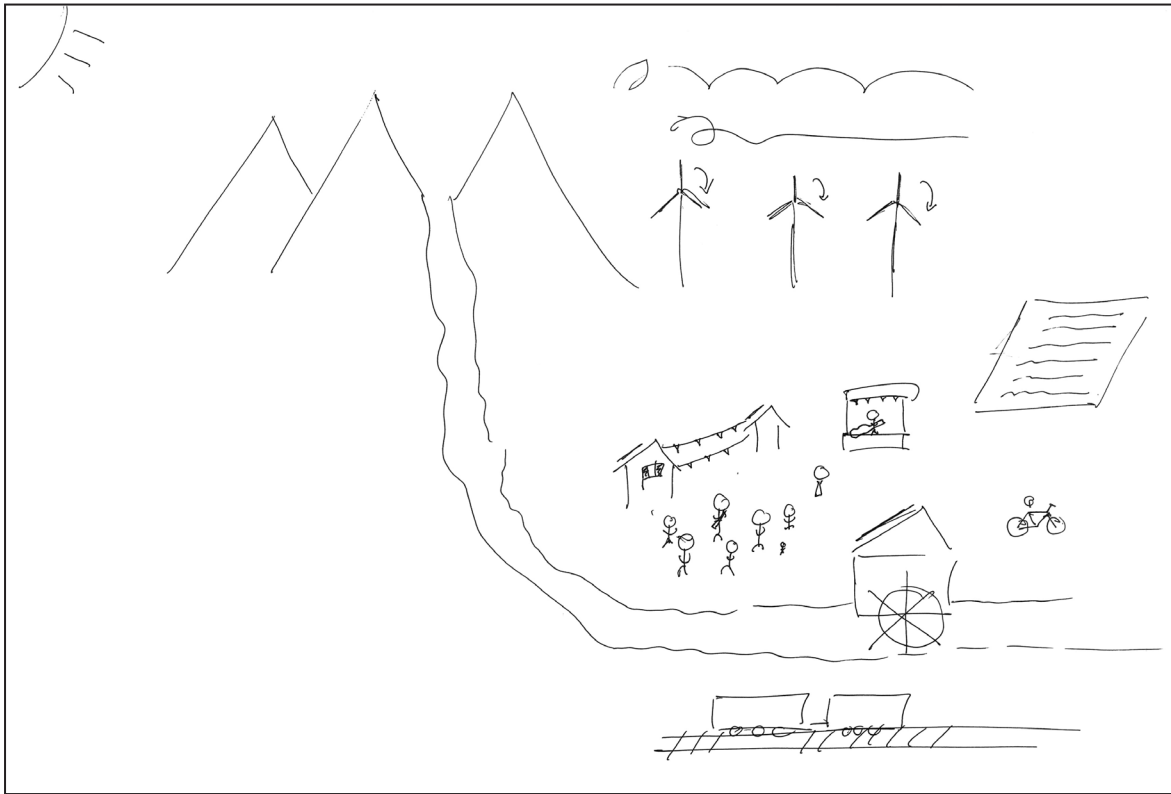


Figure ML9. Responsible projects CoopaWatt, association supporting citizen participatory in renewable energy projects

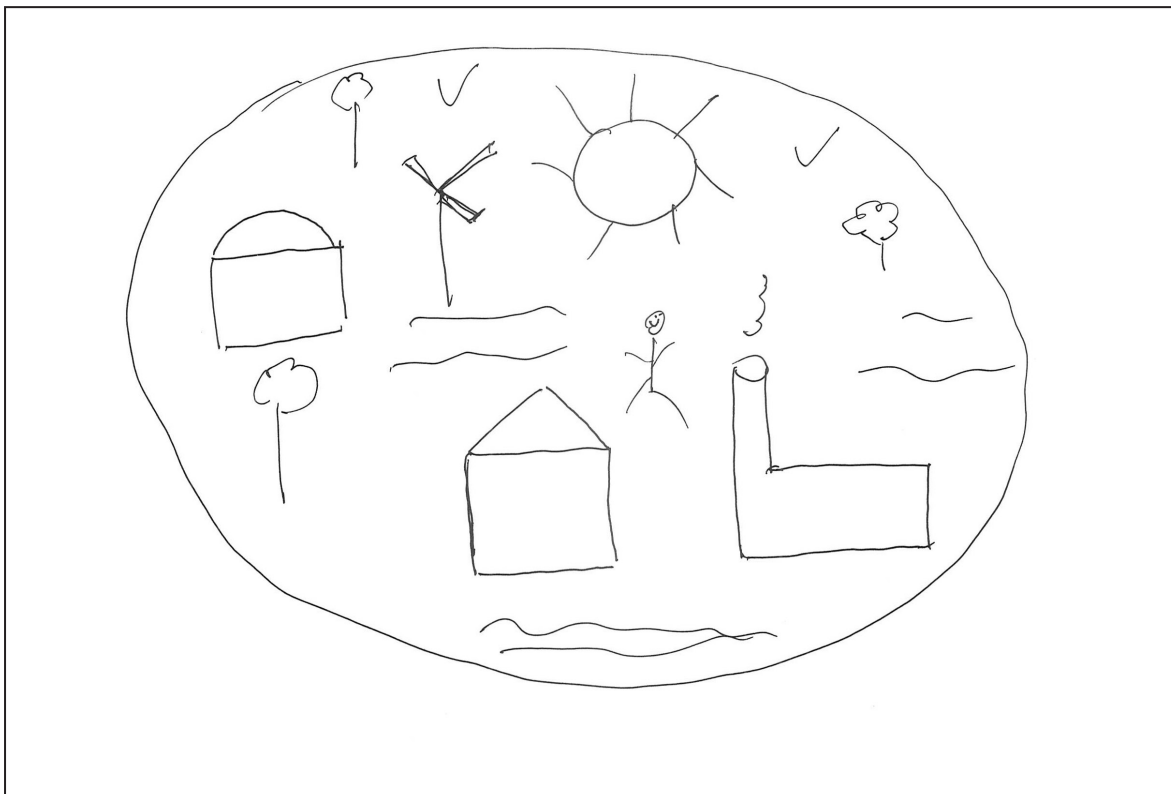


Figure ML10. Farmer, biogas project initiator in CC Monts du Lyonnais

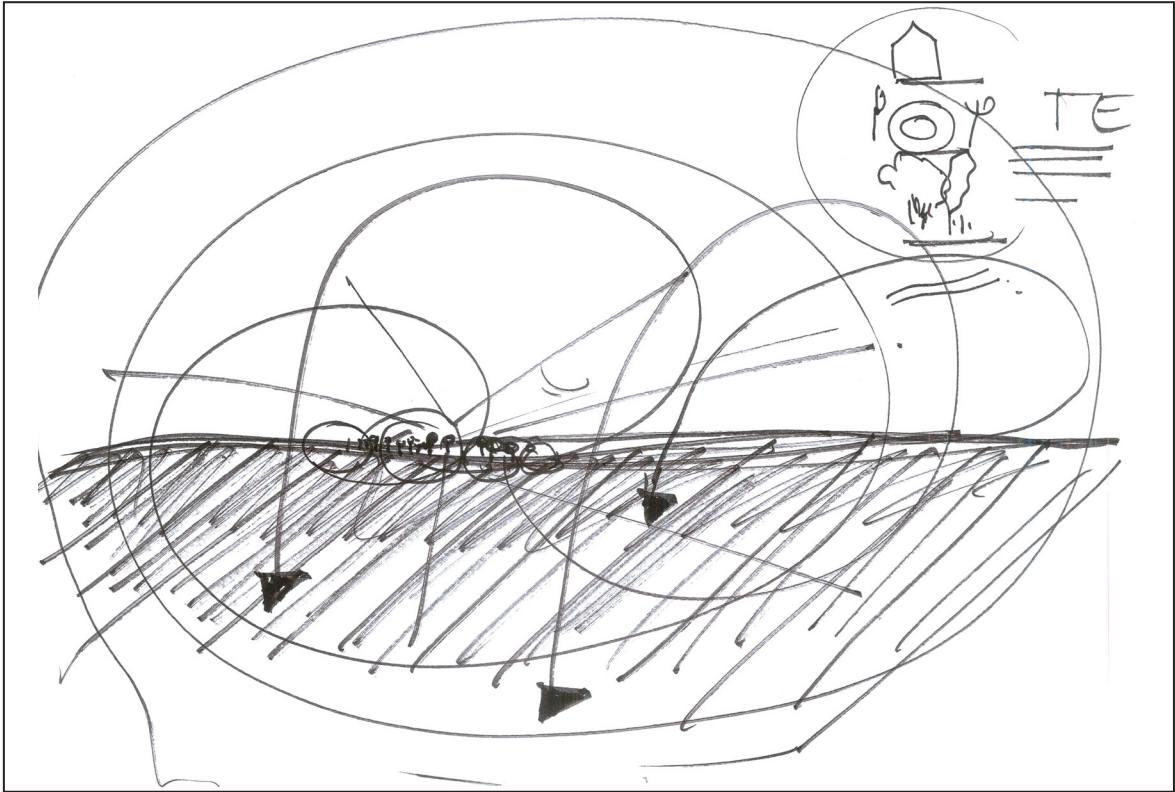


Figure ML11. Landscape architect who worked in CC Monts du Lyonnais and CC Thouarsais

CC Thouarsais - agents' drawings

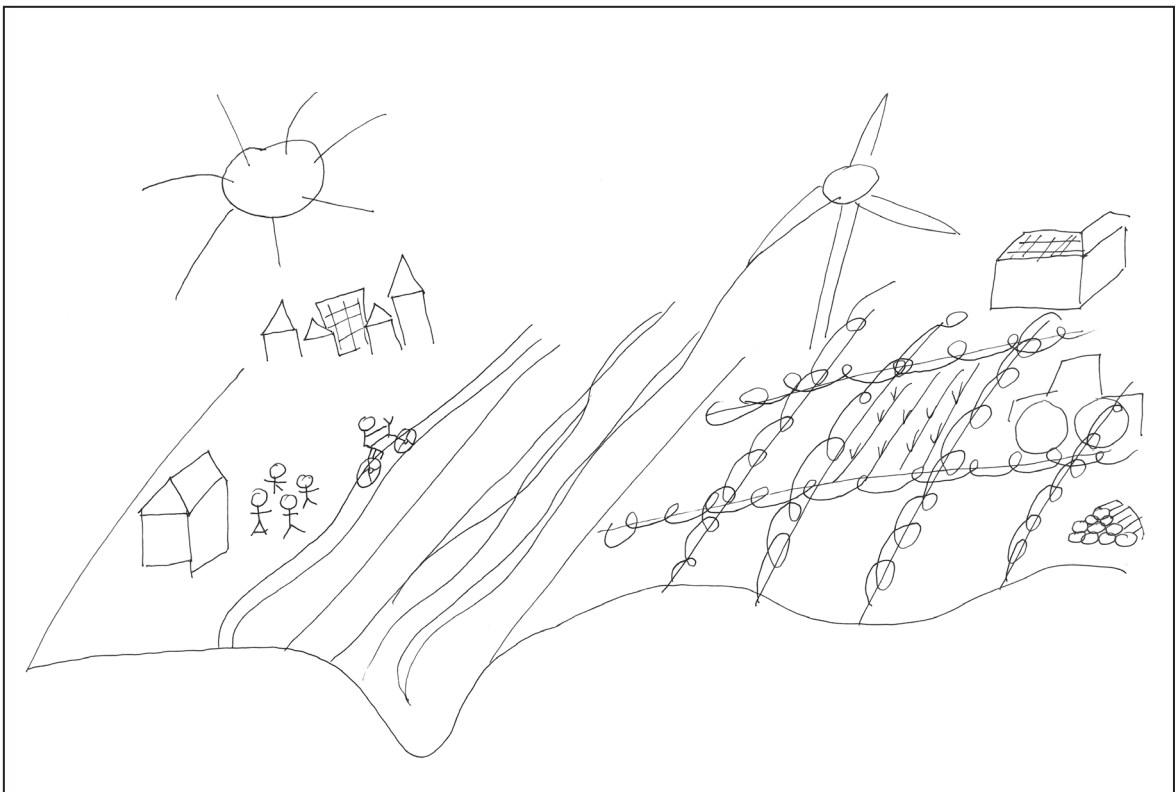


Figure T1. Sustainable territorial management division director for CC Thouarsais

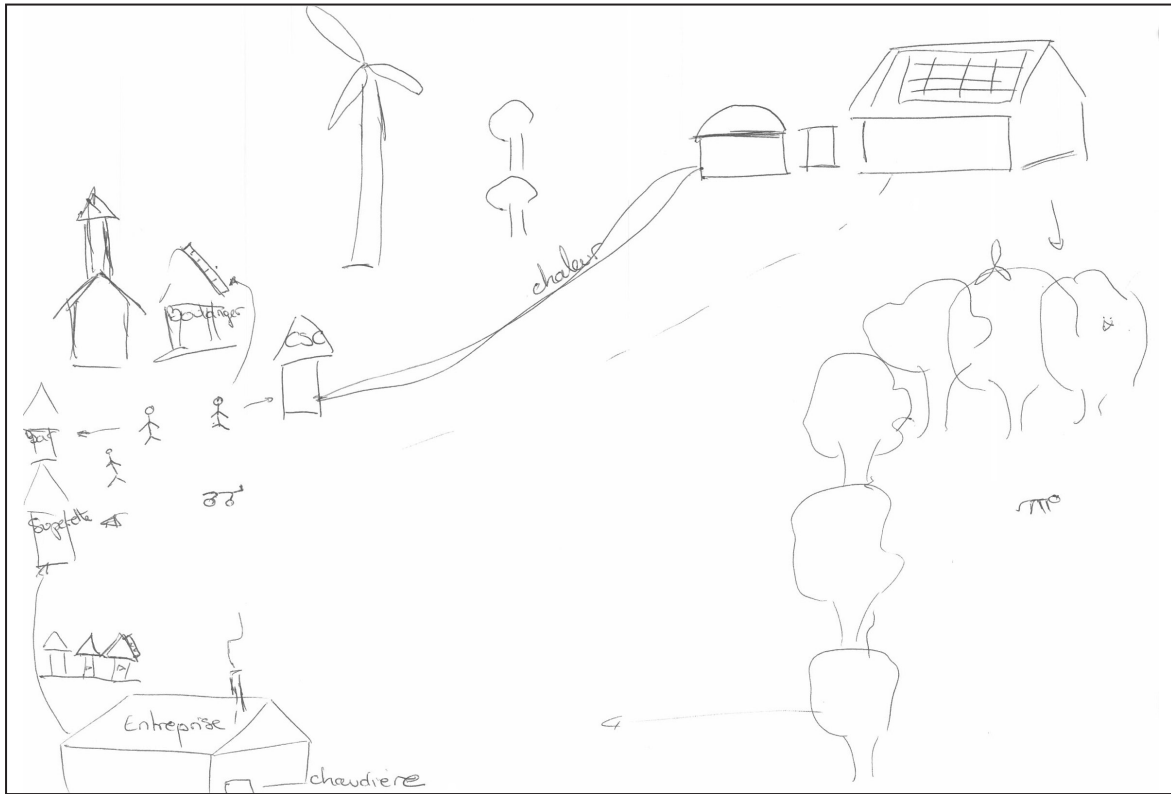


Figure T2. Project manager energy and climate for CC Thouarsais

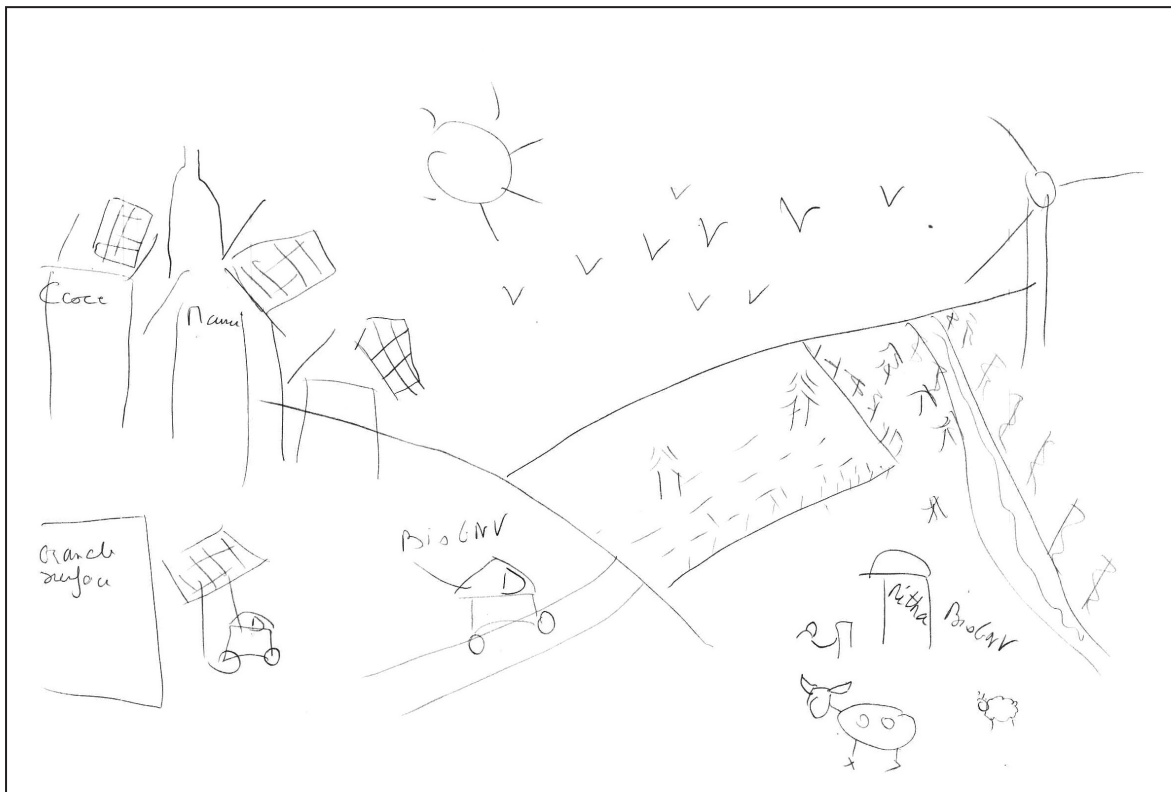


Figure T3. TEPOS agriculture and companies project manager for CC Thouarsais

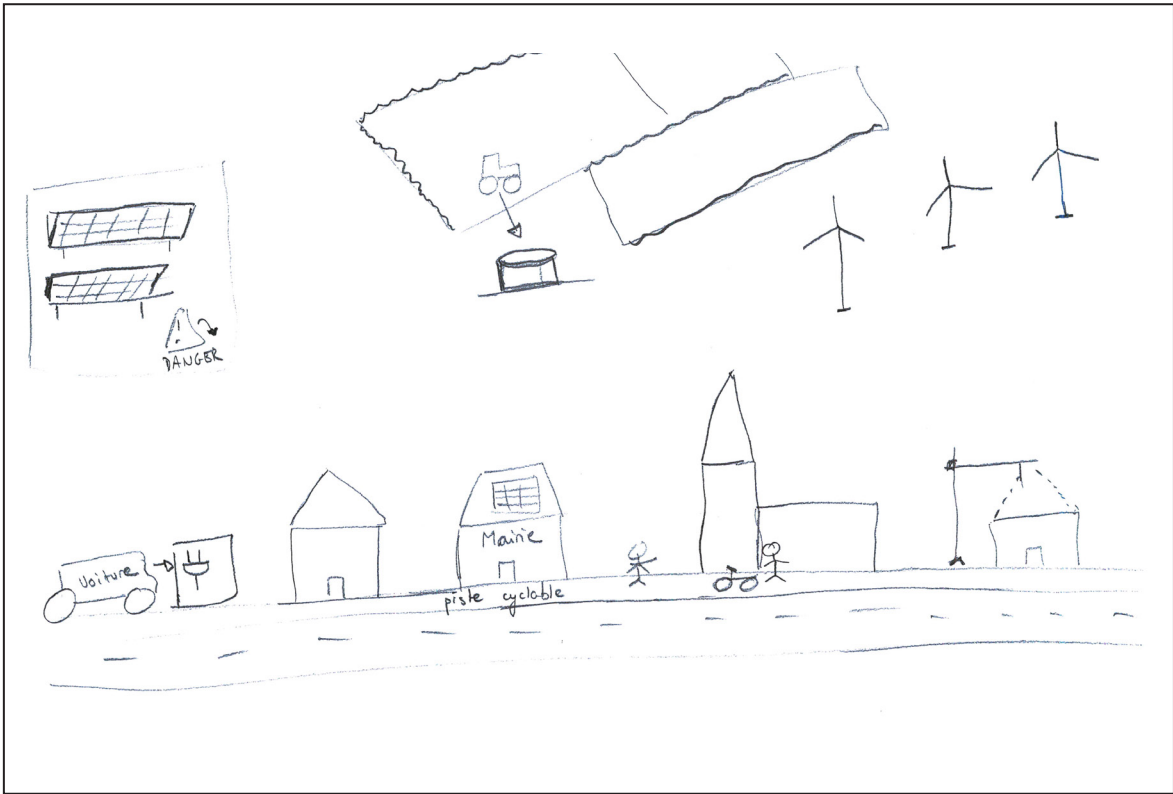


Figure T4. Cit'ergie and TEPOS project manager for CC Thouarsais

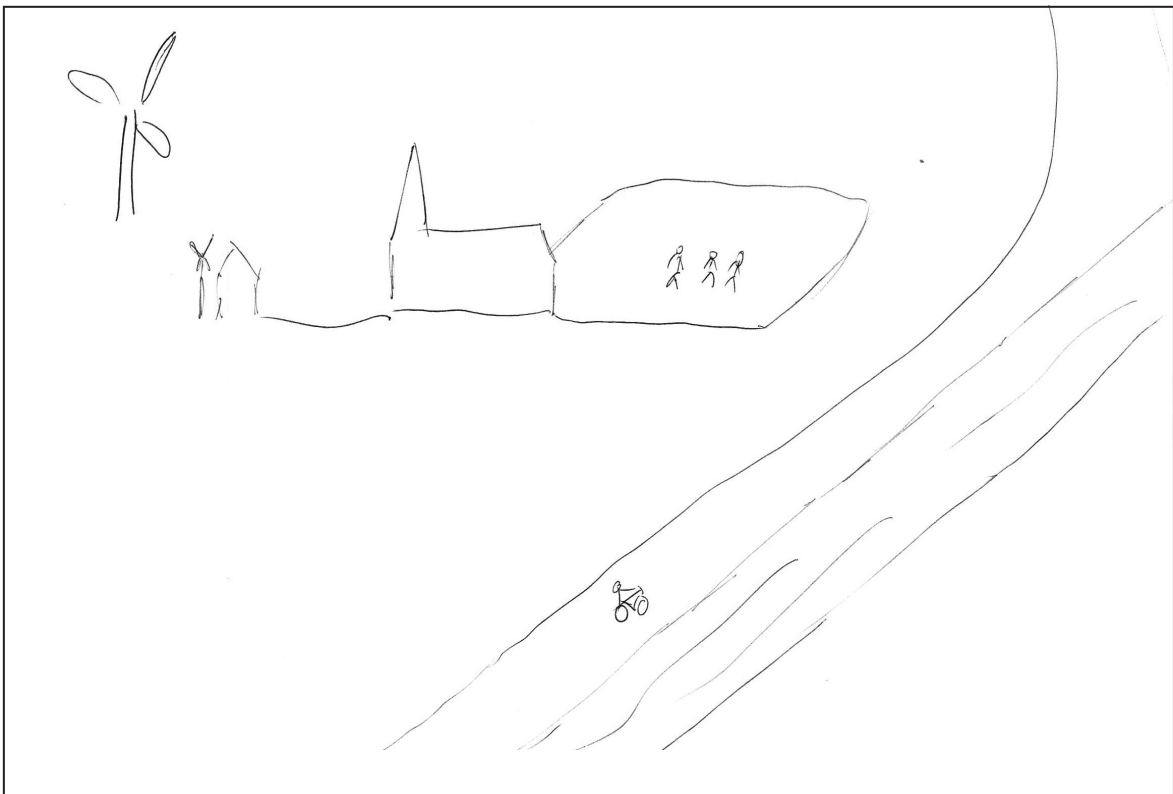


Figure T5. mayor of Saint-Varent and vice-president of energy transition for CC Thouarsais

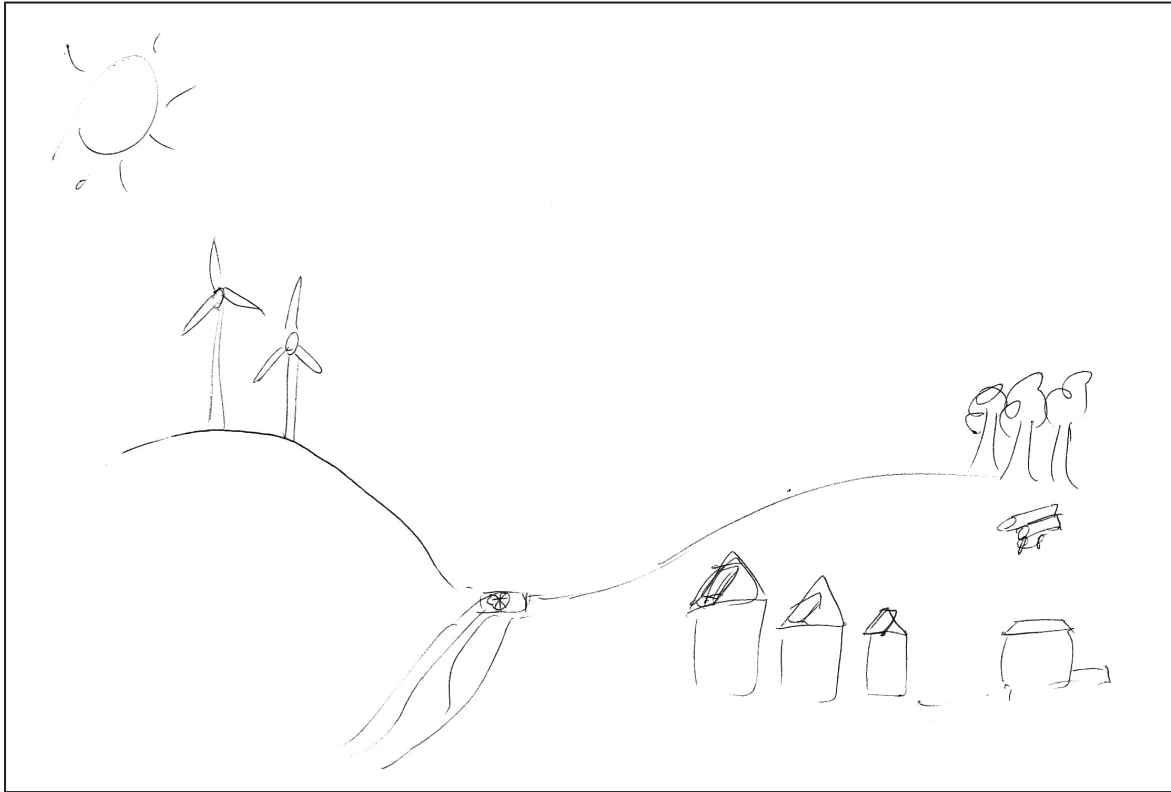


Figure T6. ADEME territorial referent of Deux-Sevres

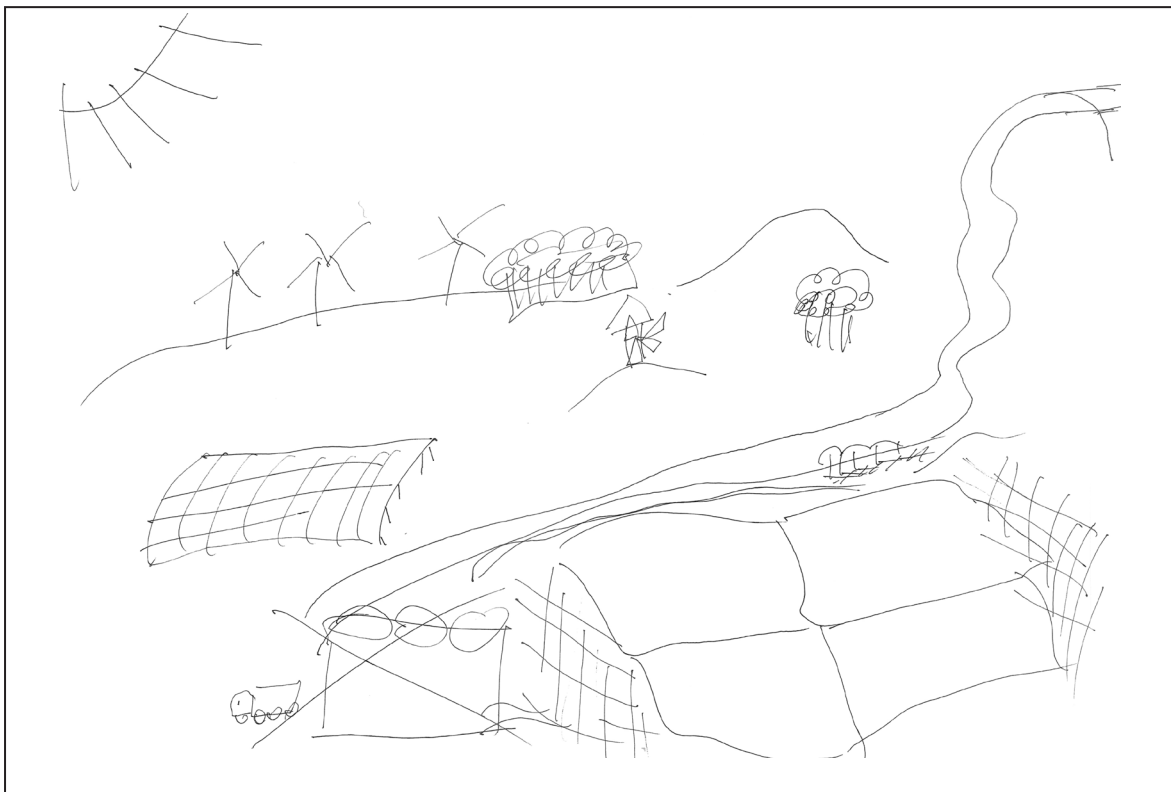


Figure T7. Project manager local development of agriculture chamber of Deux-Sevres

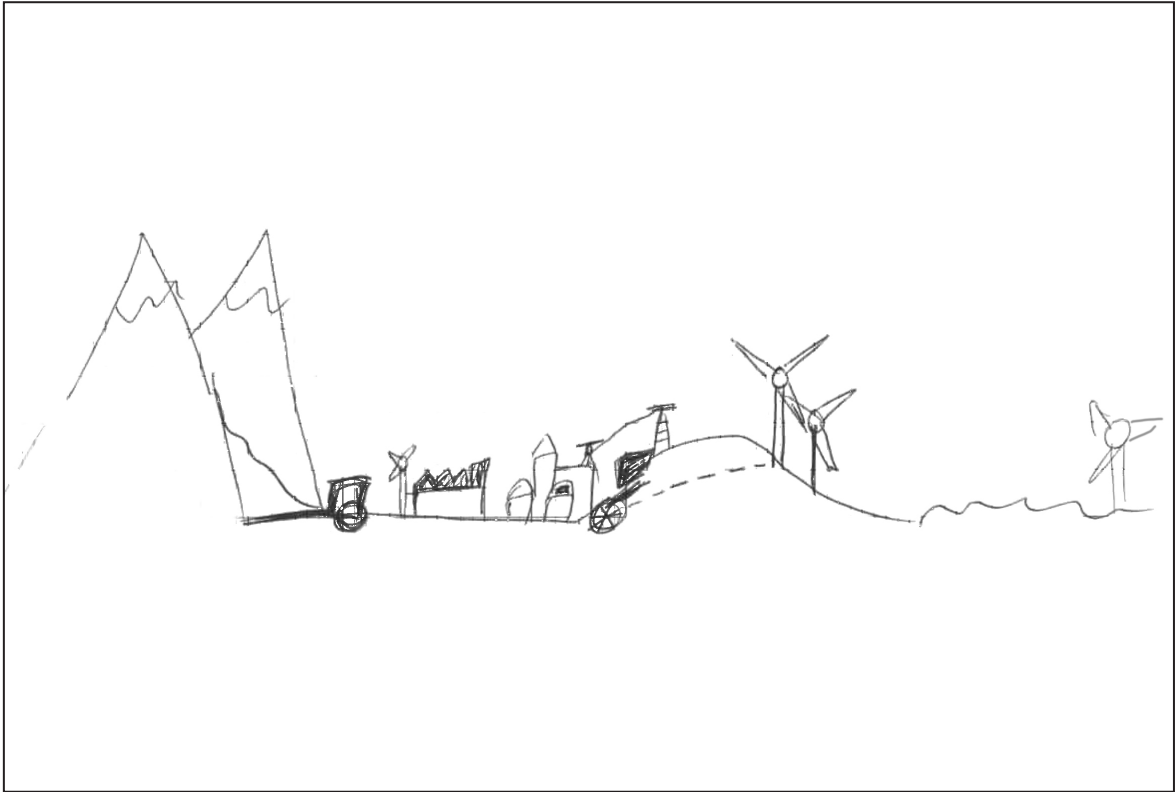


Figure T8. Wind turbine project manager in wpd, which realized wind turbines in TIPER project



Figure T9. Farmer which developed a bocage/wood-energy boiler



Figure GO3. Senior account manager of energy transition in Stedin. Before program manager for sustainability and innovation, Goeree-Overflakkee

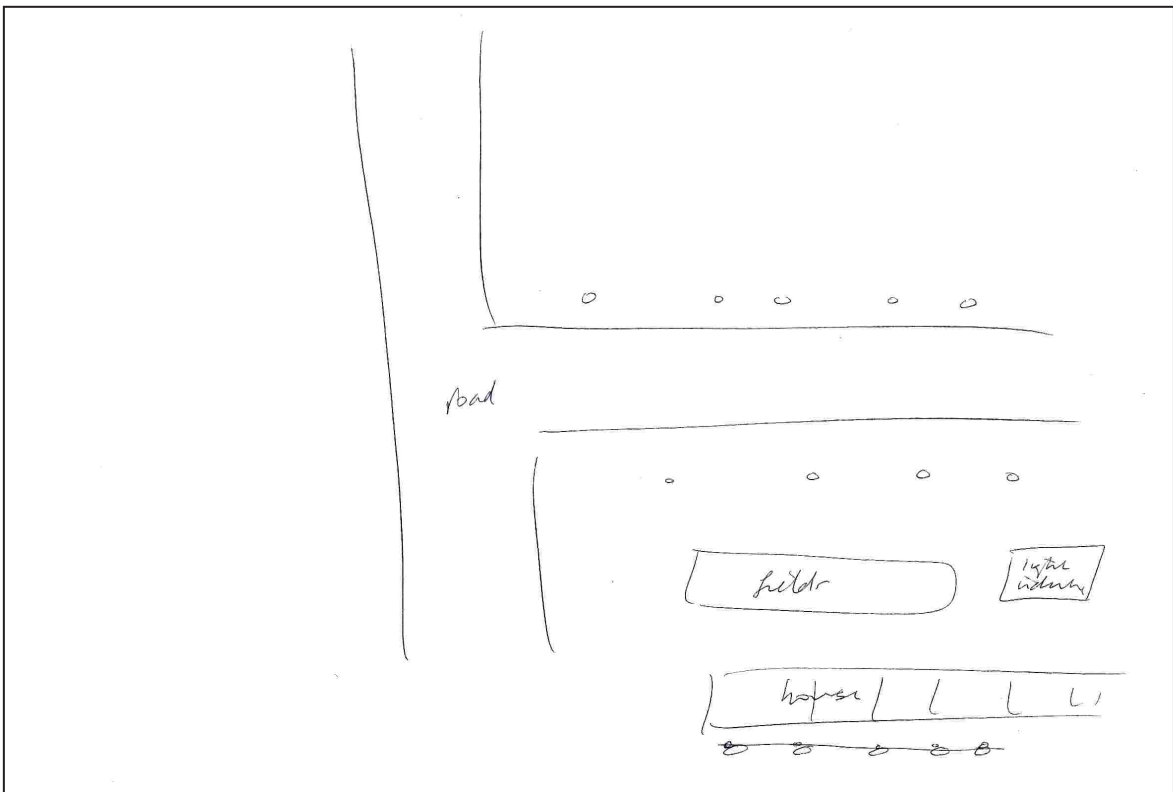


Figure GO4. program manager for energy transition], in Zuid-Holland province

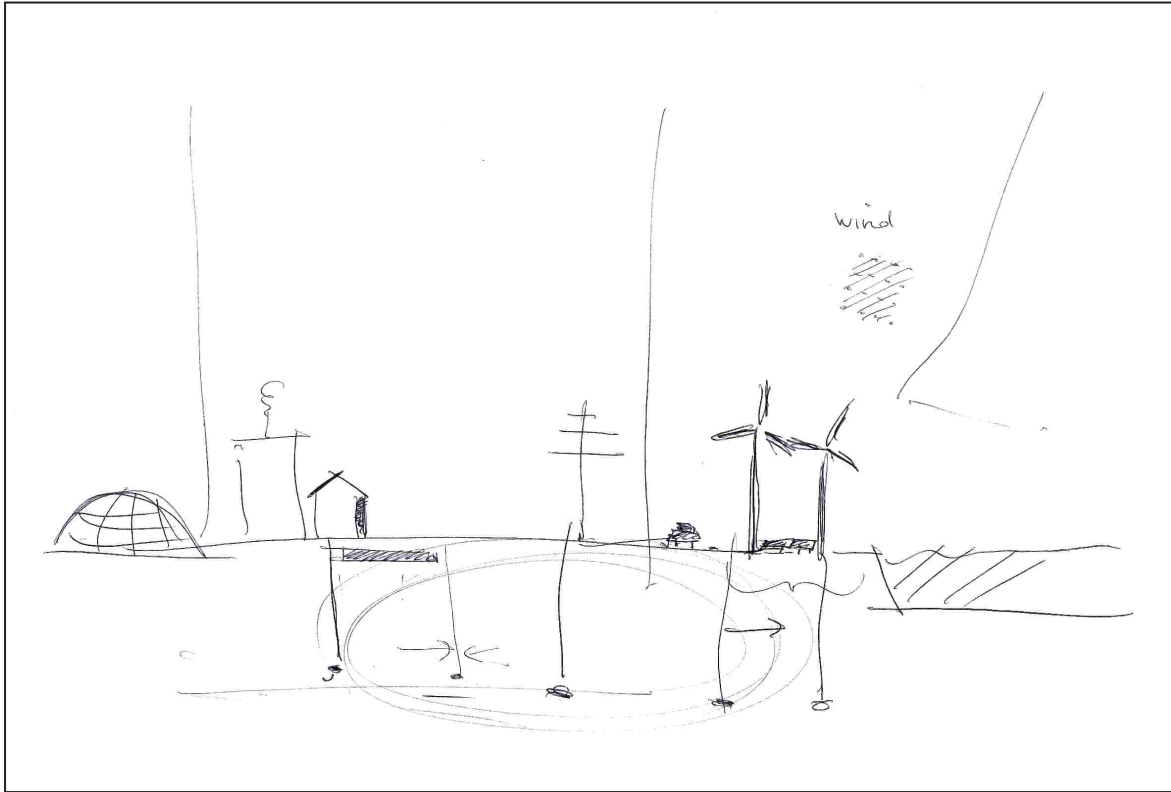


Figure GO5. Program leader spatial quality and Project leader energy and space in Province of Zuid-Holland

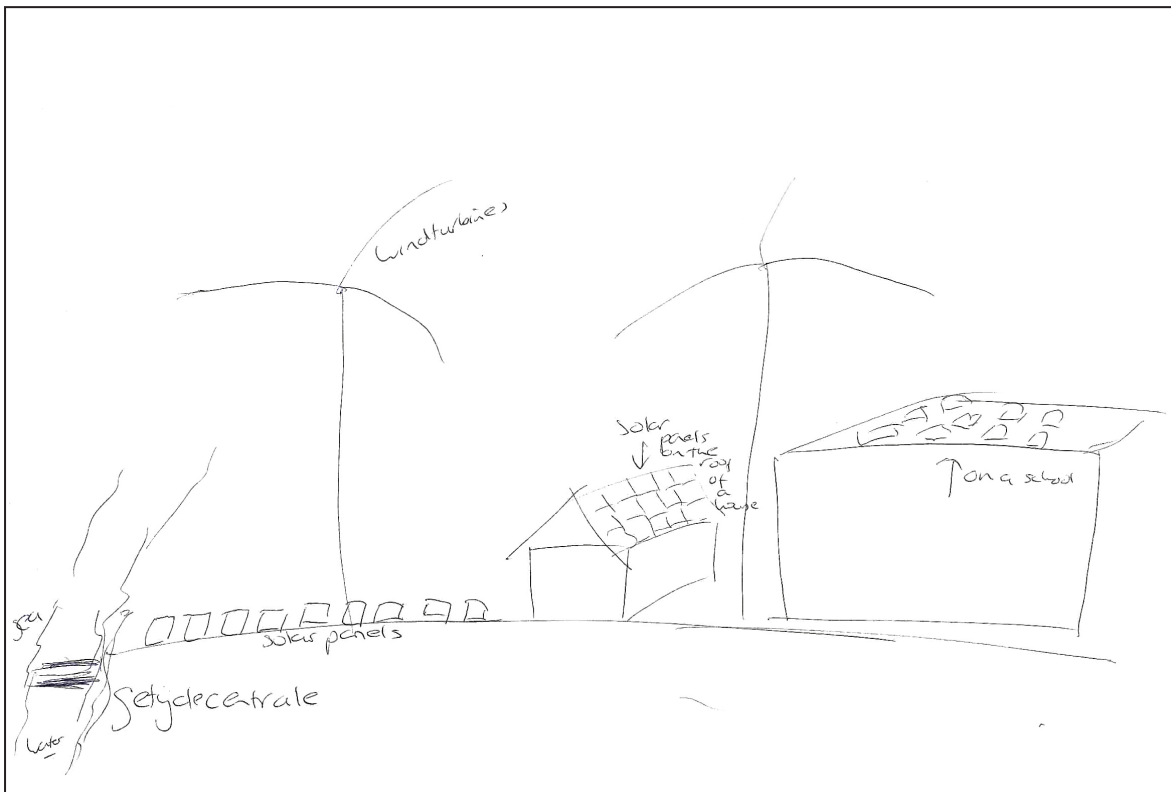


Figure GO6. municipal councilori n Goeree Overflakkee for innovation and sustainability

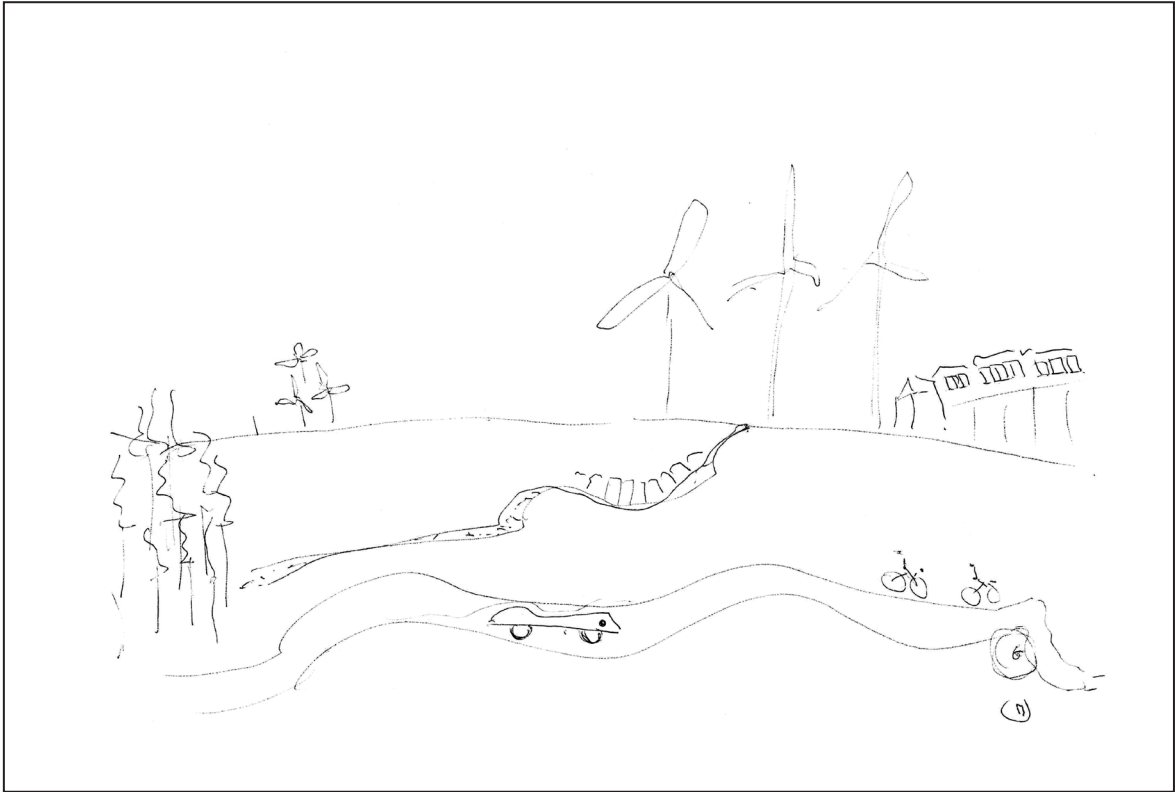


Figure GO7. Director Cooperative Deltawind Deltawind (project support for renewable energy project implementation)



Figure GO8. Farmer that developed a biogas facility in Goeree-Overflakkee

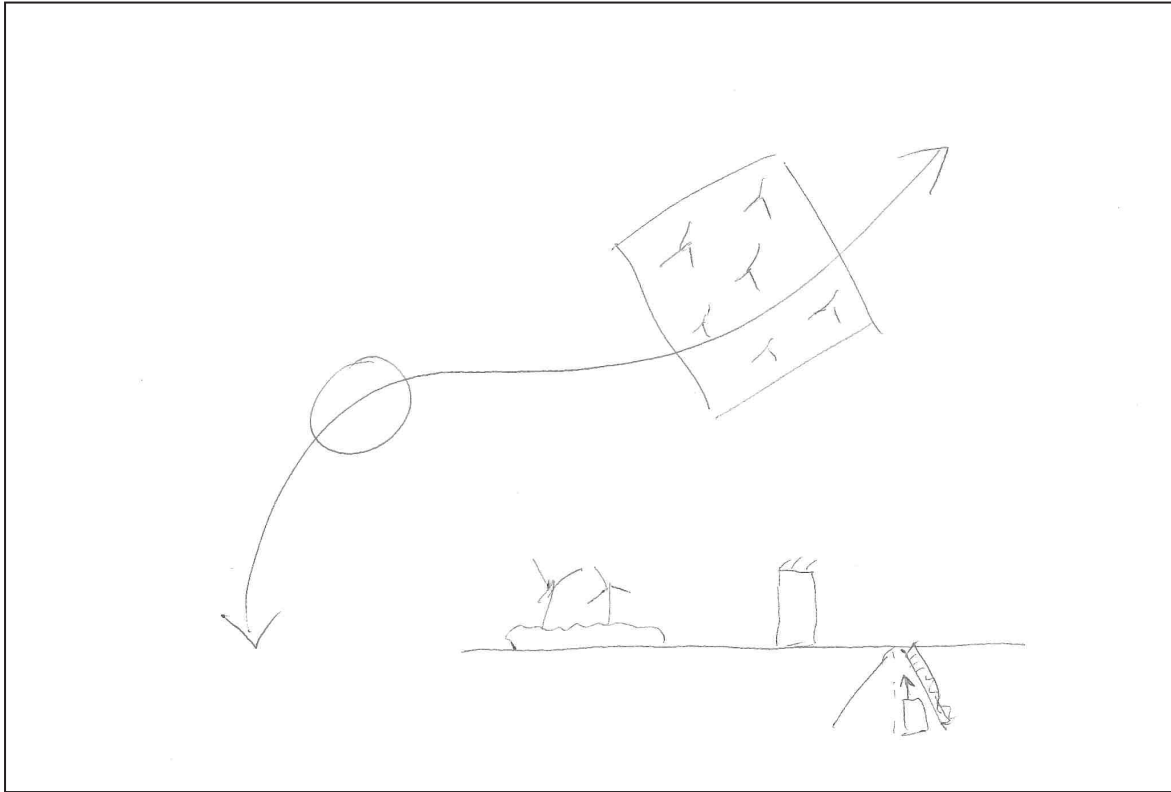


Figure GO9. Landscape architects that worked in Goeree-Overflakkee

9.1 A deeper picture of energy transition landscape through drawing: content analysis

Concerning the contents in this section firstly the general style of the drawings is discussed followed by the analysis of how and to what extent the three main strategies of energy transition are acknowledged and represented by agents.

9.1.1 The drawing appearance

In this research we focused mainly on the content and the process of drawing during interviews, however, some thought about form is revealing in some way and deserves a short discussion. The first insight is that agents represent ordinary and inhabited landscape that corresponds to the kind territory we inquired. Secondly, most agents reproduce reality landscape, drawing houses, hills, streets, etc. and just two landscape architects (ML11 and GO9) and a farmer developing a biogas power plant project, gave a more conceptual representation through symbols (ML10). Moreover concerning the drawings' "form" all the "energy transition landscapes" are represented mainly in three dimensions (23 times) (e.g. ML1), while several others through a section (e.g. T8). To ask to draw a "landscape" allows overcoming some disadvantages that other research faced while using drawing research methods in landscape research, such as mental mapping. This because mental map or sketch map results in two dimension representations that reduce the general understanding of landscape (Soini 2001). The act of drawing a landscape, seems to let people reproduce a landscape such as "the human glance covering a visible extent of territory"¹ (Donadieu and Périgord 2007, 7). Nevertheless, the manager of the energy transition program for the province of Zuid-Holland draws a very schematic plan (GO4). This drawing is less accomplished and less understandable than other, probably due to the background of the interviewer, being more of an engineering one. Indeed when the drawing request was made, she seemed to be a little bit skeptical, taking only two minutes to sketch.

So even if everybody drew, the personal investment in the process was either strengthened or not by the interest understanding behind the request, impacted the degree of representational accomplishment and thinking about the request. This is a possible obstacle in the development of this method, because most people are not used to drawing and it is a difficulty shared by others researchers (e.g. Soini 2001).

The landscape architects working in the three territories did not draw a "landscape" inspired from the reality but the concept of the action beyond it. One draws arrows representing how energy transition has to be grounded into the territory (ML11) and another draws how energy flows, represented by arrows, could be optimized and connected (GO9). This difference could be explained because landscape architects deal with drawing on a daily basis not only as a way of describing landscape but also as a synthesis of concepts (Tiberghien 2013).

¹ "le regard humain porté sur une étendue visible du territoire"

9.1.2 Energy transition’s main strategies from landscape drawings perspective: principles

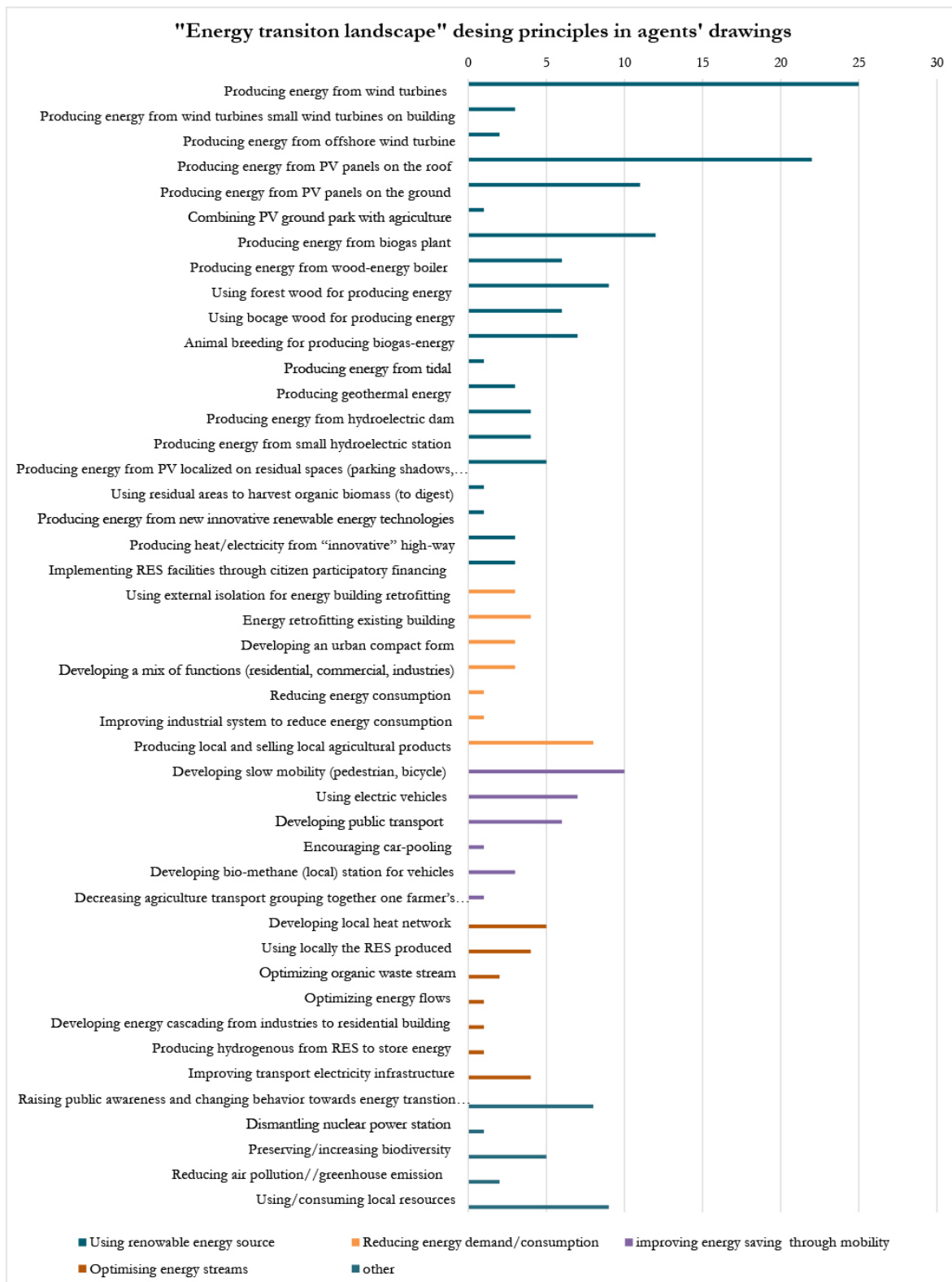


Figure 1. Number of times that one principle is highlighted in agents “energy transition landscape” drawing. Source: author elaboration of data from interviews.

Considering the drawing's content, the first visible result is that, compared to the agents' oral answers about an "energy transition landscape", when asked to draw they thought up many more elements and principles of the transition process. Figure 1, shows the number of times each transition principle is visualized or mentioned in the drawing. As defined in chapters 2 and 8 *principles* here are defined as abstract action/design statements that are taken into account when composing an energy transition landscape. Some are really specific such as "producing energy from PV panels on the roof" although others are broader and more general such as "reducing energy consumption".

In order to allow comparison with figure 11 (chapter 8), we cluster principles according to the three strategies of *Trias Energetica* (Tillie, Rotterdam Climate Initiative, and Project Group Hart van Zuid 2009). We added the category "improving energy savings through mobility", which groups several principles straddling other categories but make it more immediately understandable that transportation sector represents an important point of view in the developing of the transition process.

What stands out from figure 1, if we compare it to figure 11 (chapter 8), is that the number of principles mentioned by agents increased considerably. In the oral narrative 19 principles were found, while in the drawings they are 45. This addition concerned both principles for RE production, for example geothermal energy, and more frequently cited was wood-energy production. Besides we found more principles concerning energy saving actions, for improving mobility and for energy stream optimization. However, principles to reduce energy consumption and optimize streams remain secondary compared to the one pertaining to RE production. This predominance about RE technologies point of view is in line with other research about social representation (e.g. Devine-Wright 2011; Sarrica, Brondi, and Cottone 2014).

The principles most quoted remain those citing the production of RE from wind turbines, followed by energy production from PV panels on the roof. Only three agents did not draw wind turbines: the French landscape architect, which did a conceptual sketch, the elected representative of the CC Monts du Lyonnais, which, however, drew a windmill and the policy adviser for spatial development of Goeree-Overflakkee that gave a "futuristic innovative" interpretation of her energy transition landscape.

However just seven interviewees, made drawings that group together at least one principle of RE production, one energy saving principle and one for improving energy saving in the transportation sector (figures ML1, ML3, ML4, ML5, T2, T4 and GO1). Moreover, of these, only three also added at least one principle concerning the optimization of energy streams (figures ML1, ML3 and GO1). In the category "optimizing energy streams" we include agents' drawings that illustrate a specific principle going beyond the simple affirmation of the idea of using and consuming local resources.

The agents that have this more global vision for energy transition main strategies are part of the technical services of the territory, therefore working on TEPOS or in general collaborating to define global territorial strategy to achieve energy goals over a long period, both in France and the Netherlands. This working position leads them to a more global understanding of the transition process compared to agents working on a more precise topics such as agricultural sectors or others. Only one drawing represents only RE production from technological facility point of view (Figure GO7), and even in this case it highlights three kinds of different facilities,

beyond wind turbines and photovoltaic panels. Moreover, drawing these principles allowed the interviewee to develop some progressive reflections about the way of siting the photovoltaic panels, as illustrated by the following quote:

“I make solar, and that’s on the ground and a lot of them I think and also on the buildings. I make houses also with solar panels on them and a lot of solar panels also on factories, school buildings for example, on the roof. We also see have a flat roof, solar panels. It is on a flat roof, you don’t see them ...when you are nearby you don’t see them...and may be it would have been better if I only put them on the roof...because we have a not a lot of space in the Netherlands...and they take a lot of space” (municipal councilor innovation and sustainability-GO 2017) – Figure GO7

In the following sections, each energy transition strategy is discussed further in order to give a broader overview of agents’ perspectives.

9.1.2.1 Renewable energy production strategy

Beyond the number of energy conscious principles mentioned, the higher number of agents explained their choices of localization for RE facilities, giving context insights, such as a windy place for wind turbines, and the kind of roof for the photovoltaic panels, as expressed by the following quotes:

“I draw a part a little bit higher where, so it could be considered to put rather wind turbines because there is the need of a little wind to make them work...”² (ADEME territorial referent Deux Sevres - CCT 2018) – Figure T6

“Well in France it’s complicated, but well on high points to put wind turbines- normally, we don’t have too much the right because the landscape sometimes well it’s there we finally we see them most, but well it’s there where there are more wind, so it’s necessary always to find a compromise in the development of our projects”³ (wind turbine project manager, WP-CCT 2018) – Figure T8

“So the sun is there, because the [photovoltaic] panels are oriented south obviously”⁴ (responsable projets CoopaWatt-ML 2018) – Figure ML9

“Solar panels on all houses. Well, in short, also on the church, so, we make a bell tower. Finally, on the church or other, it could be the town hall or...or even the schools”⁵ (TEPOS agriculture and company project manager CCT 2017) – Figure T3

Particularly agents that localize photovoltaic panels on the ground in most cases explain the

2 “je dessine une partie un peu plus en hauteur où du coup on peut peut-être envisager mettre plutôt des éoliennes parce qu’il faut quand même qu’il y ait un petit peu de vent pour que ça fonctionne...”

3 “Bon, en France, c’est compliqué, mais bon ben sur les points hauts mettre de l’éolien – normalement, on n’a pas trop trop le droit parce que le paysage des fois ben c’est là où au final on le voit le plus, mais bon c’est là où on a le plus de vent, donc faut toujours trouver aussi le compromis dans le développement de nos projets.”

4 “Donc le soleil est là, parce que les panneaux sont orientés au sud évidemment hein”

5 “Panneaux solaires sur toutes les maisons. Bon, bref, même sur l’église hein, du coup, on va faire un clocher. Enfin, sur l’église ou autre, ça peut être la mairie ou... ou même les écoles.”

reason of that choice, showing to be conscious about the possible land use competition with agriculture, and highlighting possible combination with the agricultural world. In their words:

“Solar...and there are chickens under it, what we talked before. So we have...and may be there are some cows as well that don't go underneath, but still...so we have agricultural land, in which every way shape or form and of course we still have our beloved potatoes, that growth underneath the wind mills, because I don't see why not.” (sustainability policy adviser-GO 2017) – Figure GO1

“In fact, I'm going to do photovoltaic park on the ground...but we would be more on something like this. Tac. These are polluted ground, we agreed with that? We will not put them on the...tac tac tac. We will do a second one. And so there, we are on a plot, actually...then, I don't know how to do it...with attention danger!”⁶ (Cit'ergie and TEPOS project manager-CCT 2018) – Figure T4

Beyond siting context insights other agents detail how they want the integration of the RE facilities in landscape, often explaining how to reduce their visual impact, improving the aesthetic perception.

“A small biogas unit in the farm, there. It was missing. Which is actually just a semi-buried dome, a little gray, I would have done this brown but...This is the farm, next to the agricultural holding, and then we could have fir trees nearby, it's well surrounded, north side, we hardly see it. A bit of biogas production to feed the...the houses, the villages, where people could easily...well it join directly everybody”⁷ (responsible energy transition service, Parc Eco Habitat-ML 2017) – Figure ML1

“we need wind mills, because without we never ever get out targets. But the windmills not have to be too close to the houses because otherwise it's annoying. So we have some windmills together in a cluster” (sustainability policy adviser-GO 2017) – Figure GO1

“And then, well wind turbines, they would still be necessary ! So, where to put them? They don't have to... They have to be a bit on the ridge, but a little bit hidden as well”⁸ (Technical animation regional center of forest property-ML 2018) – Figure ML7

Interestingly in one drawing, done by the project leader energy and climate in the CC Thouarsais (Figure T2) we found represented the design principle elaborated in the landscape study developed by students and further re-updated in the ongoing *plan paysage* elaboration, showing how the *bocage* and wind turbine siting could be thought together in a system of proportion. In figure T2 we see the three small blades of a wind turbine, behind a big tree, in order to represent

6 “En fait, j'avais faire des parcs photovoltaïques au sol... mais on serait plus sur un truc comme ça quand même. Tac. Ce sera des sols pollués, on est d'accord, hein? On va pas mettre ça sur de... Tac tac tac. On va en faire un deuxième. Et donc là, on est bien sur une parcelle, effectivement... Alors, j'sais pas comment faire... avec attention danger quoi!”

7 “une petite unité de méthanisation à la ferme, là. Ça manquait. Qui est en fait juste un dôme semi-enterré, un peu gris. Je l'aurais bien fait un peu marron, quoi, mais... Ça, c'est à la ferme, à côté de l'exploitation, et puis on peut avoir des sapins à côté, c'est bien entouré, côté nord, on le voit à peine, quoi. Un peu de méthanisation pour alimenter les... les habitations, les villages, où les gens pourraient facilement... voilà, rejoindre directement tout le monde”

8 “Et alors, ben des éoliennes, il en faudrait quand même! Alors, où les caser? Faut pas qu'elles... Faut qu'elles soient un peu en haut de crête, mais un peu cachées quand même.”

the mutual proportions of distance. How explained by the interviewed:

*“Because from this rural landscape we could take energy sources, the wood particularly, and we could... it could also hide the renewable energy sources. Because it [the wind turbine] is several kilometers behind and so we don't see it, we see only that”*⁹ (Project manager energy and climate-CCT 2017) - Figure T2

Always concerning RE production two Dutch agents draw the “underground” in order to represent the producing of geothermal energy (Figures GO3, GO5, GO8). The geothermal energy production is currently under explored in the province of Zuid-Holland, which seems to be located in a potential geothermal heat zone. Indeed we found it exploration in the document “Zuid-Holland op St(r)oom” (2012), exploring from a spatial perspective the energy transition process at the province level (see chapter 6). So agents take inspiration of the principles and project they know about their own territory.

Particular in figure GO3 developed by the landscape architect project leader energy and space in province of Zuid-Holland also refers to the question of the need an underground spatial designing.

“I think our cities will change a lot so with windmills or the solar panels on the roof, but also with spatial design in the underground. Because it is a huge part where to build in the future and how to divide the space.” (project leader space energie-PZH 2017) – Figure GO5

Another interesting point is that beyond the technological facility for RE production, several agents represent the renewable source itself. So for example in several drawings we found represented cows or chicken for manure production and subsequent heat or electricity production through the device power plant itself (figures ML2, ML4, ML5, T2 T3, GO2, GO8), as stated by them:

*“So I won't draw a cow, even if could be funny, so this way with a horn. That's it. Tictic , for the biogas production”*¹⁰ (TEPOS project manager-ML 2017) – Figure ML2

*“I would put trees everywhere, with breeding too. This is a cow, for biogas production as well”*¹¹ (TEPOS agriculture and company project manager CCT 2017) – Figure T3

However for producing electricity or heat according to the technology from animal manure, the manure has to be collected. That requires that animals be inside in a stable. And this is something correctly represented and explained only by the farmer in Goeree-Overflakkee having implemented and managing a biogas power plant powered by his farm's cows, represented in figure GO8 and expressed as following:

“So we have the farm, we have the cows in it. So I think when I look at the digesting biogas we are standing here. It is something for the future, so I draw it next to the farm, because in winter the cows

9 “Parce que ce paysage rural on peut en tirer des sources d'énergie, le bois notamment, et que on peut... il peut masquer aussi des sources d'énergies renouvelables. Parce qu'elle [éolienne] est à plusieurs kilomètres derrière et donc on ne voit pas là, on voit que ça”

10 “Donc je ne dessinerai pas une vache, alors que cela pourrait être rigolote, alors la comme ça avec un corne. Voilà c'est ça. Tic tic, pour la méthanisation.”

11 “je mettrais beaucoup plus d'arbres un peu partout, avec de l'élevage aussi. C'est une vache, hein, pour la méthanisation aussi.”

are always inside in the Netherlands, so there are always possibilities to use the manure”. (farmer GO 2017) – Figure GO8

This mismatch between the representation and the reality could be due to a conscious simplification lead by the drawing process. In other words, interviewed could have voluntarily omitted to draw the cows in the stable even if they are aware of the question. However it could also be revelatory of how an energy principles are poorly associated with its spatial/landscape reality. Energy transition is a complex process concerning many sectors and technologies and sometimes an energy conscious principle is not deeply acknowledge in deep by people that do not directly work in the sector.

However many other renewable sources are represented, nearby the device that will transform them in usable energy for human activities. Indeed in the French cases most of people draw a sun, something totally lacking in the Dutch representations.

“This farm, classic, we...we could install photovoltaic panels, so we have a beautiful sun”¹² (SCoT project manager ML 2017) – Figure ML4

We also found *bocage* systems and/or the forest for the wood energy production (for example figures T1, T2, T3, ML1, ML3), near which in many cases the technological device burning wood to produce heat or electricity is drawn. So combining the original renewable resource and the element converting it in exploitable energy. Other agents put the accent on the biomass represented but the facility needed for its exploitation is not represented such in figure ML7 and GO7, maybe because they do not know how to draw it.

So it seems that through the RE technologies there is a sort of renewed relationship and attention to nature and its elements such as wind, sun, wood but also the animals.

This importance of relation with nature is also put forward by an agent of Goeree-Overflakkee that represents an energy transition landscape in the far future imagining new innovative technologies not having a spatial footprint but that could just fly in the air far away from the ground, represented by a kite or in the deep ground. This allow nature to take over on the land and in the living landscape. Using her words:

“so we have high in the air and maybe in the underground and we reclaim our land. So this is where we live [...] we go back to the landscape with flowers and birds and no chemicals...oh that’s a bird” (Policy adviser spatial development-GO 2017) – Figure GO2

This is the only agent that make this kind of abstraction and imagination projecting into the future. However some other Dutch agent also mentions new innovative, but existing, technologies allowing to produce energy from the road, combining with mobility infrastructures (Figures GO3, GO7, GO8). These principles are not really represented but explained in the discourse:

“and may be also something in the roads that generates energy” (Director Cooperative Deltavind-GO 2017) – Figure GO7

“but maybe you can make some energy from it, for example some highways, with cars, are driving very

12 “Cette ferme, classique, on... on peut installer des panneaux photovoltaïques, donc, du coup, on a un beau soleil”

fast and the fast driving cars, will produce wind but also heat on the floor, so maybe we can use something from that.” (farmer GO 2017) – Figure GO8

However the most of draws represent energy landscape based on the utilization of principles and technologies well know and already existing. Imagining landscape that could easily exist in a near future reality, and for sure already existing in some territories advanced about the achievement of their energy goals.

9.1.2.2 Reducing energy consumption

Principles for energy consumption reduction are mentioned less frequently compared to the RE energy production. Nevertheless, they are more numerous and more frequently emphasized compared to the oral narratives explored in chapter 8, both, oral narratives and drawings, considering the improvement in mobility sector than in the design of building and urban areas for low energy consumption. However, in drawing these kinds of principles, are less immediate and they are accompanied by oral explications.

Principles for reducing energy consumption in buildings and urban areas are mainly highlighted in the CC Monts du Lyonnais in figures ML1, ML3, ML5. This is in line with the content of the answers previously analyzed and probably is due to the local institutions main entry to TEPOS through energy building retrofitting, which leads to stronger awareness about these subjects. However, we found at least one principle for reducing energy demands in each of the three territories as represented by the following quotes.

“The city is rather compact while equipped ...with electricity... [...]. So, also with the...market, etc. The idea that there are not only houses, but also shops, etc., and eventually industries, or at least not located far away”¹³ (PCAET project manager-ML 2017) – Figure ML3

“There are a lot of small houses, that could be retrofitted all together”¹⁴ (Project manager energy and climate-CCT 2017) – Figure T2

“This [building] is very well insulated. Insulation” (sustainability policy adviser-GO 2017) – Figure GO1

However agents that represented principles for designing low energy consumption buildings and urban areas, in the three cases studied belong to the professional category, that even if from different perspectives they are all implicated in the definition of territorial energy goals by developing and having access to roadmap and planning documents (e.g. TEPOS report, PCAET etc.). So they are mostly part of the technical services of the CC (figures ML1, ML3, ML4 or T2, T4) or the municipality (figure GO1).

However some exceptions exist, for example the TEPOS project manager of the CC Monts du

13 “La ville qui est plutôt compacte, qui est équipée en... en électricité... [...]. Du coup, avec également les... les marchés, etc. Le... l'idée que ce ne soit pas que des maisons, mais bien aussi des commerçants, etc. Et éventuellement des industries, ou en tout cas pas loin”

14 “Y a plein de petites maisons, qu'on a peut-être rénovées tous ensemble”

Lyonnais (ML2) and the person responsible for the sustainable planning pole of the territory CC Thouarsais (Figure T1) do not give details about urban designing and energy saving measures, even if they hold two working positions allowing a global vision of energy transition. They focus mainly on RE production from several sources and they also include principles for energy saving but from the point of view of mobility and transportation.

Only one agent, the sustainable policy adviser of Goeree-Overflakkee (GO1), represents the need for energy savings in the industrial system while restructuring the production system, an aspect never mentioned in the oral discourse.

“Of course there are normal houses, but we have also the companies...so it’s industry but it’s not... but if it’s industry it’s green industry, circular materials (sustainability policy adviser-GO 2017) – Figure GO1

The reduction of energy consumption is also mentioned for the agricultural sector, which could also be seen through the perspective of improving streams. Eight agents mentioned the principles of a local production and consumption of agricultural products, among them the three farmers interviewed as represented by the following quote:

“So the short food supply, and also that the farm’s products go to the supermarket, so that not every resident needs to go to the farm, but that there are groups [places where farms bring the products] proposed”¹⁵ (Project manager energy and climate-CCT 2017) - Figure T2

One agent, the vice-president of energy transition of the CC Monts du Lyonnais (figure ML5) added a principle related to the agricultural sector but from the viewpoint for a redistribution of agricultural fields for reducing energy consumption for agricultural activity and movement/mobility.

“There is one thing that we haven’t talked about that seems to me to be part of it, even if it’s hidden energy...It’s in our [agricultural] plot...Farmers try to group together agricultural land. That is meant to avoid movements, because we have only that. And little tractors here go to take manure there, and come back here, spread it here, there is one that has its farm here, with photovoltaic panels, we are going to put it.”¹⁶ (mayor, b.VP energy transition-ML 2018) - Figure ML5

This also connects to the idea of embodied energy needed to develop agricultural activity and to obtain final agricultural products. This is a kind of energy often underestimated.

The figure ML5 is one of the drawings that sums together a broad range of energy-saving principles, concerning urban area planning, agriculture and mobility, along with energy production. Using the words of the agent:

“then the energy transition it’s also about to concentrate together a little the houses because...to redo our villages”¹⁷ (mayor, b.VP energy transition-ML 2018) - Figure T2

15 “Donc du circuit court, et d’ailleurs que les produits de la ferme finissent aussi à la supérette, pour que ce ne soit pas chaque habitant qui aille à la ferme, mais que quand même y ait des regroupements de proposés.”

16 “Y a une chose qu’on n’a pas parlé aussi qui m’semble en faire partie, même si c’est d’énergie cachée... C’est dans nos parcelles... Des agriculteurs essayaient de faire du remembrement. C’est-à-dire que éviter, éviter les déplacements, parce que nous on a que d’ça. Et des petits tracteurs-là qui vont ici prendre du fumier, revenir là, l’épandre ici, euh, y en a un qui à sa ferme ici, avec du photovoltaïque, hein, on va lui en mettre.”

17 “puis la transition énergétique, c’est concentrer un peu les habitations aussi parce que... refaire nos villages...”

“It’s all these little paths, all these little roads, there, that have to exist, that have to be redone, because there are gone. The small paths that connect the houses. [...] While they should be used in a useful way, to walk, to cycle, maybe to ride a horse, but all this has to be rehabilitated”¹⁸ (mayor, b.VP energy transition-ML 2018) - Figure T2

Indeed, he took around 15 minutes for drawing taking the time to think about it, progressively adding complexity to the drawing, not stopping after his first, more immediate ideas. Besides he was not showing apprehension toward the drawing process.

Generally speaking, the time for drawing and the not fear of the drawing process seems to be an important element for deeper thoughts and to give a more complete overview of the landscape.

9.1.2.3 Improving energy saving through mobility

The aspect of mobility transport appears in good numbers in the drawings. Actually at least one principle linked to mobility is present in 17 out of 29 drawings. This topic is addressed from the point of view of the need to reduce the consumption through the encouraging and improving of slow mobility system, through bike and walk. But also from the point of view of technological changing and energy efficiency, changing the source for powering vehicles from fossil fuels to electricity and bio-methane.

Interestingly, just one Dutch interviewed (GO7) represents slow mobility through bicycle paths a principle that instead we found 5 times in the CC Monts du Lyonnais (figures ML2, ML3, ML5, ML6, ML9) and 4 times in the CC Thouarsais (figures T1, T2, T4, T5).

“And moreover there is a road and we have a lot of public transport. And then there we have a GW station. And then there is a bicycle path too. But I’m not able to draw a bicycle”¹⁹ (TEPOS project manager-ML 2017) – Figure ML2

“There, a small road that shows the...the...the encouragement of slow mobility. So, that’s the...the... the... bicycles; well, after, I haven’t represented a bus or something, but the idea of public transport, of develop the railway too, I could have done that”²⁰ (PCAET project manager-ML 2017) – Figure ML3

“then we are biking, also bikes of course” (Director Cooperative Deltawind-GO 2017) – Figure GO7

This is an interesting finding considering the high diffusion of bikes in the Netherlands, and the high number of bike’s path on Goeree-Overflakkee saw during the field visit. This lack in drawings could be due to the fact that, generally speaking, bike mobility is already highly widespread and part of the current mentality of people in Dutch context so they do not feel the necessity to mention it. It is also true that Goeree-Overflakkee local institutions in their action

18 “c’est tous ces petits cheminements, tous ces petits chemins, là, qui doivent exister, qu’il faut refaire, parce que c’est parti, ça disparaît. Les petits chemins qui relient les habitations. [...] Alors qu’ils devraient être utilisés de manière utile, pour se déplacer à pied, à vélo, peut-être à cheval, mais ça devrait être réhabilité tout ça.”

19 “et là il y a une route d’ailleurs et on a beaucoup des transports en commun. Et puis là on as une station GW. Et puis il y a la piste cyclable aussi. Mais je ne sais pas dessiner un vélo...”

20 “Là, une petite route qui te présente la... la... l’encouragement à la mobilité douce. Donc, que ce soit le... le... les vélos; bon, après, j’ai pas représenté de bus ou quoi, mais l’idée des transports en commun, de développer le... le ferroviaire aussi, j’aurais pu le faire”

to achieve energy goals focus mainly on RE production, while transport sectors is something that does not seem to be still addressed as a major matter of concern.

However the topic of improving transport mobility is something we found in Dutch drawings but under the idea of developing electric vehicles and their recharging borne, developed 5 times. This principle is more associated with the idea of energy efficiency in order to reduce fossil fuels consumption and greenhouse emission, not directly concerning energy saving. Nevertheless this is a restricted sample of agents and the question could deserve to broad to other people to increase a statistical representativeness.

The idea of developing electric vehicles is something we also found mentioned in one times in the CC Thouarsais (figures T3, T4) and in the CC Monts du Lyonnais (ML1) drawn by interviews part of the technical service for TEPOS goal on the territory. That so potentially have a quiet broad overview of what are the different topics of the transition process, as mentioned above for other topics such as energy saving.

Other principles for reducing energy in the transport sector are mainly mentioned by agents in the CC Monts du Lyonnais where five represent public transport (Figures ML2, ML3, ML4, ML9, ML6) and one also the car-pooling (figure ML3). Principles that we do not find in the CC Thouarsais answers and mentioned once by the sustainability policy adviser of Goeree-Overflakkee, which drawing, already quoted several times above, is one of the drawing grouping together a great number of energy principles.

“In the only car that you see, actually, well, they are four inside, so...”²¹ (PCAET project manager-ML 2017) – Figure ML3

“And moreover there’s a road and we have a lot of public transports”²² (TEPOS project manager-ML 2017) – Figure ML2

“so we have this mobile, that is a shared mobility car” (sustainability policy adviser-GO 2017) – Figure GO1

Sometimes in the oral narratives agents add “immaterial” details that they could not represent in the drawing but that the drawing process led them to speak about and precise. Such for the case of the RE facilities, for which 3 agents specify the local citizen financing, allowing economic benefit on the territory.

“An then, well, in this village, we put solar panels and we invest all together in solar panels that are on the roof”²³ (Project manager energy and climate-CCT 2017) – Figure T2

“We have wind turbines, which are built by citizens and then one which is attributed to children. To children of...of all villages’ school”²⁴ (responsible energy transition service, Parc Eco Habitat-ML

21 “Dans la seule bagnole que tu vois, en fait, ben, ils sont quatre dedans, donc...”

22 “et là il y une route dailleurs et on a beaucoup des transports en commun”

23 “Et puis, ben, dans ce village, on met des panneaux solaires et on investit tous ensemble sur des panneaux solaires qu’y a sur les toitures.”

24 “on a des éoliennes, qui sont montées par des citoyens et puis dont une qui est attribuée aux enfants. Aux enfants des... des écoles de tous les villages.”

2017) – Figure T1

But also broad to other topics concerning energy saving and improving mobility.

“Well, we’ll put a wind turbine on the back as well, because I like wind turbines. And in addition, it’s good, it indicates the wind direction, it’s very convenient in the morning when we get up. ... We know immediately, yes. I, I do a lot of cycling, too. So when I go cycling, I know if I leave with the wind in front of me or in my back, I look at the wind turbines, and that tells me immediately where it is. So that’s it”²⁵ (mayor and VP energy transition-CCT 2017) - Figure T5

This last quote also shows a sort of renewed relationship with nature and its elements, that is built through the RE technologies that for functioning use this natural element (wind, sun, etc.). An adaptation of behavior according to the day climate (sunny, windy) has been observed also to have an influence on energy behavior in local communities having developed RE technologies (Dobigny 2016). For example, inhabitants do the laundry during windy days taking advantage of the high production of RE from wind turbines (*ibid.*). However this is observed to happen in local communities that have an energy autonomy and the use of the energy produced locally have economic advantage.

9.1.2.4 Improving energy streams

Principles we clustered in the category to improve energy streams are mentioned by a lower number of interviews compared to the other categories, and often remaining on a rather general level. For example, the landscape architect having worked on the energy scenarios for Goeree-Overflakkee tells about “energy flows optimization” but remaining on a more general fuzzy level, not detailing how and through which infrastructure or designing actions, the optimization could be achieved.

“I think that it is about flows, so I draw an arrow, like this, that came from one place to another place. It’s about energy flows optimization and also thinking to connection with other flows” (HNS landscape architect 2017) – Figure GO9

Nevertheless some specific principles are also highlighted. Particularly two agents of the CC Monts du Lyonnais (figures ML3, ML8) and three of the CC Thouarsais (figures T2, T6, T9) represent the idea developing local heat network powered by local resources such as wood burning or organic waste digestion, harvested on the territory. The representation of the heat stream is various, and many represent it as an arrow connecting the producing facility with the houses, in other cases it is consciously not represented, because normally underground. So in drawing some also represent the “invisible” elements.

“My wood heating! But with my boiler, I could manage to energy feed all the houses...that’s it. With an interesting system, as with my boiler, there. With a common/shared boiler there, with a small room...with

25 “Ben, on va mettre une éolienne dans le fond quand même, parce que j’aime bien les éoliennes. En plus, c’est bien, ça indique le sens du vent, c’est hyper pratique le matin quand on se lève.

... on sait immédiatement, ouais. Moi, je fais beaucoup de vélo, en plus. Donc, quand je pars faire mon tour de vélo, je sais si je pars le vent dans le nez ou pas, je regarde les éoliennes, et ça me dit directement où c’est. Donc, voilà.”

*my boiler. And then I feed it with my good wood here. And from there, I do pas my pipes. Collectively, I like this very much. So collective beating*²⁶ (farmer bocage-wood-energy boiler-CCT 2018) – Figure T9

*“A little bit of forest resources, to produce well fuel [wood]...that is going to feed...so this there could be several building nearby. And then with a small boiler building in fact here- well, I’m not going to draw a network because we don’t see it, it’s underground...”*²⁷ (ADEME territorial referent Deux Sevres - CCT 2018) – Figure ML6

Something lacking in the drawing representation concern electricity transport pylons. Only two agents one in France and one in the Netherlands draw it. One is the project leader in a wind developer company working on the CC Thouarsais (figure T8) while the other is a landscape architect project leader space and energy in the Province of Zuid-Holland (figure GO5). So agents having very different background and role in the transition process.

*“And the ideally, it’ll be that in the landscape, well progressively also, the high-voltage line will disappear or that they are at small local scale in order to have stock and consumption on the territory. So, I tried to draw finally... wind turbines, we could say an underground cable that arrives where the mill has a bigger station, and from there, we will have e actually the high-voltage lines, but to access the village”*²⁸ (wind turbine project manager, WP-CCT 2018) – Figure T8

“so we don’t have a concept on how to divide geothermal and warmth. So it would be better to have an idea of a total grid, instead of now, could be this one here, and may be one there. Once... I’m sorry... This one does not have to go there and then...because we don’t have any spatial plan or whatever underground we need to do it. It’s only spot projects. And the network will be very important to, the infrastructure, both underground and out.” (project leader space energie-PZH 2017) – Figure GO5

Several other agents explain the energy stream functioning among elements of the drawing, for example from a wind turbine to a nearby urban areas. This is particularly emphasized in two Dutch drawings, one made by the policy sustainability adviser for Goeree-Overflakkee (figure GO1) and the program manager for sustainability and innovation at STEDIN (electricity and gas network manager in the Zuid Holland Province) (figure GO3). In this last drawings are represented the principles of energy cascading through arrows that explain synergies and connection among places and functions, representing a concept of a total grid.

“and these wind mills they connect to the same grid as the solar panels” (sustainability policy adviser-GO 2017) – Figure GO1

26 “Mon chauffage au bois! Mais, avec ma chaudière, je vais pouvoir alimenter toutes les maisons... Voilà. Avec un système intéressant, comme avec ma chaudière, là. Avec une chaudière commune là, avec un petit local... avec ma chaudière. Et puis j’alimente avec mon bois ici. Et de là, je fais passer mes tuyaux. Voilà. En collectif, ça ça me plaît bien. Chauffage collectif, donc”

27 “un petit peu de ressources forestières, pour produire en fait du combustible... qui ira alimenter... alors ça peut être plusieurs bâtiments à proximité. Et puis donc avec un petit bâtiment chaufferie en fait ici – bon, je ne vais pas dessiner le réseau parce qu’on ne le voit pas, il doit être enterré...”

28 “Et puis ben l’idéal, ce serait que dans ce paysage, ben progressivement aussi, ben les grandes lignes électriques ben viennent plutôt à disparaître ou alors qu’elles soient à une petite échelle locale pour vraiment être ben stockées et consommées aussi sur le territoire. [...] Alors, j’ai essayé de dessiner au final... les éoliennes, on va dire un câble qui serait en souterrain, ça arrive où le moulin à un plus gros poste, qui à partir de là, ben effectivement on aurait les lignes électriques, mais pour accéder au village”.

This means that they are conscious about the importance of electricity transport assuring the connection between where energy is produced and where it is consumed, but they do not concretize them in tangible real form. Even the person working for STEDIN so that work directly to the energy transport point of view does not draw the pylons or at least precise if the “arrow connection” are aerial or underground.

The finding of the lack of electricity transport infrastructure could be due to the fact that these transport elements are visible in the landscape since long allowing people do not pay attention to that anymore, as something changing the landscape and so voluntarily omitted. This could also due to the fact that sometimes these infrastructure are underground so leading people do not draw them.

However the fact that almost nobody represents them could also be revelatory of a non-association/knowledge of the electricity transport infrastructure in the energy transition process and their landscape affectation. Indeed the electricity transport infrastructure is a topic almost absent in the discourse of agents answering other questions during the interview. It seems to be a gap between the knowledge of this aspect of energy transition and agents.

Indeed the progressive implementation of decentralized RE production facilities sprawled on territory and their intermittency largely affect the network transport system that need to be upgraded. This upgrade concern both the transport infrastructure that the devices/converting station needed to allow the injection of renewable energy produced in the electrical network itself, from a landscape perspective the attention is focused on the infrastructure for energy transition production.

In one Dutch drawing is highlighted the need for energy storage, an aspect still under development concerning energy transition, where the policy sustainable adviser of Goeree-Overflakkee draws a hydrogenous conversion station. She takes direct inspiration from what local institutions has really under implementation in the framework of the ongoing *Regionale Energie Strategieën*.

“and maybe there is also a little buffer of hydrogen, the hydrogen buffer that help to stock energy.”
(sustainability policy adviser-GO 2017) – Figure GO1

On a general level it appears that agent’s values the idea of proximity of resources preferring to use what it is available on the territory. For example, all agents highlighting energy production from organic waste or wood from forest and *bocage* precise that it is produced in the territory, putting forward this idea of a territorial grounded transition.

In few answers this idea goes further evoking the idea of energy autonomy. This perspective is addressed in the farmers discourse (T9, ML10). This is particularly evident in the figure ML10 drawn by a farmer implementing a biogas facility in the CC Monts du Lyonnais, where all the actions of living, energy producing, etc., are enclosed in a circle representing the territory boundaries, as the comment below illustrates.

“But we have to succeed in recreating somewhere an ecosystem and our ecosystem. That’s it. For me that’s it. And inside all that, we need to eat, we need to drink, we need to breathe, we need to produce energy to

*live as we live*²⁹ (farmer, biogas project initiator, ML 2018) – Figure ML10

However in few cases the explicit connection for energy sharing with other territories or city is expressed. This point of view is particular by the TEPOS network to which the two French cases belong and are committed to supply surrounding cities and territories with exceeding produced energy.

*“And, yeah, there is anyway this relation to the city that’s, in the urban environment anyway, that’s important because we have to be in solidarity with these territories there”*³⁰ (Sustainable territorial management division director-CCT 2017) – Figure T1

*“Here, the dam for electricity, not necessarily only for this city, we use it also for other cities”*³¹ (PCAET project manager-ML 2017) – Figure ML3

Indeed this raises the question of rural areas as subordinated renewable energy producing areas for the dense urban city, is a matter of concern that also led to question for ensuring energy justice (Emelianoff and Wernert 2018).

Interestingly two sketches developed by agents working on Goeree-Overflakkee represent a supra-municipal /territorial level, showing a clearer understanding of the importance of connection. Indeed these two are the sustainability policy adviser of Goeree-Overflakkee and the landscape architect project lead energy and space at Zuid Holland that also represent in their drawing in a more or less explicit manner the electricity network.

“I’ll do in two levels. We have here the one in the North Sea. I think these are mono functional landscapes... production with I don’t know biodiversity something. So the wind parks in the north sea and on the level of land of the municipality or province” (project leader space energie-PZH 2017) – Figure GO5

“And some of this also goes...so we need more wind mills right, because we are already using a lot but we have not so much yet, and some of these go to Rotterdam. So goes away from the island” (sustainability policy adviser-GO 2017) – Figure GO1

The other French agent having drawn electricity pylons is the other one that in the French embedded case specify how the drawing represent French scale, so implying connection with renewable energy technologies coming from different territories for example hydroelectric from mountainous ones and on sea wind turbines for coastal ones (figure T8).

29 “Mais on doit réussir à recréer quelque part un écosystème et notre écosystème quoi. Voilà, c’est ça. Pour moi c’est ça. Et à l’intérieur de tout ça ben faut qu’on puisse s’alimenter, il faut qu’on puisse boire, il faut qu’on puisse respirer, il faut qu’on puisse produire l’énergie pour vivre comme on vit.”

30 “Et, ouais, y a quand même ce rapport à la ville qu’est, au milieu urbain quand même, qu’est important puisqu’on doit être aussi en solidarité avec ce territoire-là”

31 “Voilà. Le... le barrage pour... pour l’électricité, pas forcément uniquement cette ville, on utilise aussi avec d’autres villes”

9.2 The drawing process

9.2.1 French and Dutch differences in landscape drawings

progression

The analysis of the drawing process has proven to be insightful. In order to discuss the results better the following box 9.1 and 9.3 illustrate two examples, one of a Dutch agent and another French one, for the oral answers about “energy transition landscape” (chapter 8). Box 9.2 and 9.4 show two examples of the drawing process for the same agents, one working in the CC Thouarsais and the other in Goeree-Overflakkee. These drawings are representative of the drawing process as developed by the French and Dutch agents interviewed. Nevertheless, it needs to be mentioned that these two selected drawings represent a quite a high number of energy principles compared to others. They are chosen to give a global picture as possible, able to enrich the discussion. The choice to introduce the drawing process with oral answers, aims to show how richer and broader the drawing answers are compared to the oral ones.

Different to other research (e.g. Devine-Wright and Devine-Wright 2009), our method developed by asking agents to draw during individual semi-structured interviews and not during collective workshops, also allowed to record/trace the drawing process of each person. The analysis of the process adds some significant insights in addition to the drawing content.

Box 9.1. Oral answer of the policy sustainability adviser of Goeree-Overflakkee about “energy transition landscape”, Netherlands.

For me it's always, something that have a lot of different elements in it. So an energy transition landscape it's not just windmills. That's a wind mill landscape. An energy landscape should have multiple façades, and look for a sort of optimum system. We talked about ecosystems service right? if you have wind and solar together, you can make an optimum use of that and if you can add agriculture activities. So should be everything together and not just one thing. But I should also agree that it should be clustered so there should be cluster of energy hubs, and they shouldn't be everywhere. They should be places where you can sit without seeing the next 16 windmills.

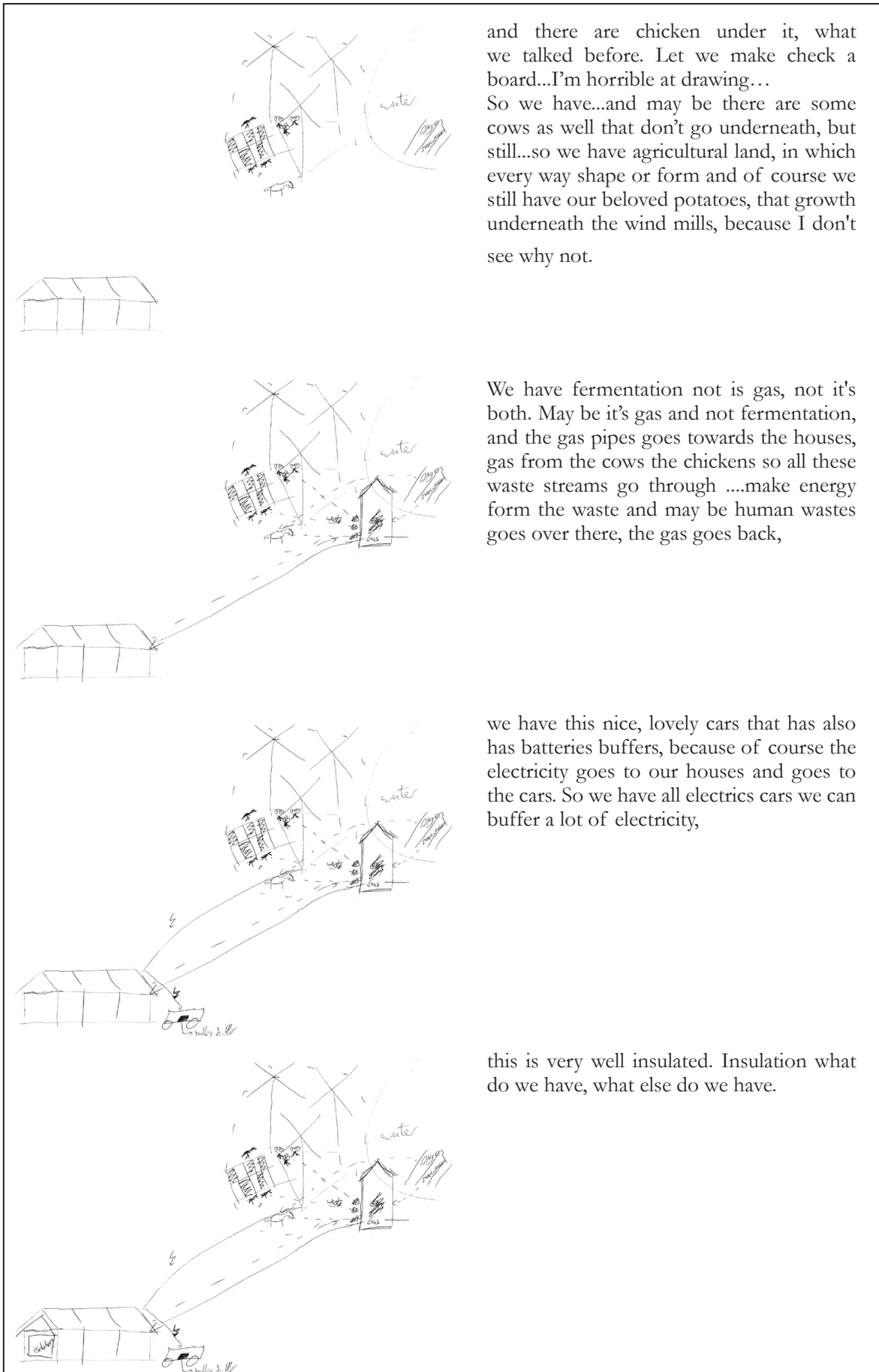
Box 9.2. Explanatory example of the drawing process along with the oral narrative of Dutch policy sustainability adviser of Goeree-Overflakkee about “energy transition landscape”, the Netherlands (figure GO1).

I have to think about a region, and then a nice region... So let's start with we have some houses, we have neighborhood right,

and we could get energy from tidal, from algae so we need water, we are in the Netherlands

in the landscape we still have production, we need wind mills, because without we never ever get out target. But the windmills not have to be too close to the houses because otherwise it's annoying.

So we have some windmills together in a cluster, and these wind mills they connect to the same grid as the solar panels. Solar...

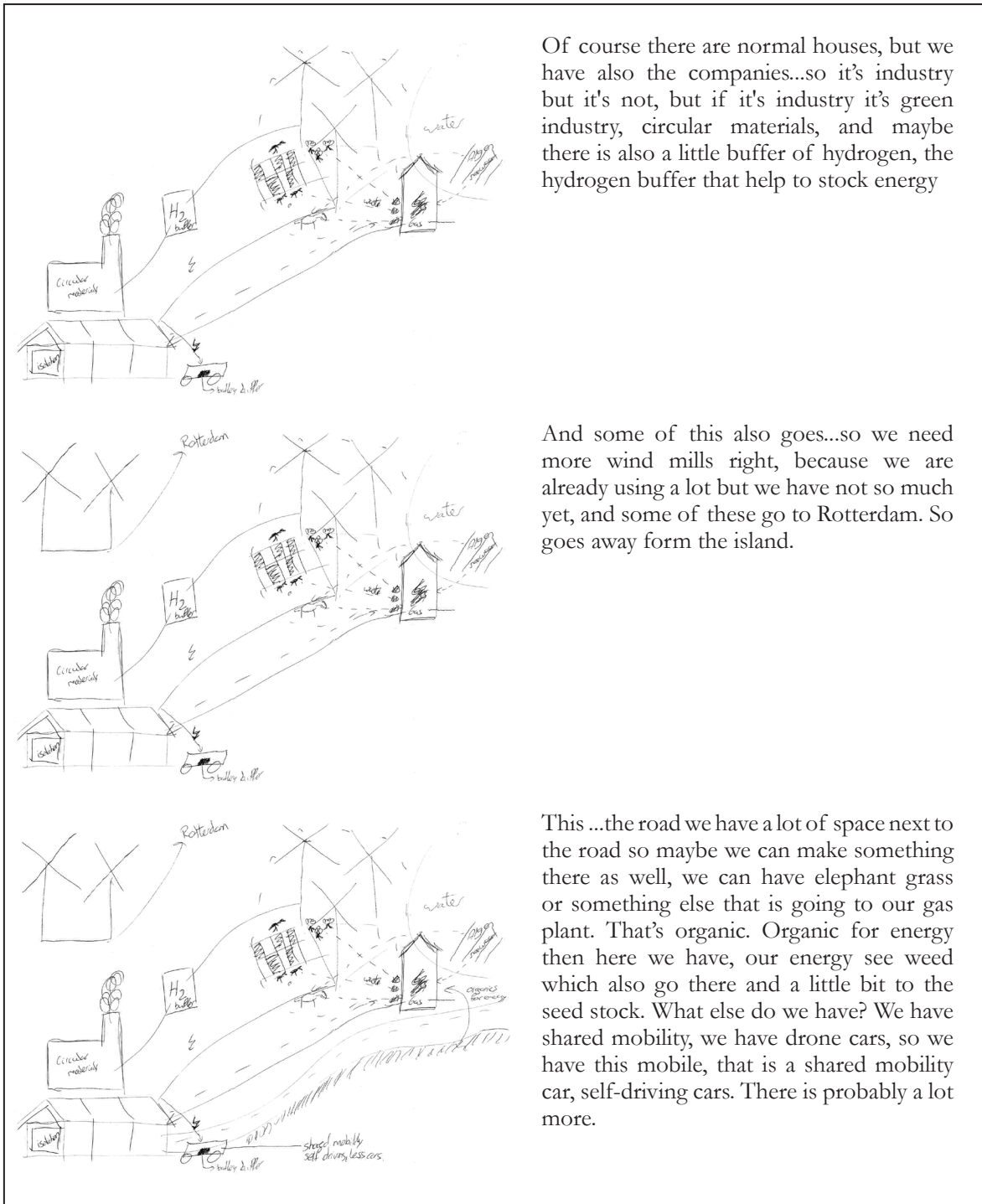


and there are chicken under it, what we talked before. Let we make check a board...I'm horrible at drawing... So we have...and may be there are some cows as well that don't go underneath, but still...so we have agricultural land, in which every way shape or form and of course we still have our beloved potatoes, that growth underneath the wind mills, because I don't see why not.

We have fermentation not is gas, not it's both. May be it's gas and not fermentation, and the gas pipes goes towards the houses, gas from the cows the chickens so all these waste streams go throughmake energy form the waste and may be human wastes goes over there, the gas goes back,

we have this nice, lovely cars that has also batteries buffers, because of course the electricity goes to our houses and goes to the cars. So we have all electric cars we can buffer a lot of electricity,

this is very well insulated. Insulation what do we have, what else do we have.



Box 9.3. Oral answer of the French sustainable territorial management division director of the CC Thouarsais about “energy transition landscape”, France.

Yeah, when you tell me energy transition landscape, I see a beautiful bocage landscape with small wind turbines scattered...why not a field of photovoltaic panels? And little houses with solar panels, wooden houses...For me it's an energy transition landscape, and then agriculture and breeding too.

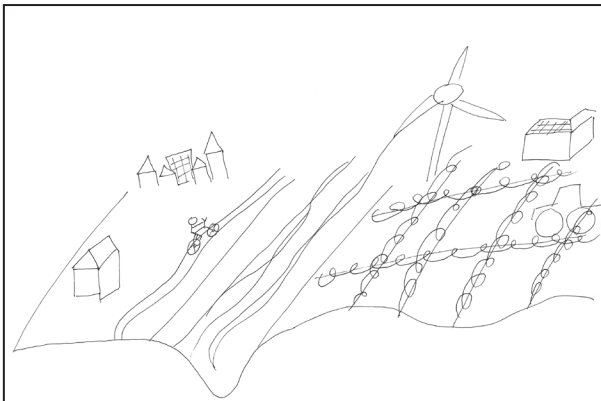
Box 9.4. Explanatory example of the drawing process along with the oral narrative of sustainable territorial management division director of the CC Thouarsais about “energy transition landscape”, France (Figure T1). The Original French text could be found in annex 8.)

We have a territory with large plains and we have a territory with valleys that are enclosed. So there I draw the valley. And after, we are on a territory with small hills.

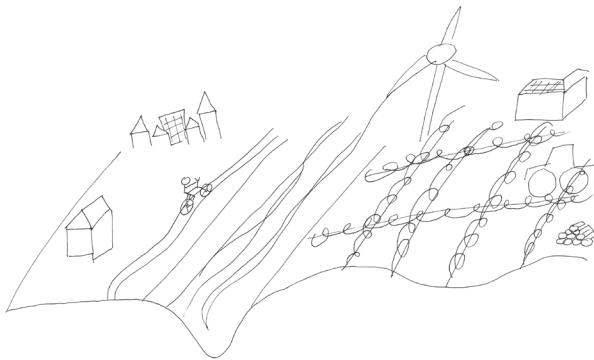
Like this and with a hedge system. So, I'm going to try to do like this. And euh...Yes, like this but it's very schematic, but basically there we have the system, the hedges system. Yes, I do small hedges. And so there, you have the water flowing in the valley.

After, there is still the more urban side, I think that it's necessary...that it's necessary to make a small city. With our large slate roof and also some buildings. This we could say it's a city. And after we have... we have all our isolated buildings. That's it, with big farms that could be a farmhouse. I'm making a framing around here [near the hedge system area]

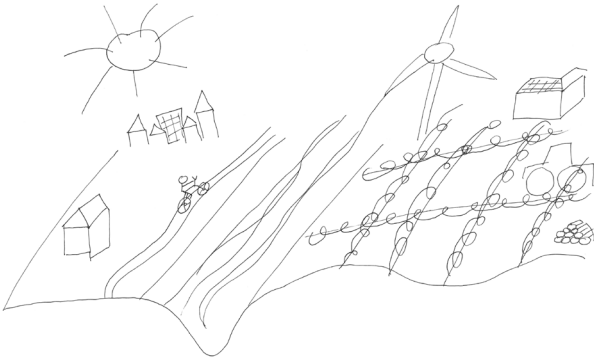
yes... after, there could be photovoltaics panels on it. For that matter. And then here, we could find back also...we found back our wind turbines, look how beautiful is my wind turbine! So. Oh la la! I didn't take into account the proportions, but it's not a big deal...



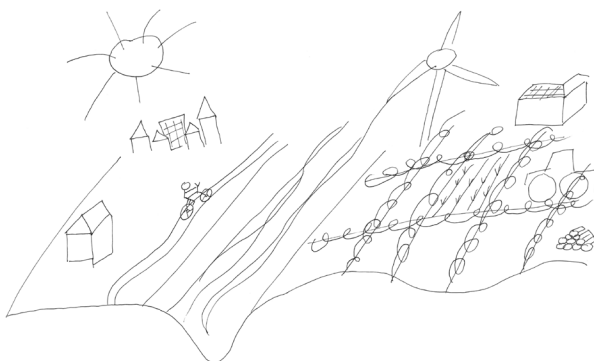
And yes, for me it's important also that there is a small road, with a person riding a bike on it. Because it's necessary to think about the mobility and on our territory the bicycle is still ...it still important. That's it. And then, there is...there is the agricultural tractor. We are on a rural environment, so the tractor is important.



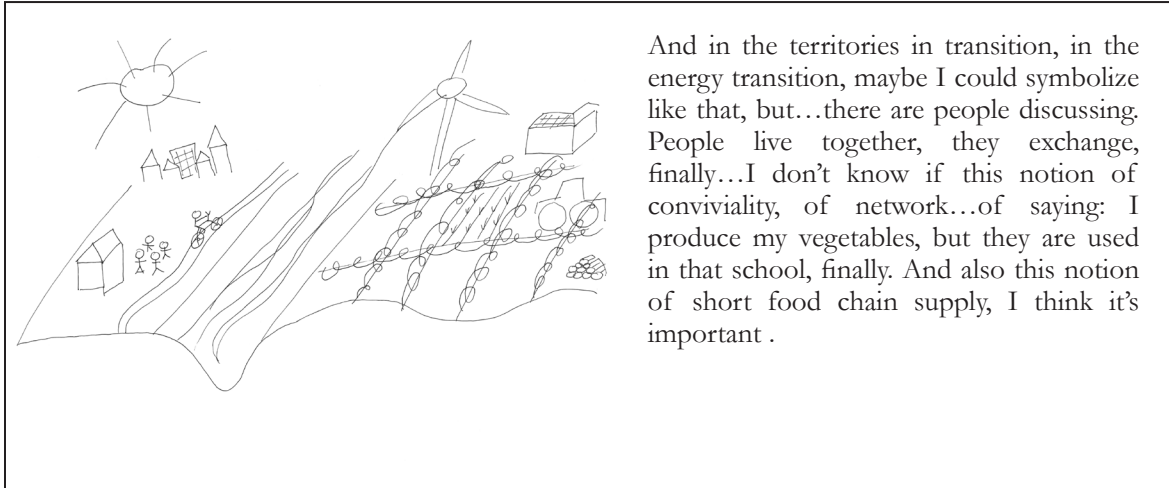
The hedge system is still not very much exploited. But we are working on the wood-energy sector...And besides I think that I have to add a pile of wood somewhere. Because the wood, it's the first renewable energy used on our territory, since several years. I think that is important to represent the pile of wood and particularly the hedge its one of its resources. A lot of wood logs, but that's it, finally it's...it's an important renewable energy



Ah yes, then maybe I should make a sun too. That's it, an energy transition landscape, yes, that's it. You see, finally, me the idea, it's to be in a beautiful landscape, where we live well, where there is no pollution, and that's it.



And, yes, there is still this relationship with the city that is...with the urban environment, that's important considering that we have also been in solidarity with those territories there. And in the energy transition landscape there is a topic that we have not spoken about - so I'm going to symbolize this like this - it's the agricultural crops. Because in the energy transition there is also the food provision. And for me, the local food, the short supply chain contribute to the energy transition. So that's it.



And in the territories in transition, in the energy transition, maybe I could symbolize like that, but...there are people discussing. People live together, they exchange, finally...I don't know if this notion of conviviality, of network...of saying: I produce my vegetables, but they are used in that school, finally. And also this notion of short food chain supply, I think it's important .

Several discussion points and difference between French and Dutch answers emerge from the analysis of the drawing process.

9.2.1.1 French and Dutch differences in composing a landscape

The analysis of the drawing process brought up some interesting insights. The first is that the most of French interviewees, 14 out of 20, started drawing by the natural topography and orography characteristics of the landscape, mainly mountains, but also valleys and rivers. Subsequently they added villages or forests and then renewable energy components. This can be seen in box 9.4 where the first elements drawn by the French agents of the CC Thouarsais were the orography and topographical components of the landscape, in this case valleys, plateaus and rivers. However also in the CC Monts du Lyonnais agents started drawing the topography, especially mountains.

“First I represent... a mountain, one or more, there, like small mountains”³² (SCoT project manager ML 2017) – Figure ML4

Some of the French agents explicitly affirmed to begin by first drawing a “landscape”, referring to the mountain or orography component, as expressed by the following quotes:

“So first I’m going to draw the landscape. This, this is the Monts [du Lyonnais]. After...well as I said, water streams.”³³ (mayor, VP energy transition-ML 2018) - Figure ML5

“Finally, I would start in any case, by drawing the landscape, in the way where I’ll first start .The beginning of the mountain, rather flat, hills, and after finally a little in this landscape, what could I add to well participate to the energy transition?”³⁴ (wind turbine project manager, WP-CCT 2018) – Figure T8

32 “En premier je représente les... un mont, un ou plusieurs, voilà, comme des petites montagnes”

33 “Alors déjà j’veais dessiner le paysage. Ça, c’est Les Monts. Après... ben comme j’veous disais, des cours d’eau.”

34 “Enfin, je commencerais en tout cas par plutôt dessiner le paysage, dans le sens où je commencerais ben d’abord. Un principe de montagnes, plutôt du plat, en principe des monts, de collines, et après au final un peu dans ce paysage ben qu’est-ce que je rajouterai pour ben participer à la transition énergétique?”

On the contrary eight out of nine Dutch agents, started by drawing human built elements, such as neighborhoods (see box 9.2) or RE production facilities, giving no details about territorial characteristics. They did not specify for example, if the landscape that they were representing is flat or costal, etc. Using one Dutch agent's words at the beginning of the drawing process:

"I make an energy transition landscape ok. On the ground I make solar panels, and that's on the ground and a lot of them I think and also on the buildings" (municipal councilor innovation and sustainability-GO 2017) – Figure GO6

This seems to bring out two different approaches in the way of thinking about landscape that differs in the two nations. In the French approach agents draw a "landscape" defined by mountains, rivers, agriculture fields, urban areas, which are progressively modified according to needs for achieving energy transition goals. In someway, they add what Pasqualetti (2013) called a "direct energy layer", meaning that all the expected changes due to the production of RE energy, reduction of consumption and energy flow optimization. This could be seen by the progression represented in box 9.4, where the agent drew the topography, the river, the *bocage* system, the houses and later the energy focused elements such as RE technologies, the roads for slow mobility, etc.

In the Netherlands, agents drew energy focused principles that progressively compose the global landscape. Also, the topographical characteristics such as the rivers and seas are not represented straightaway but little by little, entering in the drawings because they could produce RE energy such as tidal energy (see box 9.2). It seems that agents' minds in the two countries are not the same, in respect to the things that "make up" landscape. This could be due to the different traditions towards landscape that the two nations entertain. In France, a strong cultural and nature protection perspective have historically existed (Luginbuhl 2012). While in the Netherlands landscape has both ecological and nature protection components too (De Montis 2014) with some heritage concerns (e.g. *waardervolle culturelandschappen* 1994), but also with a connection to the idea of spatial organization and its elements (van der Cammen, H. et al. 2012) and landscape seems to be connected to this idea. However, a broader sample of interviews could support a deeper understanding of these differences.

Landscape elements beyond energy

Beyond the energy conscious focused principles, the drawings also represent other components composing a landscape. Figure 2 (next page) shows the human or natural elements composing the drawn landscapes.

Certainly, the difference about the orography/topography in the drawings is also due to the characteristics of the studied territories from which agents take inspiration or directly refer to for their landscape representation. In the drawings elaborated by agents of the CC Monts du Lyonnais, a low range mountainous territory, eight out of ten agents represented a mountainous landscape. This element is not represented in drawings of Goeree-Overflakkee, which is a flat costal polder. However, in the Goeree-Overflakkee interviews the sea, according to its local characteristics was represented five times, an element that is represented only once in French drawings. Probably because none of the studied territories are in seaside areas.

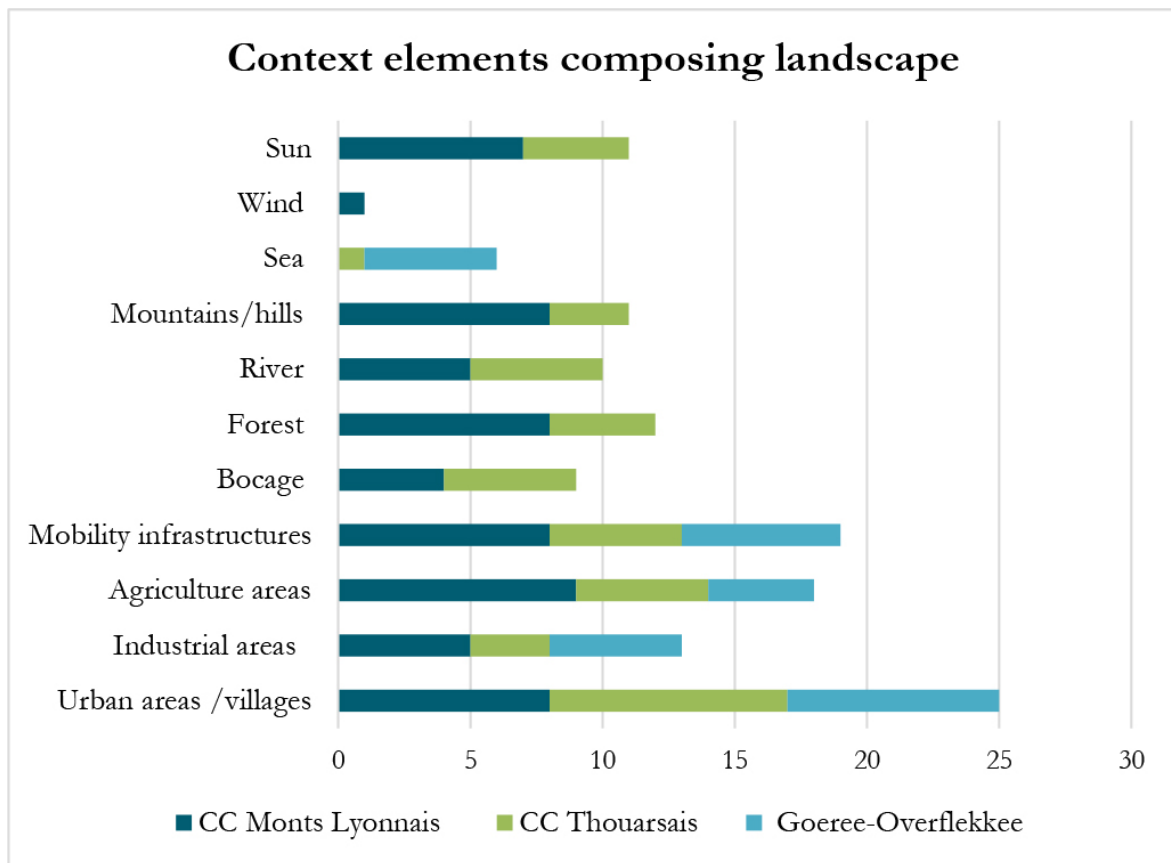


Figure 2. Represented context landscape elements highlighted in agents' drawing "energy transition landscape". Source: author elaboration of data from interviews

In several drawings (eight) we found urban, industrial, agricultural areas and transport infrastructure represented (e.g. Figure ML1, ML2, T2, GO1) and almost three of these sectors are represented the great majority of the drawings. This suggests that agents consider energy transition as a matter of concern in all these sectors, and as a part of the landscape. Indeed, the interviewees that represent the most complete vision from all sectors, belong to technical services dedicated towards energy transition or elected representatives in charge of the transition topic. Generally speaking, these professional figures are in contact with several sectors potentially knowing them better because of their roles therein.

Concerning the representation of natural elements, interestingly 11 French agents drew the sun (e.g. ML5, ML9, T7, T6) and one person also drew the wind (ML9). This connection is strongly put forwards in their narratives, as illustrates the following quote:

*"The sun, and there is wind...this is the wind. Because wind turbines necessarily turn in an energy transition landscape"*³⁵ (responsible projets CoopaWatt-ML 2018) – Figure ML9

None of the Dutch agents represented the sun or the wind, or rivers or forests, which are all components that we could find in the Netherlands. The drawings made by Dutch agents seem to represent natural fewer elements compared to the French ones, instead focused mainly on

35 "Le soleil, et y a du vent sur un... voilà... C'est l'vent. Parce que forcément les éoliennes tournent dans un paysage de la transition énergétique."

the human built element, such as villages, agricultural fields that are drawn both in French and Dutch contexts.

It is difficult to find an explanation for this difference, especially about the lack of the sun. Considering the lack of representation for forests and hedges this could be due to the fact that even if these elements are present on the island (see chapter 5), there is no production of energy from wood so maybe agents do not associate them with “energy transition landscape”.

Moreover, in many cases a difference can be found in the order in which natural elements/resources are drawn compared to the RE production that would originate from them in the two nations. In box 9.2 it could be seen that the Dutch agent started drawing a neighbourhood and subsequently the sea’s water that, however, come into agents mind after mentioning the energy production formed from tides and algae. Instead the French agent (box 9.4) for example, drew a *bocage* system almost immediately because it is part landscape, and later mentioned the use of wood from *bocage* to produce energy.

Again, it is difficult to find an explanation to account for this phenomena, but it seems that in Dutch answers there is a more direct correlation between the resource drawn and immediate energy production associated with it, in a relation of cause and effect.

9.2.2 Evolution thinking in the drawing process.

In all drawings at a certain point, but not necessarily on the onset, agents draw the object of their working profession associated to energy. For example, the agent responsible at the Parc Eco Habitant in the Monts du Lyonnais represented energy insulated houses (figure ML1), for the farmer in Goeree-Overflakkee his farm with a biogas power plant (figure GO8) and so on.

*“I draw houses. I draw...I draw a village. [...] And with...a little of insulation here and there”³⁶
(responsible energy transition service, Parc Eco Habitat-ML 2017) - Figure ML1*

“we are here in the farm, and we have people, so we still need the farms, so I first draw a farm, I think. So, we have the farm, we have the cows in it. So I think when I look at the digesting biogas, we are standing here” (farmer GO 2017) – Figure GO8

However, everybody was able to go beyond the object of their work practice by adding other elements and complexity to the drawing. Aspects that in the oral interview were more difficult to obtain. In the figure ML7 can also be seen that agents in some cases highlight similar principles to their oral answers but add more details about the “energy transition landscape”. The person in charge of the regional center for forest property, among other things, drew a forest that is also found in her oral answer, but she added details such a need for diversification of tree species and the need to access and to exploit the forest.

“Concerning forests, deciduous forest also...concerning forest...diversified forests, please, anyway. Not only conifers. [...] Paths that lead to the forest, because otherwise we couldn’t get anything out of the

36 “Je dessine des maisons. Je dessine... je dessine un... un village. [...] Et avec... un peu de... d’isolation ici là”

*forest*³⁷ (Technical animation regional center of forest property-ML 2018) – Figure ML7

Moreover, through the drawing she added elements going beyond her professional area of expertise by including RE production from photovoltaic panels on the roof and wind turbines. This remains a response focusing mainly on the RE production point of view but broadened the overview of energy transition compared to the oral narrative.

In addition, during the drawing process the fact that represented elements remain visible on the sheet allows agents to progressively structure their thoughts, creating connections and adding new energy principles to their drawn image with a cause-effect link. For example, drawing agricultural fields allows agents to add a biogas producing facility. Using their words:

*“And then, as, there, there is a farm, so, we’ll also have in our territories, it’s important, the biogas production unit that could be well implanted in the slope”*³⁸ (SCoT project manager ML 2017) – Figure ML4

*“Here, is a small photovoltaic field, because they the panels are well oriented, that could feed...in distance, that could feed an industrial area, here, that’s part of the Monts du Lyonnais too, but with an integration, we could say, these are bigger buildings, which have red roofs too, outside, a little bit, of the village, there, not too far, several buildings...which are next to one another...”*³⁹ (responsible energy transition service, Parc Eco Habitat-ML 2017) – Figure ML1

“we have a lot of space next to the road so maybe we can do something there as well, we can have elephant grass or something else that is going into our gas plant” (sustainability policy adviser-GO 2017) – Figure GO1

In the same way this visualization during the drawing process led agents to formulate clearer and more conscious thoughts about the site choice process such as if it is compatible or not with other functions in proximity.

“I see windmills that are...I drew them really close the village, that is not necessarily good [...] I wouldn’t place them over there, because I think the gap must be larger, that you can freely look towards the horizon without seeing windmills. But they have to be seen in some places” (Director Cooperative Deltawind-GO 2017) – Figure GO7

*“I’m not bothered by the city, so I’m going to do...so, obviously, it’s not just next to it, we don’t place a wind turbine just next to a building”*⁴⁰ (ADEME territorial referent 2018) – Figure ML6

37 “Au niveau d’la forêt, feuillus aussi...au niveau d’la forêt... Diversifié, s’il vous plaît, quand même. Pas que des résineux. [...] Des chemins qui mènent à la forêt, parce que sinon on peut rien sortir d’la forêt.”

38 “Et puis, comme, là, on a une ferme, du coup, on aura aussi dans nos territoires, c’est important, les unités de méthanisation qui peuvent être bien implantées dans la pente.”

39 “ici, un petit champ photovoltaïque, parce qu’ils sont bien orientés, qui alimente... voilà au loin, qui peut alimenter une zone artisanale, ici, qui fait partie aussi des Monts du Lyonnais, mais avec une intégration, on va dire, c’est des bâtiments un peu plus gros, qui ont une toiture rouge aussi, à l’extérieur, un petit peu, du village, là, pas très loin, plusieurs bâtiments... qui sont les uns à côté des autres...”

40 “Je ne suis pas gênée par la ville, donc je vais faire... Alors, évidemment, ça ne va pas que juste à côté, on ne fait pas une éolienne juste à côté d’un bâtiment.”

“And then, this farm, it could develop a biogas unit, and ...I made it a little farther, but we could say that, the biogas unit, feed in heating the public buildings.”⁴¹ (Project manager energy and climate-CCT 2017) – Figure T2

“We find our wind turbines, look how beautiful my wind turbine is! So there. Oh la la! I didn’t consider the proportions, but that’s not a big deal”⁴² (Sustainable territorial management division director-CCT 2017) – Figure T1

Especially for the French agents drawing the fact to visualize the energy focused actions led them to broaden their vision and narratives to include other sectors and activity that need to be part of an energy transition landscape, to bring it quality. This is interesting in order to comprehend other sectors and points of view about which it is necessary to pay attention in the process for achieving energy goals.

Several agents for example highlight the importance of continuing to improve the agricultural sector for food production, or the quality of public space, while seven of them accented the need not to forget to preserve biodiversity.

“And then my landscape has to speak about agriculture too”⁴³ (TEPOS project manager-ML 2017) – Figure ML2

“On the contrary, we’ll keep, and I think that’s important, that we keep...that we’ll keep agricultural production”⁴⁴ (SCoT project manager ML 2017) – Figure ML4

“That would be really nice to combine energy solutions and improve public spaces in the cities.” (project leader space energie-PZH 2017) –Figure GO5

Concerning the agricultural sector, it is not surprising that is a topic highlighted many times when considering that the embedded cases are situated in rural areas where agriculture is an important sector and occupies vast land surfaces.

As discussed above and illustrated by figure 2, even if along with renewable energy production, agents specify energy savings and optimization for energy flows in the transition process, these two strategies are drawn first by only three agents, two of which are landscape architects. The first is the director of the Parc Eco Habitat of the Monts du Lyonnais mentioned first the need to thermally insulate buildings in order to reduce their energy consumption, so he started drawing from his professional practice objectives (Figure ML1). The second is the landscape architect that worked on the Goeree-Overflakkee scenarios who first mentioned the need for energy flow optimization, even if in a general way (Figure GO9). This landscape architect has worked since a long time on the topic of energy, in a Dutch office that is recognized for development in this

41 “et puis, cette ferme elle a pu développer un méthaniseur, et... je l’ai fait un peu loin, mais on pourrait se dire que, le méthaniseur, il alimente en chaleur les bâtiments publics.”

42 “On va retrouver nos éoliennes, regarde comme elle est belle mon éolienne dis donc! Donc voilà. Oh la la! Je n’ai pas tenu compte des proportions, mais c’est pas grave.”

43 “et puis mon paysage il faut que parle d’agriculture aussi.”

44 “Par contre, on conservera, et j’pense que c’est important, qu’on conserve... qu’on conserve d’agriculture, d’la production.”

particularly expertise (HNS office), so he probably have quite a broad vision of energy transition from landscape designing perspectives. Finally, the landscape architect having elaborated the *plan paysage* for the two French cases studied, led her drawing narrative by representing a resource grounded energy transition landscape and way of living (figure ML11). It is interesting that both landscape architects had an entry into the subject based on resources and flows.

All the others (26), first drew a principle of renewable energy production, such as through wind turbines, or photovoltaic panels on the roof, while the reduction of energy consumption through urban compact form (e.g. figure ML5, GO1) or mobility (e.g. figure T1, ML6) were represented later.

“Everything that’s energy, actually, it was first. [...] And then, I ask myself: well, actually, all right we have the...we have the energies, now what should we do? In order to reduce energy consumption too. So, that’s it, a compact city”⁴⁵ (PCAET project manager-ML 2017) – Figure ML3

The sequence of principles from renewable energy production to energy saving and energy stream optimization reaffirm that renewable energy facilities are perceived as impacting landscape the most compared to the other subjects touching the planning and designing of energy transition.

This result is in line also with previous answers and also to what emerges from the use of the word landscape in planning instruments and how it was mainly associated with RE facilities, omitting concerns for slow mobility path, urban form or external insulation on buildings.

The act of drawing and so permanently visually fixing ideas on paper led many agents to make a final assessment of these aspects and strategies that were represented in order check if they forget something.

“And so with the RES, with the bicycle, so I save energy, and I develop RES, and so I succeed for TEPOS in 2050: we don’t need oil anymore!”⁴⁶ (ADEME territorial referent 2018) – Figure ML6

45 “Tout c’qui est énergie, en fait, c’était en premier. [...] Et ensuite, j’me suis demandé : ben, en fait, d’accord, bon, ben, on a les é... on a les énergies, maintenant qu’est-ce qu’il faut faire? Pour réduire aussi les consommations. Donc, voilà, ville compacte”

46 “Et donc avec des EnR, du vélo, donc je fais des économies d’énergie, et je développe les EnR, donc je réussis TEPOS en 2050 : on n’a plus besoin du pétrole!”

9.3 What could be learnt from the drawings?

In the previous sections the drawings' contents and process are analyzed and discussed. In this section some key subjects which emerge from across the previous sections are further discussed.

9.3.1 Landscape drawings as a meaningful way to get a broader picture about a phenomenon

Generally, the interviews start by drawing representations of energy production from renewable resources, but they gradually broaden arriving at a quiet global perception of landscape issues for energy management including energy saving principles, mobility improvements, optimization of energy streams, etc.

However, there is a predominance by technological aspects that focus on renewable energy production equipment with an often "conservative" vision about landscape (e.g. hide wind turbines) especially for the French cases.

Agents involved in the technical service department of the Dutch municipality and of the CC for the French case were able to give a more global vision of the energy transition. This is not surprising since they access energy/climate planning documents and collaborate and are in contact with many sectoral agents that work in energy transition process, giving them a cross sectoral perspective.

However also the agents that have a more sectoral vision (e.g. farmers, wind turbine developers) about energy transition when asked to think through the landscape drawing framework, have been able to go beyond it by adding other topics (e.g. figure ML8, ML9, T8, GO7). This allows a broadening of the vision that remained mere partial and incomplete in the respective oral responses.

Indeed, compared to the oral answers about "energy transition landscapes" agents detailed their thinking and landscapes' vision to a greater degree when asked to draw them. Actually, we found more than the double of energy conscious principles mentioned in the narratives along with the drawings compared to the solely oral ones (figure 11 chapter 8 vs figure 1 chapter 9). Moreover, the principles mentioned during the drawing process includes several about the reduction of consumption and the optimization of energy stream, topics largely unmentioned in the oral answers. Besides the higher number of energy principles brought up, highlight the fact that representing them brings a deeper insight about their quality, about their appearance and site location choice according to orography or other natural characteristics, or about spatial or visual proximity of functions, etc.

This broadening of principles and geographical details of the context could be due, as expressed in the introduction, to the fact that ask to agents to draw is somehow a way to make them embody landscape architects' roles by encouraging them produce a landscape design.

The drawings beyond the oral discourse allow to show how persons have a more global vision of energy transition aspects of which might be expected in the discourse analyses only. So the drawing method proved to be useful in order to inquire a landscape point of view from agents. Indeed the fact to spatially situate elements on a white sheet of paper forces them to think of

space, in terms of site locations, elements within proximity.

Moreover, the agents' narratives describing the process is enriching if treated in parallel with the hand-drawing because it is a way to record the evolution in their thinking by showing their priorities. Secondly, because it is helpful to overcome possible simplifications that the drawing process could lead to in people that are not familiar with it, allowing to explanations and evoking things that they were not able to represent but the drawing process allows them to think.

Besides the fact that having a visible overview of their "landscape" allows them to more easily see possible omissions, by adding elements progressively that they see are missing. From the beginning some interviewed agents seem to have a quiet specific idea of what they wanted to represent, but for many others the act of drawing and spatializing enabled thinking about what they wanted or not, and fed their thoughts. So to use Dee words "working visually stimulates spatiality in thinking" (Dee 2004, 25) and designers, that work on a daily basis with drawings, recognize the drawings process as a learning process (e.g. Corner 1992).

9.3.2 Missing elements in the drawings

The drawing process has been also useful to research the topics and elements that are not directly associated with spatial planning and designing for energy transition. Electricity transmission infrastructure is almost absent in the representations both as symbolic arrows than in their real forms in both nations. The lack of representation for electricity transmission infrastructure is an aspect that it is also omitted in the landscape focused documents, analysed in chapter 6. This aspect is never represented in the French *plan paysage*, neither was evoked by agents during the interviews. So considering that even the landscape design professionals do not represent them in the documents it is not really surprising when they do not appear in agents drawings either.

We do not find either the energy network represented in the "Goeree-Overflakkee. Duurzame energie in het landschap" (HNS, 2012) where wind turbines and other RE facilities "pop-up" on the territory without connection among them or to the electricity network. The network is instead represented in the "Energieproducerend Goeree-Overflakkee. Scenario's voor de verduurzaming van de energievoorziening tot 2030" (Marcovermulen, 2017) both in the landscape perspectives than in the maps. This because this report explores the possibility for the island to supply the surroundings areas with renewable energy production surplus. So the electricity transmission subject arises from the perspective of the energy exportation, and it was not addressed when it involved the RE production to cover municipal energy consumption, even if the electricity produced is, injected in the national grid.

Indeed, in both nations specific documents addressing the grid planning network question exist. The French "Schémas Régionaux de Raccordement au Réseau des Énergies Renouvelables" [Regional scheme for renewable energy connection to the grid] (S3REnr) elaborated by "Réseaux de transport électricité" [Electricity transmission network] (RTE) with the goals to organize the RE technologies development in the region according to the goals expressed in the SRCAE. In the Netherlands it is the "Derde Structuurschema Elektriciteitsvoorziening" [Third structure plan for electricity supply] (SEV III) of 2013 that have the purpose to guarantee space for electricity transmission and large-scale energy production facilities. Indeed the presence or absence of a nearby power lines or of converter stations that allow the injection of renewable

energy produced in the electrical network could heavily impact the spatial site choice process for renewable energy facilities, because of the associated added cost.

This seems to reveal that the grid network planning and design is not easily and directly considered by agents when thinking of an energy transition landscape.

Nevertheless a connection to the topic could be important when considering that also the high-voltage power lines and their implementation in the landscape is often perceived as negative by inhabitants (e.g. Soini et al. 2011). This is even more significant considering the ongoing need to extend and modify the electricity network because of the more decentralized system in electricity production through RE technologies in territories (Lienert, Suetterlin, and Siegrist 2015).

Moreover when considering omissions in the representations, the drawings also allows comprehension about what seems to be part of the current living landscape, so not associated with future progress, and this could be different considering national contexts. The lack of bike paths or slow mobility in Dutch drawings, where they are very much developed, compared to the French ones is an interesting example.

Interestingly the drawing method could be useful to acknowledge possible mismatches between a visual idea of an energy principle and the reality, but always by considering the possible simplification that drawings could lead to in people that are not familiar with the process. One example we found is the need to have cows in stables and not in the exterior fields that permits the collection of manure for energy production through a biogas power plant.

9.3.3 Territorial ecology

Agents' narratives through landscapes show a renewed importance for the idea of "territoriality" meaning that the resource and strategies for energy transition processes have to come from the territory and its intrinsic characteristics (e.g. sea, agriculture, etc.) (Magnaghi 2010) using as many possible resources made available locally by taking the context into account.

This idea of a grounded transition, coming from agents' perspective through the prism of landscape seems to connect with the subjects approached by "territorial ecology" an emerging disciplinary field that focuses on energy and material circulation flows, analyzing the functioning of territories associating both the society (actors, institutions, etc.) and biosphere (Buclet 2015; Barles 2014). This discipline refers to metabolism concepts, a term employed as an analogy to the functioning of an organism or ecosystem, which is defined as the flow of energy and materials put into play for the functioning of a territory and which analyses could reinforce the understanding of flow interactions on the territory but also with other territories and at other scales (e.g. national) (Barles 2017). It is shaped both by immaterial drivers such as policy, everyday practices, and cultural behaviors as by visible flows such infrastructure (Castán-Broto, Allen, and Rapoport 2012).

Studies on territorial ecology point out how the ongoing socio-ecological transition occurs through a change of territorial metabolism (Barles 2017) pointing out the need of territorialisation to the reflection about global challenges such energy transition (Buclet 2015), without dissociating it from higher regimes (*ibid.*), supporting in the identification of targets that need improvement. Landscape has been used as a material to support the territorialisation of policy and strategies

(Davodeau 2011). Our results show that thinking about landscape seems to bring the attention of agents onto territorial/local flows, supporting in the understanding of how agents think about the future functioning of these energy and material flows. In other words, how they perceive the territorial energy metabolism of the territory in an energy transition context. This prism could contribute to the understanding of the relationship between society and biosphere in a territorial ecosystem advocated by territorial ecology, through the contribution to the development of a “grounding metabolism” (Ibañez and Katsikis 2014), meaning a metabolism more rooted in its geographical, social and material context. For this purpose some researchers are exploring the role of spatial/environmental designers for the optimization of these flows (e.g. Perrotti and Stremke 2018).

9.3.4 Energy principles coming from concepts vs energy principles coming from agents

Somehow connected with the previous sections discussing territorial metabolism, during interviews with agents I asked if they were familiar with the concepts of *urban metabolism*, *circular economy*, and *cradle-to-cradle* and which principles, if any, they associated with. All the agents heard at least about one of these concepts, especially about circular economy, that now is put forward also in policy documents and law. Nevertheless, when asked which principles they associated with, almost all the interviewed agents mentioned almost exclusively the recuperation of waste for energy, or short/local energy supply chains. In the words of one agent:

“For example I think about the looping of different structures, so clearly the recuperation of waste heat recovery from industries for heating households”⁴⁷ (ADEME territorial referent 2018)

Nevertheless, through the drawing process we pointed out several principles mentioned by agents for the implementation of the energy transition on territories (figure 2). Whereas the connection, obviously is not made directly, but it could be stressed that several of these principles have similarities with the spatial energy principles associated with the concepts of *urban metabolism*, *circular economy*, and *cradle-to-cradle* in scientific literature analysed in chapter 2 (table 2.1). For the category of energy consumption reduction we found shared the principles of avoiding low-density development, energy building retrofitting, energy stream optimization, the idea of energy cascading from industries to houses, of using local resources such as wood, and for renewable energy production as well as the principles using a mix of renewable sources. The principles we found in the agents’ narratives are less numerous than the ones listed through literature. However, some of them are now part of the idea agents have in order to implement the energy transition. We found as well some additional principles in the agents’ narratives that are not in concepts literature, but these are principles more specifically about renewable energy production from different sources such as “producing energy from tides” or “hydroelectric dams”. These fall under the general category of producing energy locally from renewable

47 “Pour exemple la mise en boucle de différentes... structures, et donc très clairement la récupération de chaleur fatale des usines pour chauffer des logements”

resources in table 2.1 (chapter 2).

9.3.5 Landscape as a basis for dialogue

Even if there are unquestionable differences among drawings, a completely discordant vision of energy transition landscape among agents does not emerge even if they work in different sectors and have different backgrounds, amongst different territories. This seems to be an encouraging result, allowing to one to think that it is possible to establish a dialogue among agents concerning the planning and design of energy transition at the territorial level.

The prism to observe the energy transition topic through landscape and its drawing, reveals the principal points of interest, lacks and possible difficulties for implementation. This process could be useful as a basis for dialogue in future landscape planning and design.

In order to have a broader representativeness these exercises deserve to be extended to a wider sample of agents, such as those belonging to the electricity transmission network for the French case, or others. It could also be interesting to do this exercise with inhabitants of the territory, which may not be really aware of the energy goals pursued by local institutions. The comparison of results between the group interviewed who are aware of the energy transition topic and others who are not, could accentuate an understanding of the topic from the both parties, allowing, , local institutions to develop a more effective communication, by targeting specific topics.

Box 9. Contribution of chapter 9 to the part 2 research question

This chapter analyses drawings and oral narratives about “energy transition landscapes” made by agents. Agents’ social perspectives of energy transition landscapes made through drawing shows that they are aware of the three energy transition strategies on much broader scale compared to the one from oral answers (chapter 8). In the drawings, beyond RE production, many principles represented revolve around the reduction of energy consumption and the optimization of energy streams.

The landscape drawing process has proven to be useful as a method from a research perspective by allowing interviewed agents to think more “spatially” about topics such energy transition that are still frequently addressed from a technical and quantitative perspective. Indeed the act of drawing, somehow put the agents in a landscape architect designing perspective that leads them to add more details to their responses for example about where and how to designate sites for RE technologies in the territorial context, or about the proximity of functions to establish synergies and so on.

Moreover, a difference between the French and Dutch perspectives is observed where French agents seem to compose the landscape and think about a landscape through territorial topography referring to mountains, rivers, etc. and to which the energy “layer” is subsequently added. On the contrary, Dutch agents draw energy focused principles that progressively compose the global landscape, while topography or other landscape characteristics and components are addressed in a second time, progressively in connection with their role in energy production or improving energy streams, etc.

However, despite the differences in the drawings, agents with very different backgrounds do not have discordant visions of “energy transition landscape”. This seems an encouraging result if dialogues among parties will need to be established in order to think and cooperate for future planning and design of landscape in connection to energy systems within specific contexts.

PART 3 - Energy and landscape architecture: role and practice of landscape architects in the energy transition

Part 2 explores the role of landscape and landscape planning and design in territories committed to an energy transition process, from the different perspectives from a broad range of agents and planning instruments. This last part of the research focuses on a particular category of energy transition agents: landscape architects.

Landscape is a dynamic entity and landscape transformation results from a broad range of variables, both due to natural and human factors (Council of Europe 2000).

The transit towards renewable energy and low energy consumption systems is nowadays a major source of change in landscape (Bridge et al. 2013; Nadaï and van der Horst 2010). Landscape architects, with other environmental designers, such as urban planners and architects, are professionals that work from a design based practice (Van Damme, Leinfelder, and Uyttenhove 2013) - landscape design and planning – by acting on the conscious shape of landscape and consider both socio-cultural and physical resources (Donadieu 2009a).

More and more landscape architects are asked to bring both aesthetic and environmentally sustainable qualities to transition processes: essential elements for creating a “cadre de vie” (A. Sgard, Fortin, and Peyrache-Gadeau 2010). Landscape architects could actively contribute to advance the energy transition process, by focusing on landscape aesthetic values for renewable energy production (e.g. Apostol et al. 2016) but also more global territorial/regional strategic planning and design (e.g. Stremke, Van Kann, and Koh 2012; Sijmons et al. 2014). However extensive research on how landscape architects professionals are dealing with the energy transition challenge is not yet broadly developed.

Within this context the primary aim of this research is to answer the following question:

What could be the contribution of landscape architecture to energy transition and how is landscape architecture affected by the energy transition? What are the differences – if any – between France and the Netherlands regarding the role and practice of landscape architects in this field?

In order to answer this question this part is organized in the following way.

Part 3 organization

This part is organized in four chapters. The first (chapter 10) gives a general overview of the research methodology, presents the context while discussing the situation of landscape architecture in France and in the Netherlands. Moreover the first results about French and Dutch landscape architects involvement in energy transition, collected through an on-line survey, are presented.

Chapter 11 deepens the exploration of this topic, inquiring into the contribution of landscape architects in energy transition from their own perspective and then compared to the point of view from agents involved in territorial energy transition.

Subsequently chapter 12 analyses the knowledge and design process landscape architects need to deal with in energy transition related projects, providing insight about conventional and additional knowledge and design steps.

The final chapter (13), contains discussion about potentials and challenges for landscape architecture for the years to come.

The research keeps confronting French and Dutch contexts in order to better put results in perspective, and to draw difficulties and opportunities from both countries, in order to learn from them.

CHAPTER 10: French and Dutch approaches in landscape architecture

This chapter is an introductory chapter to part 3, providing contextual information so as to better discuss and understand results while at the same time empirical data are explored in order to give a first overview of landscape architects in energy transition in France and the Netherlands. In this chapter, first the method is explained along with the material mobilized in part 3 of this research to explore the contribution of landscape architects to energy transition. This is followed by an overview of landscape architects practice in France and in the Netherlands, briefly showing the evolution of the profession in both nations, and its subsequent involvement in energy transition, in order to give an understanding of the contextual framework to better discuss results by grounding them in their national context.

Finally, the results of an on-line inquiry developed with French and Dutch landscape architect associations is discussed, giving a first general overview of landscape architects' involvement in the energy transition process in France and the Netherlands.

10.1 Methods and materials

Landscape architecture is characterized by multi-disciplinarily approach (van den Brink et al. 2017; Bell, Sarlöv Herlin, and Stiles 2012), and Deming and Swaffield (2011, 19) emphasizes how a professional discipline such as landscape architecture is subject to a continual process of transformation. In this part of the research it is inquired about these transformations due to the involvement in energy transition process along with the conventional background that landscape architects use to face energy transition related projects.

The research is developed as a comparative approach between the French and Dutch contexts in order to develop a broader vision of the topic and to put results in perspective. The fact of highlights of national landscape architecture's practice specificity could inspire each other for future development.

It is developed a *research on design* (Van den Brink and Bruns 2014; Lenzholzer, Duchhart, and Koh 2013) method that combines project analysis and practitioners' discourse. These methods are fit for the purpose of this thesis because they question both established and new practices, with underlying meanings and reflections in order to learn from them. Moreover part of this research could be conceptualized as *research for design* (Lenzholzer, Duchhart, and Koh 2013), meaning that through the analyses of landscape architects' design and designing for energy transition, a series of principles and recommendations could be drawn up. This synthesis and discussion derived from landscape architecture practice in two national contexts, could inform future design in energy transition, and lead to some didactic implications.

10.1.1 Descriptive survey /make an inventory

Firstly, the research draws on a descriptive social survey conducted through an online questionnaire - a recognized method to obtain experts insight on a subject (Van Selm and Jankowski 2006). The questionnaire was sent to offices that are members of the landscape architecture associations “Fédération française du paysage” [French landscape federation] (FFP) in France and “Nederlandse vereniging voor tuin en landschapsarchitectuur” [Netherlands Association for Garden and Landscape Architecture] (NVTL) in the Netherlands. These associations are chosen as a sample, because they represent the broadest variety of different backgrounds of French and Dutch landscape architects.

Moreover, this focus on practitioners, defined as landscape architects practicing their profession through the development of planning and designing projects, allowed us to investigate how energy transition transcends in landscape architecture projects.

The questionnaire was composed in English for the NVTL and in French for the FFP offices and tested prior submission with a small sample of landscape architects to verify the understandability of the questions. The questionnaire consisted of 20 questions: open, multi answer, and yes and no ones, asking about energy-related projects categories, collaborations with other disciplines, other ecological aspects they consider while dealing with energy, the notion of “energy landscape” etc. (see annex 9 and 10 for the complete French and English questionnaire). One of the most challenging aspects of developing a questionnaire is to its extent and number of open questions, in order to minimize time needed to respond. Anyhow, the online questionnaire fit the purpose of this study to reach a wide sample of practitioners and to study their contributions to energy transition.

About 350 e-mails were sent to FFP offices in April 2016, and 172 to NVTL offices in November 2016. The total number of respondents, one answer per office, was 108 (30 %) and 35 (20 %) respectively. The response rate is sufficient and in line with other researchers employing online questionnaires without remuneration (see e.g. Ward Thompson, 2017). The somewhat similar response rates allows for the results to be compared. However, for some open questions we collected a larger variety of answer for the French case because of the higher number of answers.

10.1.2 Semi-structured interviews

In order to inquire about the practice of landscape architecture in the energy transition context we developed semi-structured interviews (Kaufmann 2011) with landscape architects practitioners both in France and in the Netherlands.

10.1.2.1 Landscape architects choice criteria

We selected landscape architects that have implemented or are in the process of implementing energy transition related projects (renewable energy technologies, energy quantitative scenarios, *plan de paysage* related to energy, etc.) and/or were/are advisors for them (e.g. wind turbine park

impact assessments). We chose to interview both landscape architects holding positions in private offices, and those in governmental organizations in order to have a broader comprehension of their practice. In order to do that, for the French case, we select several landscape architects with private activity that were at the same time also “Paysagiste conseil de l'état” [State advisor landscape architect], meaning that they work two days a month for the decentralized national State institutions in the region and department, DREAL [direction régionale de l'environnement de l'aménagement et du logement] and DDT [Direction départemental des territoires].

According to the national differences in the way governmental organizations hire landscape architects as advisers, in the Netherlands one interview was conducted with the landscape architect now appointed as *Rijksadviseur voor de Fysieke Leefomgeving* [State Adviser for the Physical Living Environment] in the *College van Rijksadviseurs* [State advisors board], and with a landscape architect working for Provincial institution as “Projectleider energie en ruimte” [Project leader energy and space].

The choice of practitioners to interview was made exploring the answers' and web-sites (if possible) of the practitioners that answered the on-line questionnaire and through additional research in professional publications about landscape and energy, key persons contacts, and networks such as in the French context “Paysagiste conseil de l'état” [State advisor landscape architect].

We found a difference in accessibility and so the display of information (on web site publications, networks) about landscape architects working on energy transition projects in the two countries, where in the Netherlands the information was put forward and emphasized, facilitating the selection task.

Interviews with French landscape architects were developed into a first round held in June and July 2016 and into a second round in November-December 2018. The Dutch interviews were conducted between May and September 2017. We split the collecting of the French semi-structured interviews into two phases, in order to test the questionnaire before the Dutch inquiry and to modify some questions if necessary, after the interviews made in the Netherlands.

A total of 16 interviews were done, eight with landscape architects working in France and eight working in the Netherlands (the list in annex 11). One French and one Dutch landscape architect coincides with the landscape architects we made interviews with working on the three embedded cases described in part 2. FR4 have developed the *plan de paysage* for the CC Monts du Lyonnais and CC Thouarsais and NL2 developed the energy landscape reports for Goeree-Overflakkee.

These practitioners constitute a sample and their number accord to the principles of saturation (Bryman 2012). A broader sample could have led to more complexity and insight, however we get a rich overview on our topic of interest that allows us to define categories and confirm their importance.

The interview framework was the same for all whom were interviewed, in order to allow comparison, with some minor adjustments that were needed in case by case interviews.

The grid concerned several main subjects:

- Background information about the office: such as the kind of projects that are most developed by the firm

- Landscape architect's role in energy transition
- The knowledge needed to work on energy transition projects
- The main design steps they performed and considered particularly meaningful in their energy transition project.
- The description of, at least one, a key energy transition project chosen among the ones they have developed: knowledge, design process, difficulties, collaboration with other experts etc.
- The main difficulties they are facing in the energy transition process
- The point of view of a Dutch or a French approach to landscape architecture
- The notion of “energy transition landscape”

Most of interviews lasted approximately one hour, and just two lasted one and a half and two hours, according to the timetable of the landscape architects.

The interviews were developed in French for landscape architects working in France and in English for those in the Netherlands, with everyone able to understand the question and able to answer accordingly in a comprehensible manner. The interviews were transcribed in their entirety in their original language. Still, to make sure the manuscript is comprehensible, French extracts are inserted in the text into English after they have been translated by the author.

For the analysis we used qualitative coding (Miles, Huberman, and Saldaña 2014) at progressively deepened during different steps while searching in the discourse similarities, differences, common themes.

As for the stakeholders interviewed from the embedded cases (part 2) we asked landscape architects to draw an *energy transition landscape* and how they see their *role in the energy transition process*. In this case this request was not motivated by the lack of insight into landscape and spatial references in the interviewees answers', for whom landscape is the center of their practice. We wanted to inquire if, for practitioners that use drawing in their daily practice to describe and synthesize (Tiberghien 2013), would additional insights and new designing principles appear that were not highlighted in oral discourse, thus supporting in the details of their thinking through a practice they are familiar with.

The binational point of view gives more perspective on the subject in order to catch differences and ways of designing that could potentially be put together to reinforce the designing practice employed in the energy transition.

10.1.2.2 Collecting energy transition agents' point of view

The interviews with landscape architects are intended to get an understanding from their point of view, among other things, how they perceive their role in the transition process. In order to put that into perspective we analyze, in this part, also answers coming from semi-structured interviews we dealt with agents involved in the transition process in three territories explored in part 2 of this research. They work and have contact with landscape architects, so we questioned them about their point of view about landscape architects practice, how they perceived their role and what tool or approaches were considered the most useful. This allows to put into perspective landscape architect point of view and gives an internal and external point of view

of the profession. It is collected the point of view of Dutch and of French agents, in territories committed in the energy transition process: CC Monts du Lyonnais (FR), CC Thoursais (FR) and Goeree-Overflakkee (NL). 27 interviews were analyzed and the list of the interviewed agents can be found in annex 7.

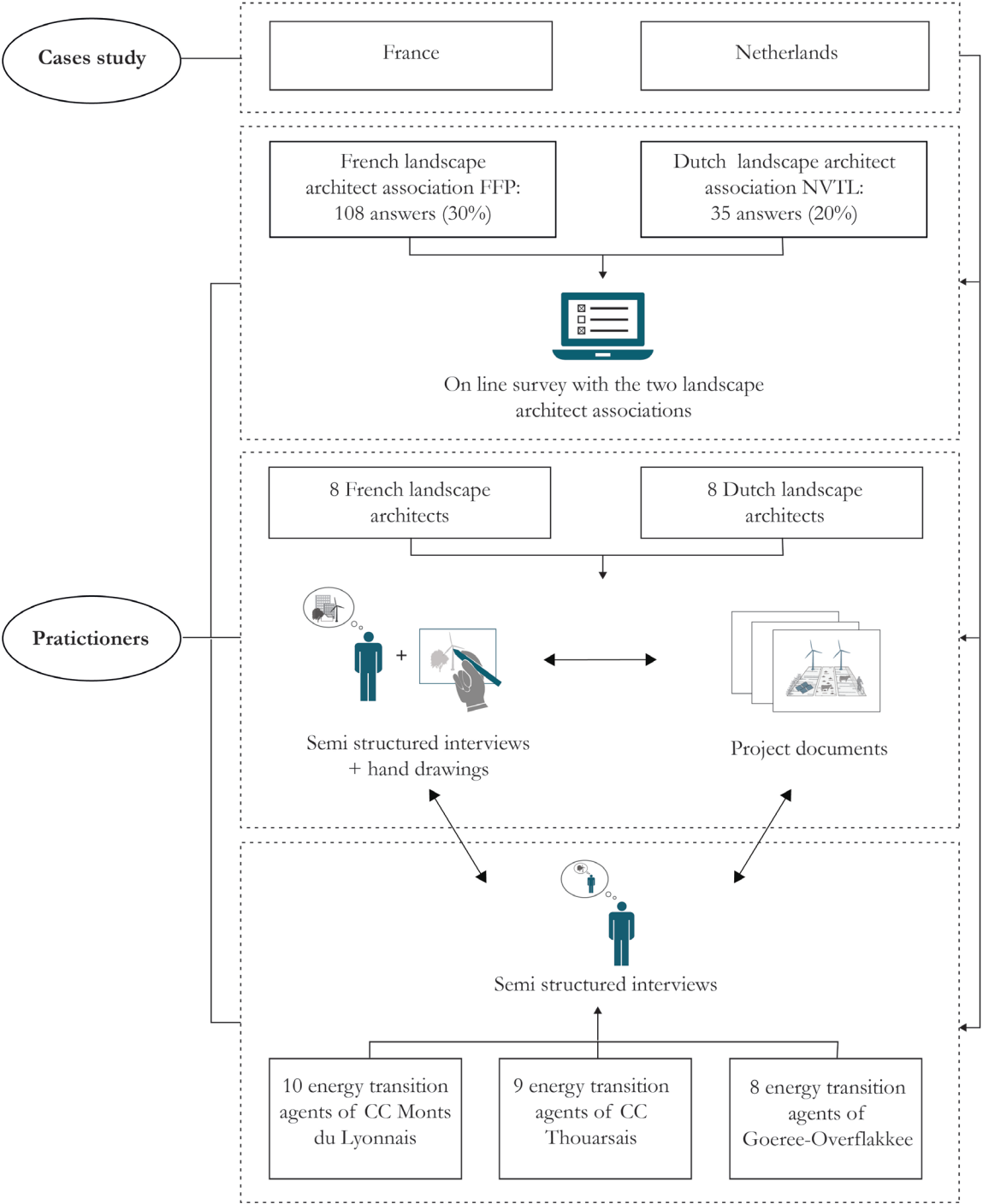
10.1.3 Document analysis

We consulted documents and project reports, when available, to which landscape architects refer and discuss during the semi-structured interviews, in order to have a deep understanding of the process and the results, beyond practitioner narratives. However not all landscape architects would share these datas and few authorized the inclusion and spread of images and information. The sharing of documents has been a particularly sensitive matter for the RE technologies projects, wind turbines and PV panels. This because the RE technologies projects landscape architects talked to us about, especially wind turbine parks, take a long time to be implemented and even when they are, they remain a sensitive subject and the private developers do not allow the project documents to be made available to the public. This was particularly true for the French landscape architects because they spoke about projects developed by private wind turbine or photovoltaic panels' developers and cooperatives.

10.1.4 Data triangulation

Figure 1, sums up the method for this third part of the research. The discussion and conclusion of research are based on interpretation of landscape architects' semi-structured interviews and drawings, projects' documents and the perspective of energy transition territorial agents'. The findings are triangulated in order to assure the quality of the research and compare the perspective and information we have got.

Figure 1. Summary of the method of the research's part 3. Source: author



10.2 Landscape architecture in France and the Netherlands

Both France and the Netherlands have an important and long-lasting tradition in landscape architecture (de Jonge 2009; Donadieu 2012; Thompson, Dam, and Balsby Nielsen 2007), but with differences in the involvement and in the role of landscape architect professionals in the planning and design of the country.

In order to better understand and situate this part of the research, a short overview about landscape architectural practice in France and in the Netherlands is provided, followed by work connected to energy transition. Detailed and in depth research has been published exploring French and Dutch landscape architectures' beginnings and evolutions¹. In this research it is given an overview in order to better understand this research about landscape architects and energy transition, putting it into the context of the landscape architect professional background in both nations.

10.2.1 Landscape architect profession in France

The landscape architecture profession in France has its roots in the figure of the “jardinier” [gardener] that historically connects the profession to garden and park design (Donadieu 2009a; Racine 2001).

However, gradually the role of landscape architects has broadened towards urban and public places, spaces and infrastructure. Landscape architects worked on post-war reconstruction and urban planning of the '60s through the “*villes nouvelles*” [new cities], the “*grands ensembles*” [standardized buildings and districts] (Blanchon-Caillot 2007). Dubost (1983) caricaturized the mission of landscape architect after the war as “‘add green’ in the interstitial spaces of the *grands ensembles*, to furnish the ‘white’ of the masterplan”² (Dubost 1983, 437). After war, landscape architects also integrated “*le grand paysage*” [landscape on a large scale] (Pernet 2014). Dutch practices inspired the growing French landscape architects' involvement at such a large scale, through the figure of Jacques Sgard, who studied the “Landschapsplannen” [landscape plan] in the Netherlands in the 50's (J. Sgard 1959; Imbert 2002), and developed the first experimental French examples, and furthermore teaching taught transmitting experiences to new generations of landscape architects at the *École Nationale Supérieure de Paysage de Versailles*. Nevertheless, because of the administration and political context at the time and the professional capacities required, the “*plan de paysage*” was not immediately applied in France, requiring some additional years (Pernet 2014). The period of 60s' and 70s' was a moment of favorable development

1 For an extensive insight about the topic, see for example De Jong (2009), Landscape Architecture between Politics and Science for the evolution of Dutch landscape architecture and Donadieu Pierre (2009), Les paysagistes. Actes Sud for the French landscape architecture.

2 Translate by the author: “‘mettre du vert’ dans les espaces interstitiels des grands ensembles, à meubler les ‘blancs’ du plan masse”.

and innovation for landscape architects where public agencies such as DATAR³, OREAM⁴, CNERP⁵ commissioned landscape architects with large-scale landscape studies including metropolitan areas (Blanchon 2000).

Nowadays the landscape architectural field's activity includes a very broad range of interventions as reported in the document developed by the French standardization system AFNOR in 2009 about the “paysagiste concepteur” [landscape architect]: over large territories, natural spaces, rural areas, agricultural forests, water management and other natural resource management, parks and gardens, infrastructure and facilities' equipment, public spaces, etc. (AFNOR and FFP 2009).

Since 1946 exists a section of “paysage et art des jardins” [landscape and garden art] in the *École nationale d'horticulture de Versailles* delivering the diploma certifying landscape architects, but later in 1976, that the first the *École nationale supérieure de paysage de Versailles* [Landscape architecture superior national school], was established formally, through which the profession was further developed, on a practical, technical and artistic knowledge base (Donadieu 2009a; Dubost 2002). The landscape architect profession in France is characterized by great variety practices and Donadieu (2009a) lists six professional categories: the gardener, landscape architect, the landscape architect urban planners, the mediator landscape architect, the engineer landscape architect, the entrepreneur landscape architect. This puts the accent to the complexity and multi-disciplinary approach that characterize the profession, leading to differentiation. However as Keravel (2015) points out, this professional diversity even if representative of great wealth approaches could also lead the risk of resulting in as many professional figures as there are of practices, potentially creating confusion about the landscape architecture profession.

Moreover in French context some overlapping and blurriness is known to characterize boundaries among landscape architects, architects and urban planners (Champy 2000). Some specificity to landscape architecture are identified as the capacity of reading site contexts, considered as the project's substrate (Marot 1994) and knowledge about “le vivant” [living things] that emerge from the heritage of the gardener (Champy 2000).

10.2.1.1 Profession recognition

Nevertheless the recognition of a protected title for the profession is still a controversial issue in France, where there is the prohibition for landscape architects, graduating from landscape architecture schools to use the name “architecte paysagiste”⁶, but there is not a regulation on the use of “paysagiste” denomination by other professions. It was the diploma “paysagiste DPLG” (DPLG: diplômé par le gouvernement) that became in 2015 “Diplôme d'État de Paysagiste” [Landscape architect State diploma] (DEP) that led to obtain the protected title

3 “Délégation à l'aménagement du territoire et à l'action régionale” [Delegation for regional planning and regional action], created in 1964.

4 “Organisation d'Études d'aire métropolitaine” [Organisation for metropolitan area studies], created between 1966 and 1972

5 “Centre National d'Étude et de Recherche du paysage” [National center of landscape study and research] created in 1972.

6 In this research I translate the French denomination of “paysagiste”, “paysagiste concepteur” as “landscape architect” in order to align to the English international vocabulary.

“paysagiste concepteur” [landscape designer]. This last title has been stated in the law “Loi pour la reconquête de la biodiversité, de la nature et des paysages” [law for biodiversity, nature and landscape reconquest] of August 2016 (*LOI N° 2016-1087 Du 8 Août 2016 Pour La Reconquête de La Biodiversité, de La Nature et Des Paysages* 2016) where it is written that “Only the holders of a diploma, issued by an authorized establishment under the conditions defined by regulations, that sanction specific training of a cultural, scientific and technical character for landscape design, can use the title of ‘landscape designer’ in the framework of their professional practice”⁷ (*LOI n° 2016-1087, art. 174*). So the profession “paysagiste concepteur” is recognized and protected, although it has not a professional order, and there are still ambiguities connected to this profession, because of the possibility of other professionals to use “paysagiste” as a description or title. Leger-Smith (2014), analyzing public commission in France highlights how the presence of professional order could contribute to improve the juridical identification of the profession and better quantify the offer of the profession compared to the demand in its procurement. However even if there is not a professional Order, there is the “Fédération Française du paysage” a landscape architecture association that represents and promotes the profession.

Moreover, the role “Paysagiste conseil de l’état” [State adviser landscape architect] exists, that professionals landscape architects in addition to their private practice work for two days a month in decentralized State institutions (e.g. region, department, etc.) in a defined French department or region, and contribute to the local implementation of national policy. This applies to landscape and all its connected topics, among those is energy transition. For example, State adviser landscape architects could be called upon to give advice about wind turbine projects and their implementation, even if their advice is not binding.

10.2.1.2 Energy transition

Moreover concerning the energy transition topic, the “Association of Paysagiste conseil de l’état” (APCE) developed two documents for methodological support and recommendations in implementing wind turbines “Optimisation qualitative du déploiement éolien dans le paysage français” [Wind deployment qualitative optimization in French landscape] (2009) and photovoltaic panels “Les paysages de l’énergie solaire. Position et recommandations de l’APCE” [Sun energy landscapes. APCE Position and recommendations] (2010) elaborated by a “landscape and energy” task force inside the APCE. This shows the interest the profession holds towards the issue and the belief in their ability to contribute to energy-related projects. According to one of the landscape architects that contributed to the development of these documents, it was not a specific request made by the government but resulted from an internal decision making process as the following quote illustrate:

⁷ “Seuls peuvent utiliser le titre « paysagistes concepteurs », dans le cadre de leur exercice professionnel, les personnes titulaires d’un diplôme, délivré par un établissement de formation agréé dans des conditions fixées par voie réglementaire, sanctionnant une formation spécifique de caractère culturel, scientifique et technique à la conception paysagère.”

“Because at one point we realized that we were all being asked [about wind turbine and PV projects], each one in his/ her department, and that we were all probably saying the same thing, and trying to see which good examples already exist and we tried to agree on a methodology about the arguments to put forward, and above all trying to encourage taking a different approach. But I don’t think that the work we did it has had much concrete impact, but it’s difficult to evaluate, because we never did a survey to find out whether or not they [wind and PV developers or local institutions] used [the guides].”⁸ (FR2, 2016)

These two guides put forward a more strategic approach advocating the importance of developing studies at the departmental or regional scale to define areas suitable for the implementation of these RE technologies upstream, avoiding an uncontrolled progressive sprawl of projects without a common logic on landscape.

However, on the topic of the energy transition no further guide has been elaborated since these two, which date back ten years. This does not mean that they did not continue to work on energy transition, but they did not produce any other related documents.

In addition the creation of the “Chaire paysage et énergie” [Landscape and Energy Chair] at the *École nationale supérieure de paysage de Versailles* in 2015, by the *Ministère de l’écologie, du développement durable et de l’énergie* [Ministry of the ecology, sustainable development and energy], as it was

8 “Parce que à un moment on s’est rendu compte qu’on était tous sollicité, chacun dans son département, et que on disait sans doute tous un peu la même chose, et essayent de voir quel sont les bons exemples déjà qu’existent et qu’on essaye de mettre d’accord sur une méthodologie sur des arguments à faire valoir, et surtout essayent d’inciter à avoir une autre démarche. Mais bon, je ne pense pas que le travaille qu’on a fait a eu des incidences concrète, mais c’est difficile à évaluer, parce que on n’a jamais fait des enquêtes pour savoir s’ils se sont servi de ça ou pas”.

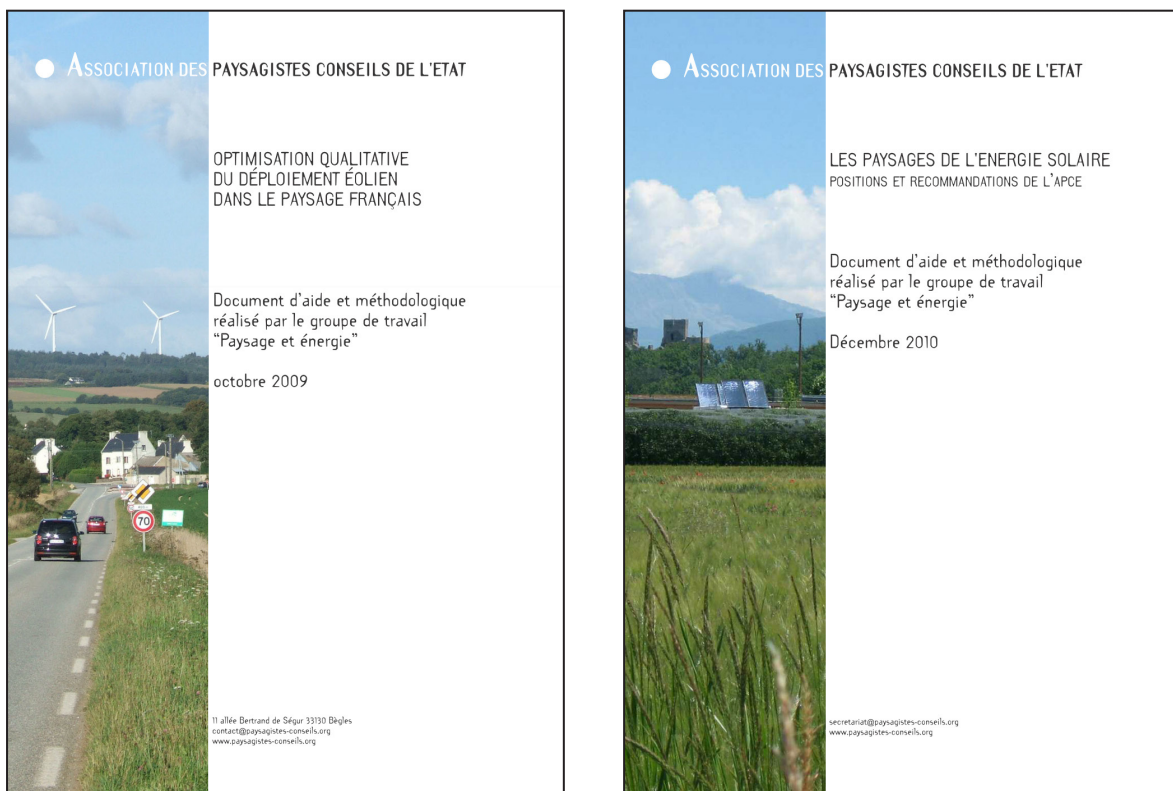


Figure 2. Two covers of the Methodological guides for wind turbine and solar energy development APCE. Source: APCE

named at that time, suggests the desire of the national government to encourage and develop the implication of landscape architects in energy transition process in France, working on the education and supporting experiences and research.

10.2.2 Landscape architect profession in the Netherlands

In the Netherlands landscape architecture has roots in parks and garden design (Meeus and Vroom 1986), as in France. However it is in the nineteen twenties of 20th century that the foundations of Dutch landscape architecture were laid (de Jonge 2009), when more complex problems concerning urban planning, agricultural food production and natural conservation linked to spatial issues, progressively led landscape architects to broaden their skills and methodologies from site design to regional/territorial planning and designing (Meeus and Vroom 1986), collaborating with civil and agricultural engineers, not without tensions (Vroom 2006). This involvement increased demand on landscape architects to support their projects with clear logic and calculations along with artistic graphics, for that Meeus (1986) defines the Dutch landscape architecture of the first half of 20th century as a form of “applied engineering”. In the Netherlands, the recognition of landscape architecture, similar to how we know it nowadays, dates back of 1946 when Jan Bijhouwer was assigned as the first professor in landscape architecture at Wageningen Agricultural University (Almekinders and Koolen 2007). The landscape architecture program ranged from site design to regional/territorial design and planning, and it combined lecture and design studios (Kerkstra 1994). Large scale regional/territorial design was encouraged and oriented not only to “embellish the works of others” (Vroom 2006, 12) but to develop more substantial changes in the landscape (*ibid.*). Especially, while following the destructive flooding on a national scale in 1953, in 1954 *Ruilverkavelingswet* [Land consolidation act] made it compulsory to develop the “Landschapsplannen” [landscape plan] increasing landscape architects involvement in polder and rural land development, embedding their practice in the context of governmental policy planning. The French landscape architect Jacques Sgard wrote in 1959, speaking about the Netherlands, how the *plan de paysages* for the polder constituted “a rural landscape of 20th century. Moreover, landscape planning/designing was conceived in close connection with spatial planning”⁹ (J. Sgard 1959). However researches recognize that it is in the second half of 20th century, around ’80s that Dutch landscape architects embraced and were recognized to have a strategic and in regional/territorial planning and design in the Dutch planning system (de Jonge 2009; Janssen and Knippenberg 2008). Moreover, during this period, this strategic approach led them to more and more include water management, environmental issues and later sustainable development within their projects (*ibid.*). Nowadays Dutch landscape architects continue their long tradition in large-scale designs (Janssen and Knippenberg 2008) and are recognized as being actively involved in territorial/regional scale designing, while also continuing garden or site designing (Kempenaar 2017).

⁹ Translate by the author: “un paysage rural du XXe siècle. Or, l’aménagement du paysage a été ici conçu en liaison étroite avec le plan d’aménagement ”

10.2.2.1 Profession recognition

Landscape architect [Landschapsarchitecten] as a professional title in Netherlands is protected by law in the *Register of architects* (architect, urbanist, landscape architect, interior architect) since 1988. Only degrees having diplomas from known landscape architecture universities could request and be accredited with the title (Wet op de architectentitel. Wet van 7 juli 1987, houdende regelen omtrent de bescherming van de titels architect, stedenbouwkundige, tuinen landschapsarchitect en interieurarchitect, Article 11). Moreover, as there is in France, the figure of *Paysagistes conseil de l'etat*, in the Netherlands there are the “College van Rijksadviseurs” [Government advisors board] (CRA), a multidisciplinary advisory board, grouping an architect, an urban planner and a landscape architect, elected for four years, working two and a half days a week for the government. They provide the government with both solicited or unsolicited advice about “ruimtelijke kwaliteit” [spatial quality] concerning the a broad range of topics that the Netherlands are facing, and among them the energy transition one is that is explicitly mentioned as a current and urgent topic (<https://www.collegevanrijksadviseurs.nl/> - 18/09/2019).

The landscape architect named *Rijksadviseur voor het landschap* [Government adviser for the landscape] has become since 2016 *Rijksadviseur voor de fysieke leefomgeving* [Government advisor for the physical living environment], but even if the name has changed the position has remained the same and is attributed to a landscape architect by the *Ministerie van Economische Zaken en Landbouw*, “Ministry of Economic Affairs and Agriculture”, under its most recent name. According to the *Rijksadviseur voor de fysieke leefomgeving* in charge in the period this research was developed, one of the most important contributions of this advisory board is that, through landscape and spatial quality different topics could be addressed and so raise awareness in different ministries to instill a transversal dialogue among them. In his words:

“The government is really working in columns; they are very much segmented so it’s really vertical, so the horizontal connections between the ministries and also inside the ministries are not so strong. That’s what we are good at, so we are interweaving, we take the need and go through all them, we try to connect it and to show the value of research by design and to project visions over twenty or thirty years and to show what the game could be for an integrated approach through landscape and spatial quality.” (NL6, 2017)

10.2.2.2 Energy transition

Interestingly the current CRA (2016-2020) directly states in their 2017-2020 agenda energy transition as one of the main topics they want to work on (College van Rijksadviseurs 2017, 10). However, over a ten year plus period, each *Rijksadviseurs* group provided the government with several documents related to the energy transition topic, which the group directly elaborated on or have been associated in their development.

Landscape architect *Rijksadviseur voor het landschap* 2004-2008 (Dirk Sijmons) published two documents:

- “Windturbines in het Nederlandse landschap” [Wind turbines in the Dutch landscape] (2007)
- “Kleine Energieatlas” [Small Energy Atlas] (2008).

Landscape architect *Rijksadviseur voor het landschap* 2008-2012 (Yttje Feddes):

- “Windmolens hebben een landschappelijk verhaal nodig” [Windmills need a landscape story] (2009),
- “Een choreografie voor 1000 molens” [Choreography for 1000 windmills] (2010),

Landscape architect *Rijksadviseur voor Landschap en Water* 2012-2016 (Eric Luiten):

- “Advies Energielandschappen” [Advice on Energy landscapes] (2013),
- “Advies naar een nationaal Atelier Wind” [Advice on a national Wind atelier] (2013),
- “Advies Windpark De Drentse Monden – Oostermoer” [Advice on Windpark of De Drentse Monden - Oostermoer] (2014),
- “Energierapport – transitie naar duurzaam” [Energy report –transition to sustainable] (2016).

Landscape architect *Rijksadviseur voor de fysieke leefomgeving* 2016-2020 (Berno Strootman):

- “Opwekking duurzame energie op rijksgronden” [Generation of sustainable energy on national land] (2018),
- “Via Parijs. Een ontwerpverkenning naar een klimaatneutraal Nederland” [Via Paris. A design exploration for a climate neutral Netherlands] (2019).

This list shows how the energy transition topic has been addressed steadily since 2008, even if the main focus remains on RE technologies production and especially wind turbines. This could be related to the need to give advice about especially wind turbine subject because of the Dutch Government wants to produce 6.000 MW from onshore wind energy shared by all the different provinces. The negotiations with the provinces started around 2010 to be settled in the document “Structuurvisie Infrastructuur en Ruimte” (SVIR) (2012) and SER, that furthermore was spatially detailed in the “Structuurvisie Windenergie op land” (2014). However what was especially put forward in the last two documents of 2018 and 2019 was global thinking about energy transition strategies, that also consider energy reduction and treatment in other sectors such as mobility, etc. This was to support the elaboration of the Dutch “Klimaatakkoord” [Climate agreement] (2019), after the Paris agreement (2015) fixing energy goals and targets for reduction of greenhouse emissions for 2030. Moreover, in connection to spatial and landscape components of the *Klimaatakkoord*, spatial and landscape_experts were associated in the development and negotiation with each of the five sectors addressed in the documents: built environments, mobility, industry, agriculture and land use, electricity (Ruimte in het klimaatakkoord” [Space in the climate agreement], 2018). For example, the landscape architecture firm H+N+S worked on the agriculture and land use sector, resulting in the report “Klimaatmaatregelen in een leefbaar landschap” [Climate measures in a livable landscape] (2018) where RE production along with energy consumption reduction, among other topics, is widely addressed and treated.

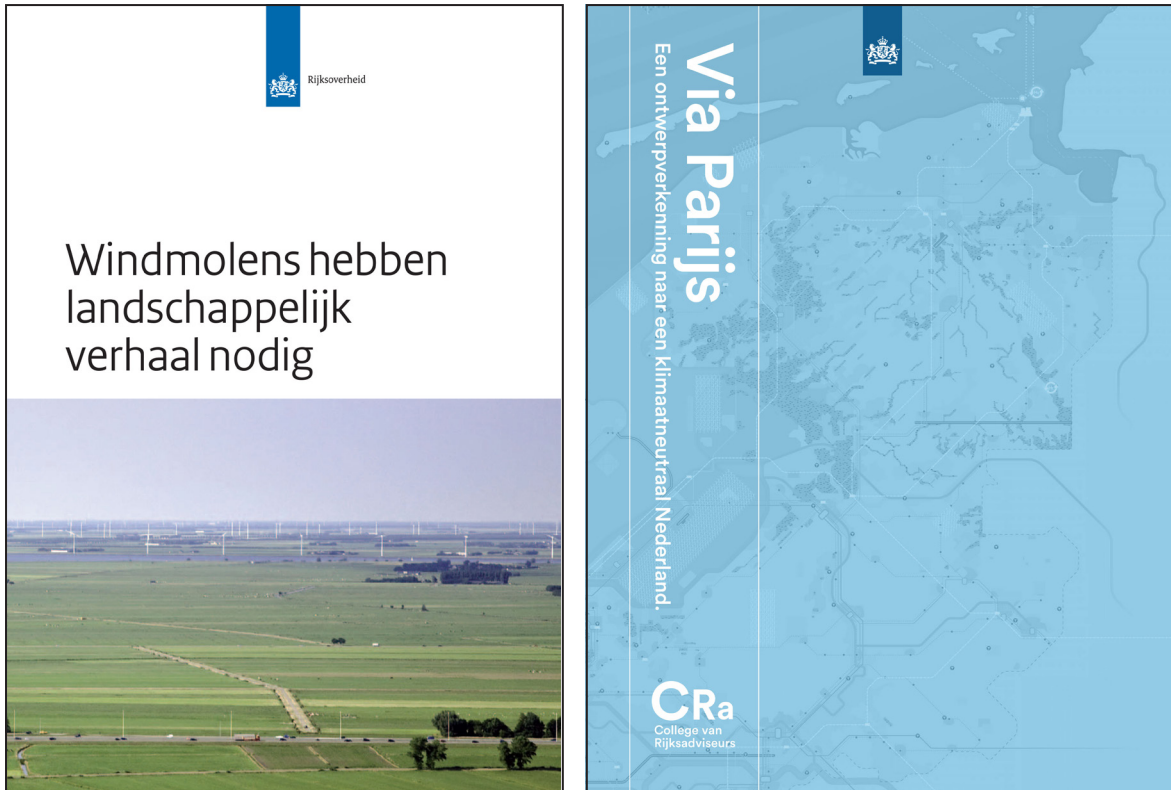


Figure 3. Covers of two landscape documents focused on energy transition topic developed by the CRA. Source: CRA

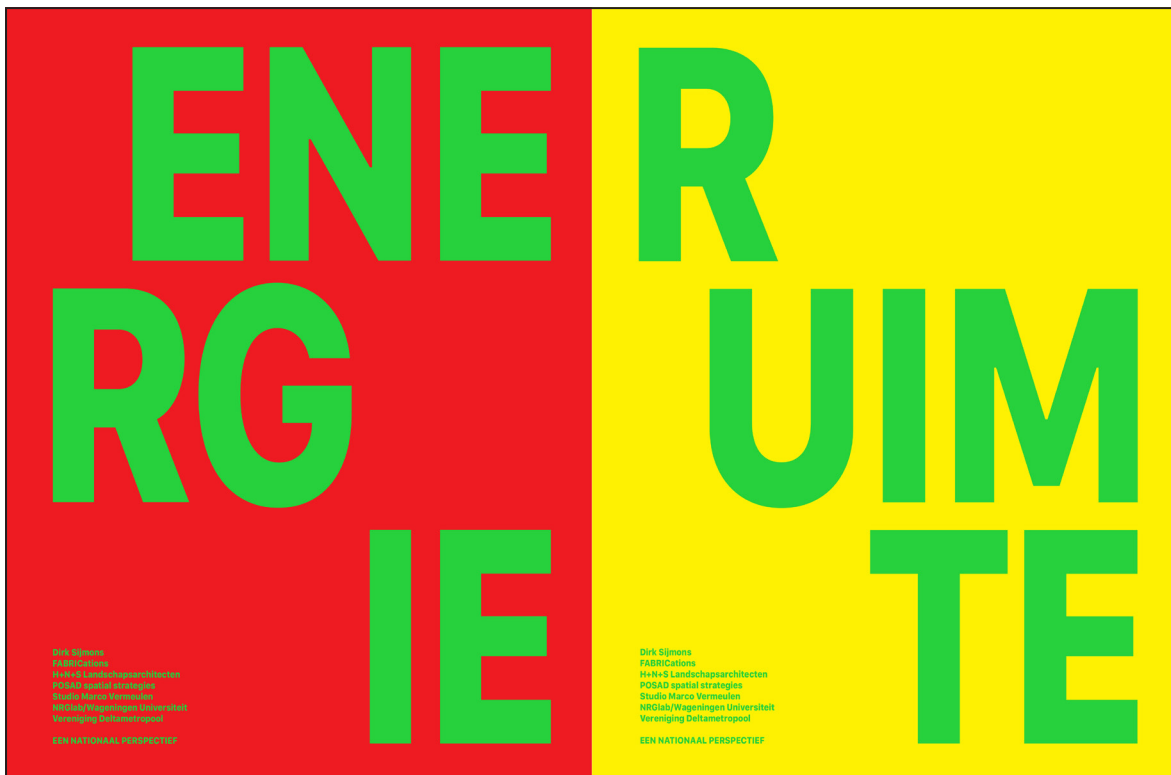


Figure 4. Cover and map of the “Energie & Ruimte. Een Nationaal Perspectief”. Source: Sijmons et al. 2017. “Energie & Ruimte. Een Nationaal Perspectief”.

EEN NATIONAAL PERSPECTIEF ENERGIE & RUIMTE 2050

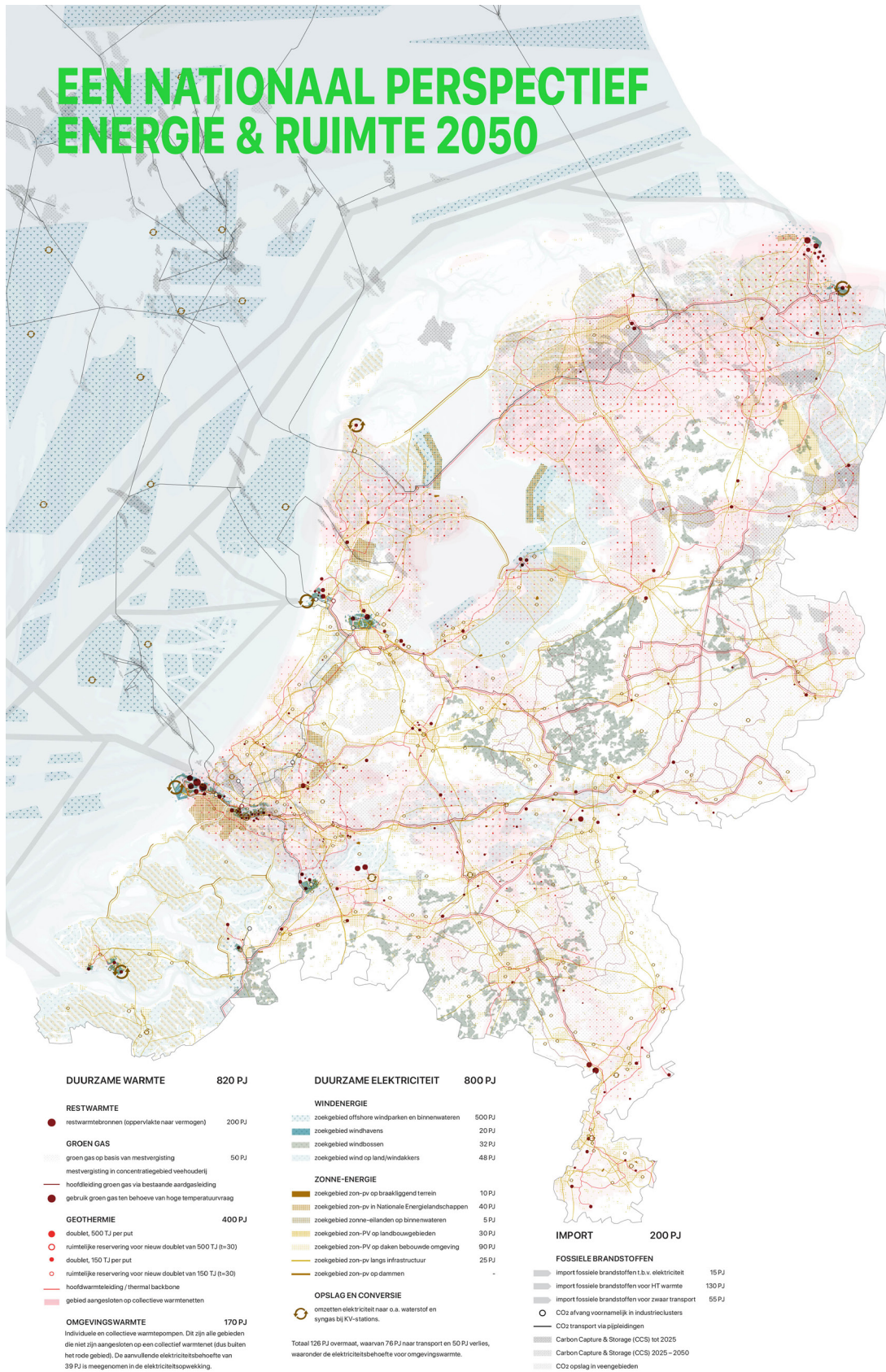


Figure 5. Map of the summing up the different energy strategies for 2050 in the Netherlands. Source: Sijmons et al. 2017. “Energie & Ruimte. Een Nationaal Perspectief”, p. 21-22.

Moreover, still concerning the energy transition process from a spatial and landscape design perspective, several documents have been commissioned over the last couple of years by the Dutch Government to landscape/spatial designers to assist conscious choices for energy transition in the Netherlands. It could be mentioned the “Klimaat, Energie, Ruimte: Ruimtelijke Verkenning Energie en Klimaat” [Climate, energy, space: energy and climate spatial exploration] (Kuijers et al. 2018) that was commissioned by *Ministerie van Infrastructuur en Waterstaat*, *Ministerie van Economische Zaken en Klimaat* and *Ministerie van Binnenlandse Zaken en Koninkrijksrelaties*, with the goal to provide insight about the energy spatial implication of different functions (energy saving, heat, transportation and mobility, etc.) and providing an overview of the ongoing energy focused experiences.

Furthermore, another important publication in 2017 was the “Energie & Ruimte. Een Nationaal Perspectief” [Energy & Space. A National Perspective] (Sijmons et al. 2017), coordinated by a landscape architect and co-authored by several environmental designers (among which there were many landscape architects too) both from academic and practitioner offices, commissioned by *Ministerie van Infrastructuur en Waterstaat* and the association *Delta-Metropool*. The objective is to understand the spatial possibilities to generate the RE required for the Netherlands within national borders, while also considering energy reduction, that therefore reduce the necessity of RE production (figures 4 and 5). This document aims to underpin support for the development of the *Klimaatakkoord* and the still ongoing “Nationale Omgevingsvisie” [National environmental vision].

These documents show a demand from government to encourage research and collect advice about the spatial component of energy transition from environmental design, among which landscape architects have a prominent role.

However, it could be mentioned that in these documents the word *landscape* is not put forward but is instead *space* [ruimte], even if in the document landscape and spatial quality often appear. This could be due to the fact that the Netherlands as a country is small and very densely populated, and governmental institutions first worry is actually having enough spatial surface to reach the stated energy goals. For example, it has been recently argued that in the *Klimaatakkoord* spatial and landscape quality play a marginal role when compared to the huge changes required if the stated goals were to be achieved (Dekker and Jongman 2019).

10.2.3 Summing up: France and Netherlands

As previously discussed, French and Dutch landscape architecture has similar roots in garden design and in both nations the first cursus of landscape architecture was developed inside schools/universities linked to horticulture and agriculture (Versailles and Wageningen). Influences and exchanges exist between the two professions in the two nations, where one of the most recognized figure is Jacques Sgard. Moreover in both nations, the range of scales and category of projects landscape architects work in are varied (e.g. public space, strategic design etc.), even if it seems that in the Netherlands the strategic large-scale design has a stronger tradition (Kempenaar et al. 2016; Janssen and Knippenberg 2008).

Besides considering energy transition process, it seems that Dutch landscape architects have a longer tradition in supporting the governmental national institutions, through the development

of advice and detailed studies.

In France, landscape architects are involved in energy transition too, but they, as *paysagistes conseil de l'État* advise local institutions, such as municipalities and/or departments, and specific and punctual projects, such as a wind turbine parks. They do not seem to be called in to give a global vision about energy transition landscape on a national level yet. The development of the photovoltaic (2010) and wind turbine (2009) methodological guides, that aimed to clarify a method and their position in the development of these projects, seemed to be an attempt to show their point of view and address higher governmental institutions. However, beyond these two guides, no further attempt to do it, has been made, about energy transition topic. Of course, the implication at a more local scale does not mean lower impacts will be made on decisions taking, compared to a national scale, but a very different kind, more grounded in sites and the territorial context.

10.3 Findings from the on-line survey in landscape architecture offices¹⁰

This section presents the result, coming from the on-line questionnaire (see section 10.1 for the method) sent to French and Dutch landscape architecture association (FFP and NVTL). The main aim of the research presented in this paper is to provide an overview and to discuss (based on empirical data) the contribution of landscape architects to energy transition. In order to draw conclusions, the French and Dutch situation are put in perspective.

Here are discussed the most relevant questions on the involvement of landscape architecture practices in energy-related projects, the category of projects, the territorial context, the disciplines they collaborate with, the notion of “energy landscape” and the ecological aspects considered while designing energy-related projects.

10.3.1 Results of the online questionnaire with French and Dutch landscape architects

10.3.1.1 Energy related projects

The first question about the involvement of landscape architects in energy-related projects points out that more than a half of respondents (“yes often” and “yes sometimes”) in both countries affirm to have worked in this kind of project. Figure 6 shows that another 15-20% sustain that, even though it is not yet the case, they would like to develop this kind of project, illustrating

10 A shorter version of this section has been published in the Dutch scientific review *Landschap*: Pistoni Roberta & Stremke Sven, 2019. “Practice in transition”. De bijdrage van Nederlandse en Franse landschapsarchitecten aan de energietransitie vergeleken”, *Landschap*, 36 (4), p. 241-245.

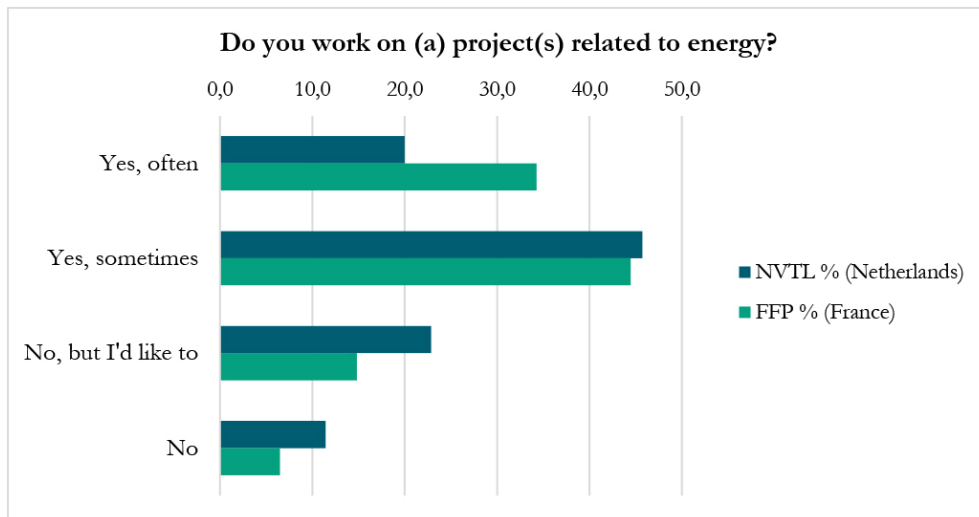


Figure 6. Comparison between French and Dutch answers on question about the involvement of energy projects about the involvement in energy projects (in percent). Source: author from online inquire

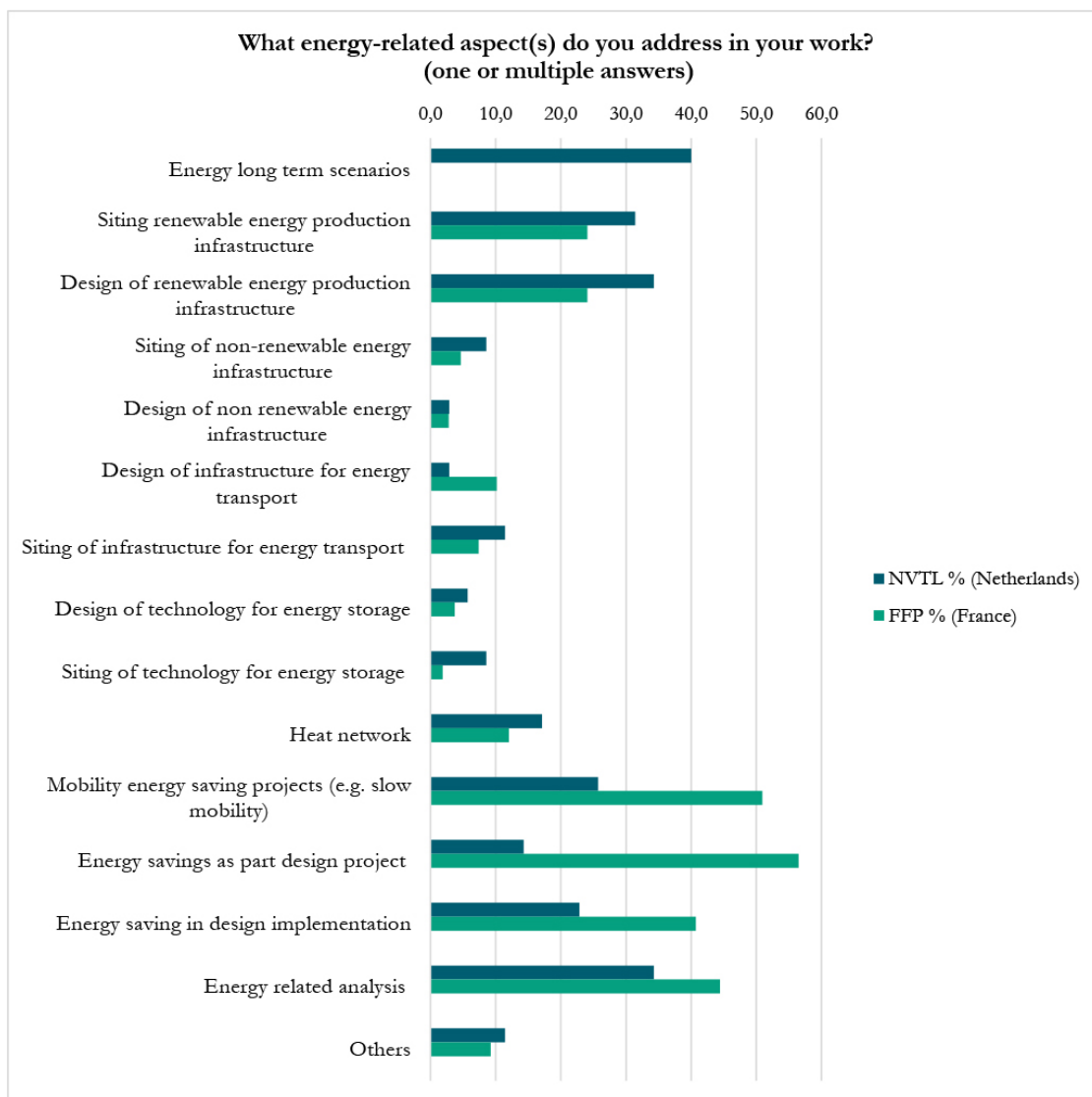


Figure 7. Comparison between Dutch (in blue) and the French (in green) about the kind of energy-related projects landscape architects work on. Source: author from online inquire

an increasing awareness of the topic in the landscape architects communities. Furthermore, according to the answers, French landscape architects seem to work more often than Dutch do on energy-related projects (66% vs. 78%).

Figure 7 provides an overview of the different types of energy projects that Dutch and French landscape architects are working on. The Dutch most often work on “energy long term scenarios” (40%) and “design of renewable energy production infrastructure” (34%). The French practitioners are more involved in “energy savings as part design project” (57%) referring for example to choose local materials to reduce energy consumption for their transports, and “mobility energy saving project” (51%), such as working on designing slow mobility paths and bike friendly cities concurring to energy consumption reduction in transports. These different percentages suggest a different contribution to energy transition wherein the Dutch are more involved in renewable energy projects both at operational and strategic levels. While French ones seem to work more about energy according to their personal desire, because even if they develop design strategies in order to save energy, and it is important to reduce energy input in a

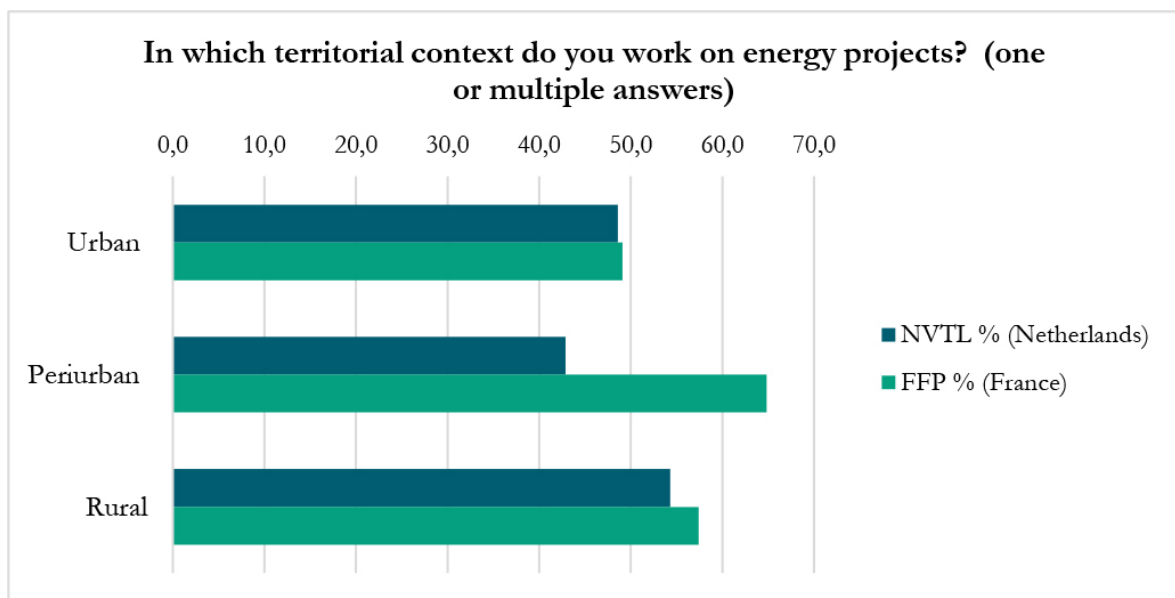


Figure 8. Comparison between Dutch and French answers about the territorial context in which they work on energy-related projects (in percent). Source: author from online inquire

system, it is not an aspect that is commonly commissioned.

When the practitioners were asked in which territorial context they work on energy projects, surprisingly no considerable differences have been found: in both countries practitioners work equally in urban, rural and periurban areas, with just a small prevalence for periurban areas in France (figure 8). This is interesting because one may expect some focus on urban and periurban areas in The Netherlands – a country characterized by high population density. The fact that Dutch landscape architects are commissioned with energy projects across all three types of territories suggests that their skill are considered important to the subject, regardless of the location. Moreover, responses suggest that energy projects are a matter of concern everywhere, from high (urban landscapes) to low population densities (rural landscapes).

Our inquiry confirms that the design teams working on energy-related projects are multidisciplinary (68% in The Netherlands and 60% in France), figure 9.

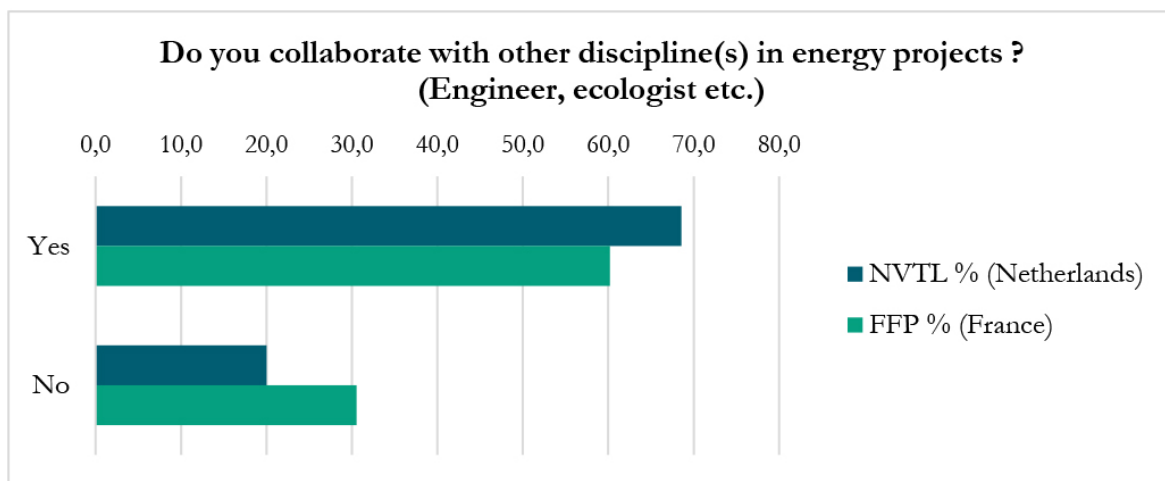


Figure 9. Comparison between Dutch and French answers about collaboration with others disciplines (in percent). Source: author from online inquire

The most quoted categories, collected through an open question, by both French and Dutch landscape architects is “engineer” (respectively 22 and 12 times), followed by the “bureau d’étude technique” [technical consulting office] (10 times) and “architect” (7 times) in France and “urban planners”(7 times) and “ecologists” (7 times) in the Netherlands. Not surprisingly, practitioners collaborate with technical experts – in line with the technical aspect of energy infrastructure and technologies such as photovoltaics panels. However, landscape architects also state that they work with other designers with complementary knowledge, for example urban planners and architects, enabling them to work across different spatial scales. The limited collaboration with ecologists could be surprising considering the fact that energy infrastructure siting and design ought to incorporate for example landscape ecological knowledge. May be, landscape architects do not mention ecologists because they have grown accustomed to this collaboration. Or because environmental impact experts and designers do not engage in a continued dialogue while working on energy transition.

Interestingly, Dutch landscape architects enumerate 11 categories of other experts and French ones about 25, that is more than the double, but all these expertises are quoted not more than once or twice. This gap in the number of quoted disciplines could be due to the differences in the kind of developed projects or in the usual requirements of team expertise in the two nations, linked to the different extension (or comprehension) of presumed professional skills of landscape architects in both national traditions. It may also simply result from the higher number of the FFP members answering the question compared to the NVTL.

In any case, we witness a great variety of experts, according to the great variety of the energy-related projects, that are, just to quote some, technicians of wind turbines (e.g. wind turbine park), forest manager (e.g. wood energy project), agronomist (e.g. biomass production for energy).

Another questions discussed here relate to the emerging discourse on the multifunctionality of energy landscapes. About 88% of the Dutch and French landscape architects affirm to consider ecological aspects while working on energy-related projects, for example biodiversity and water (see figure 10). These are topics that, for a long time, have been part of landscape architecture practice and this seems to continue when they embrace new topics such as energy transition.

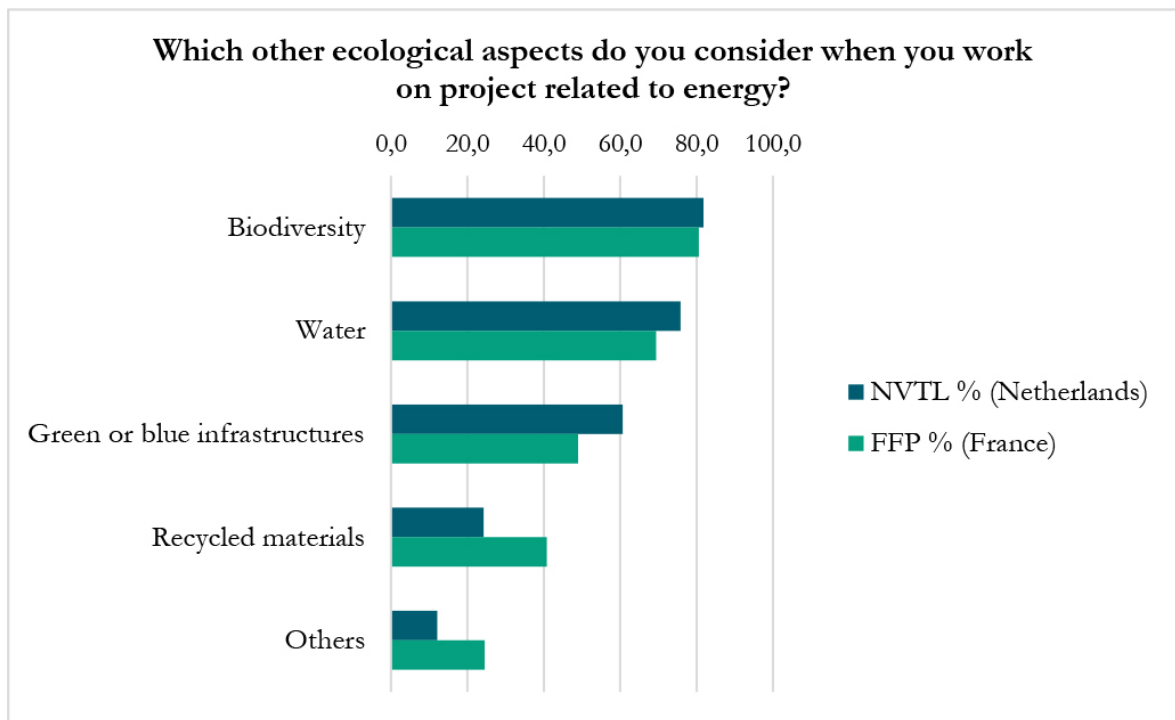


Figure 10. Comparison between Dutch and French answers about other ecological aspect that they consider in energy-related projects (in percent). Source: author from online inquire

10.3.1.2 Energy landscape notion

Subsequently respondents were asked about the meaning of the notion of “energy landscape” through an open question to have a wider range of opinions. We analyzed the responses according to the four main groups developed by Stremke (Stremke 2015) to define the conceptual framework for the planning and design of sustainable energy landscape: sustainable technical criteria, sociocultural criteria, economical criteria and environmental criteria. These categories are chosen to see what criteria are prominent or less prominent and if some criteria are grouped in the same answer, searching differences and similarities between the nations. For this question again, we collected a more varied and rich set of answers for the French case, probably because of the higher number of responses (96) compared to the Dutch ones (28).

About 46% of the Dutch respondents relate energy landscape to the presence of renewable energy technologies (France 30%), mentioning for example “Parks of windmills in the North sea and solar energy on the roof” (NL) and “wind turbines, photovoltaic park”¹¹ (FR).

This shows that they mainly associate ‘energy landscape’ with technical components, even though some also mention biomass – a non-technical component. In France, several respondents refer to nuclear power plants as technological component of the existing energy landscape that needs to be dismantled progressively. This is not surprising considering the large number of nuclear power plants in France. While several Dutch landscape architects mention “energy storage” as one of the technologies, this component of energy systems has not been mentioned in France. About 14% of the Dutch and 5% of the French respondents refer to esthetical values, which

¹¹ “éoliennes, champ photovoltaïque”

are related to the socio-cultural dimension. They define energy landscape, for example, as “A landscape that stages renewable energy”¹² (FR) or “A landscape wherein the maximal potential of available renewable energy sources is harvested and planned in a spatially attractive way” (NL). But also scale is of relevance: “Wind energy makes a landscape when placed in a proper scale and measure” (NL). The poor spatial integration of renewable energy technologies is stressed in both countries. For instance some state the “the visual pollution of badly integrated wind turbines”¹³ (FR), or “vast plots of sun collectors, which are not combined with anything else” (NL). The visual impact is indeed a matter of concern by landscape architects but, according to our questionnaire, more considered in the Netherlands.

Only a few French Landscape architects (2%) relate to the socio cultural criteria/ inhabitants behavior suggesting the necessity of “promoting the development of eco responsible life styles”¹⁴ and acceptability prior to a change in landscape.

For a small number of French landscape architects (two), the notion of “energy landscape” is explicitly discussed in connection to economic criteria: one is mentioned in a general way as “Structuring the landscape with economic considerations in the background and saving up”¹⁵. The other respondent goes further, proposing solution for the land use competition: “To ensure that a land, when it has no agricultural or forestry utility (beyond the use), can be productive”¹⁶ (FR). This economic criteria is mentioned by one Dutch landscape architect who associates “energy landscape” to “circular economy”.

Environmental criteria are mentioned more frequently; by 14% of the Dutch and 9% of the French respondents. While the Dutch, for example, refer to “A self-sustainable landscape in which all energy is renewable, without the use of carbon-based energy” the French also stress the importance of energy savings: “to plan in order to make an area less energy consuming”¹⁷. It is important to highlight that only one of the Dutch respondents associated the notion of ‘energy landscape’ with energy savings – the reduction of energy demand. This could be related to the kind of projects on which landscape architects work - Dutch practitioners conduct renewable energy projects while many French practitioners work on cross-sectoral projects. Concluding this part on the notion of ‘energy landscape’, we can report that none but one respondent to the online questionnaire associated all four dimensions from the above-introduced conceptual framework.

10.3.2 Differences between France and the Netherlands

In this research, we investigate landscape architects’ involvement and contribution in energy-related projects in the context of energy transition both in France and in the Netherlands. The research found that a higher proportion of French landscape architects are involved in

12 “un paysage qui met en scène les énergies renouvelables”

13 “la pollution des éoliennes mal intégrées”

14 “favoriser le développement de modes de vie éco-responsables”

15 ”Structuration du paysage avec des considérations économiques en arrière-plan et des économies à faire”

16 “faire en sorte qu’un foncier, quand il n’a pas d’utilité (au-delà de l’usage donc) agricole ou sylvicole, puisse être productif”

17 “Aménager de manière à rendre l’espace moins énergivore”

energy-related projects, compared with the Dutch practitioners. However, French landscape architects address energy questions in projects that are not primarily focused on energy transition and, there, often focus on energy-savings rather than on generation of renewable energy. In the Netherlands, on the contrary, landscape architects work mainly on energy infrastructure and technology projects, both at the site and territorial scale. For long they have been involved in regional/territorial planning and they seem to continue this activity also during the energy transition, contributing among others in the creation of long-term regional/territorial energy scenarios (see figure 11). The next challenge, supposedly, is to contribute to the spatial implementation of long-term scenarios and, thus, the acceleration of sustainable energy transition in the Netherlands. For the French landscape architects, chances lie in the expansion of activities towards strategic planning and design for energy transition and, simultaneously,

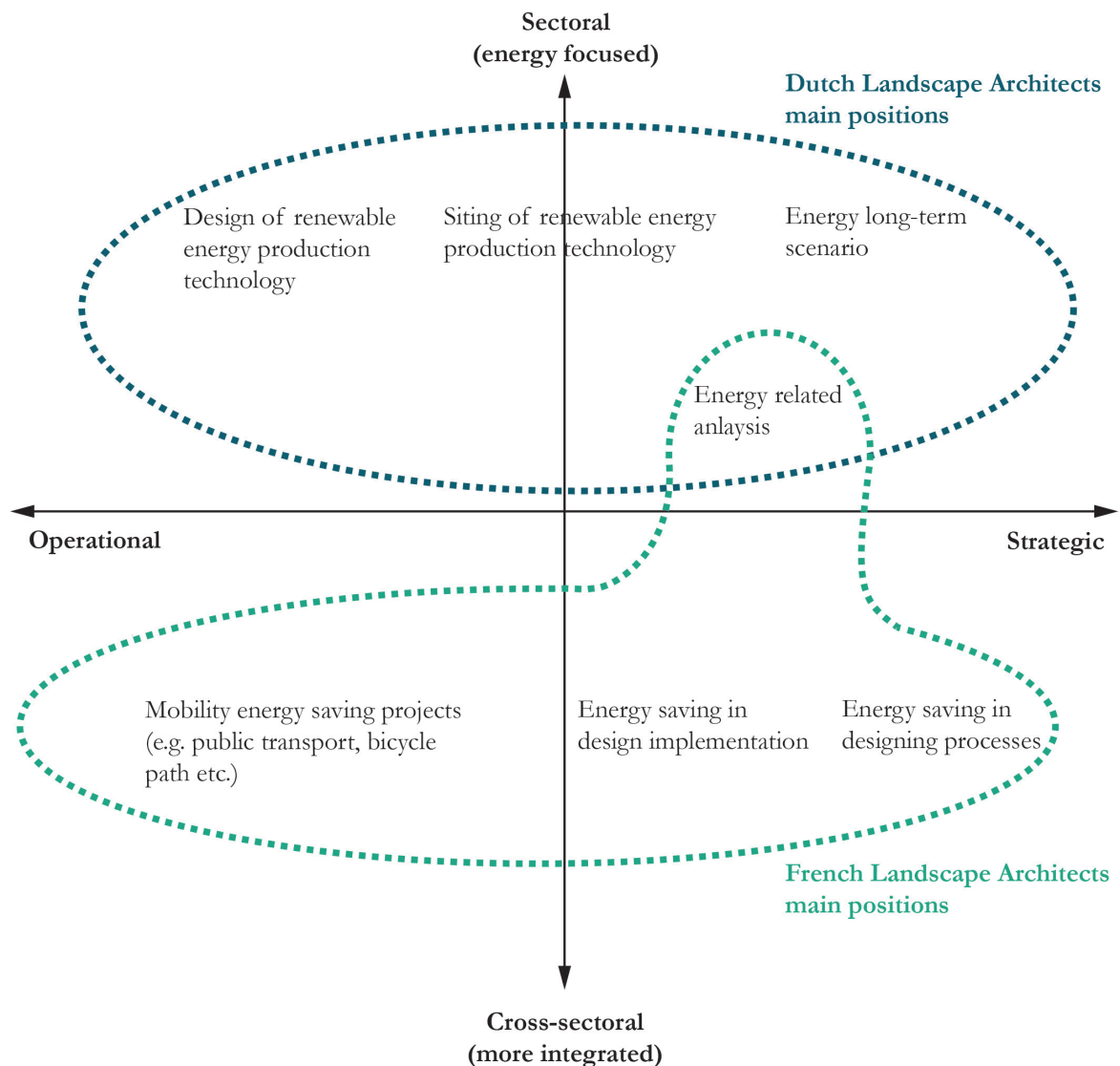


Figure 11. Four main energy related project developed by landscape architects. Differences between France and the Netherlands. Source: author, based on the results from the FFP and NVTL on-line survey.

increased engagement in projects focusing on renewable energy generation.

Even if differences in the kind of projects in the two nations exists in France as in the Netherlands the largest group of respondents when asked about the notion of “energy landscape” stress renewable energy production. It may be because of this gap between what is perceived as important and what is mostly developed, that French landscape architects do not feel to be much involved in energy transition processes. Indeed in several open question across the questionnaire French practitioners express a sort of “frustration” for example pointing out how : “Institutions should stop thinking only quantitatively but qualitative and they should hire landscape architects, the only professionals to be able to propose a global and transversal vision”¹⁸ (FR) or again referring to and energy landscape as an “awful mono-functional PV field resulting from a lack of calling of our profession [landscape architecture] on these projects in the territories”¹⁹(FR). This ‘frustration’, does not appear in Dutch answers.

The results of our inquiry suggest that the existing historical differences in landscape architecture in the two nations, especially the scale of intervention, persists in energy transition projects.

These differences, both in the perception of the involvement and in the kind of project addressed could be due to the fact that landscape architected profession seems to be more recognized and protected in the Netherlands compared to France. A better recognition may help the profession to affirm its role in the field of energy transition and strategic planning and designing, but this shall deserve more targeted communication efforts. Such institutions as the “Chaire paysage et énergie” [Landscape and Energy Chair] at the ENSP Versailles, together with the dissemination of local experiments linking landscape and energy designing (e.g. *plan de paysage* focused on energy), may progressively affirm the role of landscape architects in the energy transition process.

Opening for the profession

Although our research focused on the current contribution of landscape architecture practices to energy transition, some suggestions on the perspective development can be made. The online questionnaire, for instance, showed a low concern for energy-saving measures by Dutch practitioners - a topic that landscape architects can indeed contribute to as we learned from the French situation. Reduction of energy use, improvement of energy efficiency and increase of renewable energy generation represent the three key pillars of sustainable energy transition - all three have spatial implications while offering possibilities to successfully address other-than-energy challenges in our landscapes (for example loss of biodiversity).

The rapid changes and landscape transformation induced by the transition to climate neutral energy systems call for advanced skills and competencies. The multi-scalar and synthetic contribution of landscape architects to energy projects - integrating technical, sociocultural, economical and environmental aspects - is critical to safeguard the *sustainable* character of energy transition, encompassing more than the mere reduction of greenhouse gas emissions.

18 “il faudrait que les institutions arrêtent de penser uniquement quantitatif mais bien qualitatif et qu’elles fassent appel à des paysagistes, seuls professionnels à être en mesure de proposer une vision globale et transversale”

19 “des horribles champs monofonctionnels de PV panneaux, résultat d’un manque d’appel de notre profession sur ces projets dans le territoire”

Landscape architects - capable to conceive, co-design and develop desirable environments - have to be among the vanguards of energy transition, building and strengthening alliances with the increasing number of stakeholders and other proponents of sustainable energy landscapes. Future research could broaden the geographical scope of the inquiry to include landscape architecture associations in other European countries, in order to both enlarge the sample and allow comparative analysis across more diverse landscape architecture cultures. Moreover, semi-structured interviews with landscape architects working on energy transition projects can help to gain deeper and more comprehensive insights. Such interviews are developed in the following chapters to in deep the topic.

Box 10. Contribution of chapter 10 to the part 3 research question

This chapter first give an overview of landscape architecture profession in France and the Netherlands and secondly examines the involvement and contribution of landscape architects to energy-related projects. It compares the situation in the Netherlands with that in France making use of an online questionnaire. Results show that two thirds of the practitioners in both countries have been working on energy-related projects. In the Netherlands, we witness a prevailing involvement of practitioners in the siting of energy technologies as well as the creation of long-term scenarios. In France, we observe a focus on mobility and energy savings. The research reveals that the different landscape architecture legacies in the two countries transcend into energy-related projects; historical characteristics are re-enforced, not without implications. The French focus on garden and park design and a lack of protection and clarity about the profession, for example, may impede their contribution to long-term and strategic challenges such as energy transition. The Dutch, on the contrary, have been involved in the shaping of the land across spatio-temporal scales for long and evidence suggests that they maintain this role. Moreover they seem to be regularly called to advice national institutions about spatial implication of the energy transition topic. To them, the challenge lies in the acceleration of a more sustainable energy transition which, to date, is almost exclusively determined by economical considerations.

CHAPTER 11: A grounded practice – landscape architects contribution in energy transition

The previous chapter explored the differences and similarities that exist in France and the Netherlands concerning landscape architecture as a profession and its involvement in energy transition related projects, through an online survey.

This chapter (see chapter 10 for the detailed method) continues research about landscape architects discussing their contribution in the ongoing energy transition process, and subsequently how agents (elected representatives, consultants, etc.) working on the energy transition process perceive landscape architecture's role.

The inquiry between the two national contexts, along with the internal (landscape architects) and external (energy transition agents) perspectives about landscape architecture profession contribution to this process could reveal differences and similarities able to highlight future paths and future challenges for landscape architects' involvement in energy transition. Moreover results could be put in perspective in light of different national backgrounds about the profession's recognition. Indeed, perception about landscape architects practice, from both national perspectives, is grounded in a specific cultural, professional contexts, which are relevant when assessing a greater picture and suggesting future pathways.

In this chapter, the definition of typologies is developed to presenting how landscape architects describe their role in energy transition process or how their role is described by energy transition agents. The typology classification is a taxonomic classification that if applied to a category could result in knowledge about built form, cultural values and practice, among others (Deming and Swaffield 2011). In this research the definition of typologies wants to discuss differences in the perception of the landscape architecture as a profession and its practice, according to the semi-structured interviews. The differences highlighted about landscape architect roles are also revelatory of the primary skills and knowledge needed to perform the role.

Moreover, these landscape architects' contributions typologies could also allow to understand the different approaches towards landscape design activity in energy transition. These approaches to design could be clustered in three design categories: operational, strategic and service design. At the end of the chapter we discuss these approaches to design to understand which one is mainly emphasized by landscape architects and if and how it differs from the agent's perspective, and between the two countries.

11.1 Landscape architect role in energy transition from their point of view

We establish and discuss typologies how landscape architect perceive their role in the transition process, analyzing both their narratives and hand-drawn sketches. This give insight about how landscape architect approach the designing of energy transition. In what they consider their expertise more useful, which skills and which scale.

11.1.1 Oral narratives and drawing revelatory of the landscape architecture role in energy transition

Landscape architects have been asked to draw and graphically represent how they see their role in energy transition process. The interest and limits of the hand-drawing method is explained in detail in chapter 9 of this thesis. The difference with the method explained in chapter 9 is that in this case I asked professionals that currently deal with this task, being drawing an integral part of landscape architecture practice. So in this case the drawing is seen as support tool to better express their oral narratives and in some cases able to add details. Moreover here the idea is to represent a more abstracts concepts about the role, compared to the more concrete request of drawing an “energy transition landscape” made to agents that are not familiar with drawing activity.

It is, however, relevant to mention that how could be seen by the drawings, one French landscape architect refuse to draw, because from her point of view it was a complex question to which it was not possible to answer with a drawing considering the little time left in her schedule for the interview. Moreover another French landscape architect did not draw but wrote keywords in a schema about answering the question, see figure FR6. That has been an unexpected result considering that, generally speaking, drawing both physical environment and design concepts is part of the landscape architecture practice.

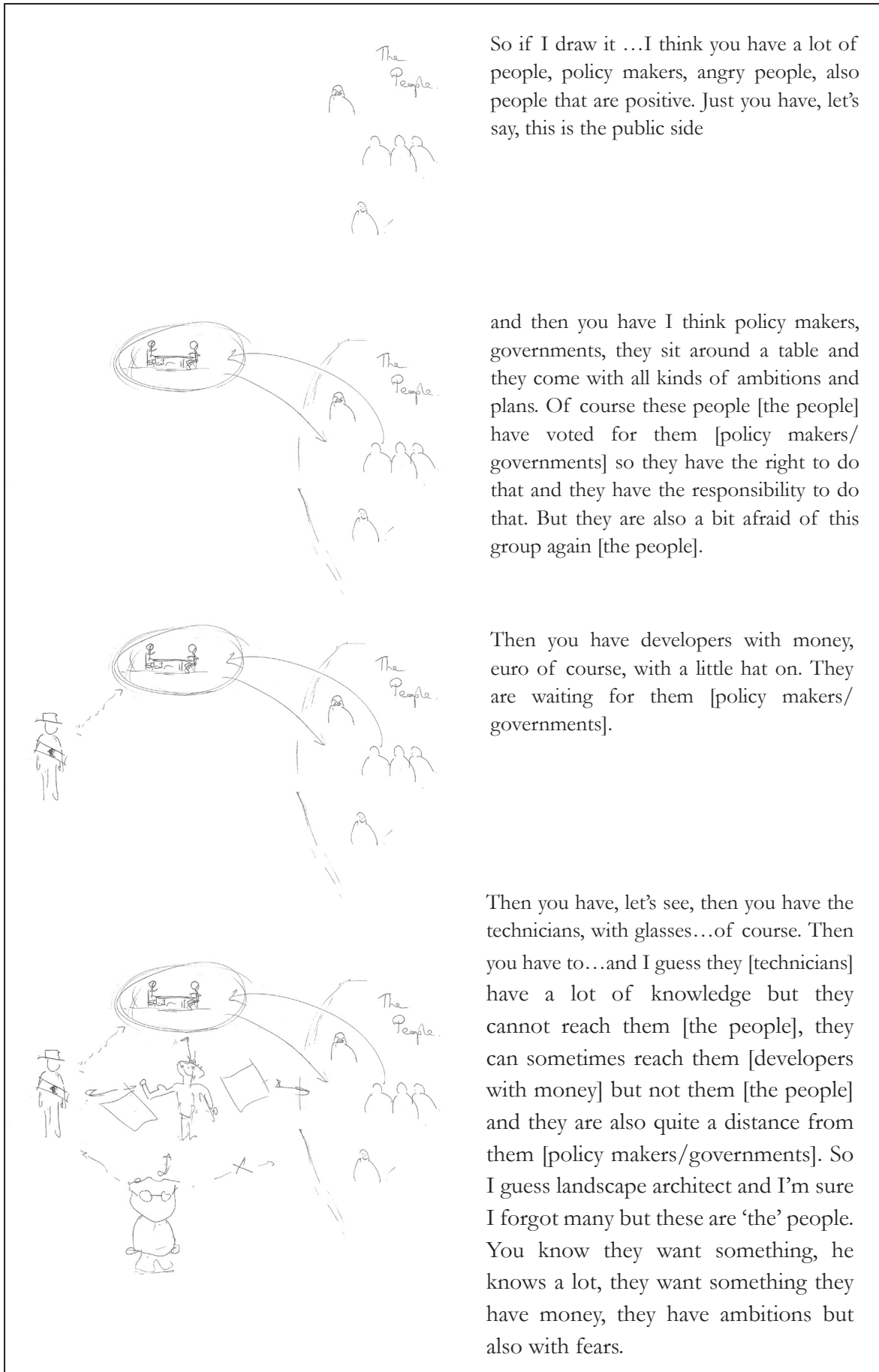
Almost all the interviewed landscape architect highlight more than one role for landscape architecture practice in their narrative. The box 11.1 below, illustrate as an example the development of the hand drawings and oral narratives answering the question.

Just one landscape architects started drawing immediately, instead of first orally explaining (Figure FR6), but it is the one that represent as a schema with words so developing more a sort of mind map that a drawing.

Box 11.1, explanatory example of the narratives and drawing of the landscape architect role in energy transition, NL7 the Netherlands.

I think the role is to put it on the agenda to make people aware of it. Make, like in the workshop one of the first things that we do, you now, to what people pay attention to is when you show, lets' say the spatial aspect of the challenge or the energy assignment is, but also to like for example the North Sea project, the Odyssey, there was also may integrate all the aspect or stakeholders and come to a comprehensive plan for the North Sea area and showing the perspective that is offers, for nature for economy, etc. And I think that what landscape architect are good at. Also in energy transition there is big challenge or big role for landscape architects to play.

And...I think the next step would be to start designing those places that is I think what's coming in the next years. Now or until now we are talking about ambitions, and I think that from now on to the next 5-10 years we'll see more project coming to realization. And the whole work to landscape architects come to place. Designers site, but also everything around it, the all process.

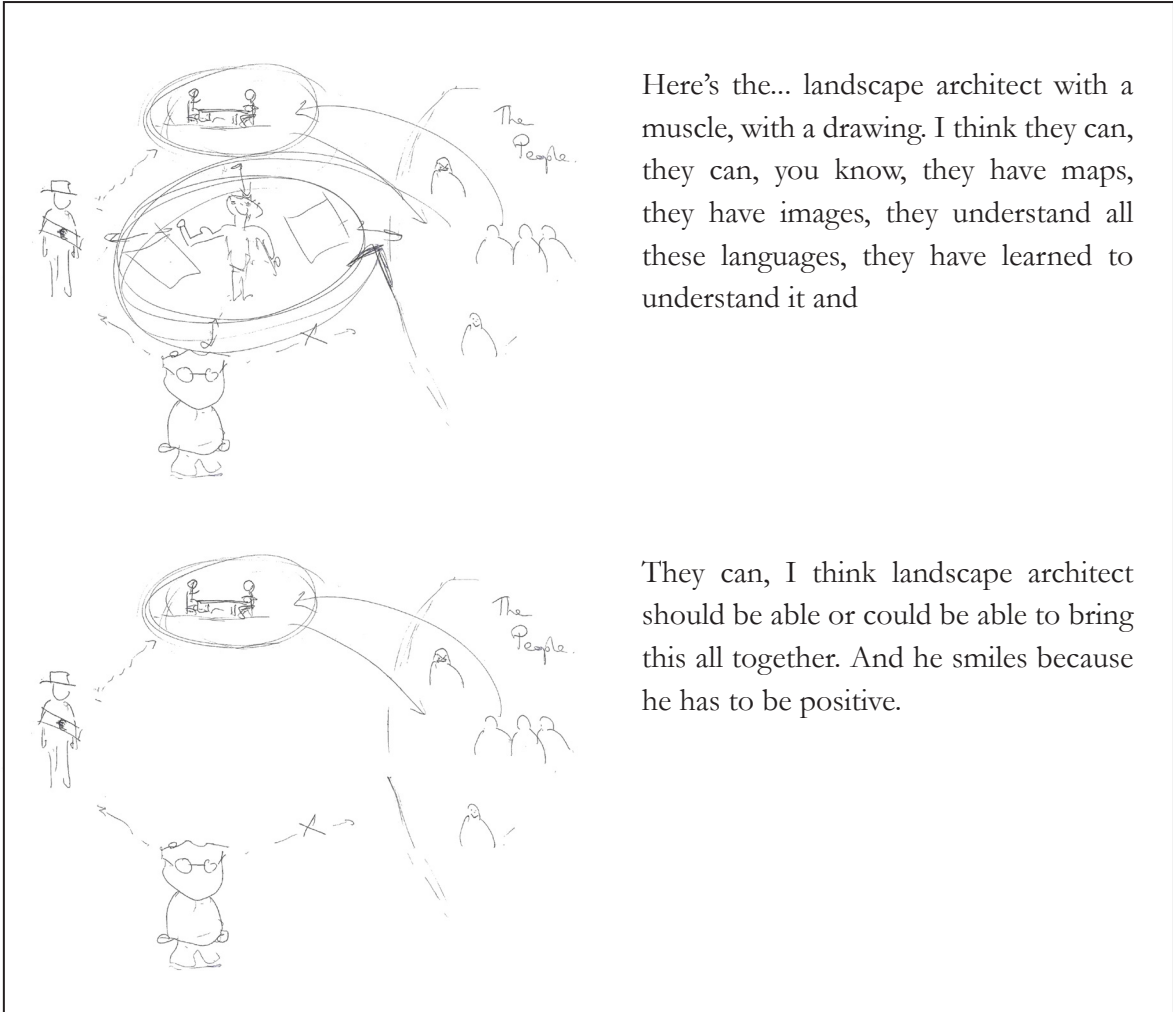


So if I draw it ...I think you have a lot of people, policy makers, angry people, also people that are positive. Just you have, let's say, this is the public side

and then you have I think policy makers, governments, they sit around a table and they come with all kinds of ambitions and plans. Of course these people [the people] have voted for them [policy makers/governments] so they have the right to do that and they have the responsibility to do that. But they are also a bit afraid of this group again [the people].

Then you have developers with money, euro of course, with a little hat on. They are waiting for them [policy makers/governments].

Then you have, let's see, then you have the technicians, with glasses...of course. Then you have to...and I guess they [technicians] have a lot of knowledge but they cannot reach them [the people], they can sometimes reach them [developers with money] but not them [the people] and they are also quite a distance from them [policy makers/governments]. So I guess landscape architect and I'm sure I forgot many but these are 'the' people. You know they want something, he knows a lot, they want something they have money, they have ambitions but also with fears.



Here's the... landscape architect with a muscle, with a drawing. I think they can, they can, you know, they have maps, they have images, they understand all these languages, they have learned to understand it and

They can, I think landscape architect should be able or could be able to bring this all together. And he smiles because he has to be positive.

Landscape architects' drawings - the Netherlands

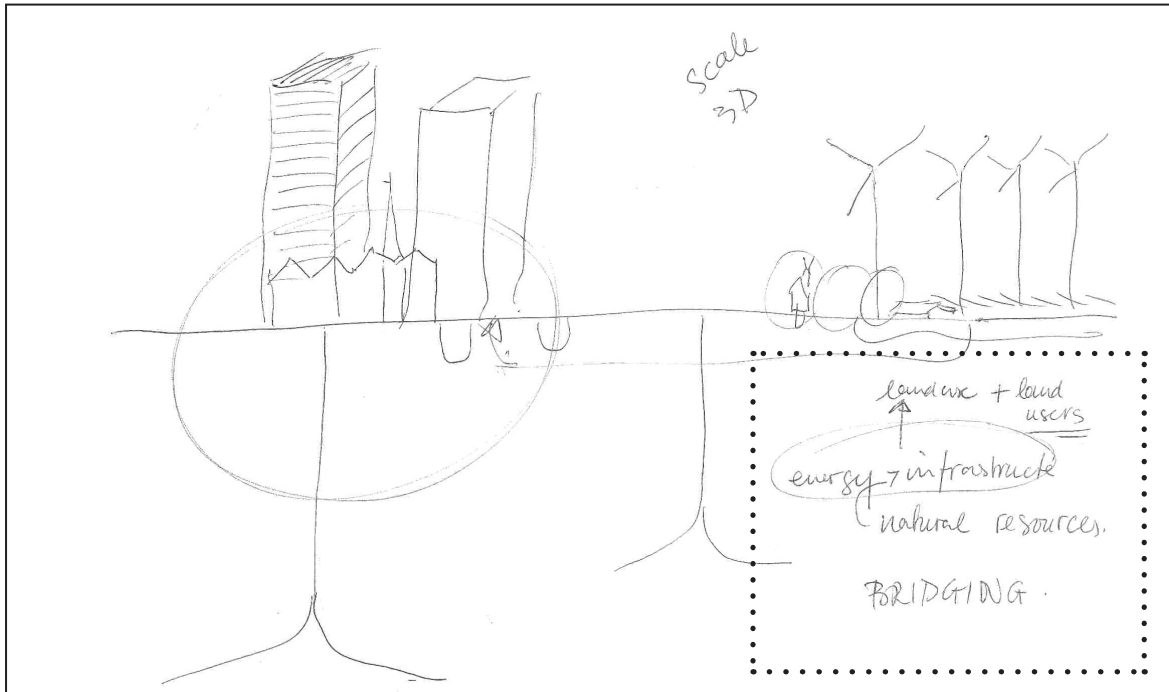


Figure NL1. Landscape architect. Dots lines shows the section referring to the LA contribution to ET (Drawing in common with energy transition landscape from LA perspective chapter 13).

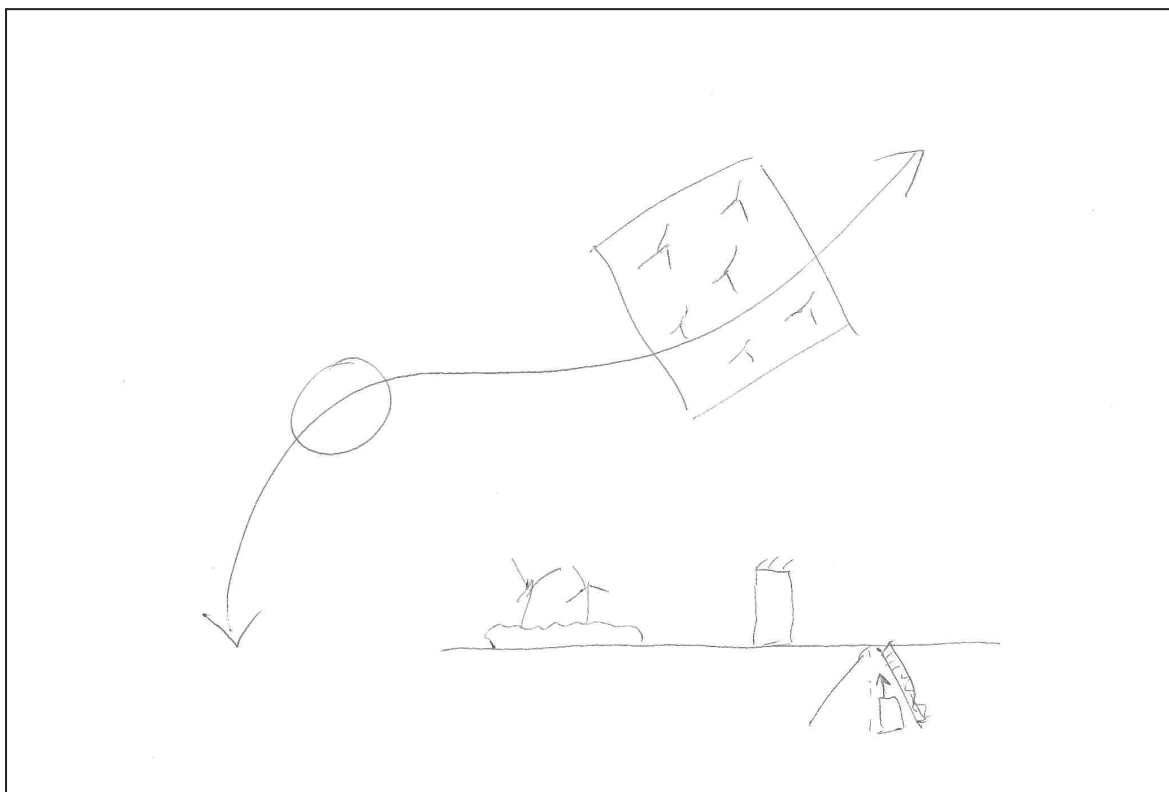


Figure NL2. Landscape architect. (Drawing in common with agents drawings analysis chapter 9)

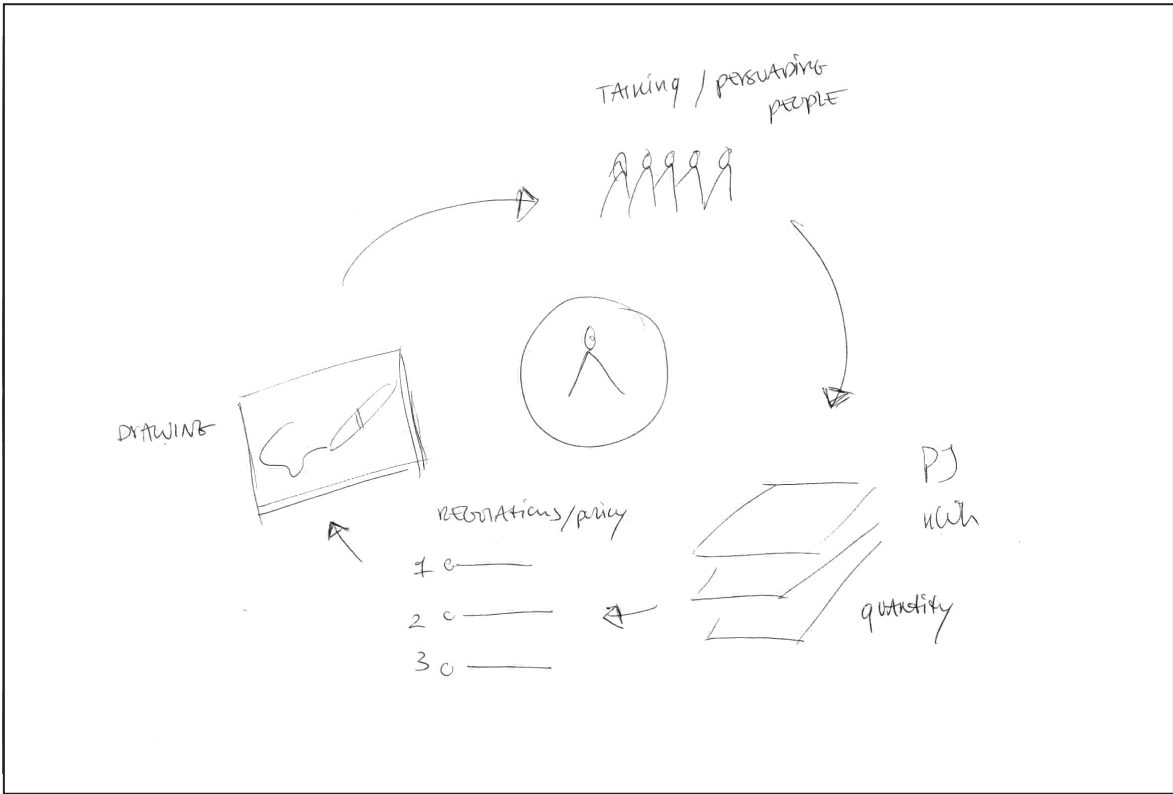


Figure NL3. Landscape architect

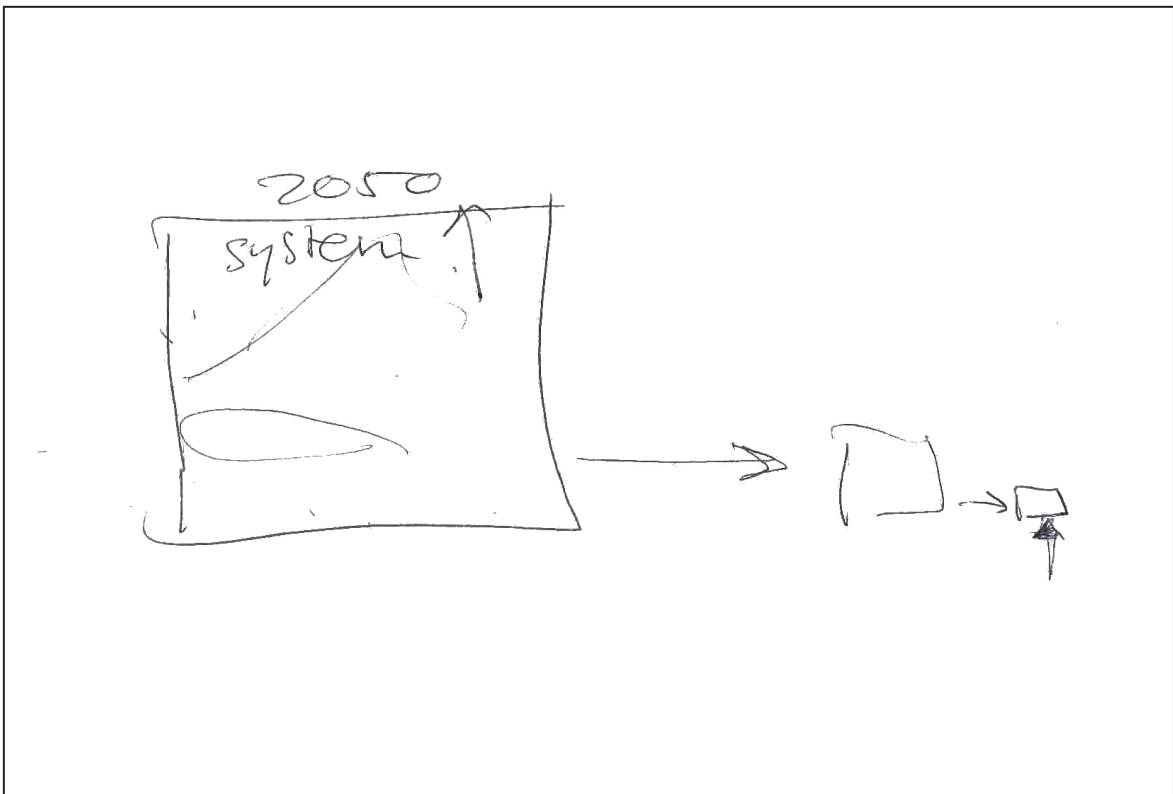


Figure NL4. Landscape architect

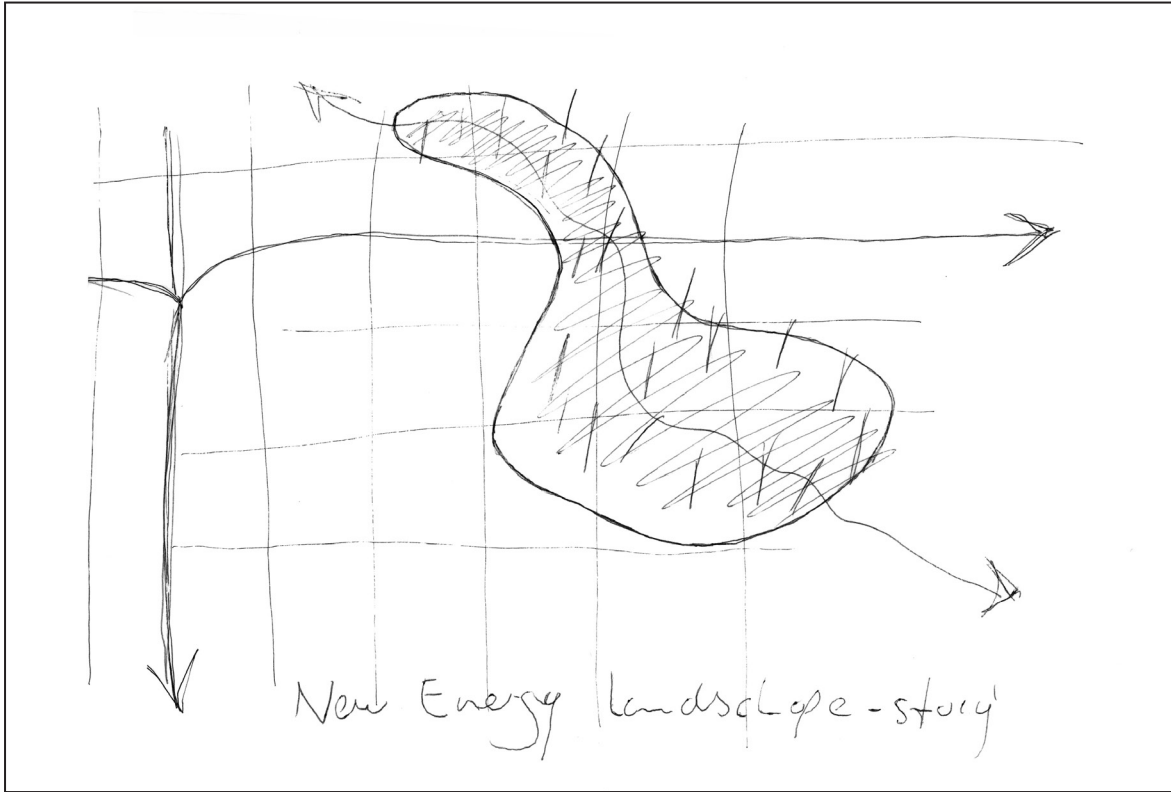


Figure NL5. Landscape architect

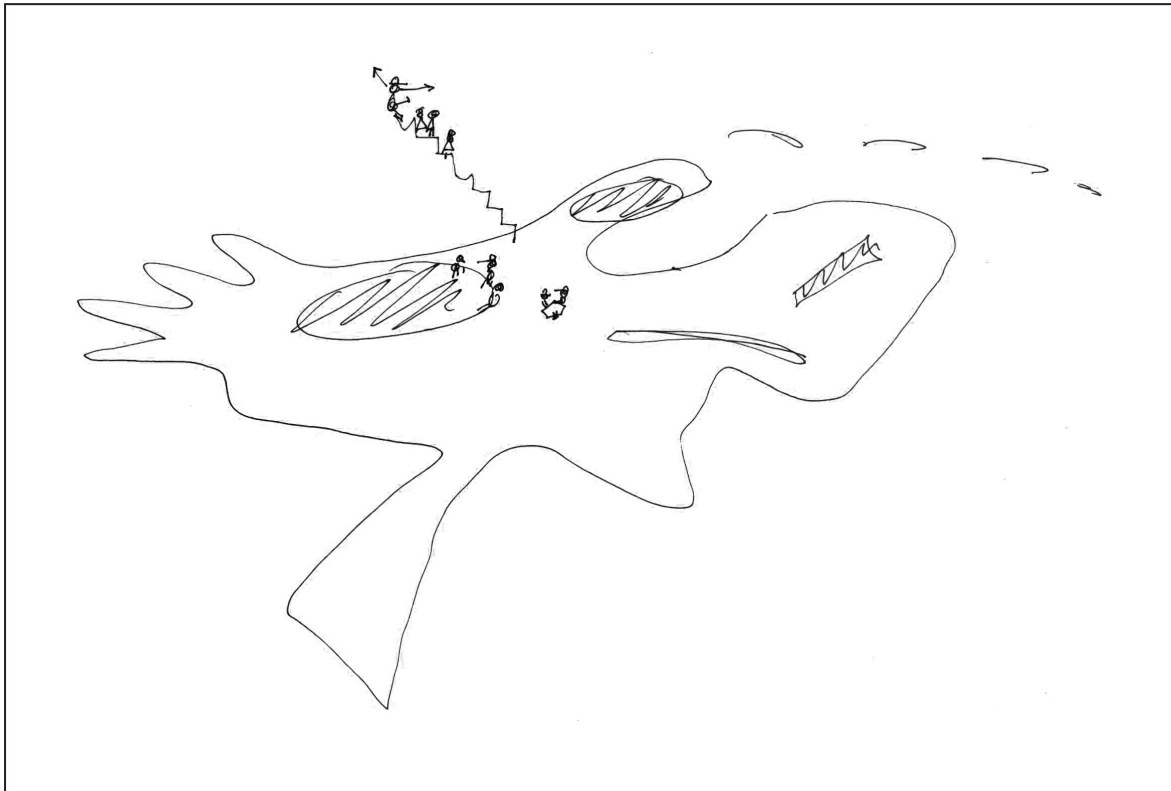


Figure NL6. Landscape architect

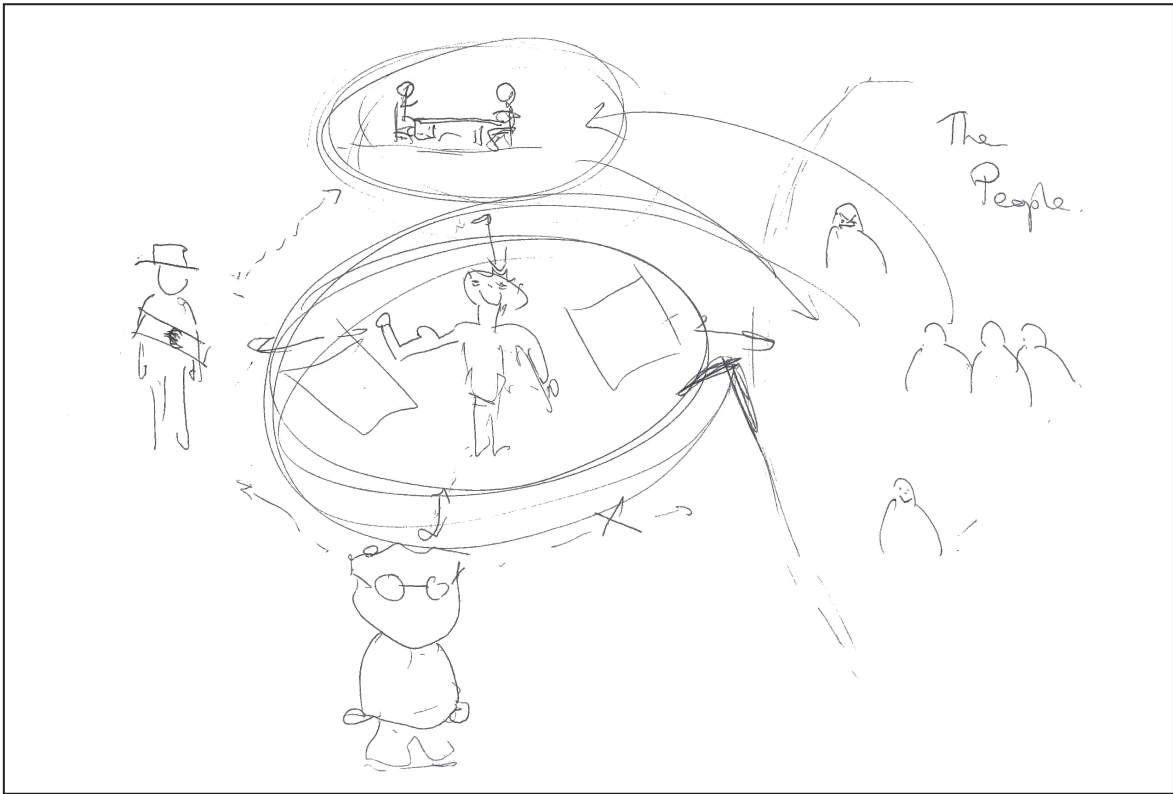


Figure NL7. Landscape architect

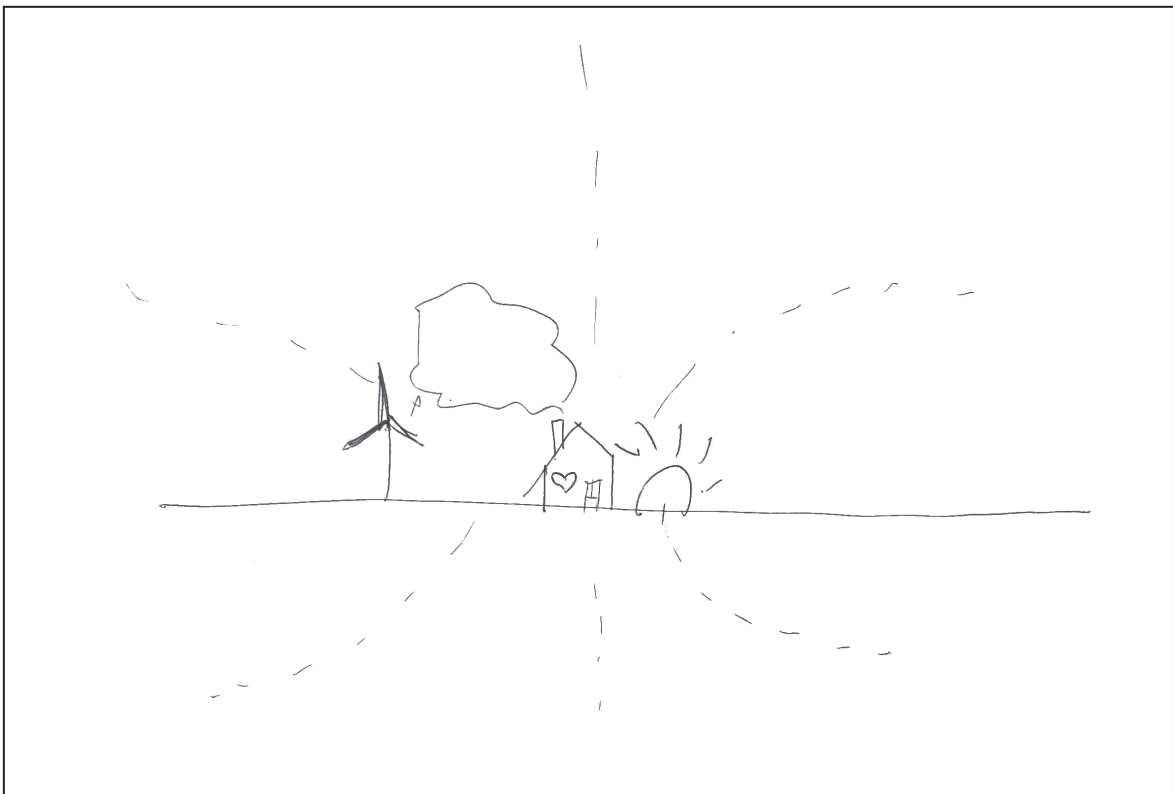


Figure NL8. Landscape architect

Landscape architects' drawings - France

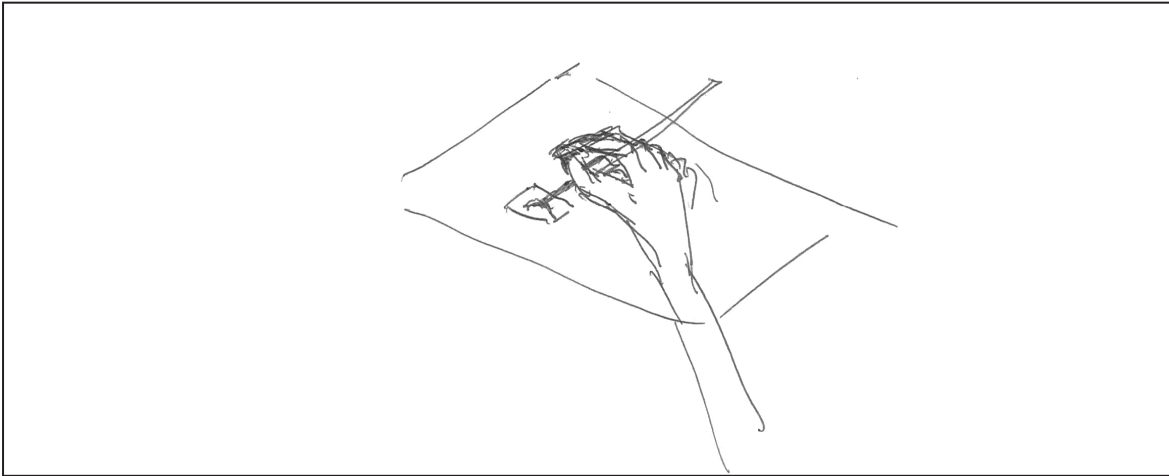


Figure FR2. Landscape architect

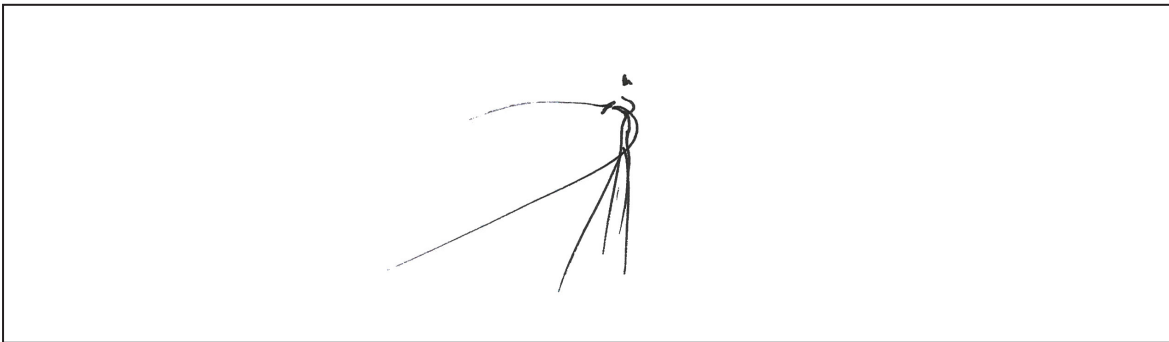


Figure FR3. Landscape architect

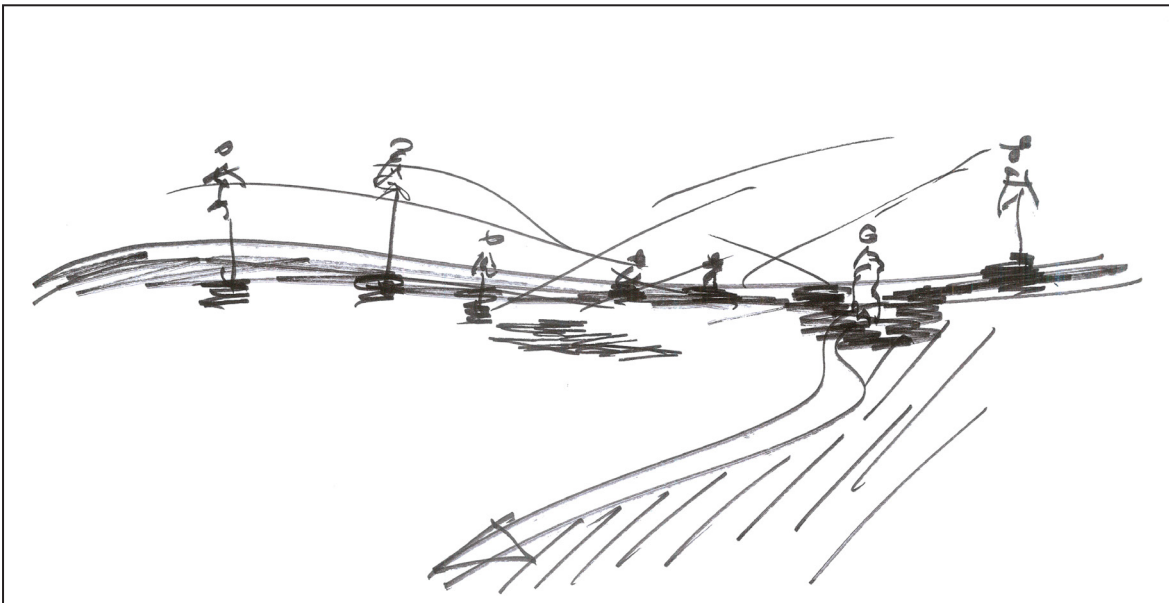


Figure FR4. Landscape architect

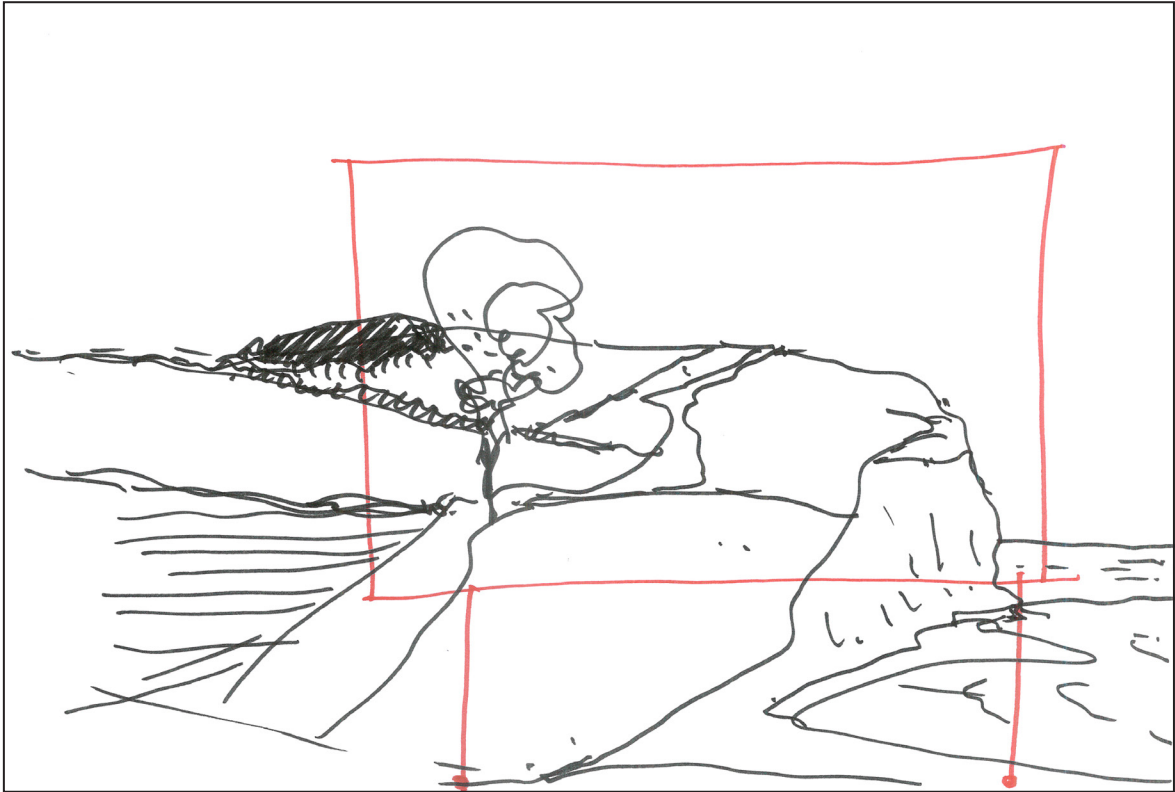


Figure FR5. Landscape architect

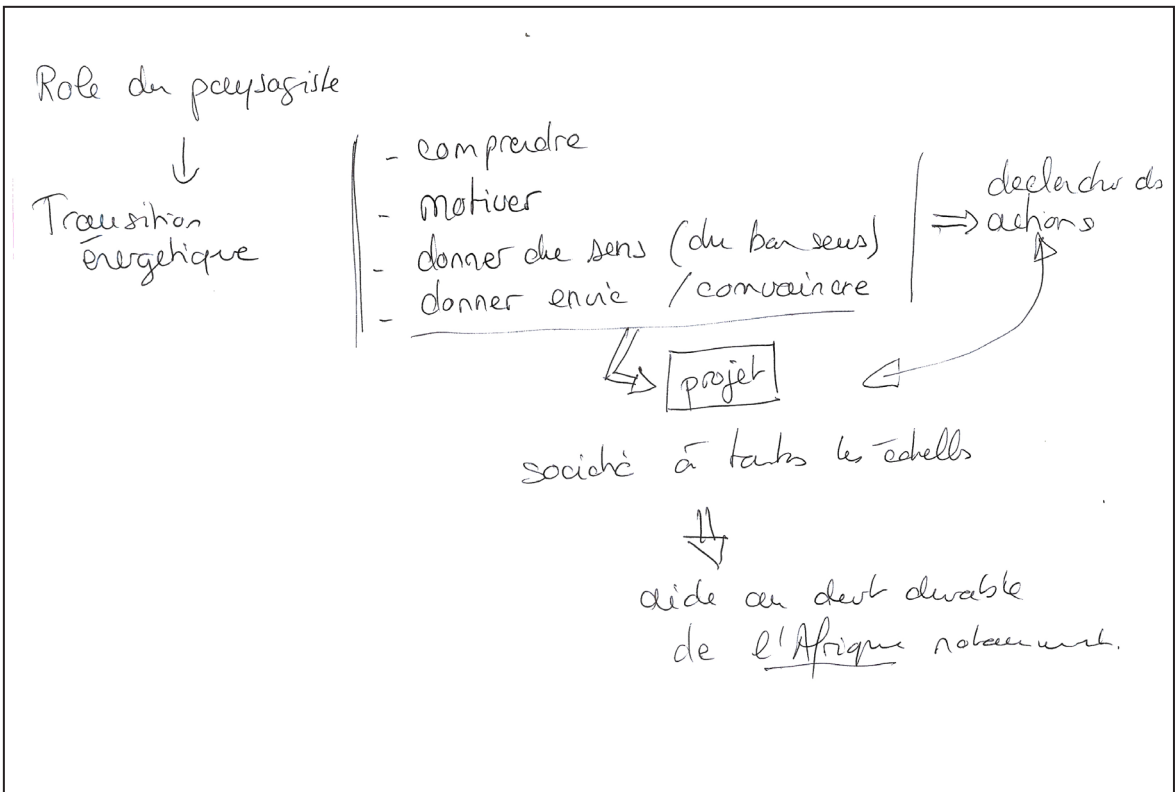


Figure FR6. Landscape architect

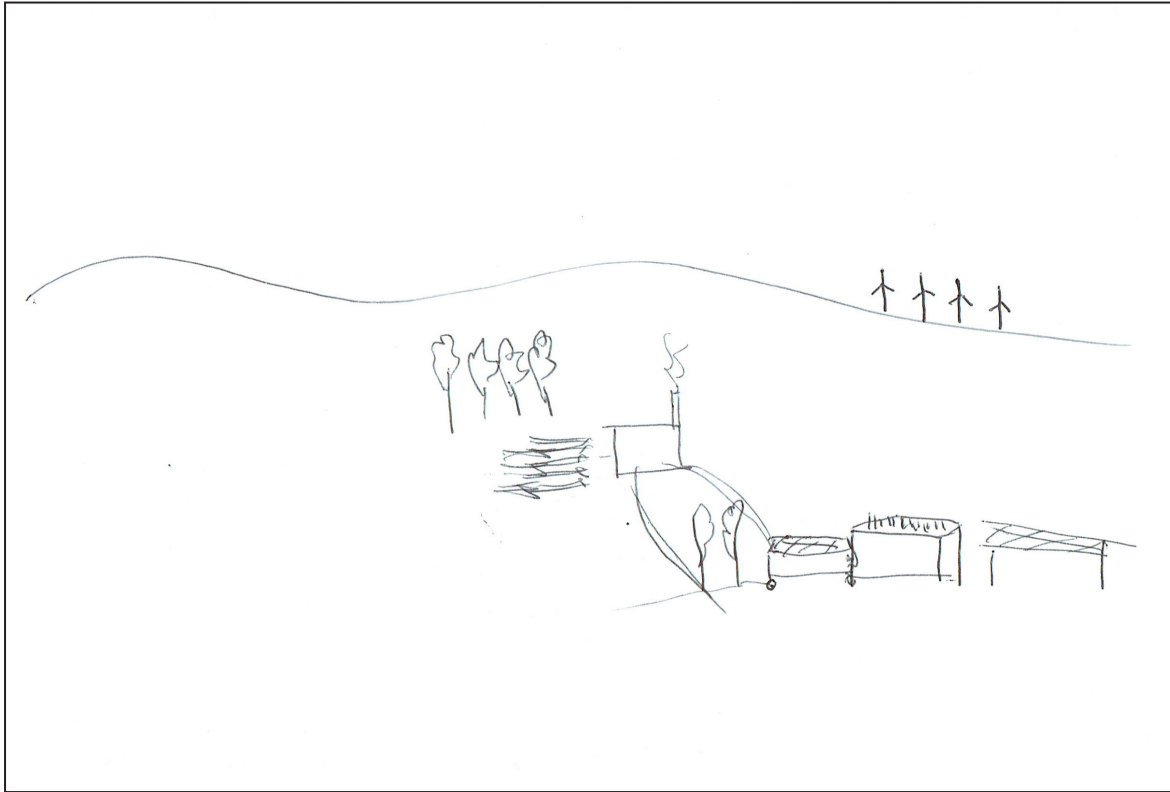


Figure FR7. Landscape architect. (Drawing in common with energy transition landscape from LA perspective chapter 13).

11.1.2 Typologies of landscape architect contribution in energy transition

Landscape architects' activity is about design as “the process of deciding on and then realizing preferred futures” (Tonkinwise 2015, 87). However this activity could be performed in many different ways accentuating different components. Table 11.1 (below), summarizes the six typologies landscape architects mention when describing their role in the energy transition process, putting the accent on different approaches towards design. These typologies come from the analysis of semi-structured interviews with eight French and eight Dutch landscape architects (see chapter 10 for the method)

The largest number of landscape architects mentioned several possible contributions for energy transition, so the sum of the number of the different contributions is higher than the total number of interviews.

These typologies of possible contributions are further described and discussed below

Table 11.1, typologies of landscape architects' role in energy transition from their perspective, illustrated with representatives' quotes and with the number of interviews where the role is mentioned. The table includes quotes selected as representatives of the main categories listed in the table, in order to provide a clear image of the contribution facets, but avoiding repetitions. Total of 16 interviews. Source: author from re-elaboration of the landscape architect semi-structured interviews.

Category	Quote	Code
Grounding the energy transition in a territory – 10 times	“Not working aboveground, working with the landscape, with local resources. This is the first thing. That means: spatialize, territorialize, the energy transition” ¹ (FR4, 2017)	IC1
	“Then designers can help with regional strategies they can help thinking of the right mix for every region, because every region is different with different possibilities but also with different qualities and different vulnerabilities.” (NL6, 2017)	BS1
Imagining and realizing future landscapes – 9 times	“there are a lot of invisible things happening and but where it comes out of the ground or where it comes out of the air that’s where... the or where things could change the people behavior, that’s where landscape architect is involved. And through designing you could improve energy efficiency, energy reducing and also support people behavior changing... through designing new shapes, news adapted spaces for the new needs, such as areas where people could recharge electrical vehicles... so it’s an aesthetic challenge but it’s also a spatial organization planning challenge.” (NL8, 2017)– Figure NL8	RW1
	“it’s to come up with new narratives and new imaginaries, I think you could say. Because there are a lot of people out of there, policy makers, specialist who can elaborate on numbers and on possible scenarios, but to really have an idea of what looks like, what would do to the space I think how actually will change our daily environment. I think to really imagine that new future you really need designer artists or at least people that... who can somehow conceptualize the new situation. That is in some point very different from the situation that we are right now. So there is a certain amount of creativity and imagination is asked I think. That’s what designers are good at. I think it’s the most important aspect.” (NL2, 2017)	JH1
	“It’s also about working on the shaping of specific projects...in the landscape, such as wind turbines and photovoltaics even more...for which is going to be urgent...and not decorate, camouflage...and also to	CC1
<p>¹ “De pas travailler hors-sol, de travailler avec le paysage, avec les ressource locales. Voilà. Ça c’est la première chose. Ça veut dire en gros : spatialiser, territorialiser, donc voilà la transition énergétique”</p>		

endorse...’’² (FR3, 2017)

Supporting the elaboration of a shared project - 7 times

“For example, in the *plan de paysage*, it’s about creating a federation of actors. At one point, it’s really the role of a mediating landscape architect, which comes as an orchestra director and in a certain moment find a common thread [...]. And the potential, it’s that we have a real role as landscape architect to go and see the actors of tourism, to go to the agriculture actors, of urban planning, and at a certain point to create a federation and to create a common thread, a project.”³ (FR4, 2017)

IC2

“Just you have, let’s say, this is the public side and then you have I think policy makers, governments, they sit around a table and they come up with all kinds of ambitions and plans. [...] Then you have developers with money, euro of course, with a little hat on. They are waiting for them. Then you have, let’s see, then you have the technicians. [...] Here’s the... landscape architect with a muscle, with a drawing, I think they can, they can, you know, they have maps, they have images, they understand all these languages, they have learned to understand it and they can. I think landscape architect should be able or could be able to bring this all together” (NL7, 2017) – Figure NL7

JV1

Supporting local inhabitants towards conscious landscape changes – 4 times

“And so the landscape architect, I think he has this vision/look, of evolution, of landscape definition at global scale, for the [local inhabitants], to explain, yeah, how it’s done, how it could evolve, that it’s already composed of several layers, finally, according to different periods, and then the notion of social perception. It’s true that when we do meetings with inhabitants, the landscape notion it’s what we see, so what we focus on. So I think that really is the landscape architect role.”⁴ (FR7, 2018) – Figure FR7

MM1

“But it does not have to be forget the inhabitants, the people, what they want...you have to understand...the fact of going on the field of talking with people, of doing participatory workshops...you see... it’s fundamental, because I explain what I perceive, what I see of their

CL1

2 “Il s’agit de travailler sur la mise en forme de projets spécifiques aussi... dans le paysage, comme les éoliennes et photovoltaïques encore plus... pour lequel ça va être urgent...et de ne pas venir décorer, camoufler...cautionner même...”

3 “Par exemple, dans le Plan de paysage, c’est créer une fédération des acteurs. À un moment donné, c’est vraiment le rôle d’un paysagiste médiateur, qui vient comme chef d’orchestre et à un moment donné trouve un fil conducteur, euh... [...]. Et le potentiel, il est que on a un vrai rôle en tant que paysagiste a effectivement aller voir les acteurs du tourisme, aller voir les acteurs de l’agriculture, de l’urbanisme, et un moment donné créer une fédération et créer un fil conducteur, un projet”

4 “Et donc le paysagiste, je pense qu’il a ce regard-là, d’évolution, enfin de définition du paysage à l’échelle globale, pour leur [habitantes locales] expliquer, ouais, comment il est fait, comment il peut évoluer, qu’il est déjà composé de plusieurs couches, enfin... selon différentes époques, et puis la notion de perception sociale. Ça c’est vrai que quand on fait des réunions avec des habitants, la notion de paysage c’est ce qu’on voit, donc c’est ce à quoi on s’attache. Donc je pense que c’est vraiment là qu’est le rôle du paysagiste.”

landscape, but they also talk to me, you have to listen...to understand what it's important for them too. And this could bring up social aspirations of which local stakeholders are not necessarily aware"⁵ (FR6, 2018) - Figure FR6 (first word of the list at the center "comprendre" [to understand])

Supporting in the development of energy transition policy guidelines – 3 times

"yeah I think, I think the role designers...landscape architect, can play in policy...decision-making processes on different levels in the Netherlands the provincial levels or the regional level is very often an important one. [...]. You have to be there before, looking to look at the issue on this strategic level... you know, before having some policy that says, 'we want 14 windmills in our municipality'. Well, nobody has thought about the effect of 14 windmills, by the way why 14?" (NL1, 2017)

DJJ1

"I think the role can also be more regulations or supporting policy so you need to help municipalities or provinces... in the finding what they think is spatial quality... in the finding of ideas about what and how they want to achieve in energy terms." (NL3, 2017)

DO1

Developing multi-functionality in energy projects – 3 times

"Another aspect I think is being creative in combining the energy transition to other well... or solutions or assignments in a certain area, so combining energy with ecology or some... maybe some social issues". (NL3, 2017)

DO2

"It is to combine wind energy development, for example, with broad landscape development. For example, make new plans for plantations so the views of people are being guided and you can well... make a landscape on two levels, you can say. You could improve ecological point of view as well or other functions..." (NL5, 2017)

FS1

⁵ "Mais il ne faut pas oublier les habitants les personnes, ce que eux veulent... il faut comprendre...le fait d'aller sur le terrain de parler aux personnes, faire des ateliers participatifs... tu vois...c'est fondamental, parce que moi j'explique ce que je perçois, ce que je vois de leur paysage, mais eux aussi me parlent, il faut écouter... comprendre ce qu'est important pour eux aussi. Et Cela ça peut faire remonter des aspirations sociales desquelles les acteurs locaux n'ont pas forcément conscience..."

In the following section each typology of landscape architecture contribution in energy transition provided in the table 11.1 (above) is discussed, in order to detail the different facets of the topic.

11.1.2.1 Grounding the energy transition in the territory

Interviewees, in both nations put forwards their role as able to define a more territorial grounded energy transition process in a given/specific territory as expressed by quote IC1 and BS1 (table 11.1). This refers to the landscape architect ability to connect territorial resources and the energy transition process through analyses and designing.

A French practitioner did draw this role (see figure FR4), representing landscape architect as arrows connecting stakeholders to the common landscape ground:

“He has to invite a whole bunch of actors...that fly a little above the ground, to go down again. [...] to give them after...a common ground. And this ground, this ground is the landscape, it's the earth, it's...: to go down on the earth”⁶. (FR4, 2017)

To accomplish this grounding goal, the interviewee highlights the importance of landscape architect skill of analyzing a landscape and territorial context, and to recognize its resources both material (e.g. the presence of forest or industries) and immaterial such as socio-cultural values and the dynamic forces that acted and are acting on the landscape leading to changes and evolution. Landscape is recognized to merging together these components (Antrop 2006), in this way interaction and synergies could be established among them to achieve an energy transition goals, having roots as much as possible in the territory.

Grounding an energy transition process on a specific territory, means also to look at the energy system.

Moreover, grounding an energy transition process in a territory have also a technological renewable energy production component where landscape architect could bridge between the recognized energy potential resources existing and the landscape designing of the renewable energy technologies for making use of them:

“It's also about the connection between natural, yeah what do you call it, resources like sun and wind and water and heat and then, of course, choose the infrastructure but energy infrastructure and how that will affect land use and land users. So it's also about bridging those layers.” (NL1, 2017) – Figure NL1

Nevertheless grounding the energy transition on a territory does not only mean to look at all potential resources from which renewable energy can be generated but also to look at the existing energy system and investigate possibilities for reducing energy consumption and improvement of energy efficiency (e.g. heat cascading). As the following quote illustrates: “To go back to the landscape ground also means to consider all the questions about energy consumption reduction, and to leave asides a little technics and engineering...of RES.”⁷ (FR4, 2017)

6 “il doit inviter tout un tas d'acteurs... qui volent un peu au-dessus du sol, à redescendre. [...] leur donner après une... un socle commun. Et ce socle, ce socle c'est le paysage, c'est la terre, c'est... voilà : redescendre sur la terre”.

7 “Revenir au socle paysager signifie aussi de ramener aussi toute les questions de MDE, et de laisser un peu la technique et de l'ingénierie...des EnR.”

11.1.2.2 Imagining and realizing future landscapes

The conscious designing of the physical human environment is one of the role landscape architects, among other environment designers, has always performed at different scales. Landscape architects both in France and in the Netherlands mention this activity regarding the energy transition process as the quotes RW1, JH1 and CC1 illustrate (see table 11.1). They advocate the capacity to develop the creative process of imagining, anticipating futures physical forms lead by the energy transition process and contribute to concretely realize them, assuring its aesthetics but also functionality aspect. Landscape architects mention the idea to foresee landscape changes addressing global energy transition scenarios (quote JH1), but for some also the smallest landscape changes, resulting from site PV and wind turbine park projects have to be supported by landscape architect contribution (quote CC1), being smaller composition parts of landscape energy transition shaping.

Regarding renewable energy technology, the approach is not to hide them, but to make these elements tell a new story about the ongoing energy transition in the landscape, being new tangible landmarks in the landscape, representative of a new process and need.

“Typical polder landscape, boring... and let's ... this big gesture, here the landscape we can call it a 'landscape story'. [...] What you can do very big like this. Don't try to put windmills in the landscape as if there are places where these windmills fit, because it is never, always fits, or never exactly fits. But make...tell a new story with it.” (NL5, 2017) – Figure NL5⁸

Besides, landscape architects recognize that designing could support the energy transition process rethinking spaces that require to be adapted to new needs (e.g. equipped spaces for waiting the charging of electric vehicles) supporting people to adopt more “energy efficient” behavior, as expressed by the quote RW1 (see table 11.1).

And, at the same time, as the same quote express, it is recognized the role of landscape designing as able to reduce energy consumption and improve energy efficiency, through the designing of spatial organization and land use. Designing energy transition landscape means “to put the reduction of energy consumption and of RES... to put them horizontally, at the same level.”⁹(FR4, 2017)

Landscape designing is believed to contribute to solve issues about energy transition process. The landscape designing activity being linked to the creativity of imagining and foreseen future possibilities and at the same time of being able to think about its concrete feasibility, and at projects site specific context. Indeed one landscape architect feel the need to specify that: “To be creative does not mean to be disconnected to the reality” (NL2, 2017)

11.1.2.3 Supporting the elaboration of a shared project

Several landscape architects in the two nations (seven) highlights the action of mediating among

⁸ The drawing represent a large scale wind turbine park of an organic form superposed to the regularity of a preexistent territorial square-grid polder, allowing it to be landscape visible landmark in the landscape telling a new energy producing history.

⁹ “de mettre MDE et les EnR... les mettre à horizontalité, au même niveau”

energy transition process stakeholders (e.g. inhabitants, private RE developers, experts, etc.). This in order to support a constructive dialogue among them, improving the understanding among parts to lead to a shared project, which takes into account and merge together in the best way the different concerns and aspiration as illustrated by the quote IC2 (table 11.1). At the same time as the same quote shows the dialogue with other project stakeholders or agents acting on the territory is also a source of knowledge about different topics (e.g. agriculture, urbanism, etc.) and about the territory itself (e.g. historical). This knowledge is important for developing a process that is well grounded in the territory answering its issues.

Moreover landscape architects perceive their role not only about supporting and facilitating the dialogue and so the process, but they also participate actively to the dialogue and to the process itself (quote IC2 and JV1). They contribute finding a main thread among topics, among territorial characteristics and give an interpretation to develop a coherent vision: “orchestra conductor, they have an interpretation and they listen...they are very empathic to the interpretation of everybody”¹⁰. (FR3, 2017) – Figure FR3.

Indeed to do that many emphasize the importance to use visual support during the dialogue and how the skill of graphically represent a concept or represent future landscape possibilities is fundamental. For example, to spatially represent energy quantitative goals could support people understanding making things more tangible. We found this graphically represented in the drawing NL3 and NL7 as rectangular sheets. And one of the interviewee’s state:

“And, of course, because we are able to visualize. It is easier to communicate with all different... both stakeholders in the region but also with technical experts.” (NL1, 2017)

Another point highlighted as a potentiality of their profession and supporting this role of mediation is their capacity to understand and be competent in different fields:

“I think what is also good with spatial design, is that we are not really specialist, we are more generalist so we know a little bit about everything, instead of knowing everything.” (NL2, 2017)

And finally another Dutch landscape architect emphasizes (figure NL6) as a basis for supporting people network and dialogue the capacity to look across geographical scales and on the long-term:

“So this is the landscape architect, on the national/ supranational level, and regional and the local level almost with people and looking over the country to have an overview, but also have a view on time, on the long-term. And helping people to get network on the right place at the right moment” (NL6, 2017)

Indeed energy transition is a multi-scale and multi actor process (Loorbach and Rotmans 2010) which goals are established for 2030-2050 so the capacity to think about the future possibilities and how to get there is relevant.

So the mediating capacity does not only refer to the idea of facilitating energy transition process, but landscape architects contribute actively and substantively to the dialogue, as an expert able to represent future landscape possibilities, creating maps and figures that support people in the understanding of the project. Thanks also to the ability to work across scale, touching different

¹⁰ “chefs d’orchestre, ils ont une interprétation et ils écoutent... ils sont très emphatiques à l’interprétation de tous.”

levels but trying to keep a global view.

11.1.2.4 Supporting local inhabitants towards conscious landscape changes

A category of stakeholder in energy transition process to which practitioner address a particular attention are the inhabitants of a territory. The inhabitants are the main figures impacted both by the landscape changing than the action to achieve the energy transition goal of a local community, being the end users of the landscape.

Landscape architects highlight the role of supporting/accompanying inhabitants in the energy transition process of their territory. Practitioners could allow the understanding that landscape is a dynamic entity, being subject to a continuous transformation, and energy transition process is not an exception. In this way they position themselves at the interface between the inhabitants and their evolving landscape as expressed by quote MM1 and CL1.

This interface position is believed to facilitate the energy transition process making better accept the landscape changes that this will lead, lowering possible local opposition, as expressed by a landscape architect while drawing a series of RE production projects creating new shapes in the landscape:

“these are some of the changes that landscape could undergo in the transition process, and we could help people to understand these changes...finally, they understand better the interest of energy transition... finally, via the landscape axis understanding that landscape is not a postcard”¹¹. (FR7, 2018) – Figure FR7

Landscape architect could symbolically act as a framework between inhabitants and the landscape to guide them to look at it and to understand its dynamicity and so its future changes impulse by energy transition process (see figure FR5).

At the same time being at the interface with inhabitants could also allow the landscape architect to understand their issues and trace back their aspiration as it is expressed by the quote CL1. Landscape being used as a medium and a method (Nassauer 2012) to develop discussion about energy transition.

In relation to this role - supporting inhabitants - landscape architects highlight the ability to analyze a landscape and at the same time to be able to talk to people with vocabulary understandable for everybody and visual representation along with the capacity to animate collective meeting. A particular very beneficial action are the organization of “field workshop” with inhabitants and eventually other agents/stakeholders in order to “speak about landscape being immersed in the landscape”¹² (FR6, 2018). And in this context is mainly the visual perception of a landscape that is emphasized.

This role is only mentioned in the French context. However Dutch practitioners equally consider inhabitants in the energy transition process, but they do not speak about them separately but as a part of the many stakeholders involved in the process, as represented in drawing NL3 and NL7, under the more general name of “people”.

11 “Enfin, ils comprennent mieux après l’intérêt de la transition énergétique... Enfin, via l’axe du paysage, en comprenant que le paysage ce n’est pas une carte postale quoi.”

12 “Pour parler de paysage en étant plongé dans le paysage.”

11.1.2.5 Supporting in the development of energy transition policy guidelines

The contribution in supporting energy transition policy is pointed out as illustrated by the quote DJJ1 and DO1 (table 11.1). This particular role is mentioned only by three Dutch landscape architects, one working as a project leader “energy and space” for the Zuid Holland Province and the other two working in an office mainly implied in supporting in early strategic phase of the projects.

Regarding this contribution landscape architects mention the need to work at provincial and/or municipal scale, as mentioned by the same quotes (DJJ1 and DO1). So focusing on large geographical areas, which could refer the idea of territory (see chapter 4), having a prospective of the whole system as much as possible and interact with local institutions.

The interviewees empathize the importance of a translation in spatial and landscape term of energy quantities as one of landscape architect reported: “then there is also... really the spatial dimension of the Peta joules, the kilowatt hours. There is the need to make these quantities spatially explicit.” (NL3, 2017) – Figure NL3

However one of the landscape architects highlights how in the making of energy transition policy the action of spatially represent the energy goals too early in the decision making, showing the wide extent of the spatial and landscape impact, could be difficult to accept and potentially slow down the process. In her word:

“Something goes in and you need to have...it’s not only with the maps but also into flow cart or...but the use of map [maps representing the spatial and landscape footprint of energy quantitative choices for a territory] it’s really useful to get straight what we are talking about, not just the quantities, but how affects our living surroundings that... in the process of decision-making these maps became smaller and smaller. So they are very important for understanding but at the decision-making level they are a bit too scary. So at the beginning you [as a landscape architect] are here, you play a role and at the end may be you are not there anymore”. (NL4, 2017) – Figure NL4

This seems to suggest that in some cases, even if landscape architects are involved at the very beginning of the energy transition physical implementation contributing to energy policy definition, this early implication could not be enough to maintain a spatial perspective of the energy goals all along the deciding process. This because the spatial representation of energy territorial goals could be too broad creating resistance a fear among certain stakeholders. A possibility preventing this problem could be to divide the spatial representation of the ambition in shorter timeline steps, showing how the energy goals and their corresponding spatial/landscape changes progressively.

11.1.2.6 Developing multi-functionality in energy projects

Two Dutch landscape architects points out how they could contribute thinking about a multi-functionality of specific energy conscious project that need to be implemented in the energy transition process as illustrated by the quote DO3 and FS2.

They perceive designing as able to weaving multiple connection among topics (e.g. water management) and among functions (e.g. agriculture, recreational etc.) in order to lead to more

desired futures. It relates to the capacity of thinking about possible interaction based on the analysis of a site, of a territory, considering all its component in a multi-criteria basis, even if it is an energy focused commissioned projects. The generalist background of the profession being important to establish these connections. The multi-functionality of a project being highlighted as something making the difference between a project where a landscape architect participate compared with another where he is not:

“Because it’s possible to make a wind energy plan without any choices, just look what is ...what are the areas where there is the least negative impact on the landscape. Try to make a line in between it and you have a plan without a landscape architect, so the landscape architect should show them some more options that there are more aspect that could be included in the project, more functions, that could improve the project beyond energy production that could make it more acceptable...” (NL5, 2017)

However to have a transversal approach in not always easy, in order to cross sectors, to cross functions the initial commission program needs to be reformulated and adjusted, as landscape architect precise:

“sometimes the inclusion of other topics is not mentioned by commissioners, by the initial commission but...you...but that doesn’t mean that you could not consider them, include them in the design...and convince commissioners that it’s good...that it’s better...even if it cost more money...” (NL5, 2017)

11.1.3 Specificity of drawing process

All practitioners, except one, started speaking about how they see their role in energy transition and after a while they start to draw. Some landscape architects represent what they think its landscape architecture main contribution, even if they list several contribution in their oral narratives (e.g. NL2, NL3). Others try to synthetized several contributions they mentioned orally in more complex drawing, generally also adding precision and details to their description (e.g. NL3, NL7).

Asking landscape architect to draw has been useful to establish a hierarchy in their discussion, fixing on the sheet the most important topic and to add details about the topic, supporting them in elaborating more their answers. This is well represented in the box 11.1, (NL7 interview) that shows, how the landscape architect in the oral narrative speaks about general “stakeholders” of the energy transition process, and through the drawing it details the main stakeholder’s categories: people, policy makers, technicians, developers, and how they interact among them, and with landscape architecture professionals. To draw supports practitioners in their thinking. Two main kind of representation are developed by landscape architect: some (eight) draw the landscape architect itself and/or its action (e.g. FR2, FR3, NL3, NL6, NL7), several others (six) draw a landscape, an energy transition landscape, showing where and how landscape architect act/design in it (FR5, FR7, NL1, NL5, NL8). In both cases the act of drawing encouraged landscape architect to think dynamically to their contribution as a process, focusing both on the action to develop than on the result of the actions. And also when landscape architect focus on the tangible form on which they could act the drawing process allow to follow the process to get there, broadening the insights we could get from interviews.

The drawing contents are broad and varied in both nations, being connected to the experience and aspiration of each interviewee. Indeed no substantial differences have been found between French and Dutch drawings, however some specificities should be mentioned. The first is that if all Dutch landscape architect draw forms, in France one landscape architect refuse to sketch and another represents a schema through words (FR6). Moreover the majority of French landscape architects in the drawing synthesize one main role (e.g. see FR2, FR3, FR5). Instead Dutch interviewees try to represent graphically several contributions (see e.g. NL6, NL7) compared to the French practitioners (four vs one).

11.2 Landscape architecture role towards energy transition: agents point of view

In the previous part it is discussed how landscape architects perceive their role in the transition process. In this section I inquire the landscape architect contribution from the perspective of energy transition agents working on energy transition process. This double inquiry allows understanding whether there is a convergence or divergence of views between the two parts that could give insight about the recognition of landscape architect profession. Moreover the comparison between the two nations could highlight differences, allowing to put the results in perspective.

In this section I analyze semi-structured interviews conducted with agents in the three case study territories analyzed in part two of this thesis (see annex 7 for the list): CC Monts du Lyonnais ten interviews, CC Thouarsais nine interviews and the municipality of Goeree-Overflakkee eight interviews. The total number of interviews analyzed in this part is 27. These interviews represent a sample of agents implied in the energy transition process of a territory. However for the inquiry I try to collect a broad range of points of view of key agents, covering the internal technical service of energy transition of the *communauté de communes* (France) or municipality (Netherlands), elected representatives, and other external consultancy agents or people developing specific energy transition project.

These agents are working on territories where a landscape document (e.g. *plan de paysage*) has been elaborated or it is in progress in connection to energy transition process (see chapter 5 for the territories choice criteria), so these agents entered in contact and collaborate with landscape architecture profession.

In other words, the discussion below report the perspective of agents in somehow familiar with landscape architecture profession. So these results should not be read as representatives of any territory agents, but those having a landscape concern displayed on the territory.

Results need to be appreciated considering this circumstance.

Table 11.2 summarizes the three main roles interviewed agents attach to landscape architect role in energy transition. Subsequently these categories are described and discussed.

Table 11.2, typologies of the role of landscape architect in energy transition from agents' perspective, illustrated with quotes and with the number of interviews in which the role is mentioned. The table includes quotes selected as representatives of the main typologies listed in the table, in order to provide a clear image of the contribution facets, but avoiding repetitions. Total of 27 interviews. Source: author from re-elaboration of the landscape architect semi-structured interviews.

Category	Quote	Code
Integrating RE technologies in the landscape – 13 times	“Yes, Yes, I think that landscape architects, precisely, I think that they could enormously help about integration of renewable energy in local landscapes. So I think that these could be competences that could be integrated in our development strategies, of wind turbines parks for example, so that the integration is optimal.” ¹³ (Project manager energy and climate - CCT 2017)	DM1
	“There are farmers that call a landscape architect to look how organize... finally how to make the site pleasant to look at [in the surroundings of the biogas plant facilities]. With trees plantations, small soil slope, things like that. Things that make the site just nice to look at” ¹⁴ (Rhone agricultural chamber, energy adviser-ML 2018)	GC1
	“I think solar panels in the surroundings then you can see the effect on the surroundings ...and you can give advice for example to make it harmony with the surroundings, that not disturb, the landscape, for example. And maybe you can also do this with wind turbines.” (municipal councilor innovation and sustainability-GO 2017)	TB1
Supporting in the understanding of future landscape possibilities – 13 times	“There are many things in landscape aspect that go through the draws, the photo...It's very much visual. And these visuals are very concrete, and I think that this speak very much to the elected members. More than writing. Even on proposal, you know, what I was talking earlier: do you see when you put a hedge there, this allow to that distance... [to hide a wind turbine]. To make a little drawing, I think that it's immediately speaking...	AC1
	<p>13 “Oui oui, je pense que les paysagistes, justement, j’pense qu’ils peuvent énormément aider sur l’intégration des énergies renouvelables dans les paysages locaux. Donc, j’pense que c’est des compétences qui pourraient être intégrées justement dans nos stratégies de développement, des parcs éoliens par exemple, pour que l’intégration soit optimale.”</p> <p>14 “Il y a des agriculteurs qui ont fait venir un paysagiste pour regarder comment organiser... enfin comment rendre le site agréable à regarder [dans les environs d’unités de méthanisation], quoi. Avec des plantations d’arbres, des petits talus, des trucs comme ça, quoi. Des choses qui font que le site est juste agréable à regarder”</p>	

”¹⁵ (Sustainable territorial management division director-CCT 2017)

“so also the artistic [landscape] impression at the beginning are very useful, because you take those to the people who live in the village and say: ‘look this is the plan. That is now on the table, what do you think, you probably not going to like this so please pay attention, think with us how we can make this better, because there will be 15 wind mills but now they are standing like this, is that the best way?’ So the communication, to others stakeholders is very very dependent on this ...visualization and changing visualization after somebody says ok but what if we do like this, visualize this, make the scenario and then look at it again.” (Sustainability policy adviser-GO 2017) MvS1

Integrating energy transition with other topics - 3 times

“I think that the most benefit you have is to paint a big picture, so if it’s going to be here, how does it work around it, how do people use the landscape? Can we improve others things? We cannot deny that is there, but you can make the transformation have an impact on the higher scale considering many other topic” (Policy adviser spatial development-GO 2017) PD1

“Because you see nowadays is “ok this is my border this is where I stop thinking”. But for landscape architect this border is not the end of landscape. Landscape is bigger than that. And I hope that a lot of landscape architects are able to inspire municipalities in building new desirable landscapes, which are attractive not only for energy production, but also for recreation and may be economical driven uses.” (since 2017 account manager of energy transition in Stedin, before Program manager for sustainability and innovation GO 2017) LS1

¹⁵ “Y a beaucoup de choses dans les aspects paysages qui passent par finalement le dessin, la photo... C’est très visuel. Et ces visuels-là sont très concrets, et j’pense que ça parle beaucoup aux élus. Plus que de l’écrit, voilà. Même sur des propositions, tu sais, c’que j’te disais tout à l’heure : est-ce que vous voyez quand vous mettez une haie-là, ça permet à tant de distance... [de cacher une éolienne]. D’en faire un p’tit dessin, j’trouve que c’est tout de suite parlant et... voilà...”

11.2.1 Integrating RE technologies in the landscape

Thirteen interviewees mention as the main landscape architecture contribution to energy transition the landscape integration of RE technologies, as the quotes DM1, GC1, TB1 illustrates (table 11.2). However this role is highlighted mainly by agents working on French territories. Only one interviewee highlights this role in Dutch context (quote TB1), the person being an elected representative of Goeree-Overflakkee so probably concerned about possible local opposition towards new RE projects, for whom visual impact is an important contribution. In addition, as the quote GC1 and TB1 points out, what is considered of importance for integrate RE technologies is the design of their implementation site surroundings, that through tress, bushes, earth banks or other elements could hide them.

The design composition of the RE technologies on a defined plot and the upstream site choice for the project itself are not mentioned as part of the landscape architect contribution. Indeed these two actions could contribute to a “good” integration in the landscape, upstream of the implementation phase, and not at the end of the process for “damage control”, for example considering the vision axis from the main streets in the territory, eventually avoiding putting RE devices visible from there. Probably RE technologies site is more connected to opportunity, land propriety, or other. Only one agent of the CC Monts du Lyonnais who participated in some meeting organized by the landscape architect for the elaboration of the *plan de paysage* explicitly highlight landscape architect as able to support in the RE site choice affirming:

“And I think that he has a role to play precisely to avoid that we begin to produce renewable energy everywhere and in any way. It could be planned, and the role of...of landscape architects could be of saying: there in that place, that place, that place we could...we could produce quite a lot. Here, we could put a field of renewable energy production, but it could be well built in the landscape”¹⁶ (responsible energy transition service, Parc Eco Habitat-ML 2017)

This landscape architect’s contribution of integrating RE technologies in the landscape, is something that they are indeed already developing. For example, it is compulsory both in France than in the Netherlands to have landscape impact study for the implementation of wind turbine parks, which content are detailed for example in the French “Guide relatif à l’élaboration des études d’impact des projets de parcs éoliens terrestres” [Guide concerning the impact study of onshore wind turbines parks] (Ministère de l’environnement de l’énergie et de la mer 2016).

However a very small number of landscape architects (two) when specifically asked about the role in energy transition mention this, how seen in the previous sub-chapter (e.g. quote CC1 table 11.1). And one of the two, a Dutch landscape architect, explicitly affirm that this is a recognized landscape architecture role, but she immediately added that this is not what she thinks is the most relevant contribution to the energy transition. In her word:

“The most easily recognized role for designer that is when we have to install solar panels or windmills or whatever, then you make a plan how to build them. But that is the traditional role. I don’t think that’s

16 “Et je pense qu’il a un rôle à jouer justement pour éviter que on se mette à produire des énergies renouvelables partout et n’importe comment. Ça peut être planifié, et le rôle du... du paysagiste pourrait justement de, là, dire : ben là, tel endroit, tel endroit, tel endroit on pourrait... on pourrait produire pas mal. Ici, on pourrait mettre un champ de production d’énergies renouvelables, mais ici ça s’implanterait bien dans le paysage.”

the most interesting role at the moment, although it's still very necessary because we see a lot of examples that it's not done by designers and well... then it's not always very smart, and not nice and not beautiful, well whatever" (NL1, 2017)

Towards this design for RE technology landscape integration one Dutch agents explicitly react against the idea of landscape architect camouflaging RE technologies in the landscape:

"It what it is it's high-tech, you have not to make it curby, or you don't have to paint it pink, if you know what I mean. It's what it is, it's metal, it's hard it's not soft and I don't think you have to externalize it's an industrial landscape. So with this project [pallantpolder in Goeree-Overflakkee] we have said the energy is hard, the landscape we made is soft. It's contrast, you have not to hide it, this is what it is it's metal into landscape" (Policy adviser spatial development-GO 2017).

This shows a gap between what is considered by the higher number, of the interviewed agents, the role of landscape architects and what they think or would like to develop. Moreover, mentioning this landscape architect contribution, agents' perspective address mainly aesthetic landscape component, focusing on the tangible visibility and shape of these projects in the landscape.

11.2.2 Supporting in the understanding of future landscape possibilities

The second most frequently contribution of landscape architects mentioned by agents (13 interviewees) is the capacity to imagine future landscape transformations and being able to share this possible changes through visual graphical representations, as expressed by the quotes AC1 and MvS1 (table 11.2). The same quotes highlight how these graphical representations elaborated by landscape architects are believed to be useful tool to develop discussion with stakeholders or with inhabitants giving a concrete image able to clarify thing and eventually support in decision taking about projects, considering their spatial and landscape repercussion. Interestingly an elected member of the CC Monts du Lyonnais, which participates in the participatory indoor and outdoor workshop conducted during the elaboration of the *plan de paysage* of the CC Monts du Lyonnais, mentions along with graphical representations the usefulness of the participatory field visit, developed by landscape architect as well.

"And after the tangible case on the field. It's a good tool, because...It's better not to be too numerous. But she [the landscape architect] showed us the landscape strength lines, its characteristics and so how the implementation of PV panels could be done in the villages in the industrial areas, but being in the places...being in the landscape, so this becomes very clear, very evocative..."¹⁷ (mayor, b.VP energy transition-ML 2018)

In this last quote it could also be recognized how a landscape architect also action of mediation among stakeholders, among people through the landscape perspective.

17 "Et après aussi le cas concret sur le terrain. C'est un bon outil quoi, parce que. Faut pas être trop nombreux non plus, voilà. Mais elle [la paysagiste] nous montrait les lignes de force du paysage, ses caractéristiques et du coup comment peut se faire une implantation des panneaux photovoltaïques dans les villages dans les zones artisanales, mais étant sur le lieu... étant dans le paysage, donc ça devient très claire très parlant...parce que en plus on donnait notre opinion, on pouvait s'exprimer sur ce qu'on souhaitait..."

Then a Dutch agent mentioned the use of a board game, elaborated with the purpose of guiding stakeholders in a progressive spatial understanding of the energy choices on a territory, acknowledging that the choice of different RE technologies for achieving the territorial energy production goal has different spatial footprint.

“yeah they made a sort of game you can play on the table, with little wind mills and solar fields and they made, the area on the scale and the symbol on the scale as well. And say this is your energy use in 2035 go ahead, so you can visualize it and you can play it. And you can swap or you can invest in innovation and ten windmills will disappear and you get something new... so you can ...yeah in a nice way you can address the issues.” (energy transition program manager-PZH 2017)

So the capacity to visualize and to represent is at the center of the landscape architecture contribution, but it could take different and more interactive form than the more “traditional” drawings, photomontage, etc. where the designers are not experts that answer a commission proposing a project, but co-work, co-design with other agents or other stakeholders. However in agents perspectives this remains very secondary in the narratives, and it is something highlighted by agents that have participated in this kind of activity with a landscape architect.

We found some similarities with the role *supporting the elaboration of a shared project and imagining and realizing future landscapes* discussed in the previous sub-chapter, mentioned by landscape architects. However if landscape architect in their narratives expressed the possibility of their contribution as agents able to synthesize different aspirations and needs, create synergies, actively participating in discussion and the project process (e.g. see quote IC2 table 11.1), in the agent’s narratives this role is mostly narrowed to the elaboration of visual landscape representation of projects possibilities.

11.2.3 Integrating energy transition with other topics

The two previous contributions are those that we found mostly in agents interviews. However, another possible landscape architect contribution to energy transition is mentioned by a smaller number of agents.

Particularly two Dutch interviewees highlighted landscape architect’s capacity to integrate projects leading the energy transition with other functions and subjects, crossing scales and administrative boundaries, as mentioned by the quote PD1 and LS1 (table 11.2). Through thinking the energy transition for a territory other strategies could be explored and connected to it, such as agriculture, recreation, etc. leading broader benefits beyond energy only. Moreover eventually through landscape cross-border consideration, opportunity could be found in nearby municipalities creating shared projects and synergies (LS2).

It is probably not a coincidence that the two agents expressing this role are working on Goeree-Overflakkee where, as explored in part 2 of this research, several energy transition landscape report has been formulated at provincial and municipal scale and an explicitly multifunctional energy production project, combining recreational, ecological aspect is under implementation (see chapter 8 - “Zonneweide van Pallandtpolder” project).

11.3 Crossing perspectives on design

In the two previous sub-chapters, I explored the contribution of landscape architects towards energy transition, first looking at the landscape architect's perspective, secondly at that of other agents. In this section, these landscape architects and agents' perspectives are compared to highlight their similarities and differences. Finally, the differences between Dutch and French answers are discussed.

11.3.1 Different approaches towards energy transition landscape

designing: operational, strategic, services

The nine contributions of landscape architects from their internal and external perspectives can be grouped into three different approaches towards design. One belongs to what could be called a *strategic* approach and another to an *operational* approach. And some contributions also show a shift towards *service design*. These are three recognized design categories, but interaction exists among them and sometimes their boundaries could be unclear when applied in practice (Ceschin and Gaziulusoy 2016). Here we use “designing” instead of “design” to emphasize the idea of the action more than the results of the design process (Lenzholzer, Duchhart, and Koh 2013). Both *operational* and *strategic designing* are the main axis of landscape architect practice (de Jonge 2009; de Waal and Stremke 2014), where the main highlighted difference is the focus on the final product for the first and on the process for the second (de Jonge 2009).

Operational designing: focuses on forms' shapes and objects' outcomes at lower/site scale, and requires primarily short-term implementation (de Jonge 2009). The strategic approach is generally associated with a large scale, and concerns also the vision across scales, and the far future (Albrecht 2004). From a landscape architecture perspective, Kempenaar et al. (2018) exploring different design disciplines, highlights several dimensions that could characterize *strategic designing*: (1) taking a system perspective, (2) opening future visions for more desirable futures and indicating pathways/actions to reach them, (3) interacting with tangible forms during the design process, (4) developing a co-design process with people, (5) fostering the process thanks to the flexibility and transdisciplinary collaboration.

Moreover, some contributions seem to belong to what is now called *service designing*, as a process defining rules and functioning systems more than resulting in a single product and form (Thackara 2008). Based on the observation and understanding of user behavior and needs in a context aims to provide usable, desirable efficient service solutions for the users (Irwin 2015; Saco and Goncalves 2008) that could also be seen as a community of people. *Service design* is considered to mainly address strategic perspectives in projects (E. Manzini and Vezzoli 2003), even if its implementation would require the implementation of several operational projects. Both *service designing* and *strategic designing* focusing on ‘designing for something’ rather than ‘designing something’ show a progressive shift in the 20th century (Meroni and Sangiorgi 2011; Meroni 2008). *Designing* in landscape architecture has the double purpose of aesthetics, giving a pleasing fashionable appearance to the design result, but also functionality, by creating or re-creating a utility service (Donadieu and Périgord 2007).

Table 11.3. Landscape architects' contribution addressing different approaches to *designing* in the energy transition context, from the landscape architects' and agents' perspective. Approaches representing the majority of interviewees are marked with "***". If few acknowledge the designing approach is marked "**", and "-" if that is not the case. Source: author from re-elaboration of the semi-structured interviews.

Landscape architects' contribution typologies	Number of interviews where the contribution appears	Operational designing	Strategic designing	Service designing
Landscape architects' contribution from their own perspective				
Grounding the energy transition in a territory	10	*	**	*
Imagining and realizing future landscapes	9	*	**	*
Supporting the elaboration of a shared project	7	-	**	-
Supporting local inhabitants towards conscious landscape changes	4	-	**	*
Supporting in the development of ET policy guidelines	3	-	**	-
Developing multi-functionality in energy projects	3	*	**	*
Landscape architects' contribution from agents' perspectives				
Integrating RE technologies in the landscape	13	**	*	-
Supporting in the understanding of future landscape possibilities	13	**	*	-
Integrating energy transition process with other topics	3	-	*	-

Table 11.3, summarizes and puts in perspective how the landscape architects' contributions, from their internal perspective and the energy transition agents' external ones, relates to these three different *designing* approaches: *operational designing*, *strategic designing* and *service designing*. The table shows how several of these contributions could be related to several of these *designing* approaches, as addressed by the interviewees.

11.3.1.1 Strategic designing

The same table shows that *strategic designing*, is the main approach addressed by landscape architects when they mention their contributions to energy transition. Considering their prevalence for *the strategic designing* approach, table 11.4 illustrates more in depth the connection among the landscape architects' contribution to energy transition and the five dimensions advanced by Kempenaar et al. (2018).

The typologies of landscape architects' contributions listed are elaborated with the goal to understand their connection with the energy transition process. So, the typology definitions is based on the analysis of the corpus of semi-structured interviews, but are not thought to directly reveal or overlap the dimensions of *strategic designing*. Nevertheless, the results show that connections exist and could be critically discussed.

Table 11.4 shows that some dimensions associated with *strategic designing* almost overlap with the typologies defined for landscape architects about their contribution to energy transition.

Table 11.4, landscape architects' contributions put in connection with the five dimensions of *strategic designing*. Dimensions that are strongly acknowledged in the interviewees are marked with “**”. If some acknowledgements are made about *designing* dimensions, they are marked “*”, and “-“ if that is not the case. Source: author from re-elaboration of the semi-structured interviews.

Strategic design dimension according to Kempenaar et al. 2018	(1) Taking a system perspective	(2) Opening future visions for more desirable futures and indicating pathways/actions to reach them	(3) Interacting with tangible forms during design process	(4) Developing co-design process with people	(5) Fostering the process thanks to the flexibility and transdisciplinary collaboration
Landscape architects' contribution from their own perspective					
Grounding the energy transition in a territory	**	*	-	-	*
Imagining and realizing future landscapes	*	**	-	-	-
Supporting the elaboration of a shared project	*	*	**	**	**
Supporting local inhabitants towards conscious landscape changes	*	*	**	**	-
Supporting in the development of ET policy guidelines	*	**	**	-	-
Developing multi-functionality in energy projects	*	*	-	-	**
Landscape architects' contribution from agents perspectives					
Integrating RE technologies in landscape	-	*	-	-	-
Supporting in the understanding of future landscape possibilities	-	*	*	*	-
Integrating energy transition with other topics	*	*	-	-	-

For example, the typology *imagining and realizing future landscape*, corresponds to the point (2) of *strategic designing* about *opening future visions for more desirable futures and indicating pathways/ actions to reach them*. Instead, other dimensions of *strategic designing*, are transversal to several contribution typologies.

One of the transversal dimensions is the idea of *taking a system perspective* (1), which means to consider the whole system (such as territory) and its multi-dimensional nature, not just isolating elements but looking at their interactions and potentially creating synergetic links (e.g. Ceschin and Gaziulusoy 2016; Ezio Manzini 2015). And this system perspective is transversal to all the landscape architects' contributions, because of their capacity to synthesize different functions and components while *designing* the transition to energy producing and low energy consuming systems. This dimension is particularly emphasized in the contribution named *grounding the energy transition in a territory* (e.g. quote BS1 table 11.1) but also in *imagining and realizing future landscapes* and *developing multi-functionality in energy projects* (e.g. quote FS1 table 11.1) in which landscape architects address the possible results of this system and cross-breeding perspective. The first puts the accent on the recognition/comprehension of the system to lead toward sustainable changes, the second shows what these changes will look like, and the third focus on how to merge several dimensions in projects. The point (2) *opening future visions for more desirable futures* also crosses landscape architects' contributions underlying their ability to foresee actions needed to be done to reach energy transition energy goals from a spatial/landscape perspective. This is especially stressed in *imagining and realizing future landscapes* and *supporting in the development of energy transition policy guidelines* where they want to select and to orientate towards specific subjects that frame actions (Albrechts 2006) (e.g. quote DO1 table 11.1). Moreover, across these landscape architects' contributions, the use of tangible drawings or other supports is considered highly important and useful, to explicitly show energy spatiality and landscape spillover, here addressed by point (3) *Interacting with tangible forms during design process*. This point is particularly emphasized when addressing the idea of *supporting the elaboration of a shared project* (e.g. quote JV1 table 11.1) and of *supporting local inhabitants towards conscious landscape changes*. These last two contributions are also connected to point (4) *developing co-design processes with people*, accenting how landscape architects could interact and speak with stakeholders, with local inhabitants during the design process (e.g. quote CL1 table 11.1). Finally, the point (5) stressed in *supporting the elaboration of a shared project* and *developing multi-functionality in energy projects* where exchanging with experts and other disciplinary fields is considered important to better take in consideration all the dimensions and subjects of the energy transition process (e.g. quote IC1 table 11.1).

These results show how the dimensions of *strategic designing* are present and included in landscape architects practice while working in energy transition, and where the most important dimensions appear to be the ones referring to interaction with stakeholders, inhabitants etc. (dimensions (3), (4), (5)). This seems to strengthen their contribution as “mediators” able to conceive representations and establish dialogues that could be the basis of territorial shared projects. The goal is to find spatial/landscape solutions that answer the social questions around energy transition implementation.

Another point of attention that emerges considers that the majority of contributions address by a *strategic designing* approach are that landscape architects do not feature themselves as the sole owner of the projects, on which to put a signature, instead they conduct them with a more

sharing attitude. Nevertheless, in some cases, such as those represented in the drawing NL5, the landscape architect expressed an idea to take over the project, an attitude mainly found in the contribution *imagining and realizing future landscapes* where personal creativity is put forward. So, these contributions show complementarities and alternation between what Heeres *et al.* (2017) call *technical* and *relational designing*. The first focusing on the design content and the optimization of a solution while the second develops collaborative approaches to discuss problems and consider solutions (*ibid.*). This *relational designing* approach illustrates the base of the contribution *supporting the elaboration of a shared project*, while the second could be found in *imagining and realizing future landscapes*.

11.3.1.2 Operational designing

Finally, several contributions from the landscape architects perspective address *operational designing*, but how as illustrated in table 11.3 (above), is less addressed. The designing of tangible forms shapes *designing* is something landscape architects have traditionally dealt with, but the few mentions of this approach in the interviews could be connected to the fact that they perceive it as evident in the way they can be involved in energy transition process, and so with no need to mention it. It could also be connected to the fact that energy transition process is recognized as a complex problem, concerning technical and social changes (Miller, Iles, and Jones 2013), that need to be addressed across scales, involving a broad range of actors and resources (Fischer-Kowalski and Rotmans 2009). So maybe this has induced landscape architects to emphasize roles that address the energy transition process itself as a whole, more than the smaller near future projects that lead up to it. Indeed, we found in the interviewees always employed the strategic approach across these contributions, while the operational one is always secondary and never addressed alone. However, some interviewees highlighted this approach, particularly in *imagining and realizing future landscapes*, where short term, smaller, site specific projects such as the implementation of a PV park are addressed as part of landscape architects' role in energy transition (e.g. quote CC1, table 11.1). The progressive implementation of sites short-term projects contribute to the progressive implementation of the different long terms strategies and energy goals for territories to become energy neutral or energy positive. Some references to more tangible designs could also be seen in *developing multi-functionality in energy projects*, where the idea for the final shaped form of a site allows a multiple functions, such as renewable energy production along with recreational activity. These roles are more focused on the design process and what they could bring to energy transition in terms of strategy rather than on the final product. However, many small tangible and operational projects when thought upstream the process as a whole, could be part of strategic vision. In particular, a Dutch landscape architect mentions the necessary interaction between these two approaches to achieve energy transition goals:

“if in a global energy scenario in a region, you could define smaller designs that you could implement easier and faster...well then it will be easier for commissioners to accept... and it will be more probable that the strategy will be achieved, you have to think broad but also very small” (NL6, 2017).

11.3.1.3 Service designing

Finally, the discourse of several landscape architects' contributions could be brought back to *service designing*. Landscape architects work in spatial/landscape contexts where people live, shaping tangible forms, organizing space, and modifying land use that directly or indirectly are always connected to the people as end users of these places. Landscape/spatial *designing* could influence people's behavior about specific subjects. For example, the implementation of a bicycle path could encourage people to embrace slow mobility, instead of using the car. So landscape *designing* in energy transition context can contribute to encourage people to improve and support more energy-conscious and efficient behavior. This approach to *designing*, focusing on people end users behavior is found in several landscape architect narratives even if it is not the primary approach mentioned. We found references to this approach in the contribution of *supporting local inhabitants towards conscious landscape changes*, where it could be recognized in the narratives the idea of observing and understanding people's needs and aspirations in order to answer them as much as possible (e.g. quote CL1 table 11.1). A similar attitude could be found in the contribution about *developing multi-functionality in energy projects* where the idea of combining other dimensions/functions beyond energy to the project could foster other desirable services for the users, such as recreational ones or a calm working environment. However where the connections to this design approach are more clearly made is in the *imagining and realizing future landscapes* where the quote RW1 (table 11.1) directly addresses the role of designers who could "change people's behavior" (NL8, 2017) by *designing* new functional spaces that could increase energy efficient behavior. Other contributions can be attached to *service designing*, but in the interviews the connections with people's behavior and needs are not directly addressed.

So narratives show that the *service designing* approach that originates from multidisciplinary fields but is mostly applied to companies and markets place (Saco and Goncalves 2008), it has begun to be addressed in landscape architecture, possibly by bringing a spatial perspective to this *designing* approach in an energy transition context. This context is particularly favorable because individual people's behavior is recognized as having a role to play in improving energy systems (e.g. Vainio et al. 2019; Steg, Perlaviciute, and van der Werff 2015).

11.3.1.4 Discussion for future designing

Landscape architects seem to position themselves at the interface between global energy transition issues and their translation into local landscape planning and design. In this way they remind that the landscape is not an isotropic space, as global agenda often address it as such (Olwig 2011), but it is heterogeneous (Nadaï and van der Horst 2010). And it is through working/acting on this heterogeneity, that landscape architects can improve the grounding of energy transition process in local landscape. All the contributions highlighted by landscape architects are local, meaning that they are thought out in a particular context, which could be ranging from a specific spot site, or a region or a nation, but never mentioning the idea of applying an energy strategy, as applied elsewhere, without a proper analysis of the context. This point fits into the introduction of a landscape architects approach towards another emerging *designing* approach: the "transition design". It is defined as "design led societal transition toward

more sustainable futures and reception of an entire lifestyle. [...] Transition design focuses on the need for ‘cosmopolitan localism’, a place based lifestyle in which solutions to global problems are designed to be appropriated for local social and environmental conditions” (Irwin 2015, 231).

However, this *designing* approach is directly orientated towards the idea of sustainability, and accentuates the ethical component in this activity and a professional engagement, as key agents of energy transition, along with aesthetical and functional concerns. In this case the designers do not work only for a commissioner (private or public) but must give an account of their work to the whole community. In landscape architecture, this point is linked to the kind of commission the landscape architect could get and/or decide to answer. Indeed even if a landscape architect shapes a living environment, by bringing defined qualities (esthetics, ecological, etc.) by answering a commissioner or social/public procurement, it is subject to the procurement’s terms itself, in some way limiting the marge of maneuver (Donadieu 2009a).

11.3.2 Differences between agents’ and landscape architects’ perspective towards the profession

Moreover table 11.3, shows a difference between landscape architects’ and agents’ perspectives, where agents see mainly a contribution towards energy transition regarding an operational/tangible involvement, more than a strategic one. Besides *service designing*, that connects landscape architect practice with users’ behaviors, is not addressed in either national context. The majority of French agents address the primary landscape architect contribution such as *integrating RE technologies in the landscape*, by referring to the site and short-term projects made for implementing RE technologies in landscape, referring to an operational tangible designing. The second contribution from agents’ perspective *supporting in the understanding of future landscape possibilities* according to the interviewees, addresses both operational and strategic *designing*, even if in numbers, the proportion for the reference is more linked to site RE technologies projects, than territorial understanding for landscape translation of energy transition goals on a long-term (three vs ten interviewees). However, this contribution is the one that, even if few in number, addresses the higher number (three) of the strategic design dimensions (see table 11.4). Moreover, the last contribution emphasized by agents *integrating energy transition with other topics* is addressed mainly from a strategic large-scale and considers a systemic perspective of the territory or beyond cross-breeding of topics (1) (see table 11.4).

Beside from the table 11.3 we could see that the typology of possible contributions from agents’ perspectives are fewer compared to the ones mentioned by landscape architect themselves.

The confrontation between landscape architects’ and agents’ perspectives reveals a gap between the two about possible role for landscape architects where the agents’ perspectives put the accent on the final product more than on the process, on the shape of forms and spaces more than on the definition of a process-oriented actions.

Nevertheless, the three contributions mentioned by agents are effective contributions that landscape architects themselves recognize as part of their practice, and that partially overlap with the other contributions typologies coming from landscape architects’ perspective. The name of

the contributions defined by landscape architects' and agents' perspectives are different, because even if some similarities exist between certain contributions, the point of view developed by the two sides respectively it is not the same.

Figure 1 illustrates where the two points of view have some common points. In the role of *imagining and realizing future landscapes* mentioned by landscape architects about the siting of RE technologies is addressed (e.g. quote CC1 table 11.1), but it is not featured as the main realm of intervention from their point of view. And the landscape architects that do emphasize it, refer to RE siting process as new layers on the landscape and landmarks that express the transitional phase that the territory/society is experiencing (e.g. figure NL5), without the notion of camouflage. The preservation of scenic landscape aesthetics seems to remain one of the main concerns from the agents' perspective, as shown by the high number (13) of interviewees mentioning *integrating RE technologies in the landscape*. This is a subject recognized which connects the landscape architect's work with the RE implementation (Apostol et al. 2016). The landscape architects I made interviews with speak about it, but site RE technologies implementation is mentioned as being less interesting compared to work on the global energy transition process for a territory, such as a *plan de paysage*. This shows that landscape architects' contribution in the energy transition process is related to a recognized limit about the landscape architecture profession brought to attention by Donadieu (2009a), where he mentions how landscape architects are more often called to conceal/hide an effect instead of working and interacting with the cause of the effect.

Concerning the other contributions mentioned by agents, of *supporting in the understanding of future*

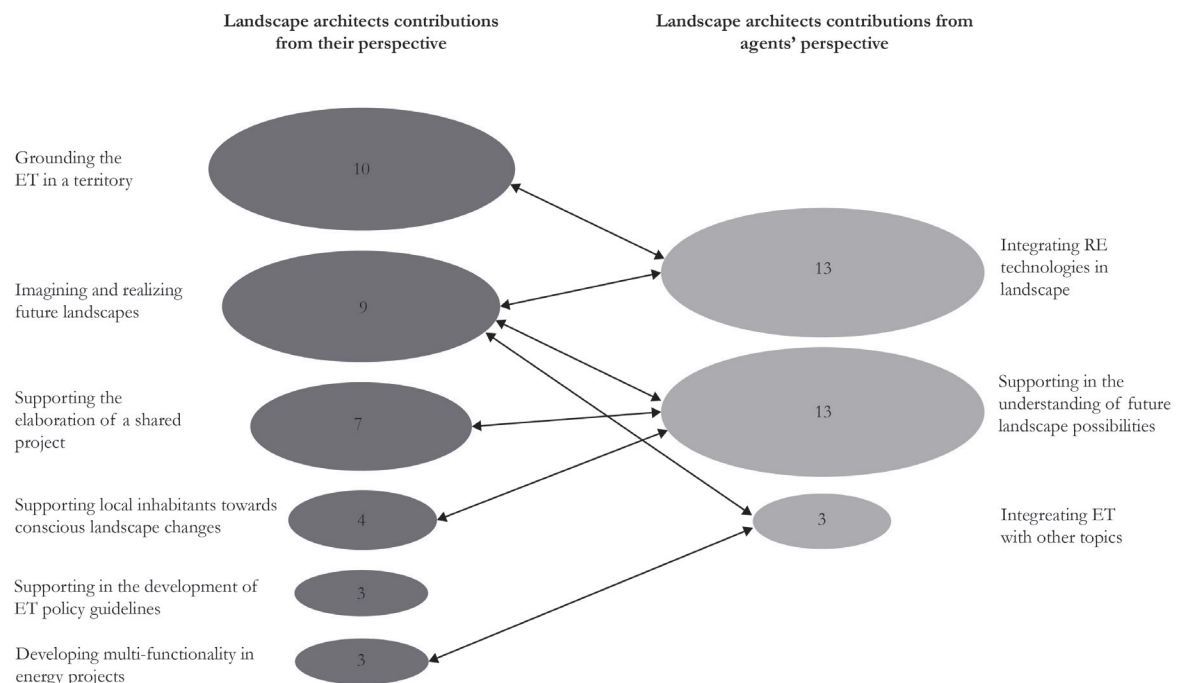


Figure 1. Connections between the landscape architects' contributions to energy transition from the landscape architects' and agents' perspectives. The size of ellipse corresponds to the number times the contribution is mentioned. Source: author from the elaboration of the semi structured-interviews.

landscape possibilities is an action landscape architects extensively speak about, being at the very basis of landscape design activity, imagining and implementing something that is not yet there. This illustrated by several quotes that are associated with the contribution *supporting the elaboration of a shared project* such as IC2 and JV1 (table 11.1), but also in *imagining and realizing future landscapes* as the quote JH1 (table 11.1) represents and *supporting local inhabitants towards conscious landscape changes* (quote CL1 table 11.1). However, in agents' narratives landscape architects' contributions are considered as a support to facilitate the process, while landscape architects emphasize their ability to propel and to syntheses. Landscape architects try to stress the importance and value of their own profession.

The last contribution mentioned by agents about *integrating energy transition processes with other topics* has a common point with *imagining and realizing future landscapes*, acknowledging landscape architects' capacity of thinking about new desirable landscapes that include a global vision, integrating different topics. However this agent's perspective typology is one having more in common with the landscape architects' perspectives with great similarities to *developing multi-functionality in energy projects*, where the quotes DO2 and FS1 (table 11.1 landscape architects' perspectives) as the quotes PD1 and LS1 (table 11.2 agents) share the idea that looking at landscape as a whole, could reinforce connections to other functions and values such those that are economic and recreational, by broadening from the sole energy focus. However, this contribution from agents' perspective is addressed only by three persons, and so really few times compared to the other two contributions (see table 11.3), suggesting that this a role still not easily associated with landscape architecture by persons external to the profession, yet. Moreover, connections between the landscape architects contribution to *supporting in the development of ET policy guidelines* and agent's perspective do not seem to be established. Indeed, this contribution refers to a *strategic* approach to *designing*, located upstream the decision making process that orientates further implementations, the *designing* approach that we have seen in table 11.3 is overlooked from agents' perspective.

Nevertheless, some additional common points are identified between the agents' and landscape architects' visions. The main point shared is the capacity of landscape architects to visualize, to represent future possibilities (e.g. quote AC1 and MvS1 table 11.2). A *designing* action is recognized as able to foster the understanding of a situation and the communication (e.g. Sheppard 2005). However, agents addressed visualization referring to site RE implementation changes while landscape architects' make reference also to a more global idea of imagining what an energy transition landscape will look like (e.g. JH1 table 11.1).

Another common point to be found in both perspectives is the capacity to reach a broad audience through landscape, allowing different people with different ideas and background to express themselves and establish dialogue among parties. This ability is expressed by some agents accenting a contribution that refers to *supporting in the understanding of future landscape possibilities*, by mentioning participatory field visits and interactive board games. This being expressed from the landscape architects' perspective, for example, in the quote IC2 (table 11.1).

Another difference between the two perspectives is that in agents' narratives about landscape architects' contributions, there is not an explicit reference about the possibility of landscape architecture reducing of energy consumption, but instead is found in some landscape architects' narratives (e.g. RW1 table 11.1). This could be connected to the idea, in agents' mind, that energy

reduction is “less visible” in landscape (see chapter 8 and 9), compared to the RE technologies, so it is less connected to landscape *designing*.

The differences in the kinds of contributions from the two perspectives could have repercussions in the kinds of commissions that landscape architects could get, and these could fail to match their aspirations in the years to come. So maybe landscape architects need to be more explicit about their own profession.

11.3.3 Differences in landscape architects’ contributions in France and the Netherlands

In this chapter I discussed the contribution of landscape architects in energy transition, analyzing both the French and Dutch answers. However, some peculiarities from the two nations were outlined along the chapter and deserve more discussion, by looking at the number of times that a contribution is mentioned in each country, without forgetting that is only a sample.

Figure 2, shows some differences between national contexts. One of the most evident differences could be associated with the contribution of *grounding the energy transition in a territory*, mentioned by all French practitioners and by two Dutch interviewees. This result does not mean that the other Dutch landscape architects do not analyze and ground energy transition in local contexts,

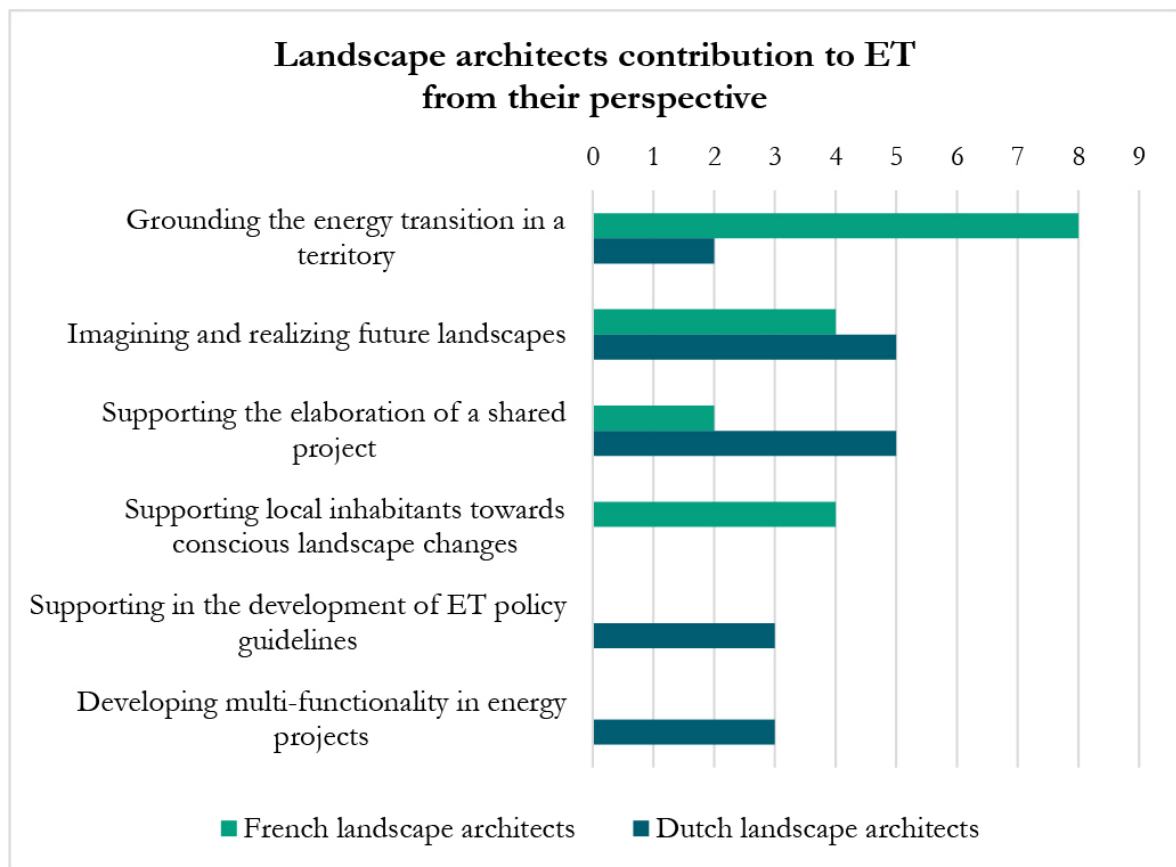


Figure 2. Landscape architects’ contribution to energy transition process, from their perspective with the number of interviews in which the role is mentioned subdivided for nation.

Source: author from re-elaboration of the semi-structured interviews.

but choosing to not highlight this in their narratives, could be related to the fact that they consider the topic too evident and not worth mentioning compared to others. While French landscape architects all mention this seems to show they consider it as a strong peculiarity of their profession.

Another difference is that the two contributions *supporting the development of energy transition policy guidelines* and *developing multi-functionality in energy projects* are mentioned only by Dutch practitioners, this again could be connected to the kinds of projects they work on during their professional practice, suggesting that French landscape architects do not highlight this role because they have not yet experienced it or that in the French context it is something in which they do not think they could be involved.

Particularly, three Dutch landscape architects mention the possibility of *supporting the development of energy transition policy guidelines* suggest a recognized involvement in government planning policies for landscape architects about energy transition topics. Indeed in the Netherlands the presence of the “College van Rijksadviseurs” [Government advisers board], composed by landscape architects, architects and urban planners has the goal to advise the central government on spatial quality and publish several documents about energy transition, the last one “via Parijs” (College van Rijksadviseurs 2019) outlining a spatial landscape picture for the Netherlands in 2050. Certainly, this does not mean that all the advice is taken into account, but at least they exist and are heard. Dutch landscape architects have been involved and employed by the government for “ruimtelijke ordening” [spatial planning/ordering] since long time (de Jonge 2009), and they probably express the feeling of continuing to do so in the energy transition process. Moreover, one of the Dutch landscape architects I interviewed, mentioning this contribution to policy guidelines, is “Projectleider energie en ruimte” [Project leader energy and space] in the Province of Zuid-Holland. This a job position introduced by the province itself in order to support the development of its energy transition policy and roadmap while considering spatial quality. So, landscape architects in the Netherlands are directly called upon to perform this task. In France too, there are the “paysagistes conseil de l’Etat” [landscape architect State advisers] (see chapter 10), but, according to the interviews they are mostly called to give advice to local collectivity about specific RE technology implementations.

Also the contribution *developing multi-functionality in energy projects* is highlighted by Dutch practitioners and one of them connected this with something typical to the Dutch background: “I think Dutch designers always think about making it about more than just energy” (NL3, DO 2017). Probably this refers to the small and highly dense characteristics of the Netherlands where the superposition and coexistence of different functions are a necessity. Indeed, some references to other topics, such as agriculture, concerning not only energy, can also be found in French narratives, for example in the quote IC1 (table 11.1) about the *plan de paysage* development that is cross sector in definition. However, this quote the focus is not explicitly about superposing functionalities in a project, but on the mediation activity among stakeholders working in different sectors.

On the contrary, *imagining and realizing future landscapes* is a contribution equally mentioned in the two countries, addressing more directly the creation and transformation of spaces and shapes as an intrinsic activity in landscape architecture (Donadieu 2007) and highly performed in the two national contexts.

If we compare the two national perspectives about the different kind of contributions agents mention for landscape architects, illustrated in figure 3, some points can be discussed. The first point is that almost only French agents, except one Dutch agent, mention the *integration of RE technologies in landscape* as a main contribution by landscape architecture.

Moreover, just two Dutch agents working for the municipality of Goeree-Overflakkee mention the contribution *integrating energy transition processes with other topics*, therefore addressing landscape architects' ability to consider and combine different functionalities, and adding possible values to the process. It is interesting to mention that from the landscape architect perspective the mention of the contribution *developing multi-functionality in energy projects* is stated directly only by Dutch practitioners, showing a convergence of points of view. As proof of the importance of multifunctional thinking in the Netherlands, is that in the *Klimaatakkoord* (2019) [climate agreement] are stated four spatial principles that include this topic: (1) efficient and multiple use of the space (where possible); (2) closest possible alignment of supply and demand for renewable electricity; (3) combination of tasks and targets; trade-offs and rezoning if necessary; (4) close alignment with area-specific spatial quality.

The Dutch agents' answers, even if reduced in number compared to the French responses, because they result from one Dutch embedded case analysis (Goeree-Overflakkee), seems to suggest landscape architects' contributions to be more in line with landscape architects' own expectations. This could be linked to better knowledge of the landscape architect profession in the Dutch context or at least in a territory such as Goeree-Overflakkee where many reports connecting the energy transition process and landscape were written (see chapter 6), may be creating a better understanding of the profession. It is, however, true that also in the two French

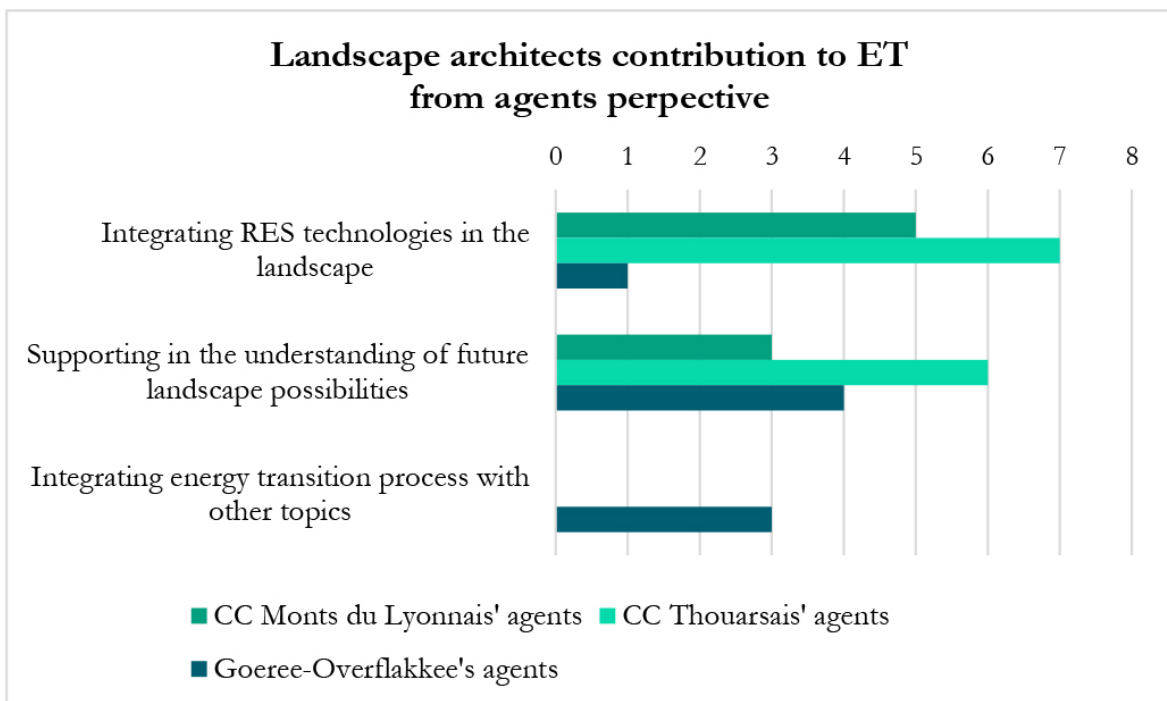


Figure 3. Landscape architects' contribution to energy transition process, from agents' perspective with the number of interviews in which the role is mentioned subdivided, for territories and national contexts. Source: author from re-elaboration of the semi-structured interviews.

territories a *plan de paysage* has been elaborated allowing interviewed agents to enter in contact with landscape architects, for the elaboration of this document that is strategic in nature since it's on the scale of the territory, cross-sectoral, and considers the different strategies of energy transition and is based on participatory workshops (see chapter 6). However, even if several agents' experienced the participatory workshop and collaborated on the *plan de paysage*, they gave only a few highlights on these broader strategic contributions of landscape architecture (e.g. quote table 11.2).

A way to interpret these differences could be connected to the national contexts and backgrounds towards the landscape architecture profession, where the Dutch landscape architects possess a more protected and recognized title, compared to their French counterparts.

Box 11. Contribution of chapter 11 to the part 3 research question

In this chapter the landscape architects' contributions towards energy transition are explored from an internal, external (energy transition agents') and binational perspective. The first outcome is that from landscape architect's point of view they could and would like to work on energy transition mainly from a *strategic designing* approach, also shifting to *service designing*, more than *operational* one. Instead, agents mainly point out an *operational designing* approach such as integrating RE technologies in landscape. This shows a gap between the two visions that could have spillovers on the kind of commissions landscape architects could obtain in the energy transition process. Moreover, the binational inquiry shows some differences between the French and Dutch contexts. From the landscape architect point of view, the differences are not many, even if Dutch practitioners mention the possibility of *supporting the development of ET policy guidelines*, not mentioned in the French context, suggests a stronger and earlier strategic implication, in the definition of the energy goals themselves, before the implementation phase.

CHAPTER 12: Practice in transition? Adapting knowledge and design process in an energy transition framework

In the previous chapter we discussed landscape architect's contribution in energy transition process. This chapter explores what knowledge and design process landscape architects consider necessary to work in energy transition, analyzing their discourse along with energy transition projects they worked on and they talked about during the interviews.

In this research, *energy transition related projects* (ET projects) refer to projects that landscape architects are working on, which have the goal to contribute to one or more of the three strategies that composes energy transition: renewable energy production, optimization of energy flows/energy efficiency and reduction of energy consumption.

The aim of this chapter is to provide insights about what kind of knowledge that conventionally belongs to landscape architects, they use and consider useful for working on ET projects and whether they need to acquire additional knowledge and perform additional design steps when they are working on these ET projects. The increasing number of ET projects could affect landscape architecture practice and lead to possible changes and evolutions in terms of knowledge and /or new design steps to apply in the process. At the same time landscape architects could have some key knowledge to support energy transition implementation – another focus of this research. In this chapter, both points of view are explored.

The research draws insights from semi-structured interviews with landscape architects. They have been asked open questions about the knowledge they used and design process they develop in energy transition contexts coming from their experience in the field. Moreover, I inquired about specific ET projects in order to get additional information (see chapter 10 for more information on the method).

The landscape architects I interviewed work on various kinds of projects related to energy transition. This broad range of projects allows to extract a wide palette of insights on the topic. However, the landscape architects that were interviewed are not exclusively working on this kind of project, but also working on others such as parks, water management, landscape studies for infrastructure such as highways and many more. This diversity in terms of project typologies allows them to have a better understanding of the differences and any additional knowledge needed while dealing with energy transition.

Table 12.1 (below), gives an overview of the projects landscape architects spoke about during the interviews. These projects could be subdivided in four main categories: *RE technologies site design*, *landscape strategic perspective for RE technologies' localization*, *landscape strategic perspective for energy transition*, *landscape energy transition quantitative scenarios*, and *non-energy transition focused projects* (table 12.1).

These four project categories that landscape architects worked on belong essentially to two groups. The first group includes *RE technologies' site design* and *landscape strategic perspective for RE*

technologies' localization categories, focusing on the RE production axis of energy transition through the implementation of RE technology projects. Specifically, *RE technologies' site design* (design siting) category includes the elaboration of a landscape study and design of different layouts for RE technologies, especially wind turbines or photovoltaic panels, when the implementation plot is already settled (e.g. FR3, FR7 table 12.1). *Landscape strategic perspective for RE technologies' localization* (strategic siting) consists of designating possible sites for RE technologies (e.g. FR6, NL2, NL5 table 12.1) on a larger territorial basis.

Beyond the focus on RE technologies, the second group of projects mentioned by landscape architects is of strategic nature, meaning that it provides a recommendation and action framework to enable stakeholders to achieve a certain goal (Albrecht 2004), in our case a landscape and spatial perspective towards energy transition concerning energy production, energy saving and energy flow optimization (e.g. FR4, FR6, NL1, NL3, NL7 table 12.1). *Landscape strategic perspective for energy transition (ET strategies)* includes projects providing energy transition strategies for a territory, such as the development of PV panels, and defining, design guidelines for their siting and implementation. However, in these projects these strategies are not supported by energy calculation and quantification in terms of energy production or reduction of energy consumption, that are instead at the basis of the *landscape energy transition quantitative scenario (ET scenarios)* project, another category belonging to strategic projects group. This category grouping projects defining energy transition strategies for a territory, accompanied by energy calculation and spatial surface analysis to provide as much as possible insight on the feasibility of the energy goals (NL3 and NL8 table 12.1).

The category *non-energy transition focused projects (non-ET projects)*, refer to projects in which landscape architects affirm of consciously using knowledge and design steps in projects (such as parks etc.) in which they estimate having contributed to reduce energy consumption or to improve energy efficiency even if these projects are not explicitly related to energy transition. In table 12.1, it could be seen that only one landscape architect FR8, directly name this project category. However during the interviews several other landscape architects (e.g. FR1, FR3, NL8) made reference to this project category, but not naming them specifically, so they are not included in the table. However this category is considered necessary to give a more comprehensive and exhaustive overview of the topic, and also showing how from landscape architect perspective a broad range of projects could be energy transition related, even if it the energy topic is not specifically commissioned.

In any case, there are other projects that landscape architects worked on that could be considered related to energy transition process, such for slow mobility ones supporting in the reduction of energy consumption working on bicycle path for example, or working on the implementation of high- voltage lines needed to dispatch electricity coming from RE projects on the territory. However even if several landscape architect we interviewed have worked on these kinds of projects, according to their portfolio (e.g. FR3), they do not speak about these experiences when asked about energy transition projects. That could do that they perceived these projects as less connected to the transition topic compared to the renewable energy production.

However a majority of French landscape architects (six) talk about *design siting*, while Dutch ones mainly highlight landscape strategic energy transition projects. This could be the result of the most usual kind of commission they receive in energy transition, but it cannot be considered

representative for the French nor Dutch situation because we targeted certain firms affecting the sample. However in order to have a broad vision on the topic the choice of landscape architecture firms has been made selecting firms that worked as much as possible on different kinds of projects from one another, looking at their portfolios and other publications. However for the French case, even if we searched for diversity, the main kind of project displayed in the landscape architects' portfolio are about RE technologies implementation. Possibly, because they are still not very much involved in strategic energy transition projects. However, thank to the landscape architects' online inquiry (chapter 10) and exchanges with other networks working on energy transition (e.g. TEPOS etc.) we were able to interview two landscape architects that developed a *plan de paysage* focusing on energy transition of territories, introducing a large-scale landscape strategic vision on the topic (FR4 and FR6 table 12.1).

Table 12.1, overview of French and Dutch energy transition related projects discussed during the interviews with landscape architects. Source: author from elaboration of the semi-structured interviews and project documents.

Landscape architects	Project	Project goal	Project category	Year
French landscape architects				
FR1	Wind turbine park, Lande de Cojoux (Bretagne)	To advise, to develop a landscape impact study about the implementation of 5 wind turbines near a megalithic archeological site.	RE technologies site design	2012
	Drafting, in the APCE's group "landscape and energy" of two methodological guides about solar energy and wind turbines	To develop methodological guidance and recommendations for the implementation of wind turbine parks and photovoltaic panel projects	Other: guide document	- wind turbines 2009 - solar energy 2010
FR2	Wind turbine park, Mayenne	To develop an environmental impact study on the implementation of 6 wind turbines	RE technologies site design	2010
	- Drafting, with the APCE's group "landscape and energy" of two methodological guides about solar energy and wind turbines	To develop methodological guidance and recommendations for the implementation of wind turbine parks and photovoltaic panel projects	Other: guide document	-document about wind turbines 2009 -document about solar energy 2010
FR3	Wind turbine park, Mailhac sur Benaize	To develop a landscape impact study for the implementation of 7 wind turbines: layout localization in a site	RE technologies site design	2015/2016

FR4	<i>Plan de paysage</i> CC Monts du Lyonnais*	To elaborate a <i>plan de paysage</i> at the scale of the CC, including the energy transition topic	Landscape strategic perspective energy transition	2016
	<i>Plan de paysage</i> CC Thouarsais*	To elaborate a <i>plan de paysage</i> at the scale of the CC, including energy transition topic	Landscape strategic perspective for energy transition	2018/2019
	OAP “energy and landscape” (PLUi) CC Thouarsais*	To elaborate a document for the implementation of wind turbines in the territory (with the location previously defined)	Landscape strategic perspective for RE technologies localization	2018- In progress
FR5	Wind turbine parks, Nord-pas de Calais	To advise about the implementation of a wind turbine park	RE technologies site design	Since 2000
FR6	<i>Plan de paysage</i> for Parc naturel régional (PNR) de la Brenne	To elaborate landscape analysis and objectives for future development landscape including renewable energy production.	Landscape strategic perspective for energy transition	2013/2014
	“Schema régional éolien” [Regional wind schema] (SRE) of Rhône-Alpes region	To define suitable areas for wind turbine parks and their implementation at regional scale. Collaboration with other firms or offices and DREAL, DDT, ADEME, RTE, ERDF.	Landscape strategic perspective for RE technologies localization	2012
FR7	Wind turbine park participatory project, Parc naturel régional du Pilat	To support the local community in the choice of the site for the implementation of 10 wind turbines and elaboration of the environmental and landscape study.	RE technologies site design	2011/2018
FR8	Wind turbine and photovoltaic park, Finistère	To give landscape advice about wind turbine and PV park projects	RE technologies site design	Since 2010
	“Le parc du Grand Pré”, Langueux, Bretagne	A park designed with attention given to recycled and used local materials in order to reduce energy consumption	non-ET focused projects: park design	2008
Dutch landscape architects				
NL1	“Eo-Wijers” competition: “Energie & Omgeving. Verbinden van systeem en paktijk” [Energy & Environment. Connecting a system and practice]	To develop project strategies for energy neutrality for “Stedendriehoek” (city-triangle) Apeldoorn-Deventer-Zutphen in 2030. Collaboration with other firms H+N+S, FABRIC, WING, Witteveen+Bos and CE Delft	Landscape strategic perspective for energy transition	2015

NL2	“Goeree-Overflakkee. Sustainable energy in the landscape”, visions for renewable energy production **	To develop landscape visions though a mix of renewable energy production (wind turbine, solar, biomass) to achieve territorial energy neutrality in 2030.	Landscape strategic perspective for energy transition	2011/2012
NL3	Analysis of energy potential in a territory: Parkstad Limburg Energie Transitie (PALET)	To support eight municipalities (South of Limburg) to assess, form a spatial perspective, on the potential for energy savings and for renewable energy generation before stating political targets. Collaboration WUR, HNS, Zuyd, CoE NEBER, Parkstadlibourg	Landscape energy transition quantitative scenarios	2013/2015
NL4	<i>Regionaal energie strategie</i> Goeree-Overflakkee	To follow the process and give advice, but not directly lead nor develop the project.	Landscape strategic perspective for energy transition	2017
NL5	Landscape design strategies for choosing sites for wind turbines in the Flevoland polder	To develop alternative scenarios for the site choice for about 150 wind turbines in the Flevoland polder.	Landscape strategic perspective for RE technologies localization	2004
	Wind turbine park along the Sternweg, Zeewolde in Zuidoost-Flevoland Province	To elaborate a layout for the implementation of 9 wind turbines.	RE technologies site design	Started in 2005 and finished in 2013
NL6	Advice report to petaplan, developed as Cra (college van Rijksadviseurs)	To advise and give perspective to the Government and ministry about the need to consider landscape from a qualitative perspective in order to achieve energy goals at national level.	Other: advice document	2017/2018
NL7	Wind turbine parks in Wieringermeerpolder, Holland, Kroon municipality, Province Noord Holland.	To develop an “image quality plan” [Beeldkwaliteitsplan] for global thinking and coherent development of about 350 MW of electricity production from wind turbines.	Landscape strategic perspective for RE technologies localization	2014
NL8	Development of solar energy components and creation of synergies with other components (wind, etc.) for the elaboration of the project “Energy & space. A national perspective” [Energie & ruimte. Een national perspectief]	The general project was aimed to explore scenarios about Dutch energy uses and to develop scenarios in order to supply them though wind, solar, biomass, geothermal energy as well as energy savings. Collaboration among NRGlab, HNS, POSAD, FABRIC, Studio Marco Vermeulen and Vereniging Deltametropool. FABRIC was in charge of the solar energy component	Landscape energy transition quantitative scenarios	2017/2018

* Document discussed in detail in part 2 of the research about the French embedded cases CC Thouarsais and CC Monts du Lyonnais

** Project discussed in detail in part 2 of the research about the Dutch embedded case report, “Goeree-Overflakkee. Duurzame energie in het landschap” [Goeree-Overflakkee. Sustainable energy in the landscape]

Every project needs a specific amount of knowledge that is specific to the questions at hand in the commission and the site. However we found in landscape architect interviews some recurrent general topics that allow sketching a portrait of landscape architects working on energy transition projects.

In the following, we firstly we study knowledge and know-how that landscape architects highlight as necessary when dealing with energy transition projects. With ‘knowledge and know-how’ we mean all the information and understandings acquired by courses, personal learning or experiences. A difference exists between knowledge and know-how term, where the first refers to a more theoretical level and the second refers to a more “practical knowledge and ability” (Stevenson and Oxford dictionary of English 2010). In landscape architect interviews, both these levels of knowledge are mentioned but are entwined and mixed together, the boundaries between them being blurry, especially considering that for landscape architects these theoretical and practical knowledge have both the goal to conduct to the design action. In this thesis and during the interviews in both nations, these are both referred to as ‘knowledge’ [savoir].

Secondly, we inquired about the landscape architect’s design processes. The goal is to understand which steps are the most important to be performed and whether new additional steps have emerged in practice.

At the end of this chapter, conventional/additional knowledge and conventional/additional design steps from practice are discussed relating them to the different categories of projects in which they are used.

This allows to understand whether some (and if so, what kind of) energy transition projects require more knowledge and modification of the design process.

12.1 Adapting knowledge for working on energy transition process?

The multidisciplinary that characterizes landscape architecture lead the practitioners to have a varied knowledge background depending on the national institutional context, socio-cultural and the approach thought in landscape architecture schools (van den Brink et al. 2017). However Landscape architects’ knowledge is recognized to include natural sciences (botanic, ecology, soil science, geomorphology, etc.), humanities/social sciences (history, geography, art, etc.) but also technical science (hydrology, construction techniques etc.) (Bell, Sarlöv Herlin, and Stiles 2012), also together with what could be defined design knowledge [savoir de conception] (Donadieu 2007) such as graphical representation (e.g. drawing).

In the narratives of landscape architect working on energy transition related projects are mentioned what we call “conventional” knowledge, meaning the set of knowledge that is recognized as belonging to landscape architecture domain that is now used in energy transition projects. Along with conventional knowledge a certain amount of additional knowledge is also highlighted by the interviews, in order to conduct certain kinds of projects in energy transition context. In the following section these conventional and additional knowledge are discussed, highlighting some differences between French and Dutch practitioners.

The table 12.2 below summarize conventional landscape architecture knowledge belonging to landscape architecture discipline along with the additional knowledge needed to which landscape architect refers as necessary to be acquired in their practices working energy transition related projects

The largest number of landscape architects mention several kinds of knowledge useful to work in the energy transition, so the sum of the number of the different knowledge category is higher than the total number of interviews. These categories are further described and discussed below.

Table 12.2, categories of conventional landscape architecture knowledge and additional one needed to be acquired for working in energy transition process, illustrated with representatives' quotes and with the number of interviews in which the role is mentioned. The table includes quotes selected as representatives of the main categories listed in the table, in order to provide a clear image of the contribution facets, but avoiding repetitions. A total of 16 interviews. Source: author from re-elaboration of the landscape architect semi-structured interviews.

Category	Quote	Code
Conventional landscape architecture knowledge		
Design knowledge – 15 times	“So you need to know how to look and understand landscape, to represent it also...to represent the existing landscape and also designing choices. The drawing, the photomontage before/after, for what is the integration of things...and use aerial photos of...and many other ways. This is the basis. It's ...in 1960, or before, we were already doing that” ¹ (FR4, 2017)	IC1
	“So knowing a little bit of a wide range of subject and being able to combine them in a site in a project, because I think this what spatial designers also are. And, of course, drawing skills and providing image of new imaginaries to reintegrate all these different functions” (NL2, 2017)	JH1
	“Actually the capacity to represent...it's true that it's interesting to have... to be able to give a representation to people that are concerned, so the inhabitants and also people who decide, so the regional and departmental authorities. So it's necessary to do photomontages, that means that you take a picture and you make a project simulation on it, but there are so many representation methods! and nowadays there are several software	MM1

¹ “Donc il faut savoir regarder et comprendre le paysage, le représenter aussi... représenter l'existant et aussi les choix de projet. Le dessin, le photomontage avant/après, pour c'qui est de l'intégration des choses...et utiliser de photos aériennes de... et plein d'autres façon de faire. Voilà c'est... Voilà c'est la base, hein. C'est... En 1960, ou avant, on faisait ça déjà hein.”

doing it.”² (FR7, 2018)

**Hydrology,
topography
and geology
knowledge –
5 times**

“You need to know to read the territory, its morphology, its hydrographical system, its geological structure...but these concerns two levels both one on the field and to be able to read maps... the map of the ...level lines... the topographic and hypsometric maps make it possible to read a certain number of things starting from the relief. But to be able to do that you have to know about the adapted terms, the different components composing and hydrography systems, how they work, for example what is and how it works a watershed... And this is an important knowledge...for all the projects and in the framework of wind turbines projects for example too. Because if you are not able to do that, whether you’re working on an energy projects or not you won’t be able to understand the territory”³ (FR3, 2017)

CC1

“And you need to be able to read the whole landscape components, its hydrography, very important in the Netherlands, for water management, even if at the end you have to make energy transition scenario, you have to have this knowledge about water system about the topography, so how different components are named, how they works, how they could interact... because all this is important to know even if you want to deal with energy at the end, and this also could give additional ideas for the energy scenario” (NL2, 2017)

JH2

**Ecological
knowledge –
3 times**

“And we have this knowledge about ecology too...it’s important because when you deal with wind turbine project or other technological devices you know that they have an influence on the ecology...and if you have some basic knowledge is good to discuss certain ideas. For instance, we have this concept...this idea that could be good to put wind turbines in the forest, and even if you need to discuss it with ecologists you could have some initial ideas and make propositions” (NL2, 2017)

JH3

**Botanical
knowledge –
2 times**

“How that kind of essence used in this or that way, it will allow to lose some degrees or to bring it. In any case we know it, trees help fighting the

PA1

2 “En fait la capacité de représenter... c’est vrai que c’est intéressant d’avoir... de pouvoir donner une représentation aux personnes qui vont être concernées, donc les habitants et aussi aux personnes qui décident, donc aux autorités enfin régionales et départementales. Donc faire des photomontages, c’est-à- dire qu’on prend des photos et dessus on simule le projet, mais il y a tellement de méthodes de représentation! et maintenant il y a plusieurs logiciels qui le font.”

3 “il faut savoir lire le territoire, sa morphologie, son system hydrographique, sa structure géologique... mais cela concerne deux niveaux soit sur le terrain que aussi savoir lire les cartes... la carte de... avec des courbes de niveaux... les cartes topographique et hypsométrique permettent de rendre lisible un certain nombre de choses à partir du relief. Mais pour faire ça il faut connaitre les termes corrects, comment les réseaux hydrographiques sont composés, comment ils marchent, pour exemple qu’est que c’est et comment fonctionne un bassin versant...Et ça c’est un savoir important...pour tous les projets et dans le cadre des projets éoliens par exemple aussi. Parce que si tu ne sais pas faire ça soit que tu travailles sur un projet d’énergie ou non tu ne pourras pas comprendre et connaitre le territoire.”

heat island effect in the cities. [...] and even if it's not easy to evaluate... to evaluate the shadow, the quantity of shadow and the quality of the shadow behind some vegetal essences are different. And we could use this information in projects. Because it's obvious that the chestnut's shadow and of an acacia tree are two different things, and, moreover, they lose leaves so the sun could filter in winter...but we are not able nowadays to evaluate that precisely... this kind of information.”⁴ (FR1, 2016)

“And when you know about vegetal essences you could develop a virtuous circle, we could say, from energy point of view. It happened to me in a project to develop a...landscape design that allowed to make biomass because there was a biomass power plant nearby. And we had huge landscapes/ spaces to manage with areas for parking and of water retention in a waterproof soil. And so I know that some kinds of biomass... you could produce it very easily in wetlands. I accentuated that aspect so that [the biomass power plant] could be powered by energy”⁵ (FR8, 2018) LP1

Additional landscape architecture knowledge

Institutional organization and decision process – 8 times

“The way things are organized at territorial level and political level. And that, it seems to me absolutely essential. If we don't understand, we could not enter in strategy question. The strategy isn't about questioning about where to put wind turbines, it's about knowing at which moment we'll put them, with whom we'll work, how we'll finance them, how we'll set a number of thinking...over the next 15 years, or even the next 20 years. [...] in any case to understand a bunch of dimensions about decision organization. It's about politics, it's about the economy, it's about territorial PH1

4 “C'est à dire, comment tel type d'espèce utilisé de telle ou telle façon, va permettre de perdre quelques degrés ou de l'apporter. En tous cas on le sait les arbres aident à combattre l'effet de l'îlot de chaleur des villes [...] ce n'est pas facile à évaluer...d'évaluer l'ombre, la quantité d'ombre et la qualité d'ombre derrière certaines espèces végétales. Et on peut utiliser ces informations quand on fait un projet. Parce que c'est bien évident que l'ombre d'un marronnier et d'un robinier sont deux choses différentes et en plus ils perdent leur feuilles l'hiver et le soleil peut filtrer à travers...mais on n'est pas capable aujourd'hui d'évaluer précisément ça...ce type d'informations.”

5 “Et quand on connaît les essences végétales, on peut s'inscrire, on va dire, dans un cercle vertueux de ce point de vue de l'énergie. Ça m'est arrivé dans un projet de développer un... des aménagements paysagers qui permettaient de faire de la biomasse parce que il y avait une usine de biomasse à côté. Et qu'on avait des immenses espaces à gérer avec des espaces de stationnement et de rétention d'eau dans un terrain imperméable. Et donc comme je sais que certains types de biomasse sont très... se fait très facilement dans les milieux humides. J'avais accentué cet aspect-là pour que ça [usine de biomasse] puisse s'alimenter en énergie.”

strategy. We have to know the territorial stakeholders”⁶ (FR5, 2018)

“It’s important to understand the schedule but also who do what at each step...in the decision and implementation phase. If you don’t know that the project simply won’t be done especially for the strategic energy vision...” (NL3, 2017) DO1

Technical renewable energy production knowledge – 7 times

“you need to understand something about the technology so you need some kind of technical well... not background per se but you have to have some interest in the technological aspect so what is a Peta Joule, what is a Tera Joule, what is power, what is energy provision, the technologies how do they work, when do they work, what is their spatial we call it: *ruimte beslag* [use of space], what are the spatial dimensions of certain technologies?” (NL3, 2017) DO2

“I don’t know, may well it’s a little bit on details there are many very technical things. The effect you make advises and you think about structures and landscape but what is being realized in the end is a very technical element. It’s one high thing of metal and the influence on how exactly and it’s the... this is being placed in a landscape to have really influence on this on a small scale you should know what are... well how is this electricity being generated, where is this, how the energy and electricity is... how is the network attached who are responsible for example...” (NL5, 2017) FS1

Energy focused knowledge – 6 times

“Well, of course, there you need to have the knowledge of energy, because there are different measurement units, you know, Joule, Watt hours... so what that’s’ means, what’s the difference, how you could switch from one to the other...how to calculate... There are energy experts all around, but if you want to be able to talk, to these experts, you need a certain amount of knowledge on energy, if you want to develop new ideas, then you need a lot more knowledge on energy.” (NL2, 2017) JH4

“I think you need to have a certain interest also in the mathematical side but not only that. But it’s important because you know, you some presenting of people suggesting something but if you can’t put it in the right perspective and you can’t have the right basic calculation for it, then you know what are the values over there” (NL7, 2017) JV1

6 “la manière dont les choses s’organisent au niveau territorial et au niveau politique. Bon. Et ça, ça me semble absolument indispensable. Si on comprend pas ça, on peut pas rentrer dans des questions de stratégies. La stratégie, c’est pas d’s’e poser la question de savoir où on va mettre les éoliennes, c’est d’savoir à quel moment on va les mettre, avec qui on va travailler, comment on va les financer, comment on va phaser un certain nombre de choses dans... sur les 15 ans qui viennent, voire les 20 ans qui viennent. [...] en tout cas comprendre tout un tas de dimensions d’organisation de la décision. C’est de la politique, c’est de l’économie, c’est de la stratégie territoriale. Faut connaître les acteurs des territoires.”

Computer software –
5 times

“In particular wind turbines are always studied in a static manner, and this is a mistake, because the wind turbines turn, it’s a movement, it’s not a little animal that we pose on a territory like that and they don’t express themselves. [...] So I think that the movement implies that we do studies and we don’t use photography, sketches, etc., but using video not from the point of view but of trajectories, etc. Because it happened one thing... the size of these projects, and it concerns as much the wind turbine as the photovoltaic.”⁷ (FR1, 2016) PA2

“Another thing I have learned is I think the GIS component so with energy transition knowing something about quantity instead of always quality is more important. I think it was also important, for example: water or ecological projects but in energy it’s really important that you have your numbers right and you know, if you want to explain something about the spatial dimension of the energy transition, you have to know about what dimensions you are talking. So if a municipality you have to know what kind of room there is for certain energy technologies. So learning just practical GIS systems to be able to advise your commissioner on which technologies they can... they can use, you need to know something about the spatial composition of an area.”(NL3, 2017) DO3

“And this also allows to exchange, because of exchanging data among us - I work only about landscape criteria - but in the projects so there are other topics, but there is somebody working on the naturalistic component, somebody working on the acoustic component, all that. So, that’s it, we exchange GIS data and this that you could overlap everything, and all... we’ll have a global view under the form of a map”.⁸ (FR7, 2018) MM2

7 “Notamment les éoliennes sont toujours étudiées de façon statique, et ça c’est une erreur, parce que les éoliennes ça tourne, c’est un mouvement, ce n’est pas une bestiole que on pose dans un territoire comme ça et elles ne vont pas s’exprimer. [...] Donc je crois que le mouvement implique que nous faisons des études en nous servant non plus de photographie, petit dessins etc., mais en se servant de la vidéo à partir non pas de point de vue, mais de trajectoires, etc. Parce que c’est passé une chose... la grandeur de ces projets, ça touche autant l’éolienne que le photovoltaïque.”

8 “Et ça permet aussi de s’échanger, parce que s’échanger des données entre nous... – moi je travaille uniquement sur le critère paysage – mais dans les projets donc il y a les autres thématiques, mais il y a quelqu’un qui s’occupe du volet naturaliste, quelqu’un qui s’occupe du volet acoustique, tout ça. Donc on, voilà, on s’échange des données en SIG et ça de pouvoir tout empiler, et tout... on va avoir une vue globale ben sous forme de carte.”

12.1.1 Conventional landscape architecture knowledge

In landscape architects' narratives, there is knowledge grouped in three categories that refer to a more "conventional" landscape architect knowledge, which is considered as needed and useful to deal with energy transition projects. In this part it is discussed how this knowledge is perceived as useful from landscape architect perspective in an energy transition context.

12.1.1.1 Design knowledge

Almost all landscape architect in both nations (15) mention in their narratives what could be called and summed up as design knowledge, meaning everything that concern information synthesis, representing (e.g. drawing), and communicating about the landscape and about their projects (Donadieu 2009a). This is expressed by the quotes IC1 and JH1 and MM1 (table 12.2), which, however, show how this could be performed in many different ways taking many forms, covering a broad range of possibilities.

And how illustrate in the quote IC1 (table 12.2) the synthesizing landscape information and representing them and elaborating them for projects it is something historically conventionally belonging to the profession, even if some technic has evolved as the use of computer software along with hand-drawing.

This knowledge is needed both for the landscape architect to develop the projects itself according to the initial commission, but it also includes the capacity to share the projects and the ideas with commissioners or other stakeholders projects as the quote MM1 illustrates.

12.1.1.2 Topography, hydrography and geology knowledge for reading landscape characteristics

Several landscape architects (five) in both nations highlights as necessary knowledge of topography, hydrography, and geology and how to read them in a landscape. This knowledge to understand the water, topographical and geological characteristics is one at the basis of landscape architecture profession for any type of project and energy transitions one makes no exception, as expressed by the quotes CC1 and JH2. Moreover, how the quote CC1 express the knowledge needed to combine both theoretical notions about topography, hydrography and geology that lead to understand and describe the phenomenon and situation (e.g. specific vocabulary) on the field, and at the same time the knowledge to read maps about these topics in order to collect information from them.

Besides, as stressed by the quote JH2, the acquisition of this knowledge leads to have a broader picture/understanding of landscape, which could provide additional energy strategies. For example, the presence of rivers with certain characteristics could lead to think about developing hydropower devices. This could be seen for example in the figure 1, part of a project analyzing the energy potential of a territory (NL3 - Parkstad Limburg Energie Transitie project), a map representing the topography combined with the hydric system that is named originally "Energy potential hydropower map", showing as reading these characteristics could be already considered

as a designing act itself, having the potential to lead to energy project (NL3 - Parkstad Limburg Energie Transitie project).

Moreover in several documents illustrating energy transition projects the interviewed landscape architect speak about, it could be found maps representing and analyzing the geology and hydrography of the territory in a *plan de paysage* (figure 2), as well as the topography and hydrography in a wind turbine sites localization project (figure 3).

So this knowledge it is tightly connected to the capacity of landscape reading, crossing the knowledges and interactions among natural factors and human ones, synthetized in the landscape. This knowledge is considered to be at the basis of landscape architecture (Bell, Sarlöv Herlin, and Stiles 2012), and the fact that is not very much put forward by the interviews, could refer to the fact that many do not feel the necessity to speak about it, being embedded in the practice.

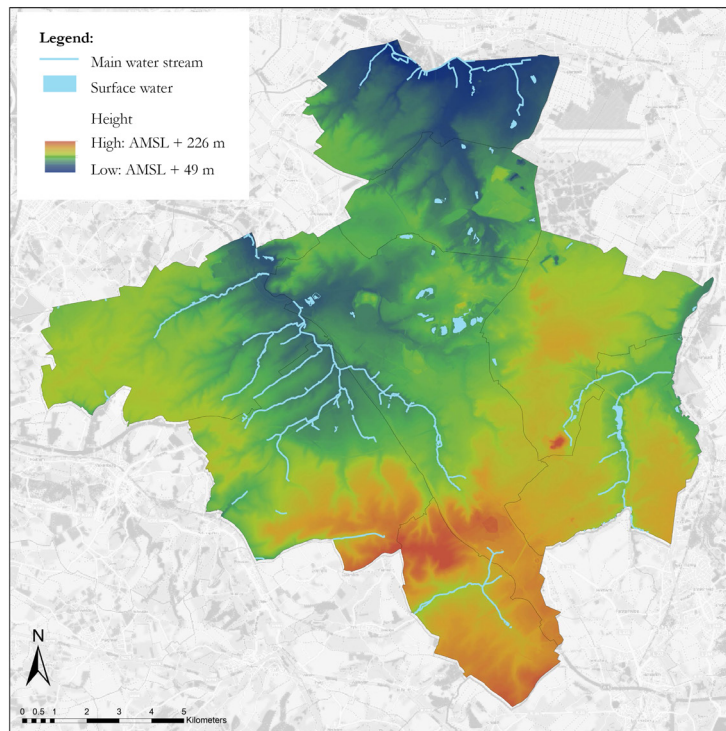


Figure 1. Energy potential hydropower map of Parkstad Limburg territory. Source: PArkstad Limburg EnergieTransitie (PALET). Achtergronddocument hernieuwbare energieopwekking. 2014. p.38.

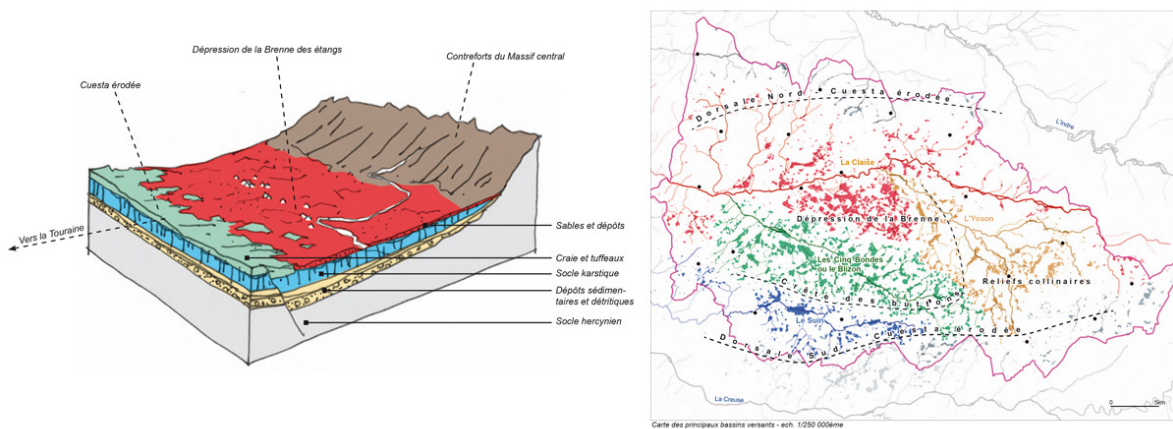


Figure 2. Geology structure (right) and watershed analysis Brenne territory. Source: Projet de paysage Brenne-Boischaux Nord. 2013. à ciel ouvert, p.8.

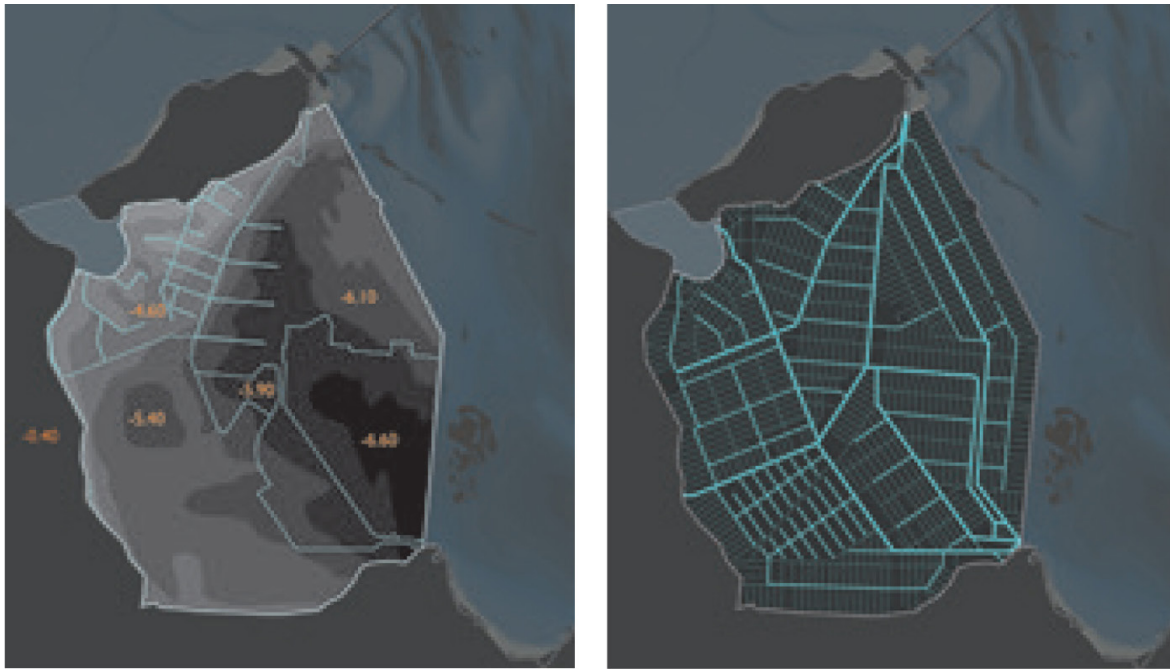


Figure 3. Wind turbine localization map in the Wieringermeerpolder, in green. Source: Beeldkwaliteitsplan Windenergie Wieringermeer. 2014. H+N+S, p. 17

12.1.1.3 Ecological knowledge

Ecological knowledge, meaning the science having the goal of studying the “relation of living creatures to each other and to their environment” (Stevenson and Oxford dictionary of English 2010), is part of the landscape architect background. However in landscape architecture ecology knowledge is reduced and adapted having the goal of landscape design (Rumelhart 2010; Nassauer 2002).

Ecological knowledge is highlighted by three landscape architects, and as the quote JH3 (table 12.2) expresses it is considered very useful especially for RE technology projects. Some ecology basic knowledge could support suggesting new ideas for the RE devices implementation and localization, such the exploration of siting wind turbines in forests. Moreover knowing about ecology is considered to be helpful in order to have a constructive dialogue with ecology’s experts that are always part of the team for RE technologies projects.

12.1.1.4 Botanical knowledge

Botanical knowledge, meaning the science having as object the study of plants, is part of landscape architect knowledge, which historically deal and work with plants starting from garden (Donadieu 2009a). This is considered one of the specificity of landscape architects differentiating them to the architects for example (Champy 2000). In energy transition context botanical knowledge on how essence looks like, their dimension, and functioning in winter and summer is highlighted as useful for increasing energy saving as the quote PA1 states (table 12.2). The conscious choice of a specific tree essence in the right place could provide cooling shadows in summer, recognizing a difference among essences for shadow density, and maximizing solar

gain in winter when the leaves fall. Moreover the presence of trees is recognized to cool down temperature and reduce the heat island effect in the city, and knowing about the time growth time of plants could be important to maximize the benefits.

Another point expressed in the quote LP1 (table 12.2) emphasizes the importance, beyond the vegetal essences themselves, of knowledge about the suitable condition for a plant's correct development/growing process. These notions could lead the landscape architect to choose the essences that better fit the project site characteristics. Considering energy transition this knowledge could allow landscape architects to choose essences, used as biomass to produce energy, when they recognize the optimal site characteristics for their growing. Indeed how the same quote suggests, the knowledge of the vegetal essence has to be connected with knowledge about soil characteristics.

12.1.2 Additional knowledge to be acquired for energy transition projects

12.1.2.1 Institutional organization and decision process

Landscape architects in both nations (8 times) point out the need for an understanding of the institutional level, who led the energy transition project, who and how decisions are taken, and the role of stakeholders in the process, as expressed by the quotes PH1 and DO1. The knowledge of institutional process and organization is something landscape architect practitioners already have depending on the kinds of projects, however concerning energy transition the need of specific knowledge is stressed.

This shows the complexity and controversy that still accompany this kind of project and illustrate how somehow a landscape architect finds himself as dealing with multiple numbers of stakeholders, institutions, laws.

This understanding seems to be associated mainly to the strategic vision on territories, which crossing many topics (urban, agriculture, mobility, etc.) and law lead a greater complexity to the process.

12.1.2.2 Technical renewable energy production knowledge

Beyond the knowledge of energy, also knowing about some basis of the technological construction and functioning aspect of renewable energy technologies is highlighted. This knowledge leads to have better discussion with the multidisciplinary team leading to a more constructive dialogue, and to choose designing projects better exploiting potential synergies among them and be able to get more conscious and specific landscape/spatial solutions, as expressed by the quote DO2 and FS1 (table 12.2).

A Dutch landscape architect explains that during a designing process of a wind turbine park on a defined plot some technological knowledge could have led him to reply and obtain a better designing solution (see figure 4):

“It’s windmills and there was this small building [Figure 4 – 1] next to it and I said why is this not, can be made in this? Well, and or it was even more it was attached to it [Figure 4 – 2], and they said well it is not possible because on ownership this is a thing, this is being owned by someone else and this small building. So I said why you can’t make a part of this windmill belonging to someone else? I guess you can do it in a building, in an apartment building so why not in this? Well, they don’t know if that is possible, to make this integration so...and I, I didn’t have exactly the knowledge of everything concerned the technical management of this this windmill. So you, that could be improved but well it’s on details, and details are important” (NL5, 2017).

As for the previous energy focused knowledge highlighted, also the technological basic one is mainly addressed in the Dutch context (five times), and only twice by a French practitioner. In French answers as the following quote express, the RE knowledge emphasizes mainly focus about the impact of the technology itself in the near and far surrounding in order to better integrate them.

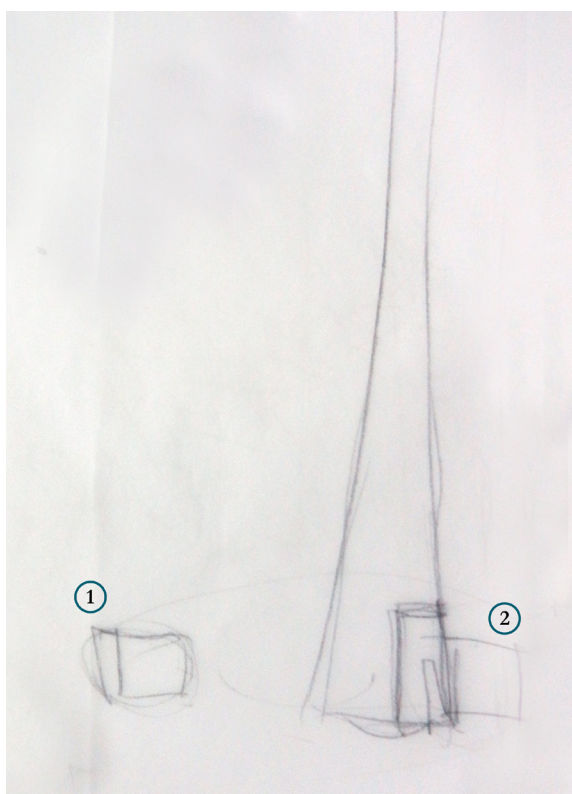


Figure 4, Sketch of a wind turbine and possible localization of an associated small technical building by the landscape architect NL5, 2017.






“Afterwards, of course, you need to have some knowledge about the impacts...so wind turbine has an impact concerning...even if there are other...there are other professions that deal with that, but we need to know that that exist the fauna, flora, things, etc. the noise...” (FR2, 2016)

⁹ “Après, évidemment, il faut avoir un peu de connaissances sur les impacts quoi enfin... Donc en éolien y a des impacts par rapport au... même si y a d’autres... c’est d’autres métiers qui les traitent, mais il faut savoir que ça existe quoi l’impact sur la faune, la flore, machin, etc. quoi. Heu... le bruit...”

Again this non-mention of some sort of RE technological knowledge of French answers is questioning because all the interviews worked, at least with one RE device even if at different scales. This lack could be revealing of a different way in the involvement of the practitioners in these kinds of projects.

12.1.2.3 Energy focused knowledge

A knowledge mentioned by six of the Dutch landscape architects interviewed is energy focused one, referring to the several measurement units of energy, etc. and the way to deal with energy measure and calculations, as expressed by the quotes JH4 and JV1 (table 12.2). This is some knowledge that, generally speaking, is still not part of landscape architecture backgrounds and taught in the landscape architecture programs. For example, the figure 5, represents a table, summing up, the energy quantification and calculation in Petajoule for RE production from different sources to achieve the energy transition goal for the territory in 2040, mentioning also the surface (ha) needed for each technology implementation developed by landscape architect working on the “Parkstad Limburg Energie Transitie” (NL3).

	2014		2020		2030		2040		INTERVENTIES # / ha / ton	CO ₂ REDUCTIE Mton
	max tech	integraal	max tech	integraal	max tech	integraal	max tech	integraal		
 ZON	1,74	0,31	14,14	2,43	39,22	6,58	69,80	11,47	1658 (ha)	1129
PV	1,63	0,21	13,40	1,72	37,38	4,79	66,80	8,55	1066 (ha)	
Boiler	0,03	0,03	0,23	0,22	0,62	0,58	1,07	0,98	386 (ha)	
Asfaltcollectoren	0,07	0,07	0,50	0,50	1,22	1,22	1,93	1,93	207 (ha)	
 WIND	0,31	0,04	2,32	0,26	5,67	0,65	9,15	1,04	7022 (#)	113
Gebouwegebonden windturb.	0,00	0,00	0,01	0,01	0,03	0,02	0,05	0,03	6960 (#)	
Windturbines	0,31	0,03	2,30	0,26	5,63	0,63	9,09	1,01	62 (#)	
 WKO	0,34	0,25	2,37	1,76	5,75	4,27	8,79	6,54	n.v.t	155
Mijnwater 2.0	0,03	0,03	n.n.b.	n.n.b.	n.n.b.	n.n.b.	n.n.b.	n.n.b.	n.v.t.	
Bodemwarmtewisselaar open/gesloten systeem	0,17	0,13	1,18	0,88	2,86	2,15	4,38	3,28	3003 (ha)	
	0,17	0,13	1,19	0,88	2,88	2,13	4,41	3,25	3003 (ha)	
 BIOMASSA	0,03	0,02	0,22	0,13	0,54	0,32	0,83	0,48	n.v.t	29
stortplaatsgas	0,00	0,00	0,01	0,01	0,02	0,02	0,02	0,02	n.v.t.	
mest	0,00	0,00	0,02	0,02	0,05	0,05	0,08	0,08	121094 (ton)	
bermmaaisel	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	308 (ton)	
houtige biomassa	0,00	0,00	0,03	0,03	0,06	0,06	0,10	0,10	8603 (ton)	
stro	0,00	0,01	0,00	0,05	0,00	0,11	0,00	0,17	11462 (ton)	
energiegewas	0,02	0,00	0,14	0,00	0,34	0,00	0,52	0,00	0 (ton)	
 WATER	0,00	0,00	0,01	0,01	0,03	0,03	0,04	0,04	477	5
waterturbine	0,00	0,00	0,01	0,01	0,03	0,03	0,04	0,04	477 (#)	
TOTAAL	2,42	0,62	19,06	4,60	51,20	11,84	88,60	19,57		

49

Figure 5. Table giving an overview of the energy results (PJ) to reach 2040 energy goals with the associated landscape intervention and CO2 reduction. Source: Parkstad Limburg EnergieTransitie (PALET). Achtergronddocument hernieuwbare energieopwekking. 2014. p.49.

12.1.2.4 Computer software

Five respondents highlight the need to learn about informatics software in addition to the ones already widespread for creating plans, photomontages, perspectives or other representations in two or three dimensions.

Two French landscape architects (FR1, FR7) highlighted the utility to use video giving an interactive and visually dynamic experience to the commissioners or local inhabitants or other stakeholders to improve the understanding of the result of the large-scale RE technologies design projects. This seems to be particularly important for wind turbine project, differing from other kind of project because of their constant movement as expressed by the quote PA2 (table 12.2). However, it is also specified how this kind of expertise also requires economical effort, for software that could lead to the disparity among small and bigger landscape architecture firms or consultancy offices.

“To address these issues in particular the visual issue and the visual in movement, it’ll evolve, and which that’ll be luckier, that means, it won’t be the liberal landscape architect that could afford it alone, on the contrary the big advice offices or bigger landscape architecture firm will release/ use this and they’ll become leaders.”¹⁰ (FR1, 2016)

Concerning informatics software three landscape architect, of whom two in the Netherlands also highlights the need to know the functioning of GIS [geographic information systems] software. Both refers to the need to use this software while working on a project inquiring about renewable energy potentials in a large scale territory (NL3 - Parkstad Limburg Energie Transitie project) and at national level (NL8 - “Energie & ruimte. Een national perspectief”). These two projects mainly are led through maps in order to combine the energy need, and the surface needs to encounter the energy goals (figure 6).

The quote DO3 (table 12.2) illustrate as the use of GIS is considered important because allow to deal more easily with quantities such as land use surface dimensions in order to calculate accordingly for example which surface of photovoltaic panels could be positioned. Moreover, it could also connect energy potential or energy lack calculation and statistics with a given and specific area. So this software allows to deal with the quantitative dimension of energy transition, that have to be precise in terms of quantities of energy producing and saving, but also of precise land surface quantities to accommodate for example RE technologies.

The usefulness of GIS software is also highlighted by a French landscape architect working on a wind turbine project implementation. In this case, as expressed in the quote MM2 (table 12.2) the importance to know how to use the software is connected to the need to collaborate with far many experts on wind turbine project that have to evaluate technological, ecological aspect, etc. on a large area surrounding the project. GIS system makes easier to share the document and overlap and cross layers with all the information needed for the project.

It seems that to improve the work about some energy projects background software knowledge could be more and more useful. GIS software is already known by landscape architecture

¹⁰ “pour aborder ces questions notamment la question du visuel et du visuel en mouvement, ça va évoluer, et ce seront les plus fortunés, c’est à dire, ce ne sera pas le paysagiste libéral que pourra s’offrir ça tout seul, par contre des grands bureaux d’étude ou les bureaux de paysagistes plus grands vont sortir ça et vont devenir les leaders”

professions, beyond its use for energy projects, but it seems that in connection with these kind of projects its knowledge usefulness increased for the practice.

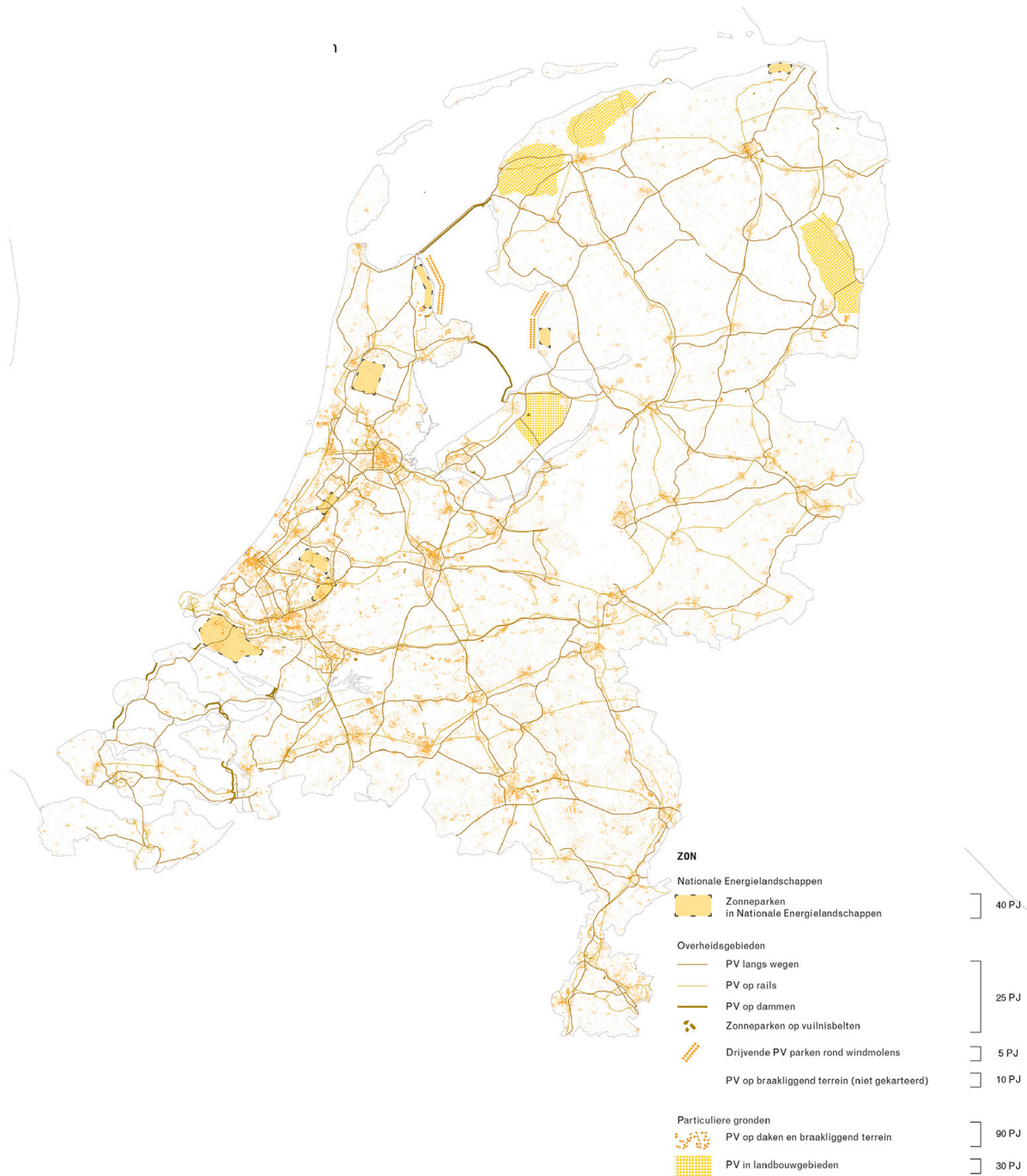


Figure 6. Map of sun energy potential at the scale of the Netherlands. Source: Energie & ruimte. Een national perspectief. 2017. p.88-89.

12.2 Adapting design process to energy transition

In the previous sub chapter conventional and additional knowledge, as mentioned by landscape architects, are discussed. In the following section the most important design steps performed by landscape architects while working in energy transition related projects are discussed, highlighting both conventional and additional steps.

12.2.1 General landscape architecture design process

Every landscape architect has its own design process methodology that, moreover, could vary from a project to another because of the typology (park, strategic vision, etc.), the scale (site, municipality, etc.) or other contingent issues.

Nevertheless, the design process could be generalized in several phases: the analysis, the synthesis and the evaluation (Lawson 1980) and to conclude the whole process the implementation (Donadieu 2009a, 21). These phases could be not linear and often allowing back loops in these process stages, in what could be not a linear process. The process alternating moment of creative action and reactive reflection (Milburn and Brown 2003).

In energy transition project this very general paradigm is not altered even if every project and every site need tailor-made solutions. The first is the analysis step both of the commission program and the site (according to the scale and place) meaning its material (e.g. landscape structures, topography, etc.) than immaterial component (e.g. social point of view) and all other kinds of data that the project could require. Subsequently there is the synthesis meaning the networking of all the knowledge and data and elements to choose the objectives, the entry through which develop the project. To this, follow the project evaluation by commissioners needed before of the final approval that will lead to the implementation of the landscape spatial answers to the initial program on the basis of a set of drawing and text. Drawings and texts accompany all the step evolving and changing during the process.

This is a very general framework in which many designing steps are performed. We asked to landscape architects to give an overview of the designing process of a project of their choices meaningful and representatives for them, highlighting project steps that they consider relevant in setting up energy transition projects.

12.2.2 Differences in design process?

The most of the landscape architects questioned affirm not applying a different design process when dealing with project related to energy compared to other projects about other topics, such as water management, etc. as the following quotes mentions:

“So with this designing method, method of reflection, at some point we could adapt to all kinds of knowledge”¹¹ (FR2, 2016)

11 “Donc, avec cette méthode de projets, méthode de réflexion, à un moment on peut s’adapter à tous types de connaissances”

“No no, because the...I would say that the thoughts that I develop, for example, to argue about wind turbines implementation in relation to landscape question, it’s exactly...I use the same means to talk about of...to defend a PLU or to defend urbanism or even road”¹² (FR3, 2017)

“For me, there isn’t...there isn’t too much, there aren’t differences. I would say that we choose much better the places where to put the wind turbines that the places where we put houses”¹³ (FR3, 2017)

“No. No. No, no, I have the same tools, I have the same...I have to understand the project, the goal. What do we want to do? The territory in which it is placed, the space that we create, the geographical space in which we settle it, and the stakeholders. Who does what? And who decide what?...”¹⁴ (FR5, 2018)

“no...I mean in a way we treat energy as we threaten other subjects as well” (NL2, 2017)

This not big difference with other projects is mainly explained emphasizing how every landscape project is site specific and need appropriate specific tailor-made solutions whether it concern or not energy transition topic. This being a shared statement in both nations practice, belonging to landscape architecture discipline (Donadieu 2007).

“A landscape project isn’t a recipe’s declination.”¹⁵ (FR4, IC 2017)

“I think every project is different. Also within energy-related projects every project can be different” (NL7, 2017)

Particularly one French landscape architect felt the need to clarify that the goal of landscape architecture practice is landscape, specifying that energy transition in one of the possible entry to work on landscape.

“Well, as a landscape architect, it is the landscape skill. That means that my...my main purpose it’s not energy transition...in itself. Because it’s a specific area.”¹⁶ (FR3, 2017)

12.2.3 Main design step in energy transition related projects

Talking about energy transition projects, according to the project and experience of the interviewed several steps rise as particularly important to be addressed. Several steps are already part of the method and competences landscape architects use while designing, some

12 “Non non, parce que le... j’dirais que les réflexions que je fais pour, par exemple, pour argumenter les implantations éoliennes par rapport à la question du paysage, c’est exactement... J’utilise les mêmes moyens pour parler de... pour défendre un PLU ou pour défendre de l’urbanisme ou même une route.”

13 “Pour moi, y a pas... y a pas trop... y a pas de différences. J’dirais que on choisit même beaucoup mieux les endroits où on met des éoliennes que les endroits où on met les maisons.”

14 “Non. Non. Non, non, j’ai les mêmes outils, j’ai les mêmes... J’dois comprendre à la fois le projet, l’objectif. Qu’est-ce qu’on veut faire? Le territoire dans lequel il s’installe, l’espace qu’on crée, l’espace géographique dans lequel on l’installe, et les acteurs. Qui fait quoi? Et qui décide quoi?...”

15 “Et ça peut pas... un projet de paysage n’est pas une déclinaison de recettes.”

16 “Ben, en tant qu’paysagiste, c’est la compétence de paysage. C’est-à-dire que, mon... mon propos premier n’est pas la transition énergétique... en soi. Parce que ça c’est un domaine particulier.”

are additional ones, specific to energy subject. Table 12.3 summarize the main design steps mentioned by landscape architects when working on energy transition related projects.

Table 12.3, categories of procedural knowledge for working in energy transition process, illustrated with quotes and with the number of interviews in which the role is mentioned. The table includes quotes selected as representatives of the main categories listed in the table, in order to provide a clear image of the contribution facets, but avoiding repetitions. A total of 16 interviews. Source: author from elaboration of the landscape architect semi-structured interviews.

Category	Quote	Code
Conventional designing steps		
Representing project graphically – 14 times	“That and I think visualization is a very important one. Showing what it could be, and how it could work. Visualization and presentation are important, suddenly it becomes interesting perspective in such way, with the narrative” (NL7, 2017)	JV2
	“Well, the first step is to really get the right feeling the size and about the spatial impact, the area needed for the energy goals of a region... And you have to be very very careful to correctly represent it, to understand yourself, we could say, but also make the other understand. Sometimes it is scary...because could be really huge” - (NL6, 2017)	BS1
	“The representation it’s fundamental, but we should not do...it’s kind of that, no! We have to calculate the exact height of the view point of the photomontage of the wind turbine considering where it is placed...and it’s the same for the photovoltaic, it’s the same because it hasn’t the same high of a wind turbine, but still it has a high, a surface and also a light reflection of the sun...and it’s necessary to be honest with the drawing” ¹⁷ (FR3, 2017)	CC2
Exchanging in multidisciplinary teams – 14 times	“So it’s really complex stuff you’re dealing with and it is too much specific knowledge to know as a designer. So you need to work in an interdisciplinary team or whatever. So the competence to work together is key in this transition.” (NL1, 2017)	DJJ1
	“So we need to solve this energy problem, but when we work on energy transition, the focus could not only be on energy...I mean you need to collaborate with energy experts, but making understand that landscape is	IS1
	17 “La représentation c’est fondamental, mais il ne faut pas faire voilà... à-peu-près ça, non ! il faut calculer la hauteur exacte du point de vue du photomontage de l’éolienne par rapport à où elle est située...et pareil pour le photovoltaïque, c’est pareil parce qu’il n’a pas la même hauteur d’une éolienne, mais quand même il a une hauteur, une surface et aussi une réflexion lumineuse du soleil...et il faut être honnêtes avec le dessin.”	

important too... cultural heritage is very important, so that there are other subjects or other goals that must be taken into account. Because when you want really step forward and make steps in this energy transition you need the other people, we need them and they need us.” (NL4, 2017)

Developing grounded landscape analysis – 11 times

“The first thing is to understand the territory, its landscape...in all its components. Finally, we could say that it’s the competence of the landscape architect. [...] To read it [the landscape] globally, to be able to understand a territory. Finally, about all the different layers, whether social or physical, what we see in the landscape, but also what we don’t see. The things to which people are attached to the landscape and... yes it’s about the synthesis and analysis spirit.”¹⁸ (FR7, 2018)

MM3

“How do I install it in the site? And we must not, of course, only study the site! But in a very broad way...so the relations with the landscape strength lines, whether infrastructure, ridge lines, stuff like that...stuff...it always works better when it’s coherent, when it creates relations, basically as all project about landscape [...]. If not you approach to a village, you see with the bell tower of a village, and then there you have...the bell tower was wearing a wind turbine, but that was 5 Km behind, you see. But, so, you see, you have the bell tower with the wind turbine beyond. At one point, this isn’t possible. Finally, after it isn’t very very bad.”¹⁹ (FR2, 2016)

AB1

“For instance, when we are working on the energy system, we were not looking only at energy, we were also looking at the spatial quality that energy can provide, we were looking if there were other problems in the region that we can integrate with the energy problem or if the solution of this energy problem production or lack of energy, that could also... if other things in the area could benefit. And to do that you have... you must do a broad analysis of the region.” (NL2, 2017)

JH5

Developing participatory process – 7 times

“Finally, what was really interesting it has been that we did many meetings with these...every time with the inhabitants that wereWhich was also

MM4

18 “La première chose c’est de comprendre le territoire, son paysage...dans tous ses composantes. Enfin bon ça on va dire que c’est la compétence du paysagiste. [...]oui, d’avoir la lecture globale, de pouvoir comprendre un territoire, voilà. Enfin, sur toutes ces différentes couches qu’elles soient sociales ou physiques, enfin ce qu’on voit dans le paysage, mais aussi ce qu’on ne voit pas. Enfin, ce à quoi sont attachés les gens dans le paysage et... ouais, c’est plutôt ouais cet esprit de synthèse et d’analyse diagnostic”

19 “Comment est- ce que je l’installe dans le site? Et on doit bien sûr pas étudier seulement le site! Mais de façon très large... Donc la relation avec des lignes de force du paysage, que ce soit des infrastructures, des lignes de crêtes, des trucs comme ça, des machins... Ça marche toujours mieux quand c’est cohérent que quand ça croise quoi, en gros comme tout projet en paysage hein [...] si non tu t’approches d’un village, tu vois avec le clocher du village, et puis là t’as... le clocher était coiffé d’une éolienne, mais qui était cinq kilomètres derrière, tu vois. Mais, du coup, tu vois t’as le clocher avec l’éolienne derrière. À un moment, c’est pas possible. Enfin, après c’est pas très très grave.”

driving force. A group of elected members also that was very committed. And so we could really exchange to create the projects [wind turbine park]...finally, to define it especially...finally to choose the site and once that the site has been chosen, well, there was...it was necessarily a line, but we could think about how many we could put there, and exactly where... finally, all these discussions...yes...the social aspect, because it's true that sometimes it lacks..."²⁰ (FR7, 2018)

"You have to work on their [local inhabitants] look in order to accustom them, progressively...but it's very complicated. [...] And these [participatory] moments are very important...because there is really a difference and it's very important the shade that has to be done between the visual and the perception, because these have nothing to do [with each other]"²¹ (FR3, 2017) CC3

"I said that it's in the tool *Plan de paysage*, with this participative component that for me has ...reversed a little the things, I could say. [...] That has allowed to have a way...a very transversal approach with this energy question. Because when you have the tourism agent on one side, urban planning in the other, agriculture in the other that come to this [participatory] moment...and you could get transversal point of view."²² (FR4, 2017) IC2

Developing additional empirical tools – 3 times

"And I liked at the beginning, we had more empirical approaches, but very funny. I remember: we rented pods with helium balloons, but it was...it was very effective. It was very effective, and it had the impact of the eyes. Finally, we saw...so, it wasn't easy, because inevitably when there is wind potential, there is wind, so the balloon move like that, while we want to see the height. Well, it was...Finally I think that was a good approach, that wasn't necessarily easy to be implemented on the field, but that was...that was pertinent and, moreover, when you have a balloon ...red of 2 meters diameter large at 50 meters of high ...finally I think that that approach LP2

20 "Enfin, ce qui était super intéressant c'est qu'on a fait beaucoup de réunions avec ces... chaque fois ce a avec les habitants qui étaient... qui étaient aussi moteur. Un pôle d'élus aussi qui était très moteur. Et, du coup, on a vraiment pu échanger pour créer le projet... Enfin, le définir surtout... Enfin, déjà, pour choisir le site, et une fois que le site été choisi, ben, ben il y avait... c'était forcément une ligne, mais on pouvait réfléchir à combien on en mettait, exactement où... Enfin, toutes ces discussions... ouais... Le volet social du paysage, parce que c'est vrai que ça des fois ça manque..."

21 "Il faut travailler sur leur [des habitants locaux] regard pour les habituer, progressivement... Mais c'est très compliqué. [...] Et ces moments sont très importants ...Parce que il y a vraiment une différence et c'est très important la nuance qu'il faut faire entre le visuel et la perception, parce que ça n'a rien à voir."

22 " j'dis qu'est dans l'outil Plan paysage, avec cet volet-là participatif qui a... qui pour moi a ... renversé un peu les choses, j'dirais. [...] C'que là ça a permis c'est d'avoir une maniè... une approche très transversale quand même, voilà, avec cette question de l'énergie. Parce que quand tu as l'acteur du tourisme d'un côté, urbanisme de l'autre, agriculture de l'autre qui viennent en ce moment... et la voilà, t'arrive à avoir des points de vue transversaux."

was...was full ...of common sense.”²³ (FR8, 2018)

“I played a game with policy deciders at Province and also for them it’s again a confrontation between numbers and what really means when you put them into account. And put them just on the map. I made, for the game, I made fiches I called them, for this is a wind turbine, this is a one hundred hectares solar park, and we need as a total tot Petajoules and we need one hundred. So when you try to solve it with solar parks, because in policy land this the better thing to do than wind turbines at the moment, we’ll need what is 10 thousand hectares, that’s more than 1/3 of the Province. Ok. And when you think of using a tool...an interactive tool, like this you are able to bring people to think easily to energy transition topic” (NL4, 2017) IS2

Additional designing steps

**Developing
energy
consumption
reduction
measure –
9 times**

“But we see that this world is also very dynamic and there is also a lot of assignment that is not directly related to energy, but that we can relate to energy, in every project we do we could consider material, places where these materials come in order to...chose things that require less energy for fabrication, for transport, but there are also other things...” (NL2, 2017) JH6

“Yes, that’s it, on the contrary, in my...in the framework of my activity, I’m concerned about avoiding materials that requires...- then there are always exception -, but materials that use too much energy for their fabrication. [...]. If I’m obliged to use metal materials for certain type of furniture because we could do only that, I’ll privilege stainless steel in order not have to put paint and powder coating - so the stainless steel, requires a lot of energy to be produced, but it’s recyclable, and after I don’t use solvent, LP3

23 “Et moi, j’aimais bien au début, on avait des approches beaucoup plus empiriques, mais très drôles. J’m souviens : on louait des nacelles avec des ballons gonflés à l’hélium, mais c’était... c’était très efficace. C’était très efficace, et puis ça avait l’impact de l’œil. Enfin, on voyait... Alors, c’était pas facile, parce que forcément quand y a du potentiel éolien, y a du vent, donc le ballon il part comme ça, alors qu’on veut voir quelle est la hauteur. Bon, c’était... Enfin j’trouvais que c’était une bonne approche, qui était pas forcément facile à mettre en œuvre sur le terrain, mais qui était... qu’avait la pertinence en plus quand vous avez un ballon de... rouge de 2 mètres de large de diamètre à cinquante mètres de haut... Enfin j’trouvais que cette approche-là était... était pleine de...de bon sens.”

paint, of this of that. You see, that's an example."²⁴ (FR8, 2018)

"As I said you, the fact of planting trees, it's useful, it support losing some degrees, fighting the heat island effect in the city. And we do this in public spaces projects, or eco-neighborhood or others..."²⁵ (FR1, 2016)

"To reach this energy neutrality or CO₂, you not only need a lot of renewable energy but also you have to reduce the actual use of energy, it's both. So that you can come to zero at certain point. The effect of changing the spatial layout in a region, the functions, to have a denser building habitat... But it's difficult sometimes to say this... well not to say but it's difficult to make accept this or really to make implement this." (NL1, 2017)

Collecting and processing energy data – 2 times

"a lot of the knowledge we collect comes from the CBS for instance, the statistic, agency or the PBL and that is often excel files that we need to organize and we need to get the proper data from that was something I never learned when I was a student." (NL8, 2017)

"And to develop the project you also need to know what is their energy consumption, and you need data to calculate the potential, let's say. And you have to get energy data about that before starting the project. And even if it's the region... municipalities are the commissioners give you the data they have. They not always have them, you have to search and work on it, it's a lot of work actually." (NL3, 2017)

Combining energy quantitative data with spatial landscape component – 2 times

"you start from the assignment, so how much solar energy do we need to place and during the whole process we figured out that it was not that easy. Because the amount of wind and the amount of solar energy influence each other because you need to have a balance and also for instance the geothermal heat or the people of heat they also need a part of their roofs for boilers while we have needed all the roofs for photovoltaics. So that was kind a very practical process on kind of negotiating and figuring out how what is our energy task. [...] "For example, first we checked the total amount of available land than we checked the suitable amount so for instance all the roads that go through forest areas, all the roads that go through cities, shadows of buildings, shadows of the forest we reduced that. Then we also calculated... we reduced the efficiency because you

24 "Oui, voilà, par contre, dans mon... dans le cadre de mon activité, je suis soucieuse d'éviter des matériaux qui demandent... – alors y a toujours des exceptions –, mais des matériaux qui utilisent trop d'énergie pour leur fabrication. [...] "si je suis obligée d'utiliser du matériau métallique pour certains types de mobilier parce que y a que ça qui peut le faire, j'vais privilégier l'inox pour pas avoir à mettre de la peinture et du thermo laquage– alors l'inox, ça demande beaucoup d'énergie à la fabrication, mais c'est recyclable, et j'utilise pas après des solvants, de la peinture, des ci, des ça, quoi. Vous voyez, c'est un exemple."

25 "Comme je vous disais, déjà le fait de planter des arbres, c'est utile, aide à perdre quelques degrés, en combattant les effets de l'îlot de chaleur des villes. Et on fait ça dans les projets d'espace publique ou éco-quartier ou autres..."

have different ways of placing solar energy on our long roads but you can never for 100% cover it.” (NL8, 2017)

“We searched for data about the energy current situation, from which... DO5 we need to start to elaborate our scenarios. We elaborated flow chart for solar energy for example, putting in relation building potential areas and constraints to this development to analyses... and accordingly we calculated the potential production and the efficiency through solar technologies, both solar thermal collectors and photovoltaic panels. And we worked a lot with excel sheets and then we tried to make maps of it” (NL3, 2017)

12.2.3.1 Representing project graphically

Another topic that it could also be connected to people’s involvement in the designing process, but generally concerning more broadly the commissioners or other team project members is the great importance that graphical representation hold in these energy transition projects (14 times). The graphical representation of a landscape and of its possible futures shape is a skill conventionally belonging to the landscape architecture disciplines. The representation being needed both to analyses and communicate about the existing landscape that the future project possibility, so they are elaborated all along the designing process developing there and back with the commissioners or/and other stakeholders involved, supporting the oral narratives as the quote JV2 sates. Particularly in relation to energy transition what emerges from the interviews is the need of precision in the graphical representation, representing as much as possible an illustration matching the physical reality. This not only for the benefits of commissioners or other stakeholders but also to ensure the understanding of the landscape architect himself as the quote BS1 illustrates. Moreover as the same quote express this precision is required to guarantee the correct amount of space and surface for example to reach the energy goals of a territory about renewable energy production and ensure its feasibility.

At the same time, the same accuracy/attention is required to elaborate images that exactly represent the dimension of the RE devices and its exact proportions with the surroundings, especially mentioned wind turbines parks and ground photovoltaic parks are mentioned, as expressed by the quote CC2.

Interestingly the weather chosen in the representation of photomontage is something to be considered, especially for wind turbines, having relapses on the back ground sky color that play a very important role, highly changing the visibility of wind turbines and so influencing the possible perception of people:

“energy people often said: well windmills are... you can see them from big distance, from 40 km for example, but that’s only a few days in the year and most days are grey, you know that’s the Netherlands. But I always used to say: “oh, you’re saying this but on those clear days most people are on the road for recreational experiences so those are important days. And then you well... you make a connection between experience and technical redactions you could say. Of course visualization is important!” (NL5, 2017)

Representation could influence the acceptance or not and subsequently the implementation of an energy transition project (also highlighted in quote BS1) and so how a landscape architect explicitly point out that means that:

“you have the responsibility to render in a way that is kind a realistic that also counts for the energy transition. So when you put the windmill in a landscape then you should render it in the actual size that you will see it. If you just Photoshop cut out the windmills put it in and you have no idea, it can be twice bigger or twice as small than nobody learns from it” (NL8, 2017)

Finally, the idea to develop dynamic video representation adding to the graphical “traditional” static one is mentioned, in connection with the need to learn how to work on this software (see section 12.1.1) for producing short video representing the project in a dynamic way. This being specifically highlighted for wind turbine project considering their turning movement.

12.2.3.2 Exchanging in multidisciplinary teams.

Another step that is highlighted as very meaningful is the moment of discussion and exchange in multidisciplinary teams (14 times) while working on a project. Collaboration among experts are almost obliged for what concern energy focused projects, because of the complexity and transversality of energy topic, that touches many sectors and often it accompanied by a technical component that landscape architect could not face alone, as the quote DJJ1 express.

However, beyond the usefulness for them to listen and learn from multidisciplinary collaboration, landscape architects also put forward in their narratives the usefulness to have a landscape perspective able to bring the socio-cultural and aesthetical component in the energy projects that have often a strongly technical engineering connotation as the quote IS1 illustrates.

The collaboration in multidisciplinary groups emerges a particular strong subject and a matter of concern during the interviews, and as something particularly challenging, so we discuss it wider in chapter 13.

12.2.3.3 Developing grounded landscape analysis

Landscape architects in both nations emphasize the need for energy projects to be grounded to the site requiring a very deep landscape analysis (11 times), considering the factual physical component such as the dynamic forces acting on the landscape (urbanism, agriculture, etc.), the dynamic that structured landscape from the historical perspective, the geomorphological point of view, etc. combined with the “cultural field work analysis”²⁶ (FR1, 2016), meaning the social, symbolic, cultural representation of the landscape. This deep landscape analysis is a step historically/conventionally belonging to landscape architecture designing process, as expressed in the quote MM3.

However this analysis phase is not conceived in per se, just reporting the existent situation, but as a source able to suggest project strategies developing tailor-made solutions:

²⁶ “analyse du terrain culturelle”

“When we do an analysis, a landscape recognition...we do an “inventive analysis” that it’s not completely only an analysis. It’s an analysis that you do in perspective for...and I don’t coldly observe, etc. but we are in a designing process already”²⁷ (FR3, 2017)

This step is highlighted for all the different categories of project landscape architects work in the energy transition both for RE technologies implementation than broader energy transition strategic one. For the elaboration of a *plan de paysage*, the landscape architect affirm how in designing process, “you have to come back to the ground. Landscape reading, its understanding, outside...it’s essential. It’s the flagship step”.²⁸ (FR4, 2017). The attention to this analysis step result from the perception that the energy transition process is directly inspired and coming from the characteristic that landscapes have. Understanding the territory and landscape characteristics could support in a better definition of energy goals and its implementation, leading to see the resources of the territory (e.g. windy spot, wood, etc.).

This deep landscape analysis step is also highlighted as particularly important for RE technologies implementation, even if the devices site of localization is already settled, highlight how these projects have to be studied in a greater context and scale, broadening from the site itself. This allows positioning them in the best shape considering the landscape characteristics and analyzing from different points of view, as expressed by the quote AB1 (table 12.2).

Another point highlighted as important of this analysis step, as illustrate by the quote JH5 (table 12.1) is that having a broad vision, about different characteristics and topic of a territory could lead to introduce multi-functionality to the project, introducing other subjects beyond energy in designing that could solve other problematic and create synergies.

12.2.3.4 Developing participatory process

One step that raises particular attention in the development of participatory process (7 times). That means that during the designing process one or several participatory meetings could be dealt allowing to involve stakeholders and local inhabitants. This step is considered important in order to allow stakeholders and/or inhabitants to express their aspirations, supporting the landscape architect to listen to them and better meets their needs, as the quote MM4 express. At the same time this participatory meeting, as the quote CC3 express, could be perceived as an educational moment with people, during which landscape architect, beyond listening, could also explain landscape to the people supporting them in the understanding of their landscape and of landscape dynamic nature.

This step is mentioned for RE technologies implementation projects (e.g. FR3, FR5, FR7) mainly for wind turbine projects as illustrated by the quote MM4, that explains how landscape architect collaborate with local stakeholders for the site choice and integration of a wind turbine park. These projects being considered particularly important for a good appropriation of the project to local inhabitants that also could support in not rising local opposition and the project

27 “Quand on fait une analyse, une reconnaissance paysagère...on fait une ‘analyse inventive’, que ce n’est pas complètement que de l’analyse. C’est une analyse qui se fait en perspective de..., et non pas j’observe froidement, etc. Mais on est dans un processus de projet.”

28 “Il faut revenir sur du sol. La lecture de paysage, sa compréhension, dehors quoi... c’est essentiel quoi. C’est juste, c’est ça la phase phare, quoi.”

fail (e.g. Ellis, Barry, and Robinson 2007).

However participatory process is also highlighted in projects of more strategic nature including a wider approach to the energy transition such as the *plan de paysage* (FR4), during the elaboration of which people participate in workshop and landscape walk with the landscape architect. In this case participatory process involves local people but also several agents such as agricultural chamber representatives, people working for the energy transition planning on the territory, etc. that in these moments could share their idea and knowledge about energy, feeding the designing process with additional elements and ideas, as illustrated by the quote IC2. Besides, as one landscape architect working on the *plan de paysage* explains, these participatory moments could be a turning point for the project itself, bringing out particular subject to deal with in the project, in her case energy transition one. In her word:

“In the Monts du Lyonnais, well, it was not the topic... finally energy come later during the participatory workshop during the step two ‘issues’ [of the elaboration of the plan de paysage], about which I speak to you, it came out a first axis about energy and later the main elected representatives asked me to treat it [energy] at the same level that the others [issues].”²⁹ (FR4, 2017)

So beyond listening and try to meet local aspiration in energy transition focused projects from the beginning participatory process could also transform a non-energy focused projects in an energy focused one. However the contrary could also be true, and this process could demand inhabitants to be already sensitized and aware about energy transition topic.

Another step that even if it is not really participatory, however, support in the meeting of local inhabitants and stakeholder aspiration is the questioning of people and stakeholders to better orient the choices that will be made during the designing process. This point being highlighted as particularly important by the landscape architect speaking of “Parkstad Limburg Energie Transitie” (NL3) project where after a spatial analysis of energy production and reduction potentials at large scale territories (eight municipalities) different spatial implementation possibilities were explored. This show, how also in large scale projects the point of view and aspiration of local stakeholders could be collected and taken into account:

“we also started with interviewing civil servants and alderman of the regions to also figure out what they thought was important on the energy transition. And we used that as a kind of well... we used it to... because if you calculate the potential for the energy transition of a region you need to make certain choices.” (NL3, 2017)

This step mainly emphasizes the designing process at the intersection between the changing of the physical environment and people, where landscape represents a discussion basis. To look at landscape being guided by a landscape architect that explains its characteristics, elements dynamic could open new ways to people to look at it and perceive it. And at the same time discussing it about energy transition could allow to share knowledge on the topic highlighting

²⁹ “dans les Monts du Lyonnais ben voilà comme c’était pas la thématique... enfin que l’énergie est venue après... dans l’atelier participatif de la phase deux ‘enjeux’ [de l’élaboration du plan de paysage], dont j’ai parlé, est ressorti un premier axe énergie et après j’ai quand même eu une demande des élus principaux en m’demandant d’la traiter à même niveau que les autres [enjeux].”

possible synergies among topics such as agriculture, industries, etc.

12.2.3.5 Developing additional empirical tool

In some cases the need to think about and use experimental additional specific tools are highlighted. Two French landscape architects highlight concerning implementation of wind turbine project examples of empirical and practical answer to solve problem of understanding on the site the higher of a wind turbine, thought drawing in proportion paper silhouette of the wind turbine device and another using balloon able to make understand better the impact of the wind turbine implementation as the quote LP2.

Moreover one Dutch landscape architect (NL4) involved in the coordination of energy and space topics in Province of Zuid Holland, advising and supporting the province and its municipalities dealing with the energy transition topic, mentions the use of a “table game” connecting energy quantities with its corresponding spatial footprint in terms of photovoltaic panels or wind turbines needed (quote IS2). The same quote emphasizes as the use of interactive empirical tools that such as a board games could be very beneficial.

These tools are used as supporting the understanding or the spatial 2D or 3D implications of the energy projects, in order to lead stakeholders or local inhabitants or other to have a more conscious idea of the project result. These could be used at different steps of the process and in different situations.

These mentioned tools could be used in a participatory process supporting people to understand visually the impact of a RE technology projects in the surrounding landscape or, for the table game, upstream in the decision process for strategies towards energy transition goals for a territory, to raise awareness about spatial relapse of energy choices. However this step point out still the difficulty faced by landscape architects to support people going beyond the quantitative aspect of energy transition.

All of these are used as a way of mediation with local inhabitants or stakeholder. These are just examples of empirical tools resulting from the experience of our interviewer. For sure other experience could exist.

12.2.4 Additional step in energy transition

12.2.4.1 Developing energy consumption reduction measures

Some landscape architects (nine), in both nations highlight how in their practice they also think and integrate energy savings measure in their projects implementation and management, in order to reduce energy consumption also in projects that are not specifically energy transition related, as the quote JH6 and LP2 (table 12.2) express. As these quotes emphasizes the topic of the choice of materials need to be thought carefully, because the use of certain material could be very energy demanding both for the production that for transport. The subject also of the recyclability of materials could play a role in the material choices, as expressed in quote LP3

(table 12.2), evoking the subject of the grey energy and the life cycles of objects and materials. Topic that has been explored in the work of designers at the city and territory scales (e.g. Viganò 2014). However the question of recycling materials from energy point of view is not so easy to be addressed, because some recycle process is high energy demanding (Haas et al. 2015). Indeed reuse and recycle are not synonymous.

To provide an example a French landscape architect (FR8) speaks about the realization of a public park, “Le parc du Grand Pré” (Langueux, Bretagne), that does not address energy transition issues directly, but in which she tried to be attentive at the energy point of view particularly in the choices of materials:

“With the park Grand Pré, as I said: as we are used to, we have always been used to do with very little means. And well, the recycle, the revalorize of waste, it’s full in this park. Especially the reuse of wooden stakes used for mussels cultivation. Moreover I use quarry waste with beautiful... beautiful rocks that are unsuitable for the cut stone, but that are perfect to do my design. [...] So, yes I...there are things that I manipulate with a lot of common sense.”³⁰ (FR8, 2018)

Moreover it is interesting to see how the topic of having a small budget is a good thing to support in energy saving in some way, because allow to use waste materials, and that could be found nearby in order to reduce transport costs. These points, generally speaking, being favorable for the reduction of energy consumption in designing implementation.

Beyond the attention of materials another point in which landscape architect could reduce energy consumption is also in the maintenance of a project as a park. One French landscape architect, which is also concerned about a material energy conscious choices, introduce the subject.

“And if we want to go further we could...I mean the maintenance of a public space, of a park it requires energy for the maintenance. Depending on whether we choose this [plant] essence rather than another that...it needs to be cut more often or not...it changes if we do a balance...”³¹ (FR8, 2018)

This step needs to be put in connection with the botanical knowledge of plant essences, to allow their choices accordingly. In connection with plant essences, also the simple fact of planting trees in urban project is considered per se an energy measure, contributing to the reduction of heat island effect in city, as the quote PA3 express. This point of view it is particularly important for the designing of the city where the presence of trees and water is recognized as a powerful cooling factor (Lenzholzer 2015).

Even if the energy transition is for sure a matter of technology, this is not the only aspect that has to be considered in the equation. And the choices of materials and of trees in a project could affect the energy balance of the project, considering not only its implementation but also

30 “avec le parc du Grand Pré, comme j’vous disais: comme on était habitué, on a toujours été habitué à faire avec très peu de moyens. Et ben, le recyclage, revaloriser des déchets, c’est plein ce parc-là. Notamment la réutilisation des pieux de bouchots, notamment j’utilise des déchets de carrière avec des beaux... des beaux rochers qui sont impropres pour la pierre de taille, mais qui sont parfaits pour faire mes aménagements. [...] Donc, oui je... C’est des choses que je manipule avec beaucoup de bon sens.”

31 “Et si on veut aller encore plus loin on peut...je veux dire l’entretien un espace public, d’un parc ça demande de l’énergie pour l’entretien. Selon qu’on choisit cette essence-là plutôt qu’une autre que ...ça demande d’être coupé plus souvent ou pas...ça change si on fait un bilan...”

its management. And this is an aspect in which landscape architect could bring a contribution, even if it is difficult to precisely quantify it.

This step category, in some ways could be considered also attached to a conventional designing process, meaning that landscape architect has conducted projects thinking about energy savings since long, potentially. Nevertheless the choice to put this step in the category of the “additional” ones, want to emphasize an increased consciousness of landscape architects about the importance of this step in direct relation to a thought about energy consumption reduction and not only related to small budget and aesthetical component. How the following quote point out the consciousness about energy transition topic lead both landscape architect that commissioners or stakeholders to appreciate these ways of designing:

“There, I’m doing a project where I’m going to do excavated gardens to reuse stone to do walls. I’m not going to do the wall with concrete, I’m going to do dry-stone walls, so we’ll not have fuel or things that’ll come...there will be human sweat, maybe animal sweat, maybe a little engine...it’ll be limited and this maybe we couldn’t have done that some years ago, because the public was not open to that’s, we neither.”³² (FR3, 2017)

In addition to these points landscape architects also mention the implementation of spatial strategies considered as able to reduce energy demands at the scale of the city or a territory as the quote JJ1. These are for example the consideration of urban form, designing of slow mobility paths, etc.

Nevertheless for this kind of intervention landscape architects mentioned the difficulty of implement them as the same quote suggest (JJ1), because of the many interest and stakeholders implied. About this topic one landscape architect commented:

“And here concerning the [energy] consumption reduction in a territory, when we speak about building retrofitting or about bicycle paths...the landscape architect could have a supporting role of the governing bodies that...that they have to go on, because it’s complex to put forward these kinds of projects...you have to help the elected members to implement them...”³³(FR6, 2018)

12.2.4.2 Collecting and processing energy quantitative data

Two Dutch landscape architects that worked on the elaboration of long-term energy transition scenarios for a territory (NL3) and for the whole Netherlands (NL8) (see table 12.1) mention an additional step in their designing process that consists of collecting and treating energy quantitative data, such as energy consumption of building in different areas, illustrated by the

32 “Là, je suis en train de faire un projet où on va faire des jardins en creux pour récupérer de la pierre pour pouvoir faire des murs. Et on va pas faire des murs avec du béton, on va faire des murs en pierre sèche, comme ça on n’aura pas de pétrole et de trucs qui viendront... y aura que d’la sueur humaine, voire animale, un peu de moteur peut être... Ce sera très limité et ça on pouvait peut-être pas le faire il y a quelques années parce que le public n’était pas ouvert à ça, nous non plus.”

33 “Et le voilà par rapport à la réduction des consommations dans un territoire, quand on parle de rénovation de l’habitat ou des pistes cyclables... là le paysagiste peut avoir un rôle d’appui auprès des instances gouvernementales que... qu’il doit avancer, parce que c’est complexe aussi de proposer ce type de projets...il faut aider les élus à mettre en place leurs projets ...”

quote RW1 and DO4.

The collect and analysis of these energy data constitute a further step in the “conventional” analysis, concerning historical, factual, social, cultural analysis of the territory, which we discussed above under the name *developing grounded landscape analysis*. This additional analysis how expressed in both the previous quotes add complexity to the designing process both for their research (e.g. DO4) that for their processing (e.g. RW1) being something that need to be further learned.

12.2.4.3 Combining energy quantitative data with spatial/landscape component

In close connection with the previous step the same two Dutch landscape architects that worked on the “Parkstad Limburg Energie Transitie” (NL3) and “Energie & ruimte. Een national perspectief” [energy & space. A national perspective] (NL8) mention the designing step of combining energy quantitative data with the spatial/landscape component, as expressed by the quotes RW2 and DO5 (table 12.2). Both quotes show a very interactive process conducted with many there and back between energy data and spatial/landscape designing choices, testing different hypothetical scenarios. The RE potential could be calculated according to the analysis of land use surface available for the implementation of a specific renewable energy technologies, but it has to be connected with the potential residual energy or statistics letting to lead with possible energy saving measure. Everything is connected and there is the need to constantly cross-breed data and energy transition axis (production, efficiency, saving), and different RE potentials, as the quote RW2 express.

Several difficulties are highlighted by landscape architects conducting this step. One is the difficulty of assessing what are the best areas to locate the RE devices, because suitable areas from a practical and technical perspective could not fit societal, cultural, aesthetical one. For projects of this size landscape architects also have to take into consideration this more societal and cultural point of view, not focusing only on land use surface but making choices, as the following quote express:

“But it is important to be able to look at the landscapes from an energy potential perspective, analyzing and understanding the areas with highest spatial quality for people and also helping them in making choices between certain areas with the highest spatial quality or lowest spatial quality and how you should include them in the... well the quantity of calculations of the energy transition, yeah.” (NL3, 2017)

Moreover another difficulty is the propriety of the land considered as suitable for the implementation of the projects, where some areas perfectly fit the project requirement, but if it's private property it could not always lead to the implementation of the projects. In the words of the landscape architect:

“roofs are private property so that means that in the end you have a certain amount of suitable roofs [for PV projects] but a certain percentage of those suitable roofs people will be really interested to do it, you cannot oblige people to put solar panels on their roofs so like that we could kind of have an indication of how much solar energy on roof is feasible. But then we have to look at national infrastructure, the nice thing is that land owned by the Dutch government is just basically one owner it's of course more owners, you have Rijkswaterstaat, you have the provinces etcetera, etcetera. But ownership structure is less complicated so we...there we did the same study” (NL8, 2017)

It is recognized as this adds great complexity to these projects, which, however, were developed by a team including different firms and experts, including engineer one.

These are quite complex projects conducting whom landscape architects are supported by engineering and other more technical expertise, but still landscape architect needs to deal with both quantitative and landscape qualitative side of energy transition in these projects.

12.3 A generalist discipline that requires more and more specialization?

Having explored in the two previous sections the knowledge and design steps mentioned by landscape architects while working on energy transition related projects, in this section the conventional and additional knowledge and design steps are connected with the different projects' categories on which landscape architects are working on energy transition processes (table 12.1). Moreover, the knowledge and design steps are put in relation to each other, showing challenges and potential. In the end, differences between knowledge and procedures found in French and Dutch narratives are pointed out and discussed.

12.3.1 Differences in landscape architects' needs for knowledge and design steps according to different projects

The four categories of projects that landscape architects speak about during the interviews are: *RE technologies site design (site design)*, *landscape strategic perspective for RE technologies' localization (strategic siting)*, *landscape strategic perspective for energy transition (ET strategies)*, *landscape energy transition quantitative scenarios (ET scenarios)*, *non-energy transition focused projects (non-ET project)* (see table 12.1, above, for further details).

These five categories, supported by examples, are presented and discussed by relating them to knowledge and design steps that landscape architects use when designing.

12.3.1.1 RE technologies' site design

In this first category, the choice of RE technologies site is already settled and landscape architects have to study the local integration of the technologies, defining possible layouts within the study area, for example wind turbines in lines or in a semicircle, etc. analyzing several points of view. They could also design the project's boundaries, choosing vegetation species or other elements for example for photovoltaic parks.

Working on the implementation of RE technologies requires additional knowledge about these technologies, how they function, what they need to optimally function (e.g. no shadow) what their impact is in terms of noise etc. and knowledge about energy supply in terms of capacity and/or output. This knowledge is needed to answer specific questions of the projects and initial commission. The collaboration with other professionals is considered fundamental.

Besides, landscape architects that work on this kind of project do not mention new steps in the design process. They mention steps that are common to landscape architecture practice in other kinds of projects and that they think are particularly meaningful for RE technologies. These include the landscape analysis of the area under study itself as well as the broader territorial context, the development of a participatory processes with local inhabitants and other stakeholders, and the constant exchange with other experts (e.g. engineer, ecologist). All of this supported by particular attention being made toward graphic representation that needs to be accurate and truthful about proportions. The use of dynamic video/animation is considered meaningful to better represent reality and so communicate wind turbine projects' constant movement. In these projects it is mainly the aesthetic and scenic component that is addressed by the landscape architect, important to be considered in order to better inform people to make landscape evidence-based choices

(Apostol et al. 2016). Moreover, the usefulness of graphic representation of landscape futures is recognized to better explain the project and engage local inhabitants or other stakeholders in the process (e.g. Sheppard 2005).

The British landscape architect Sylvia Crowe in her book “Landscape of Power” was one of the first to give insight and guidance on how “find a means of reconciling our need for power with our need for a landscape fit to live in.” (Crowe 1958, 10). She analyzed power plants, transmission lines, etc. that are not infrastructure for renewable energy production but the initial problem and the goal that she addressed remain the same: to put technical objects we rely on into our landscape in the best way possible, to have landscape we like to live in. So the design of the technical object in the landscape is something developed since long ago in landscape architecture, even if the present-day energy transition has increased the number of compared to the past. The landscape architects interviewed speak about wind turbine and PV panels projects; nobody mentioned other technologies such as biogas plants that could create nuisance in the landscape such as olfactory pollution. It is known that RE technology site projects, even if contributing to the general goal of energy transition, cannot always be considered sustainable and may not benefit the local economy either (for more details on the difference between renewable and sustainable energy (see e.g. Stremke, 2015).

No images could be included in this part of the research (e.g. wind turbines and PV parks), because they are very sensitive projects for developers and/or local energy Cooperatives that commissioned landscape architects, and none accepted to share this material. They fear the rise of local opposition and do not allow publishing the project documents even if the project is already executed.

12.3.1.2 Landscape strategic perspective for RE technologies localization

A wider range of possibility for design exists when the landscape architects have to create prospective scenarios that explore alternative strategies for the site choices for RE technologies. In this case, the large-scale landscape analysis is not only something relating to the analysis of scenic point of view but is more deeply developed to find the best spot for implementation considering not only visual aesthetics criteria but also natural, ecological, socio-cultural issues as one Dutch landscape architect pointed out “make a relation with other important structures

or meanings in a landscape it can be some cultural, historical, structural or big landscape.” (NL5, FS 2017). However, even for this category of projects, as for the previous kind, there are no major differences concerning what is the “conventional” landscape architecture steps towards design. Actually, one Dutch landscape architect (NL7) that conducted a project in the Wieringermeerpolder indicated the areas for wind turbines (a total of about 350 MW capacity) and principles that the municipalities and the province could follow for an optimum placement (order, rhythm, regularity) of the devices in the designated areas (see figures 7 and 8), affirms:

“The example [Wieringermeerpolder] I just gave is more closely related to maybe, a regular kind of designing projects, because you work through the scales from, let’s say, the regional concept or region scale and the system and concept and then, until how the wind turbine gets on the ground and how that area what it looks like and what you can do with that so it come closer to, let’s say, the more traditional kind of project.” (NL7, 2017)



Figure 7. Wind turbine localization map in the Wieringermeerpolder, in green. Source: Beeldkwaliteitsplan Windenergie Wieringermeer. 2014. p.36.

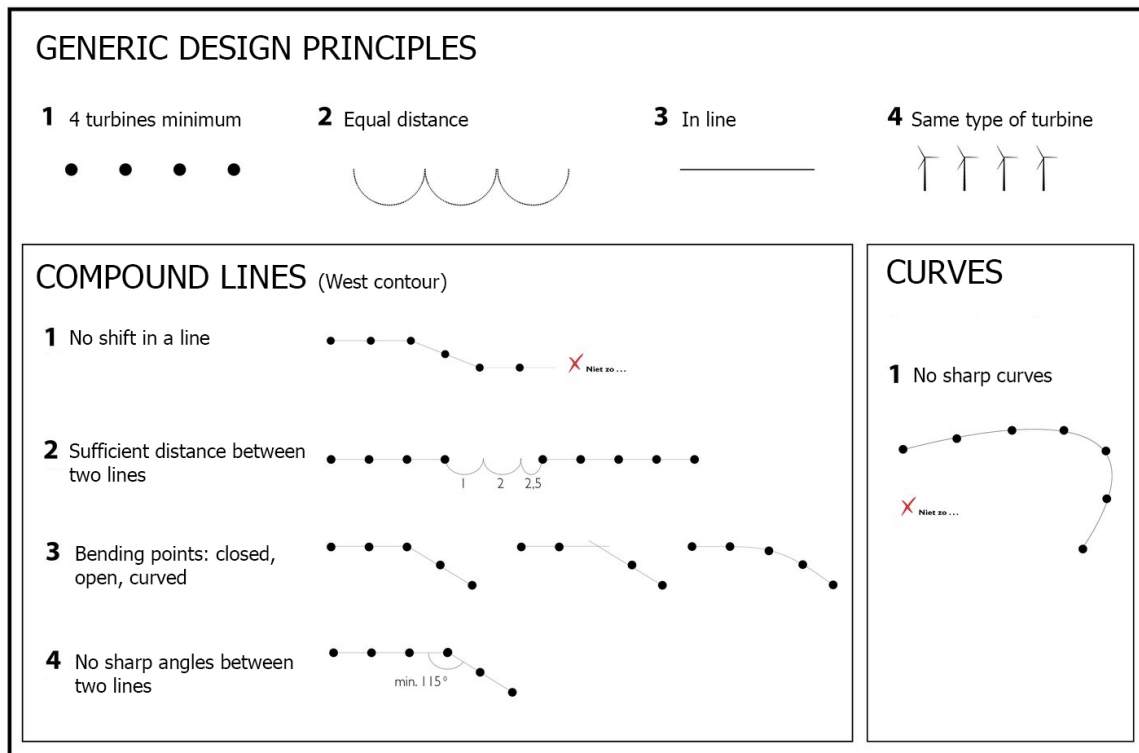


Figure 8. Table overview of wind turbines siting principles. Source: Beeldkwaliteitsplan Windenergie Wieringermeer. 2014. p.52. Texts translated from Dutch by the author.

However, these territorial projects, compared to the site-scale RE technologies design, could support the upstream decision-making of local or higher-level institutions. Indeed, most of these studies are commissioned not by private RE developers, but by governmental bodies (e.g. municipalities, provinces). For example, the *Wieringermeerpolder* project (NL7 table 12.1), is commissioned by the Hollands Kroon municipality and the Noord-Holland Province and the *Wind turbines siting in Flevoland polder* (NL5 table 12.1), is commissioned by the Province of Flevoland.

In France, an example of siting RE technologies on the larger scale is given by FR6 (table 12.1) that worked on the elaboration of a specific French planning instrument the “Schéma régional éolien” [Regional wind schema] (SRE) (see chapter 3 for more information) of Rhône-Alpes region. In this case, again, the landscape architect developed an analysis of the landscape (figure 9) and gives an overview of the favorable selected areas for the location of wind parks (figure 10), and some written recommendations on how to implement them. However, they remain more general in nature when compared to the precedent Dutch example (*Wieringermeerpolder* NL7 table 12.1), by not indicating possible wind turbines site layouts in the defined areas for implementation, nor by indicating how many turbines should be placed.

“If there are several projects, how they dialogue with each other, how it relates to the topography, considering the access, considering the villages with high heritage values, how far we distance them, etc.”³⁴ (FR6, 2018)

34 “S’il y a plusieurs projets, comment est-ce qu’ils dialoguent entre eux, comment ça se fait par rapport au relief, par rapport aux accès, par rapport aux villages à haute valeur patrimoniale, quelle distance on donne, etc., quoi.”

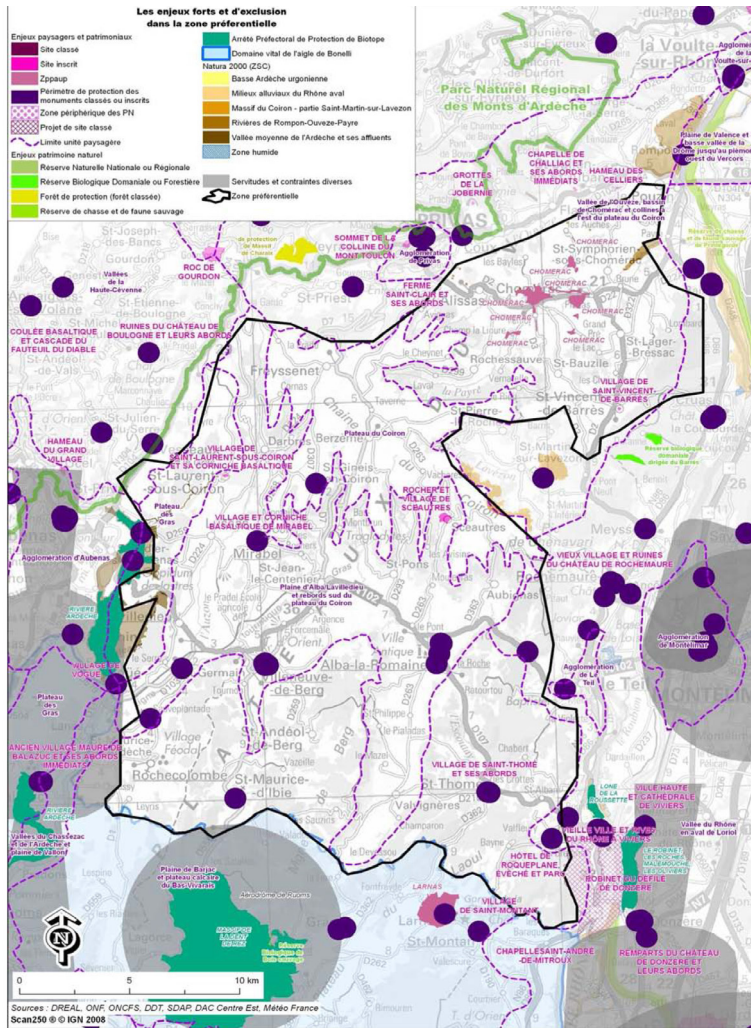


Figure 9. Analysis for favorable areas for wind turbines parks implementation in Coiron area. Source: Schéma régional éolien de la région Rhône-Alpes. 2012. p.49.

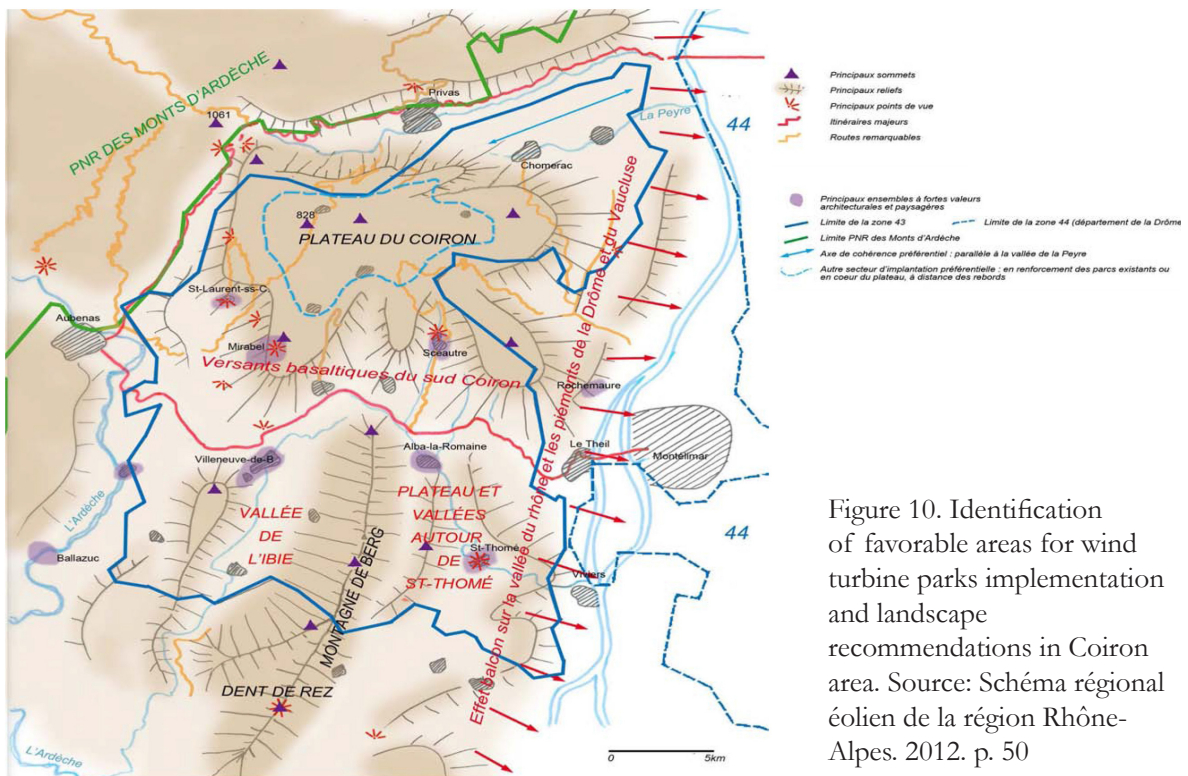


Figure 10. Identification of favorable areas for wind turbine parks implementation and landscape recommendations in Coiron area. Source: Schéma régional éolien de la région Rhône-Alpes. 2012. p. 50

12.3.1.3 Landscape strategic perspective for energy transition

The projects that involved a landscape strategic perspective for the territory are developed both by French and Dutch practitioners. These strategic explorations reinforce energy transition from a landscape perspective and have the goal to develop energy transition strategies based on the analysis of landscape characteristics. The interviewees did not highlight additional design steps but empathized the importance of *developing grounded landscape analysis* and *participatory processes* especially for the French projects (FR4 and FR6 table 12.1), to elaborate as much as possible a project that is appreciated by the local inhabitant community. For example, for the *plan de paysage PNR de la Brenne* (FR6 table 12.1) the analysis and the understanding of the presence of large areas of forest and hedges systems [*bocage*] and their progressive increase in surface area over time (see figure 11) led landscape architects to suggest the implementation of biomass energy from wood. A similar approach has been developed in the project *Energie & Omgeving. Verbinden van systeem en paktijk* (NL1 table 12.1) that empathized that the exploitation of the forest for wood energy could reinforce the conservation of the forests themselves preserving the landscape mosaic and improving biodiversity by alternating agriculture fields and wooded areas, and leading to local economic benefits (see figure 12).

These examples illustrate an effort to compose a strategic vision considering components beyond energy topics, including aesthetics, multi-functionality and economy.

However, in these projects, more specific design principles for the implementation of strategies

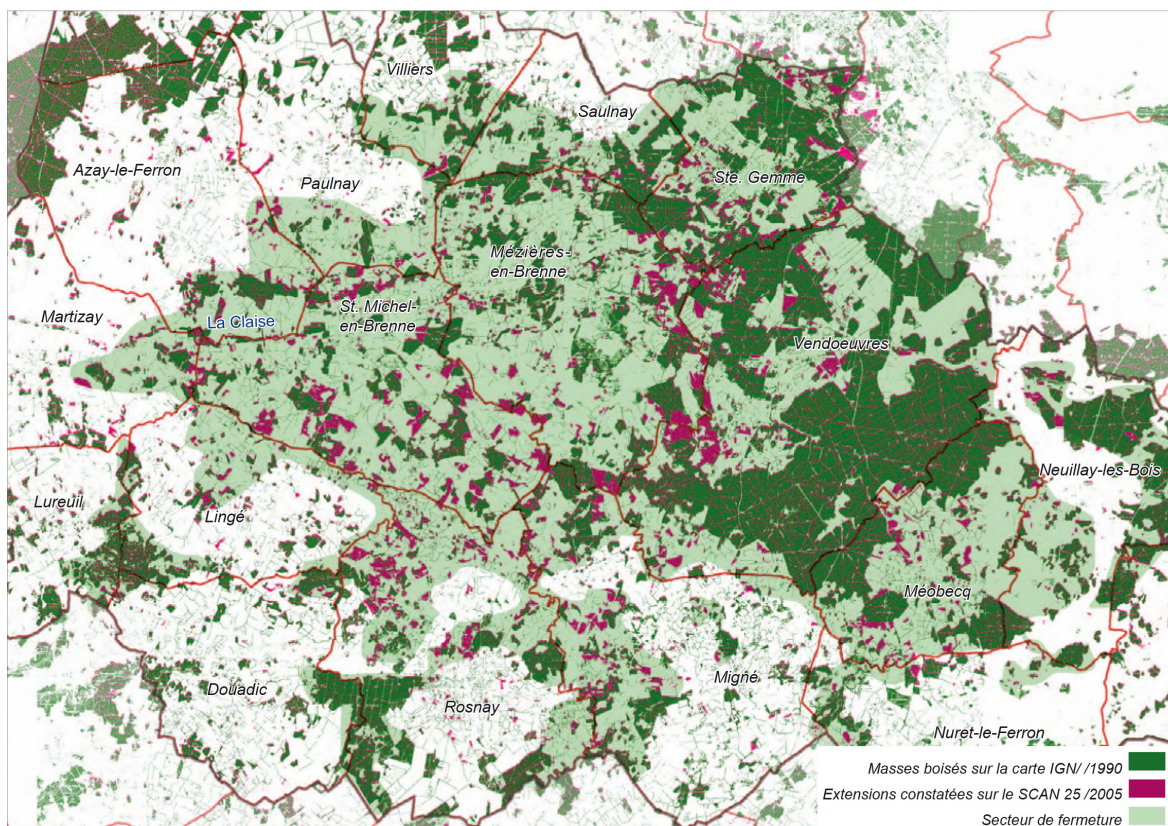


Figure 11. Illustration of the evolution of forest areas and hedges infrastructure (*bocage*) between 1990 and 2005. Source: Projet de paysage Brenne-Boischaut Nord. 2013. à ciel ouvert, p.41.

are included. For example, figure 13 (FR6, *plan de paysage of PNR de la Brenne*, table 12.1) provides insights and simulations of potential wind turbines in the area that are defined as suitable in the planning document.

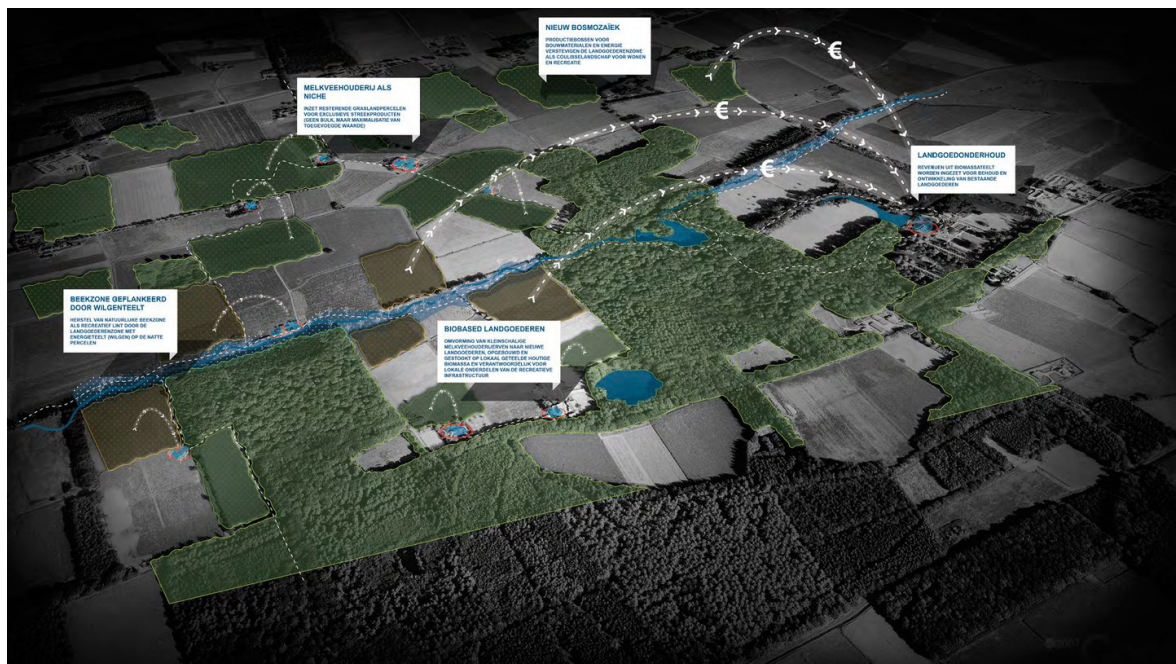
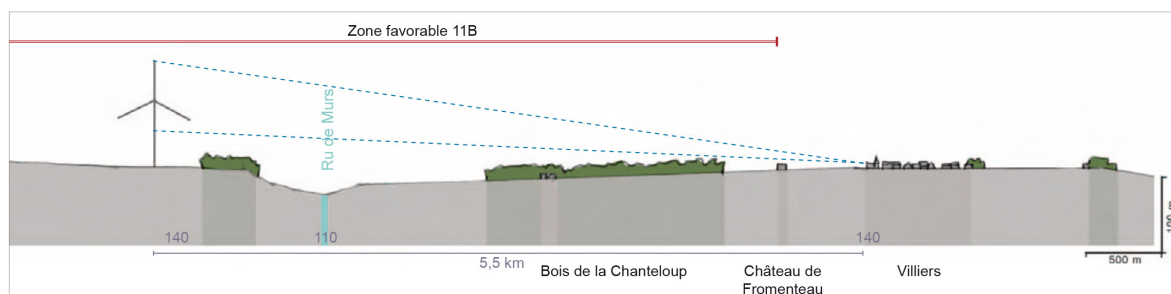


Figure 12. Schema of how the use of forest wood for biomass energy enriches the landscape mosaic and supports the local economy. Source: Eo-Wijers, *Energie & Omgeving. Verbinden van systemen en paktijk*. 2015. p. 14-15.



Coupe de principe d'évaluation des impacts sur les paysages proches (bourg de Villiers et vallon de Fromenteau).



Figure 13. Simulation of the implementation of a wind turbine park in Villier. Source: *Plan de paysage Brenne-Boischaud Nord*. 2013. à ciel ouvert, p.194.

However, even if the design steps are conventional, these projects require additional *technical RE* and *energy focused* knowledge because they have, for example proposed one or another RE technology to be implemented on the territory according to territorial characteristics. Moreover, the institutional process concerning decision-making and energy-related laws, are important in order to elaborate strategies that are in line with them. None of the landscape architects interviewed, however, mentioned the need to acquire additional knowledge in order to reduce energy consumption or improve energy efficiency.

These strategic projects provide specific design principles that can affect the transformation of the physical landscape. And at the same time, they address decision-making processes of local (or higher) institutions for the territory, by supporting from a landscape framework the definition of future strategies.

Indeed these projects are commissioned by local institutions: the *renewable energy production visions* (NL2 table 12.1) by the municipality of Goeree-Overflakkee and, the *Plan de paysage for PNR de la Brenne* by the Regional Natural Park (PNR) of Brenne (FR6 table 12.1). These projects are sort of sum up, a common design synthesis of all the landscape characteristics and issues. Using the words of a landscape architect about the description of this project category:

“So here is...a landscape project, it’s really a common thread which brings a long temporality, which brings a central axis, which starts from an analysis, from a complete qualitative list of places, of topics and from all this we elaborate project strategies”³⁵ (FR4, 2017).

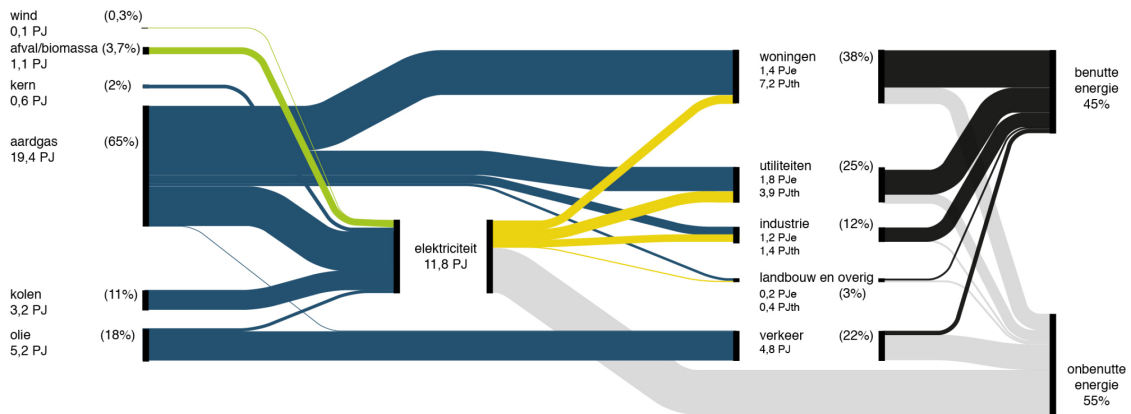
12.3.1.4 Landscape energy transition quantitative scenarios

The *ET scenarios* are the only category of projects for which landscape architects mention more complex additional steps in the design process (NL3 and NL8 table 12.1). Two additional steps are mentioned: one concerning the *collection and processing of quantitative energy data* and the *combination of quantitative energy data with spatial/ landscape component*. So the design process needs to combine the quantitative energy goals of the territory, for energy neutrality for example, with their spatial footprint on the territory for example, on how and where to generate renewable energy or reuse waste energy in the territory, meeting energy quantities with the corresponding space, while considering socio-cultural or other issues. Moreover, in the more conventional design step of *developing grounded analysis* for this project category, landscape architects put forward an understanding of the energy system of the territory (e.g. location of energy production and consumption), that needs still to be connected to more conventional landscape analyses. For example, the project described by the landscape architect (NL3 table 12.1) working on the *Parkstad Limburg Energie Transitie*, the energy situation of the territory for 2011 and the ambitions moving towards 2040, have been inquired. This is represented in figure 14, showing a drastic substitution of fossil fuels towards renewable energy production from a mix of RE technologies.

Figure 15 and figure 16 show the example of the study of the energy potential for heat energy

35 “Donc ici...un projet de paysage c’est tout d’un coup vraiment un fil conducteur qui... qui ramène de la durée, qui ramène un axe central, qui part d’un diagnostic, d’un état des lieux, d’enjeux et tout ça on le décline après dans des stratégies de projets.”

2011 Parkstad Huidige energiemix (29,6 PJ)



2040 Parkstad Voorbeeld van een mogelijke energiemix (13 PJ)

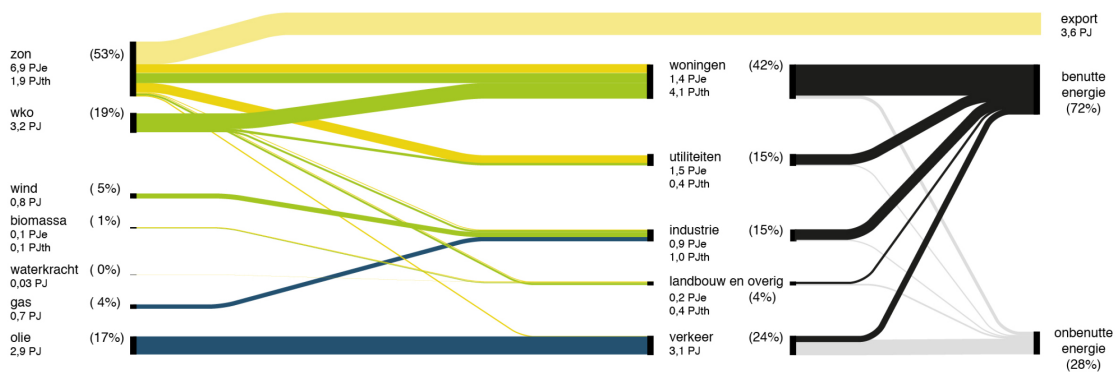


Figure 14. Sankey diagram of energy situation in 2011 and the energy goal for 2040 of the region Parkstad South Limburg. Source: Parkstad Limburg energietransitie PALET. Ambitiëdocument. 2014. p. 26.

storage and wind turbine park implementation developed by the landscape architects. And Figures 17 and 18 represent the possible scenarios elaborated to meet the territory's energy goals, based on discussions with stakeholders and questionnaires developed with them collecting their preferences and constraints for renewable energy. How could be seen comparing the energy potential maps (figures 15 and 16) and the scenario goals (figures 17 and 18), is that not all the potential energy producing areas are included in the scenarios, because of other constraints such as the choice to exclude certain areas, for example the "national landscapes" from the wind turbines and preferences expressed by stakeholders collected through a questionnaire.

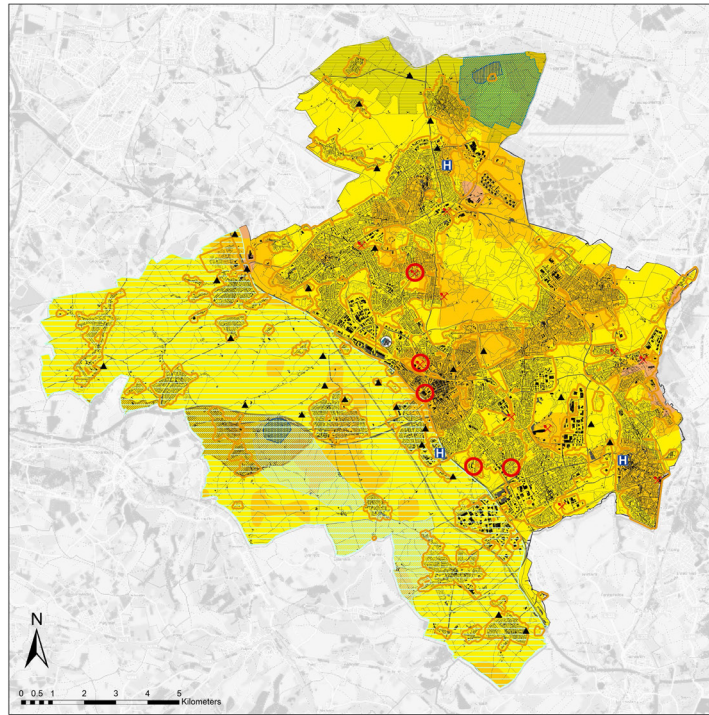


3.3.1 Potenties en beperkingen WKO

De potenties en beperkingen van warmte koude opslag (WKO) worden in figuur 3.5. weergegeven. Tabel 3.6. laat een overzicht zien van alle beperkingen en hun relatieve 'hardheid' en tabel 3.7 de geraadpleegde bronnen.



32



Figuur 3.5: Energiepotentiekaart warmte koude opslag

Figure 15. Aquifer thermal energy storage potential and limitations map of Parkstad Limburg territory. Source: Parkstad Limburg EnergieTransitie (PALET). Achtergronddocument hernieuwbare energieopwekking. 2014. p.32.

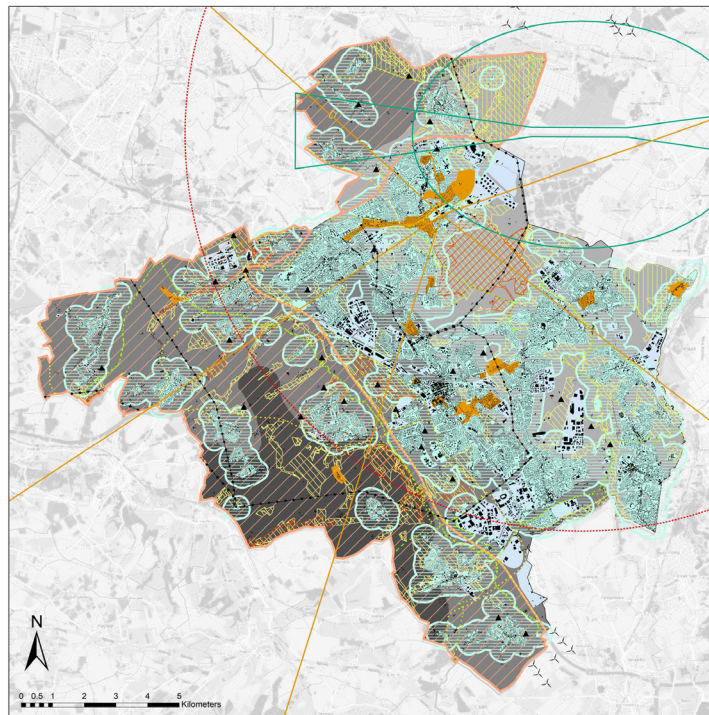


3.2.1 Potenties en beperkingen windenergie

De potenties en beperkingen van windenergie worden in figuur 3.4. weergegeven. Tabel 3.4 laat een overzicht zien van alle beperkingen en hun relatieve 'hardheid' en tabel 3.5 de geraadpleegde bronnen.



26



Figuur 3.4: Energiepotentiekaart windenergie

Figure 16. Wind energy potential map of Parkstad Limburg territory. Source: Parkstad Limburg energietransitie PALET. Ambitiedocument. 2014. p. 18.

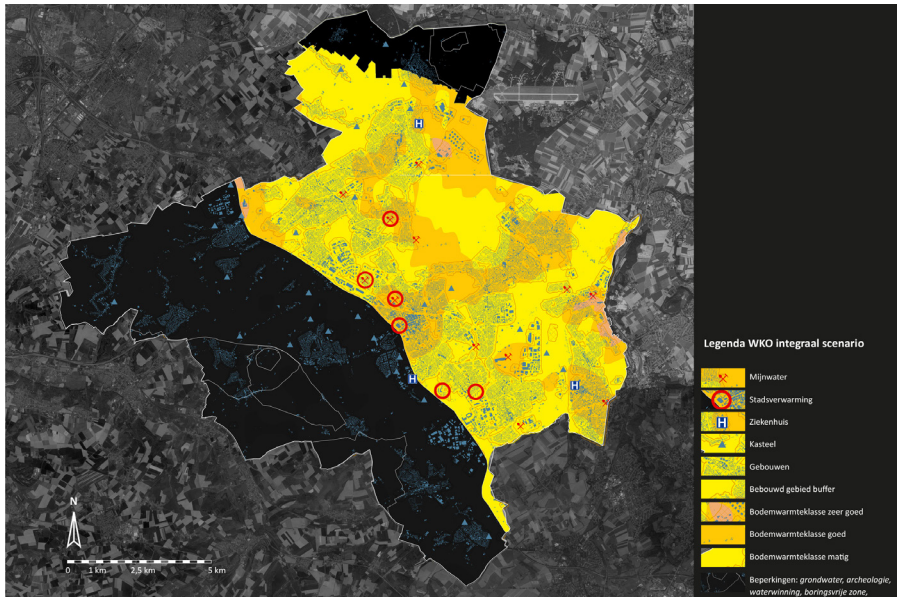


Figure 17. Aquifer heat energy storage map representing the “integral” scenario of Parkstad Limburg territory. Source: Parkstad Limburg energietransitie PALET. Ambitiedocument. 2014. p. 18.

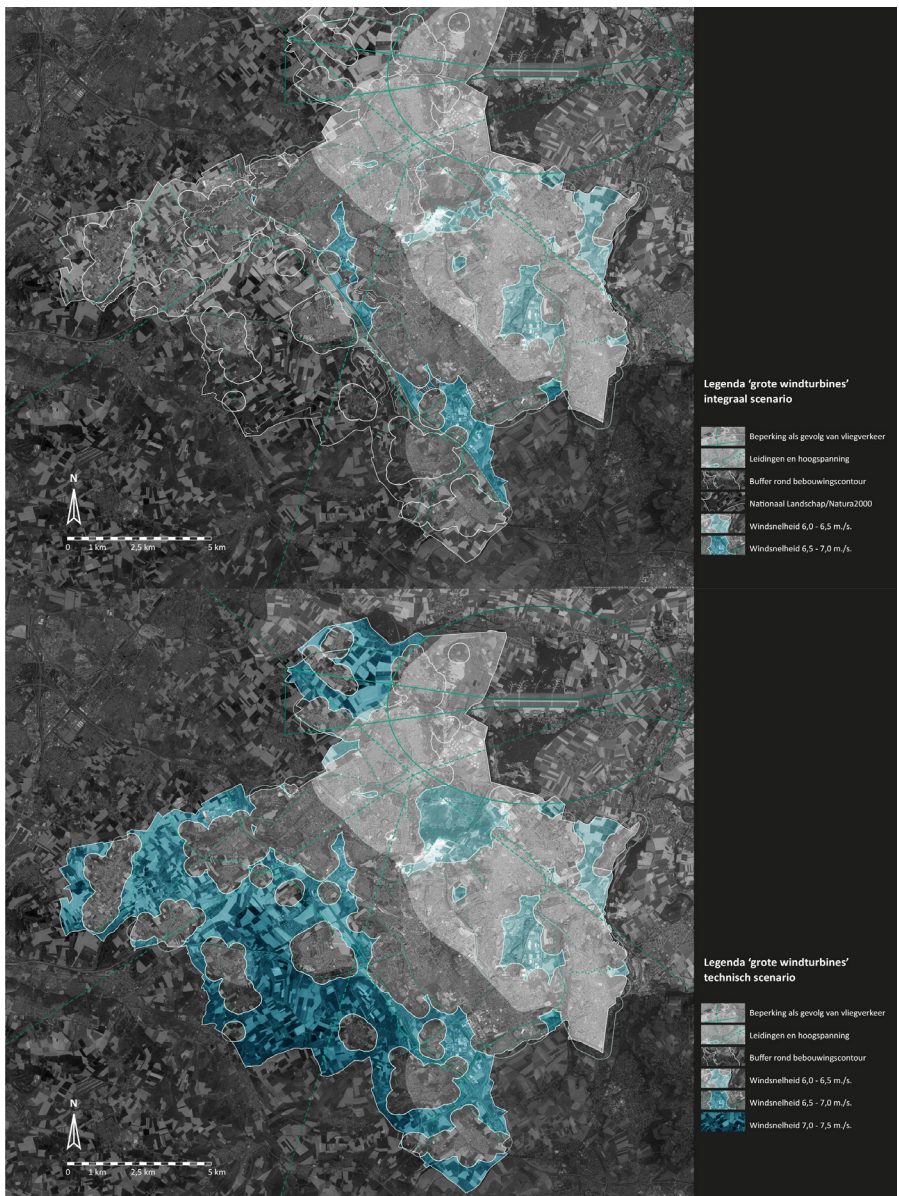


Figure 18. Large scale wind turbine integral scenarios and large-scale wind turbine technical scenario. Source: Parkstad Limburg energietransitie PALET. Ambitiedocument. 2014. p. 22.

This set of methods has been discussed and conceptualized as ‘spatial transition analysis’ (STA) combining mapping energy potential with qualitative spatial and stakeholder considerations (Oudes and Stremke 2018).

Concerning the knowledge required for these projects from a landscape architects perspective what is emphasized in the narratives is the energy focused knowledge about measured units, etc. along with technical knowledge pertaining to RE. However, except *ecological* and *botanical* knowledge that is not directly mentioned, even if probably considered, all the other categories of knowledge we identified are stressed, such as knowledge about *hydrology, topography and geology* showing how the basis of landscape architecture knowledge is still also needed in these projects. This category of projects is highlighted as being more challenging for the landscape architecture profession and, as illustrated in the previous example, has informed decision-makers for territorial institutions to determine their energy transition goals according to, among others, landscape considerations.

12.3.1.5 Non energy transition focused projects

A last project needed to be added along with the four previous ones, it is the *non-ET projects*. We define these as projects in which landscape architects estimate having applied energy conscious designing principles that contribute to reduce energy consumption or to improve energy efficiency even if the initial commission was not about energy. In this category of projects, landscape architects highlight having used local construction materials to reduce energy needed for transports (e.g. quote JH6 and LP3 table 12.3), or having selected types of vegetation thinking about energy gain (e.g. quote PA3 table 12.3) or by designing projects such parks and gardens that require low maintenance and so are less energy demanding. These principles could be applied to a very broad range of projects (e.g. parks, gardens, public squares, etc.) but they demand a personal commitment of the landscape architect himself about energy transition issues, leading them to think about solutions. This category of projects were spontaneously mentioned by landscape architects to highlight how conventional landscape architecture knowledge particularly of the *botanical* and *ecological* sort could support energy transition and facilitate to perform design step for *developing energy reduction measures*.

12.3.2 A need for transdisciplinary and transversal knowledge

“As a landscape architect you’re never the specialist you’re always the generalist.” (NL6, 2017)

As these interviews excerpts illustrate, commonly, landscape architects see themselves as generalists and able to integrate and create synergies among different disciplines and topics. So the need to acquire additional knowledge for design about energy transition is in line with the characteristic of landscape architecture, that intrinsically ranges across a broad range of disciplinary fields (Bell, Sarlöv Herlin, and Stiles 2012), and has a transdisciplinary knowledge. Table 12.4 and table 12.5 (below) provide an overview of the conventional and additional knowledge bases (table 12.4) and conventional and additional design steps (table 12.5) that

landscape architects mention in their narratives while working on four categories of energy transition related projects, with the additional category of *non-ET projects*.

Table 12.4. Conventional and additional knowledge highlighted by landscape architects while working in the energy transition framework put in relation to the four different categories of projects they conducted. The order of classification for knowledge categories is represented in decreasing order, from the most quoted by the interviewees to the least.

Source: author from elaboration of the landscape architect semi-structured interviewees (16 interviewees).

Projects' categories Knowledge	Number of interviews mentioning the knowledge	RE technology site design	Landscape strategic perspective for RE technologies localization	Landscape strategic perspective for energy transition	Landscape energy transition quantitative scenarios	Non energy transition focused projects
Conventional knowledge						
Design knowledge	15	x	x	x	x	x
Topography, hydrography and geology knowledge	5	x	x	x	x	x
Ecological knowledge	3	x	x	x	-	x
Botanical knowledge	2	-	-	-	-	x
Additional knowledge						
Institutional organization and decision process	8	x	x	x	x	-
Technical renewable energy production knowledge	7	x	x	x	x	-
Energy focused knowledge	6	x	x	x	x	-
Computer software	5	x	x	-	x	-

Table 12.5. Conventional and additional design steps highlighted by landscape architects while working within energy transition framework put in relation with the four different categories of projects they conducted. The order in classification for designing step categories is represented in decreasing order, from the most quoted by the interviewees to the least.

Source: author from elaboration of the landscape architect semi-structured interviewees (16 interviewees).

Projects' categories	Number of interviews mentioning the knowledge	RE technology site design	Landscape strategic perspective for RE technologies localization	Landscape strategic perspective for energy transition	Landscape energy transition quantitative scenarios	Non energy transition focused projects
Conventional designing steps						
Representing project graphically	14	x	x	x	x	-
Exchanging in multidisciplinary teams	14	x	x	x	x	-
Developing grounded landscape analysis	11	x	x	x	x	-
Developing participatory process	11	x	x	x	-	-
Developing additional empirical tool	3	x	-	-	x	-
Additional designing steps						
Developing energy consumption reduction measures	9	-	-	x	x	x
Collecting and processing energy quantitative data	2	-	-	-	x	-
Combining energy quantitative data with spatial/ landscape component	2	-	-	-	x	-

12.3.2.1 Conventional knowledge

Firstly what could be seen in the table 12.4 is the transdisciplinary character of knowledge that landscape architects mention that they use while designing ET projects, characteristics that belong to their profession (Bell, Sarlöv Herlin, and Stiles 2012).

Moreover, looking at the connections between project categories and knowledge, it stands out from the same table, that conventional landscape architecture knowledge about *design* and *topography*, *hydrography*, and *geology* are highlighted for all the four energy transition project categories as well for the *non-ET projects*. These are among the types of knowledge at the very basis of landscape architecture practice, that is needed and applied in every kind of project, and which directly relates to the most noted contribution landscape architects express in energy transition: the *grounding energy transition in the territory* and *imagining and realizing future landscapes* (see chapter 11, table 11.3).

Nevertheless, even if *topography*, *hydrography*, and *geology* knowledge are mentioned, none of the interviewees directly cite *geography*. Indeed, understanding the *topography*, *hydrography*, and *geology* of a territory is partly understanding its geography. However the geography field is broad and varied, and social and physical geography are recognized as one of the fields, among others, from which landscape architects base their capacity to develop a territorial and landscape analysis both concerning its material than immaterial (social-cultural) component (Donadieu 2007). These analyses of geographic ground is then used for the development of landscape projects (Davodeau 2008). Considering that the most highlighted contribution made by landscape architects is affirmed as the *grounding energy transition in the territory* (chapter 11), and the *development of landscape grounded analysis* is considered a very important step performed in all four categories of energy transition projects mentioned (table 12.5), the lack of geographic knowledge with social/human factors and physical ones could be questioned. This could be even more important considering that the geography discipline is raising interest about energy and energy transition, addressing directly the notion of “geography of energy” (e.g. Mérenne-Schoumaker 2007; Solomon and Calvert 2017; Zimmerer 2011). They advocate how about energy concerns: “geography provides the tie that binds, places it in context, highlights scale, and identifies location in reference to all other factors of supply, demand, transportation, consumption, and impact” (Pasqualetti and Brown 2014, 131) therefore acknowledging the spatial dimension of energy transition. At the same time even if landscape architects do not directly mention geographic knowledge, it seems to be an underlying theme all their narratives, especially when they talk about the importance of understanding the location and context (e.g. quote MM3 table 12.3), ranging among scales (e.g. quote AB1 table 12.3), the territoriality (meaning the social and political/institutional organization of territory) (e.g. quote PH1 table 12.2). All those points are highlighted by Bridge (2013) to assess geographical implications towards the energy transition process. In the landscape architecture practice these points are needed to develop an analysis in order to elaborate tailor-made design solutions.

Concerning *design knowledge* it is at the center of landscape architects practice itself (Donadieu 2009a), and the capacity of drawing or more generally representing the physical reality as well as the possibilities for future projects are at the basis of landscape design (Tiberghien 2005). This is also stressed by the high number of times (14) the design step referring to the *elaboration of*

graphical projects representation (table 12.5) is mentioned. However by mentioning the acquisition of additional knowledge about *computer software* both to handle energy quantitative data and spaces such as GIS (e.g. quote DO2 table 12.2) and the use of video to dynamically present wind turbine projects (e.g. quote PA2 table 12.2) shows how *design knowledge* and the design step of *representing projects graphically* are affected by some changes to energy transition projects. GIS software is mentioned by landscape architects working on *site design* and *ET scenarios*. For the first projects they are highlighted as particularly useful in order to *exchange in multidisciplinary group* and for the second for supporting in the design steps for *collecting and processing energy quantitative data* and *combining energy quantitative data with spatial/landscape components*. However the use of GIS software in landscape architecture needs to be always carefully crossed and balanced with field exploration, by not reducing energy transition projects to two-dimensional quantitative maps but by considering spatial characteristics such as historical cultural layers including qualitative data to avoid concentrating only on quantitative data (Schöbel, Dittrich, and Czechowski 2013). Besides, concerns about computer software could increase a possible disparity among landscape architecture firms. Software such as video simulation for projects or other, are often expensive and risk to be economically affordable only by the bigger offices that can afford them or to train members of the firm to use them. Another conventional knowledge in landscape architecture mentioned is *botanical*, having the potential to improve, for example local microclimate by supporting in the correct vegetation choices for cooling down temperatures during summers or in winters by reducing heat dispersion. For example, providing hedges protects from the cold wind as illustrated by the quote PA1 (table 12.2) and is recognized in scientific literature (e.g. Lenzholzer 2015; Brown 2014). Landscape design's potential to save energy through the choices and use of plant species is long recognized (e.g. Moffat and Schiler 1981). Nevertheless, in this domain, some additional knowledge, when considering the energy transition purpose, is recognized as lacking concerning for example, the different capacity of trees to absorb CO₂ and the knowledge about some species of trees that contribute to ozone smog in certain conditions of smog and heat (Brown 2011). However *botanical knowledge* is mentioned twice and only referring to *non-ET projects*, although it could support the design for other projects categories such as those in *ET strategies*, including strategies about planting urban areas or cultivating specific vegetation in defined areas to power biogas power plants. Moreover concerning *ecology knowledge* in landscape architects' narratives, it is mainly addressed as a need in order to look and understand the different ecosystems in design areas for *site design* (e.g. quote JH3 table 12.2), recognizing that landscape design affects ecological processes and ecosystems in the territories where these projects are developed (Nassauer 2002). Research in landscape architecture is also providing knowledge by looking at ecological concepts that exist for natural ecosystems in order to inspire energy conscious landscape planning and design, such as "system size" and "source and sink" (Stremke and Koh 2010), but these kind of ecological inspirations from nature do not appear in landscape architects discourse. *Ecological knowledge* even if mentioned three times, is mentioned as useful for all the projects categories except that for *ET scenarios*, showing the acknowledgement of its importance across all projects. However this does not necessarily mean that landscape architects, working on these projects do not use at all this knowledge, but they do not put it forward in their narratives, in which they put mainly the accent to the need to acquire additional *energy focused* and *technical renewable energy production* knowledge.

12.3.2.2 Additional knowledge

Concerning the need to additional knowledge the table 12.4 illustrates that all the four energy transition projects categories identified require additional knowledge: *institutional, organizational and decision process for ET, technical RE production and energy focused*. This shows how working on energy transition imply changes in knowledge in landscape architects background asking for more energy focused knowledge, even if probably with differing degrees of depth according to the different projects categories.

However it could be highlighted that for the need of additional knowledge the attention is focused on RE technologies. None of the landscape architects mention the need to acquire additional knowledge about energy saving techniques or about improving energy efficiency or mention acquiring insight into the basic functioning of technologies that concern energy distribution and energy storage. Only a Dutch landscape architect, as the quote FS1 (table 12.2) illustrates, mentions the electricity distribution network expressing how it could be useful to know how RE technologies are linked to it. This general lack of mention about technical knowledge beyond RE technologies could be due to the fact that they are not really involved in projects including energy transport infrastructure or energy storage. Nevertheless, these topics are intrinsically interconnected to the functioning for RE technologies, and to the designing of a territory especially for a profession that emphasizes the importance to keep vision as global as possible, a concern about this could be worth considering. This is especially true for the projects' categories *ET strategies* and *ET scenarios* that try to address energy transition, not only from a RE production perspective, but concerning also energy consumption reduction. Indeed landscape architects mention (9 times) as an important step in design of *developing energy consumption reduction measures* (table 12.5) through the use of vegetation (e.g. quote PA3 table 12.3), construction material choices (e.g. quote LP3 table 12.3), and spatial design (e.g. quote JJ1 table 12.3) for three categories of projects: *ET strategies* and *ET scenarios* and *non-ET projects*. This shows an acknowledgment, by landscape architects, of their capacity to increase the reduction of energy consumption, but it is not a field in which they feel the need to gain extra expertise. However also for the projects of *strategic siting*, some basic knowledge about the energy (electricity) distribution networks could be valuable in order to provide more conscious site choices by taking into account this variable. Indeed the location of RE technologies far from the electricity network could result in connection difficulties or higher costs. The few references concerning energy distribution and energy storage, focusing mainly on RE production, are in line with others research that analyzes entries for designing competitions about energy transition for territories, that found the main attention on this last problem as well (de Waal et al. 2015).

However, it is interesting to underline that the additional knowledge needed is of two kinds. One that refers directly to the topic of energy, meaning its measure units, its calculation, how it is produced, etc. summed up in categories: *technical renewable energy production* and *energy focused* knowledge. The other concerns other domains such as the public policies and administrative procedures for the *institutional, organizational and decision process* knowledge and graphic representation for *computer software* one (e.g. video, GIS), in order to better deal with the energy topic and the new issues that arise.

12.3.2.3 Design process

As can be seen from the table 12.5, for all the four categories of energy transition projects, are needed four design steps that are already applied by landscape architects and part of their practice also in other kinds of projects that are not energy transition focused. Moreover the same table shows how two additional design steps are mentioned only for the projects concerning *ET scenarios*, that require the *collecting and processing of energy quantitative data* and the *combining energy quantitative data with spatial/landscape components*, to be added to the conventional design steps already mentioned. These additional design steps are directly connected with the *technical RE production* and *energy focused* categories requiring additional knowledge.

Moreover, these additional design steps dealing with the quantitative part of energy to define landscape/spatial explicit energy goals, finds a match on what is discussed in the ongoing scientific debate about landscape planning and designing in energy transition context. Van de Dobbelsteen et al. (2011), discuss about energy potential mapping on territories in order to locate functions that for example, have residual heat and areas with heating need, matching supply and demand. Sijmons et al. (2014) inquire the spatial footprint of different types of energy: electricity, heat, transportation fuel, transport and storage. Moreover in the *five step approach*, a landscape architecture methodological framework to elaborate energy landscape at territorial scale, it is emphasized the analysis design step, merging landscape characteristics with the spatial component of the present energy system (e.g. energy provision, consumption) and RE potential (e.g. solar energy), to elaborate integrated energy landscape visions for a territory (Stremke, Van Kann, and Koh 2012).

Furthermore other methodological frameworks such as the ‘spatial transition analysis’ (STA) also try to conceptualize and combine energy potential mapping with qualitative stakeholder considerations (Oudes and Stremke 2018), possibly highlighting connections between these additional energy focused steps with the more conventional landscape architecture activity of *developing participatory process*.

However, from the perspective of the landscape architects practice beyond the two that developed *ET scenarios*, this connection between energy quantities and space, widely acknowledged in theory is still poorly addressed in practice. Indeed, landscape architects highlighting the design steps of *developing grounded landscape analysis*, do not still address the analyses of the energy quantitative system of a territory, by focusing mainly on the physical and socio-cultural components.

Moreover, a recurrent topic present in literature, but not appearing in practitioners’ narratives yet, it is the question of energy data temporality. This means that energy data needs also to have a temporal component, adding to the “where” also the “when” component, in order to better design energy supply and demand (van den Dobbelsteen, Broersma, and Stremke 2011; Voskamp et al. 2016), adding another layer of complexity to the topic.

12.3.2.4 Summing up

However, these results suggest that the design process when developing energy transition related projects does not require fundamental changes, and landscape architects’ design steps remains valid for work on energy transition. Indeed, additional design steps are required for

one particular category of projects for *ET scenarios*, presented as new category of commission for landscape architects to be developed. While the step of *developing energy consumption reduction measures* is instead, something that could have a broader use in all project categories landscape architects could work on, having repercussions both in the phase of design as implementation. On the contrary, even if combined with conventional landscape architecture knowledge, the need to acquire additional expertise is put forward for all the four energy transition projects categories. This could have repercussions in landscape architecture pedagogical programs.

12.3.2.5 Attention points for landscape architecture

In the research results we see the idea confirmed that landscape architects are “specialists of sensitive approaches as much as technical and scientific ones”³⁶ (Donadieu 2007, 13), that need the ability to understand landscapes, in their physical but also socio-cultural perspectives along with specific technical insight on energy in order to provide the best design solutions.

However, the question arises on how and to what extent a generalist and transdisciplinary discipline, when has to do with the topic of energy, requires specialization and the acquisition of specific knowledge. This could create a disparity in the profession and firm offices, where the bigger firms could buy specific software and provide specific education for some of its members about energy focused or more technical knowledge for RE technologies or other energy infrastructure for distribution or storage, etc.

This could lead some landscape architects in the profession to specialize in this domain and receive more of these commissions. This seems to be what is happening in the Netherlands where we witness leading design firms working on the *Regionale Energie Strategieën* (chapter 4). Similar, even if not representative, we observe that for the two French embedded cases (analyzed in part 2), the same landscape architect has been chosen to work on the *plan de paysage* of the CC Thoursais, because of her experience about energy subject in the *plan de paysage* of CC Monts du Lyonnais.

Nevertheless, in landscape architects’ narrative the idea remains that energy is one of the components to be considered in a project where many topics and concerns play a role. As one of the interviewees said:

“Because you can see the landscape, if it is purely meant for energy transition and then your potential would be very high, but if you see the landscape as a place where all kinds of spatial claims come together, then you can’t just well turn up the volume for energy, so to speak” (NL3, 2017)

Indeed, the fact of working about energy does not have to lead landscape architects to be blind about other themes according to the context. This could lead for example to consider biodiversity or water management in order to have benefits among parts in a project. This point strongly appears for example when landscape architects emphasize the importance of the design step *developing of grounded landscape analysis* looking for other problems or possible synergies with energy topics (e.g. quote JH5 table 12.3). Moreover, developing *multi-functionality in energy projects* is one of the main contributions that landscape architects believe they are able

36 “Spécialistes d’approches dites ‘sensibles’ autant que scientifiques et techniques”. Translated by the author

to perform to support energy transition (see chapter 11).

This is something that could appear in all kinds of projects, for example for photovoltaic ground projects the project boundaries could be further designed, beyond the standard fence adding specific vegetation to increase biodiversity. However research, about solar energy for example (e.g. Scognamiglio 2016), shows that incorporating multi-functionality is still not broadly developed in large scale RE technologies projects.

The incorporation of multi-functions in ET projects becomes even more important for strategic territorial visions, such as the *ET strategies* and the *ET scenarios*, where a multi-layer and multi-criterion-decision analysis (McHarg 1992) could create connections among topics and people, even if the complexity increases.

This consideration builds on the multi-functionality of energy landscapes and that the existing agricultural, urban, recreational areas could overlap and coexist with renewable energy production (Schöbel and Dittrich 2010) for instance, while considering other landscape qualities such as biodiversity, food production and other life-supporting ecosystem services (Stremke and van den Dobbelsteen 2013). There are topics that have been for a long time part of landscape architecture practice and they just have to continue to be so in the energy transition process.

12.3.3 Differences in landscape architects' knowledge and design steps in France and the Netherlands

Some characteristics could be identified to distinguish French and Dutch landscape architects practice by looking at the number of times that knowledge and a step is mentioned in each nation, without forgetting that this is a sample.

Looking at the figure 19, it could be seen that concerning the conventional knowledge, French and Dutch practitioners highlights an equal importance for *design knowledge* and *topography, hydrography and geology*, reinforcing the idea that these are at the very basis of landscape architecture practice. However a main difference exists concerning the *botanical knowledge* that is mentioned by none of the Dutch landscape architects, that on the other side point out mainly *ecological knowledge*, referring to the entire ecosystems and impacts made on them (e.g. quote JH3 table 12.2). This result does not mean that they do not know and use it, but it is not something they felt the need to put forward while working on energy transition. Maybe in France the historical heritage and the importance attached to knowledge on vegetation species, coming from a gardeners is still stronger, even if a strong horticultural tradition exists in Netherlands too (see chapter 10).

Concerning additional knowledge, instead it could be seen how the *technical renewable energy production knowledge* it is mainly mentioned by Dutch landscape architects and *energy focused knowledge* is highlighted exclusively by Dutch practitioners. The few or lack of reference of this knowledge by French interviewees arouses questions, because even if with different frequency (see figure 21), the French and Dutch landscape architects interviewed work on the same categories of projects except for *ET scenarios*. However not only Dutch landscape architects that are working on this last category of projects mention *technical RE production* and *energy focused knowledge*, but this knowledge is also quoted by interviews that developed all the other three categories of projects.

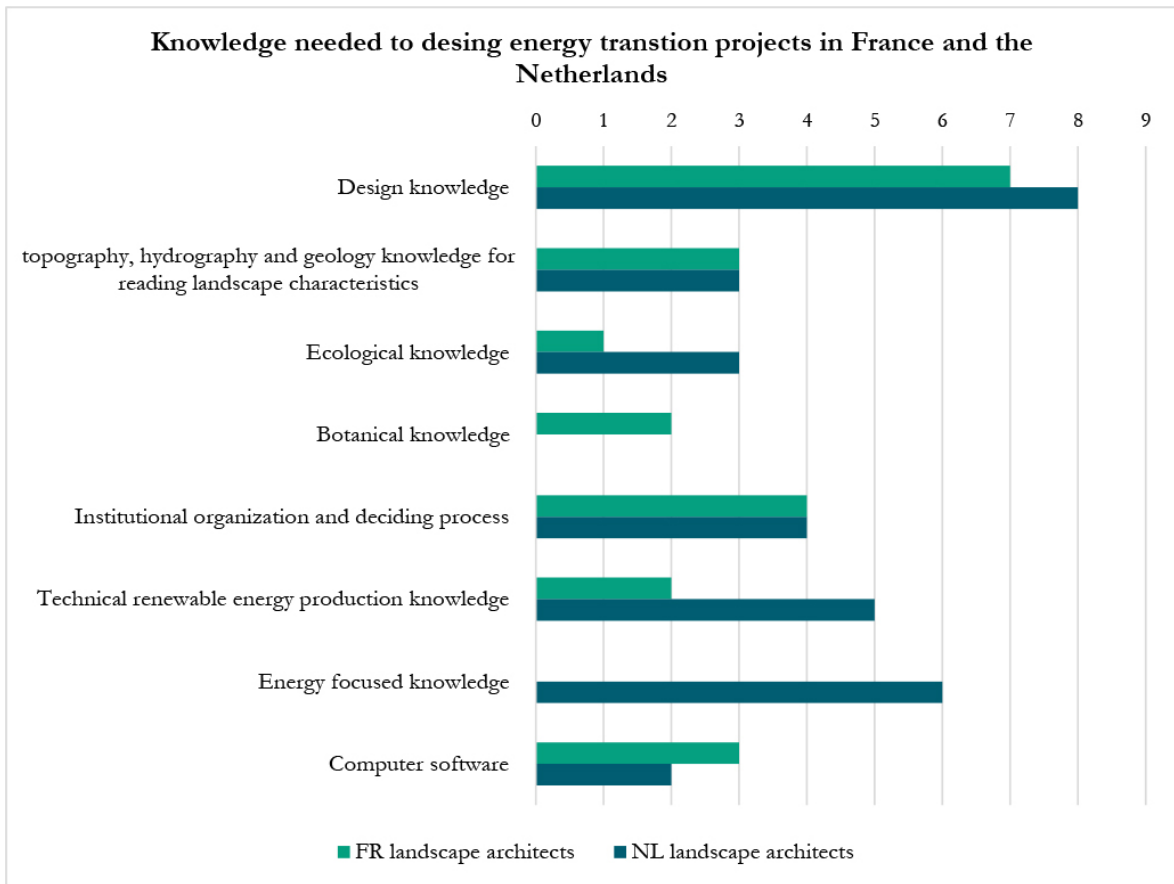


Figure 19. Knowledge subdivided for nation, with the number of interviews mentioning them. Source: author from elaboration of semi-structured interviews.

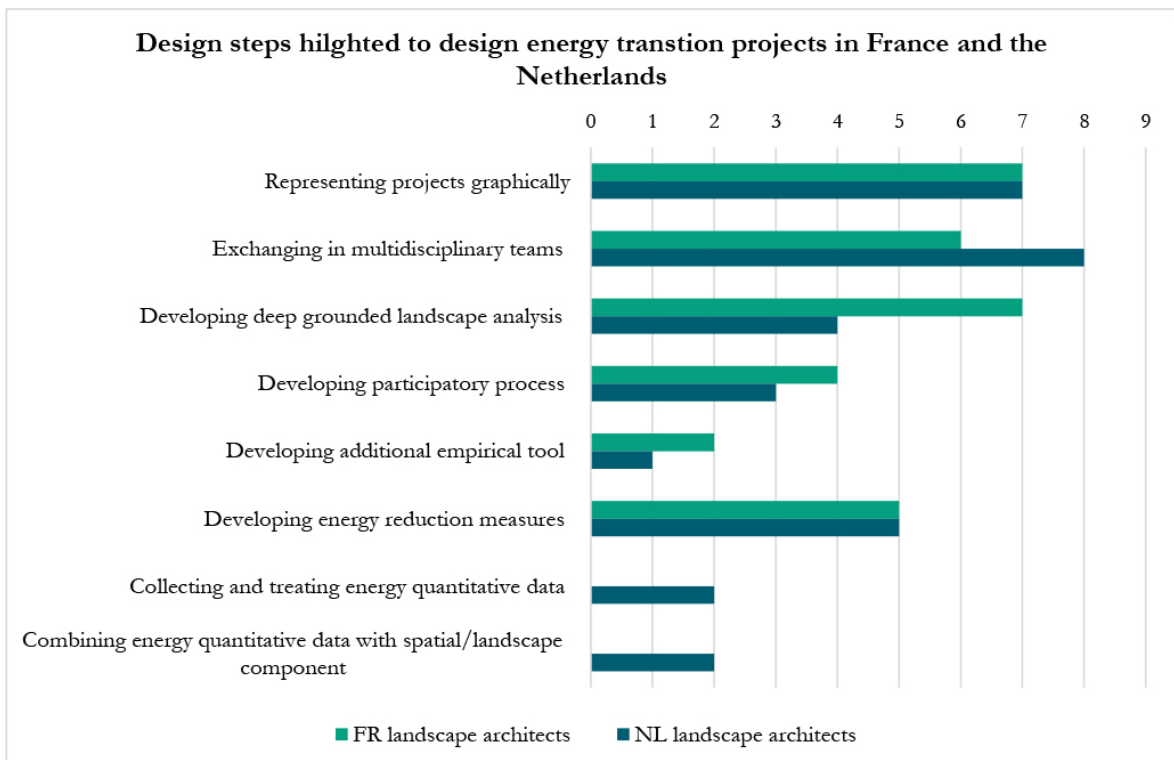


Figure 20. Design steps with the number of interviews subdivided for nation. Source: author from elaboration of semi-structured interviews.

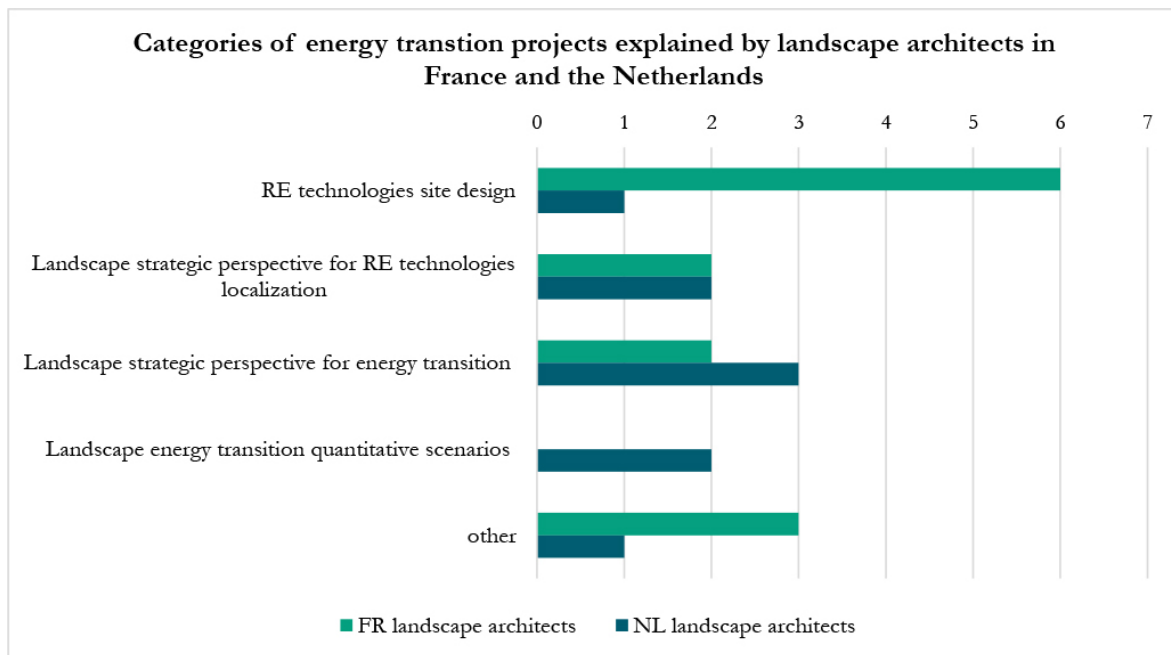


Figure 21. Categories of energy transition projects explained by landscape architect in France and the Netherlands. Source: author from elaboration of semi-structured interviews.

Questions arise about the fact that French landscape architects do not highlight the need of some *energy (basic) focused knowledge*, because in the projects mentioned by them during the interviews they mention the *RE site design* (e.g. FR2, FR3, FR7 table 12.1) as well as *ET strategies*. Particularly this last category consists of the elaboration of a *plan de paysage* (FR4, FR6 table 12.1), for the which some energy focused rudiments are certainly necessary for the designing of these kinds of projects, at least to understand the energy goals of the territory in terms of PJ or MWh. It is also true that the *plan de paysage* mentioned by the French landscape architects even if it provides a set of actions to support achieving energy goals of a territory, landscape architects do not analyze and graphically represent existing energy consumption or production on the territory spatially or calculate the energy potential. The *plan de paysage* analyzes landscape and territory resources giving general recommendations about what kind of RE technologies are suitable, such as wood-energy production in territories characterized by forest areas (e.g. *plan de paysage* of PNR de la Brenne, FR6 table 12.1). And it includes some principles for the implementation of RE technologies or mentions consumption reduction actions concerning the implementation of slow mobility and energy building retrofitting (e.g. *plan de paysage des Monts du Lyonnais*, FR4 table 12.1). So maybe French landscape architects experience for the need of *energy focused knowledge* is very small and they do not experience the need to mention it, yet. Moreover, the few mentions about *RE technologies knowledge* by French landscape architects even if in number proportion the interviewed worked a lot on *site design* (see figure 19), it could be due to different types of initial commissions and involvement in projects, compared to the Dutch practitioners.

Concerning the design steps highlighted as figure 20 illustrates, there are not any major national differences concerning conventional design steps, if not that a higher number of French landscape architects stress the step of *developing grounded analyses* where the Dutch point out more the importance of *exchanging in multidisciplinary teams*. However, a major difference concerns the two additional design steps of *collecting and treating energy quantitative data* and *combining energy*

quantitative data with landscape components that are mentioned only by two Dutch landscape architects, and are the only ones that speak about the category *ET scenarios*. So again this could be explained by differences in the commissions that French and Dutch landscape receive and are involved in (see the on-line survey chapter 10), where French landscape architects seem to be less involved in addressing the quantitative side of energy transition. This shortcoming could be problematic because it could suggest that territorial quantitative potential of energy transition strategies are led without taking landscape into account. Indeed, in part 2 of this research we explored how the French planning instrument PCAET that defined the energy goals for territories does not have a landscape perspective in them (chapters 4 and 7).

Box 12. Contribution of chapter 12 to the part 3 research question

In this chapter, the knowledge required and the design steps needed by landscape architects working on energy transition are examined. The inquiry reveals that landscape architects working on different projects categories, such as the site choice of RE technologies and broader strategic energy transition scenarios, use conventional landscape architecture knowledge (e.g. design, ecology) combined with additional new knowledge on energy issues (e.g. RE technologies). This illustrates that the transdisciplinary nature of the landscape architect profession has a potential way of dealing with energy transition. At the same time some the conventional knowledge could be updated and deepened to provide better answers on ET projects, and this combined with the need for additional knowledge on energy focused topics could lead certain landscape architect to become more specialized if they want to work on energy transition projects.

Instead of novel steps in the largest design process, landscape architects mention rather conventional steps (e.g. landscape analysis). However, three addition steps are mentioned too. One concern the reduction of energy that show how landscape architects could participate to energy transition also in projects that are not specifically ET related, such as parks, but where for example the choice of material could lead to save some energy for their transports.

Two of the three additional steps relate to the processing of quantitative energy data, combined with landscape components are mentioned by Dutch landscape architects who develop *energy transition quantitative landscape scenarios*. This project category could be considered quite new in the commissions landscape architects could obtain. This shows that the quantitative energy component of ET could be crucial and fundamentals in some projects categories, going beyond some basic energy unites and computations. Dutch landscape architects, probably because of differences in the project category and involvement of landscape architects in those projects highlight the need for more knowledge and design steps with respect to the quantitative components of energy transition.

CHAPTER 13: Potential and challenges for landscape architecture

Landscape architects in the XXI century are believed to face new challenges and evolutions in their practice in response to new needs and problems (Donadieu 2009a; Van den Brink and Bruns 2014). In this chapter of the thesis, the potential and challenges for landscape architecture in an energy transition framework are explored and discussed.

Potential and challenges for landscape architecture in energy transition could be explored in many ways considering that landscape architects could address many different dimensions. For example, researches have explored landscape architecture potential through learning from ecology (e.g. Stremke and Koh 2010) others addressed dimensions dealing with visual communication (e.g. Raaphorst et al. 2016) and many other topics. In this research we explore landscape architecture potential by inquiring into landscape architects' perspectives and analyzing a list of *energy conscious principles*, extracted from their narratives, clustered according to the *Trias Energetica*. This could permit comprehension on which strategies of energy transition landscape architects mainly employ while designing, and what can be learned from these principles for their contribution to energy transition in the future.

Subsequently challenges that landscape architects are facing while working in energy transition processes are discussed. We illustrate both internal and external challenges to the profession. The comprehension of these challenges could be a first step to understanding how to solve them. In order to put these challenges in a wider operational perspective, they are discussed through the framework of the European Landscape Convention.

This section is based on the analyses of semi-structured interviews held with landscape architects and their hand drawings of energy transition landscapes (see chapter 10 for the detailed method). From these landscape architects' answers, a set of typologies that could support knowledge acquisition (Deming and Swaffield 2011) is elaborated, first for potential, subsequently for challenges.

In the final section, a transversal approach of landscape architecture is discussed, arguing that it could be both a potential and a challenge.

13.1 Landscape architecture potential: principles for an energy conscious design

In this first section design principles sketched by landscape architects during the semi-structured interviews are arranged in clusters and discussed. I refer to 'principle' as an abstract action/design statement that are taken into account while designing (Dee 2012). They are somewhat generic and not site specific and need to be adapted in each project according to a specific context and conditions (see chapter 2). This research explores energy conscious design principles, meaning principles that have goals to imagine future possibilities and supports for the implementation of energy transition.

The analysis of these principles is a way, among others, to enhance the understanding of potential for landscape architects practice in the energy transition context, and understand which strategies of energy transition according to *Trias Energetica* (reduction of energy consumption, optimization of energy streams and RE production) and if other peculiar approaches appear in landscape architects' practice.

These *energy conscious principles* are also put in relation with principles coming from three concepts: *urban metabolism*, *circular economy* and *cradle-to-cradle* (chapter 2). A comparison between the two groups of principles could provide insights about differences and similarities that potentially could lead a broader vision on energy transition projects by combing scientific literature with a design practitioners' perspective.

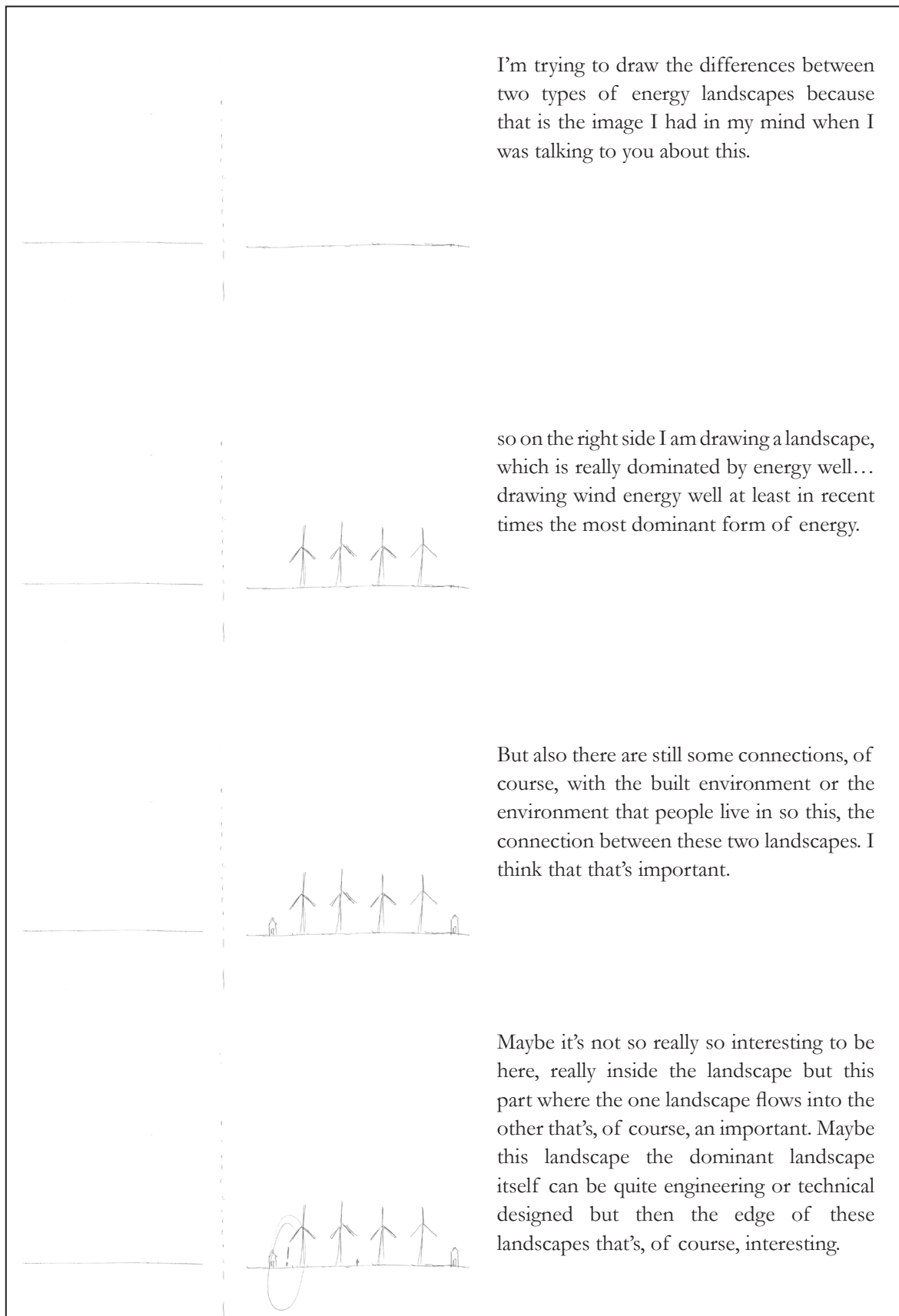
13.1.1 Method: collecting the energy conscious design principles

In order to explore energy design conscious principles, a first collection of principles is made by synthesizing results of the semi-structured interviews that are discussed heretofore (chapters 11 and 12).

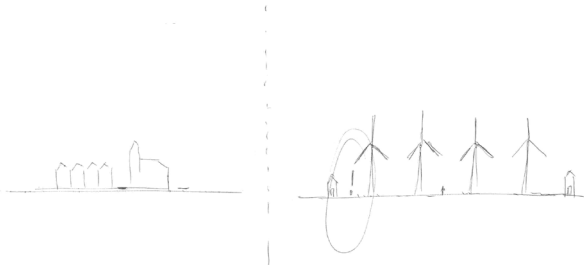
Secondly, during the interviews with landscape architects, a direct question asked them if they could highlight specific design principles they use in the designing of energy transition landscape projects. However, their answers to the question were very short and lead to a very limited range of insights almost exclusively repeating what already discussed in other answers analyzed in the previous chapters (11 and 12). So in order to collect some additional designing principles they applied in energy transition projects they have been asked to describe and to draw an "energy transition landscape". This in order to lead them to mimic/imitate a design process for a territory, leading them to express some further energy conscious design principles. This is based on the idea that drawing in landscape architecture could be considered as a description action, during which practitioners choose among the elements of reality that recover major importance for them (Tiberghien 2013). So asking them to draw could support in making visible and more explicit some main principles they used in designing, supporting in synthesizing their thinking. The box 13.1 (below) shows the process of an energy transition landscape hand drawing process accompanied by the oral narratives. This example shows that many different principles were enumerated during drawing process some more general such as the idea of improving energy efficiency in built-up areas and other more specific for example the idea of harvesting local wood to be used in a local biogas digester.

The goal is not to give a full and comprehensive view of all possible design principles used by landscape architects in designing energy transition that could be very broad and, however, very much depending on the characteristics of the territory. The objective of the research is to give an overview of principles in order to understand which axis (RE production, reduction of energy consumption, optimizing energy flows) of energy transition process are mainly addressed and considered and if other transversal ones appears, in order to give some additional insight and discuss potentialities on how address energy transition from a landscape design perspective.

Box 13.1, explanatory example of the narratives and drawing of the landscape architect role in energy transition, NL3 the Netherlands.



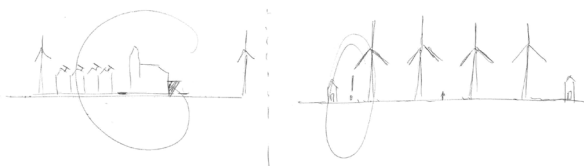
And on the other side I am drawing the more build environment and the...



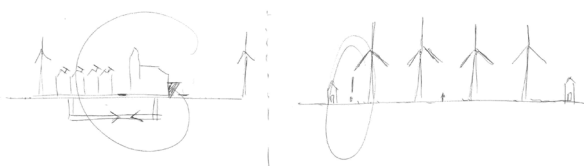
Of course also with parks and the larger parts a raw area's well where we need I think to really organize our environment to increase our energy efficiency.

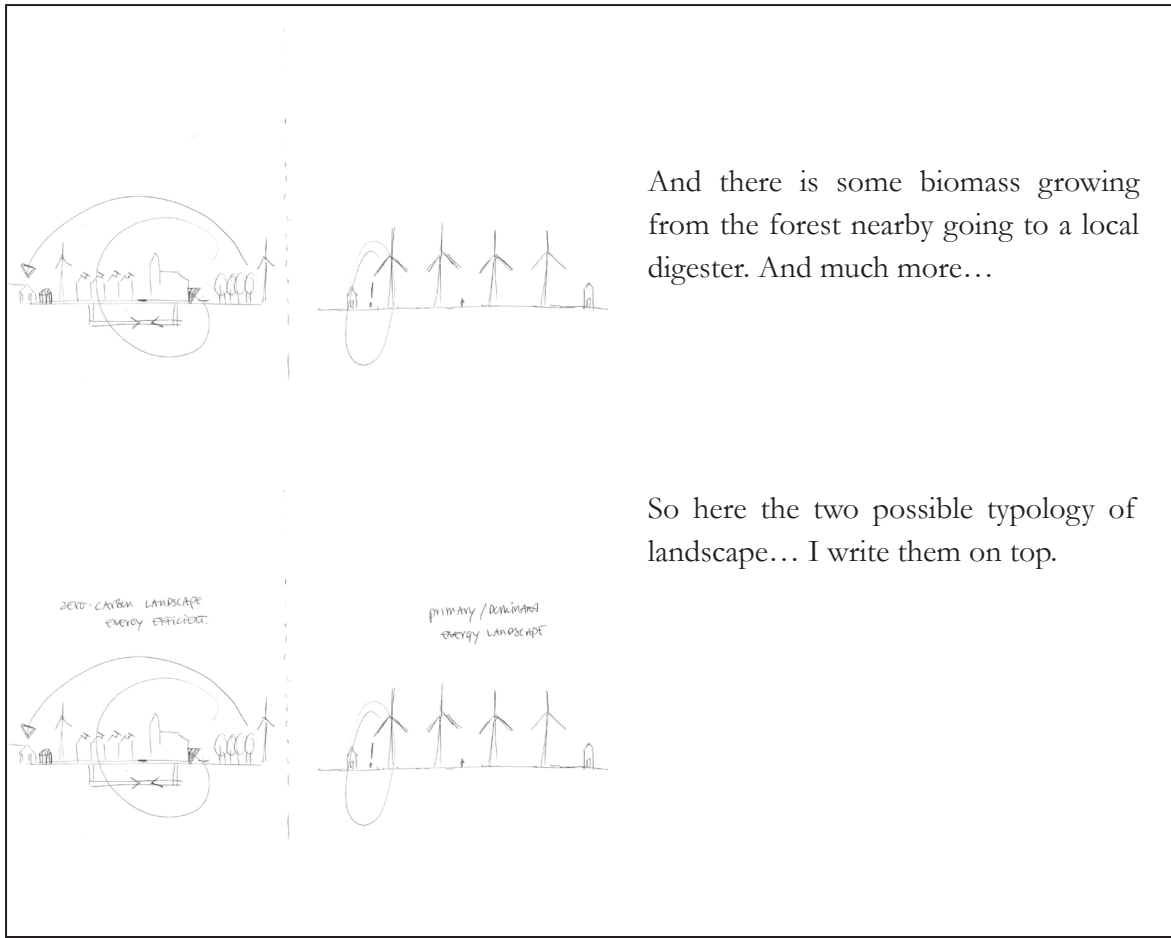


Maybe you have here, of course, some small wind turbines but it's really more about... it's not so much about energy generation.



It's more about the different spatial organization. So maybe there is some heat exchange among functions...





Even if drawing is part of landscape architecture activity is relevant to mention that a French landscape architect refused to draw, affirming that to elaborate a satisfying “energy transiting landscape” would have taken a lot of time, and considering the time scheduled for the interview time was not enough. This is the same landscape architects that refuse to draw the concept of landscape architect contribution in energy transition (see chapter 11).

Landscape architects' drawings - the Netherlands

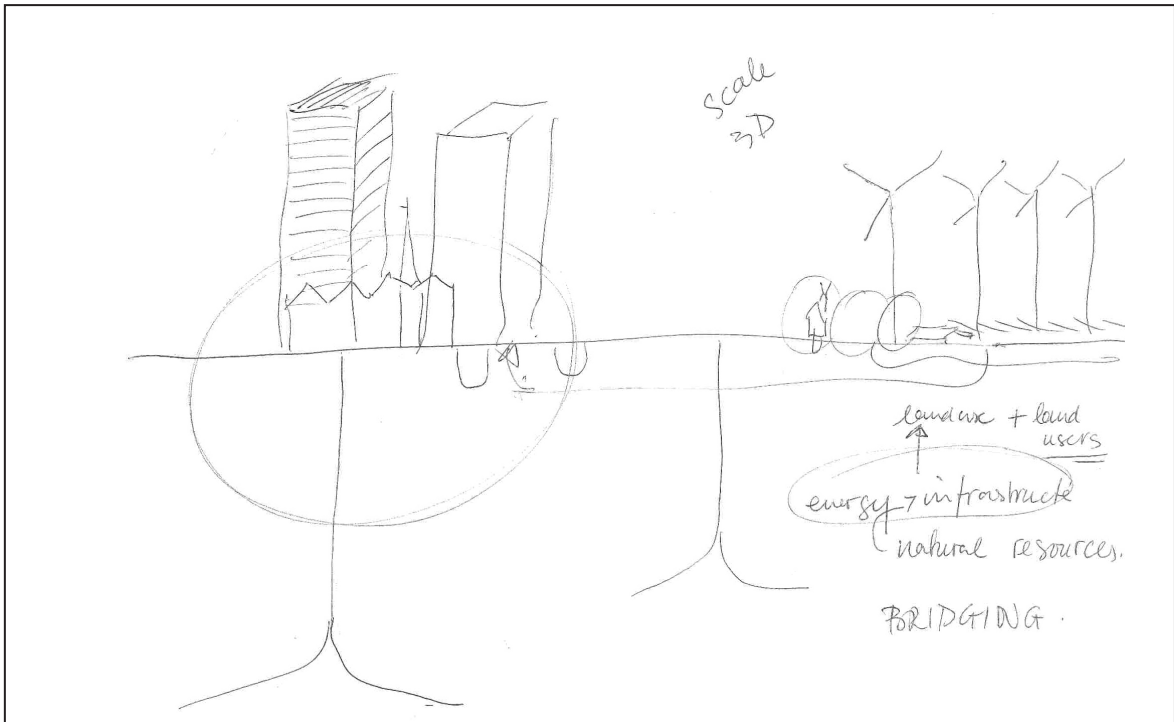


Figure NL1-L. Landscape architect. (Drawing in common with landscape architects' contribution in energy transition chapter 11)

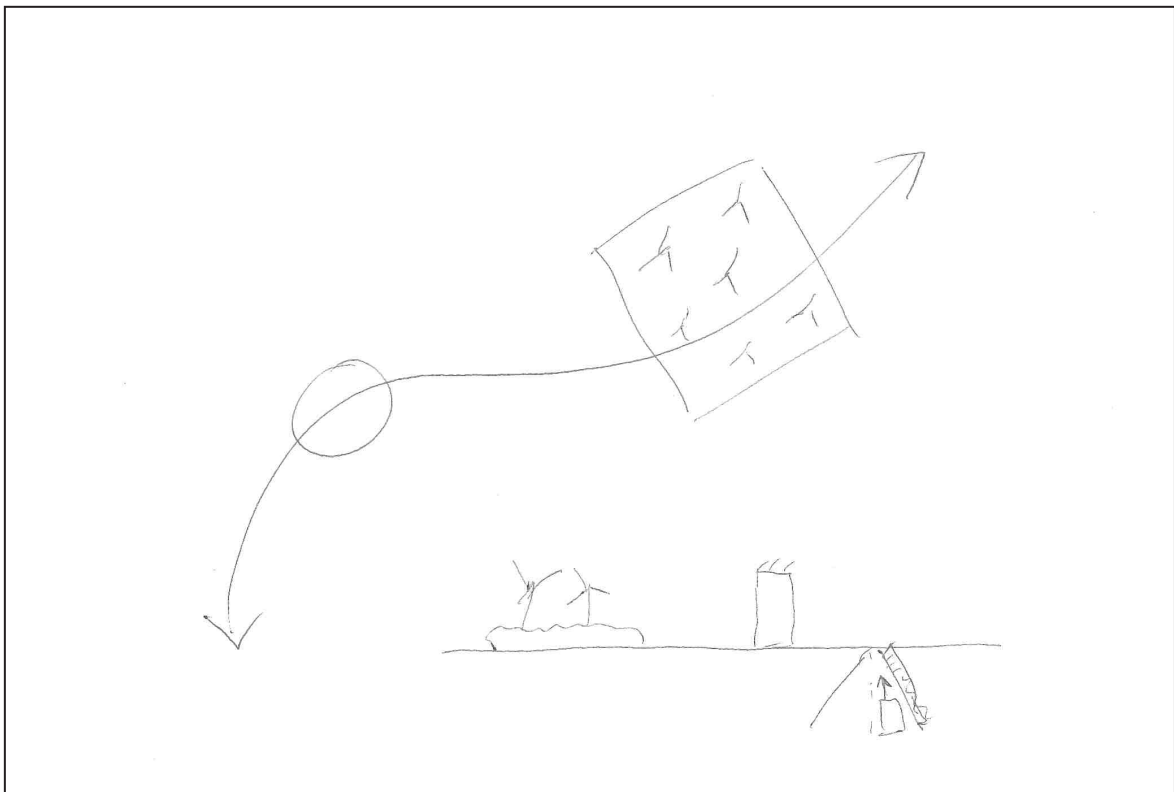


Figure NL2-L. Landscape architect. (Drawing in common with agents' drawings analysis chapter 9 and landscape architects' contribution in energy transition chapter 11)

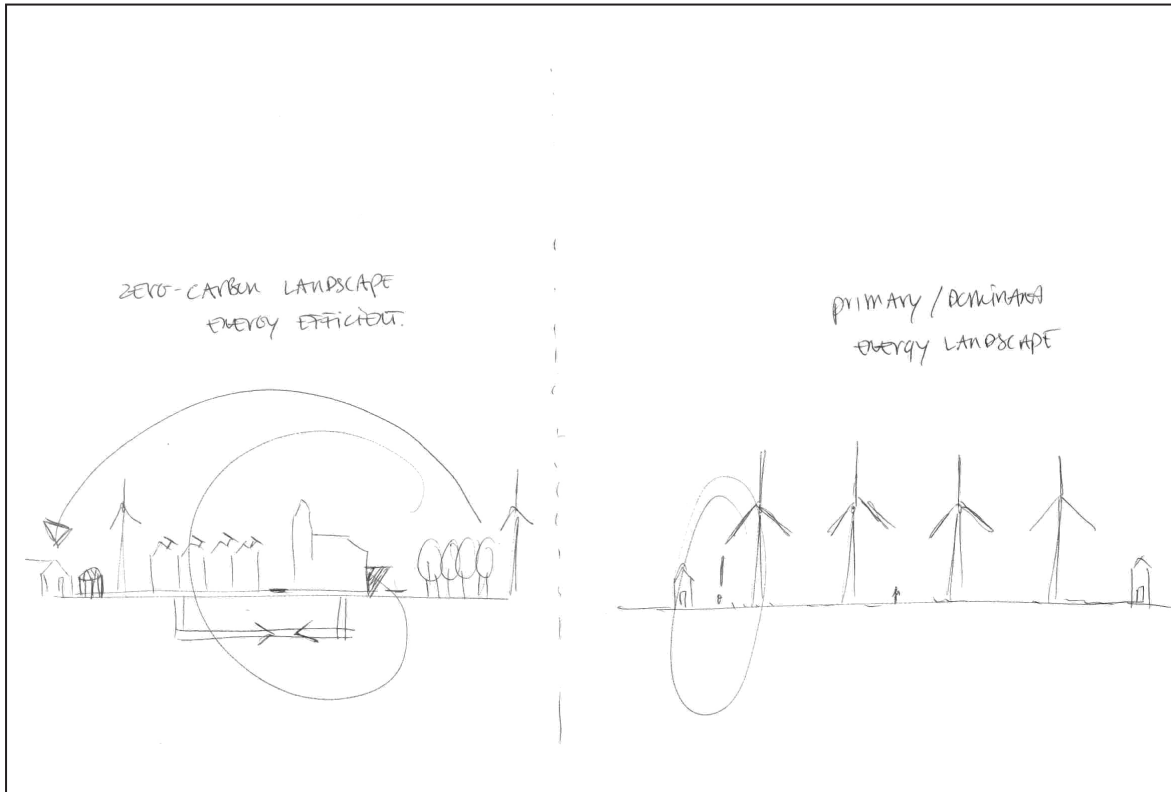


Figure NL3-L. Landscape architect



Figure NL4-L. Landscape architect. (Drawing in common with agents drawings analysis chapter 9)

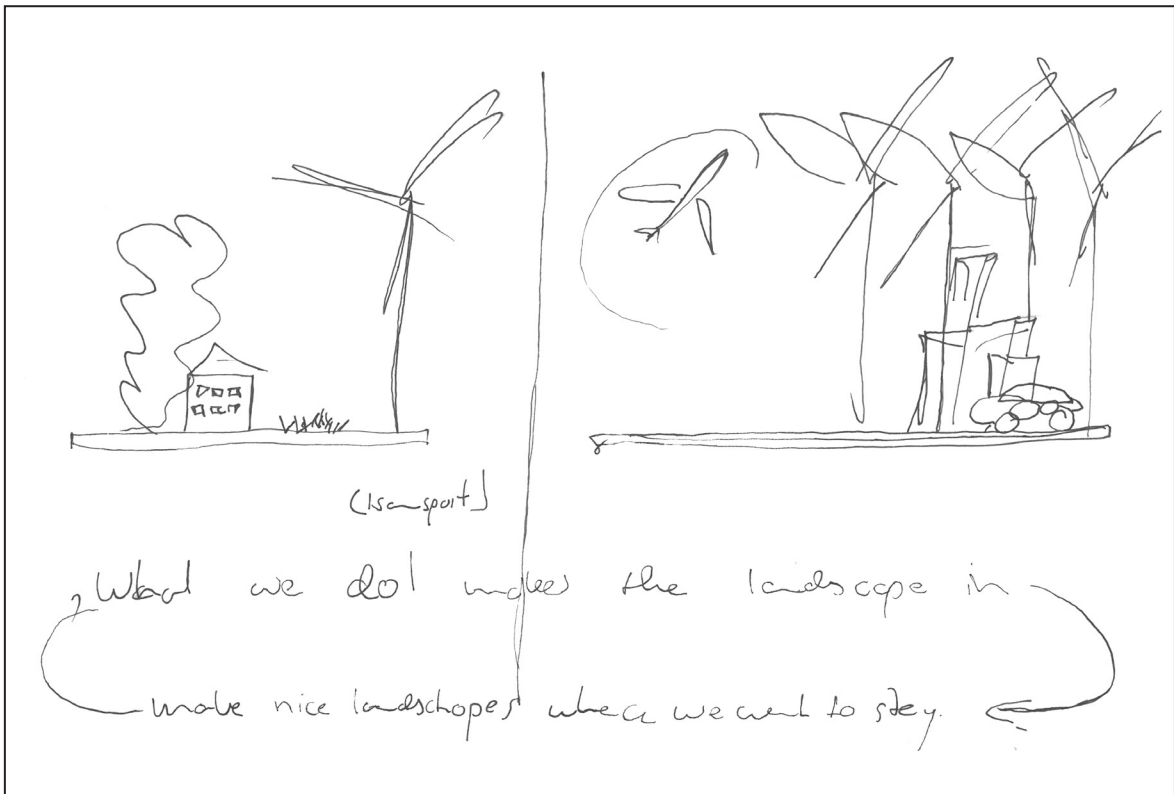


Figure NL5-L. Landscape architect

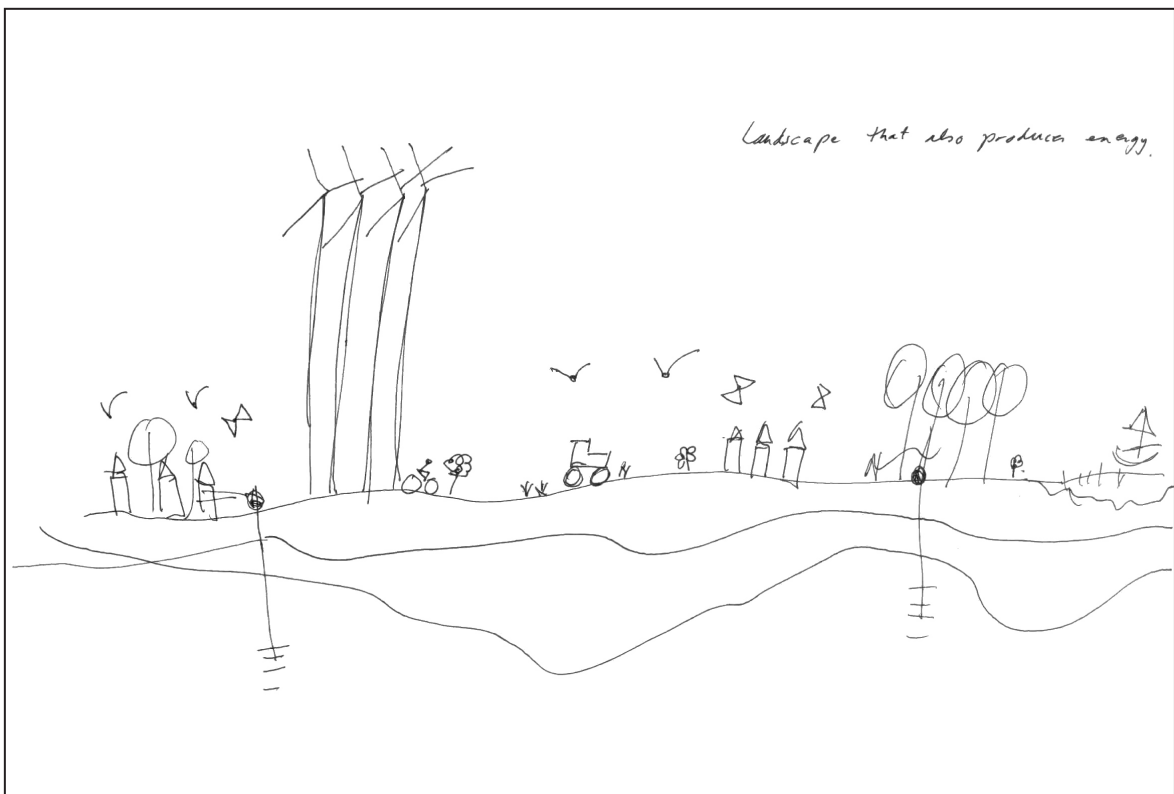


Figure NL6-L. Landscape architect

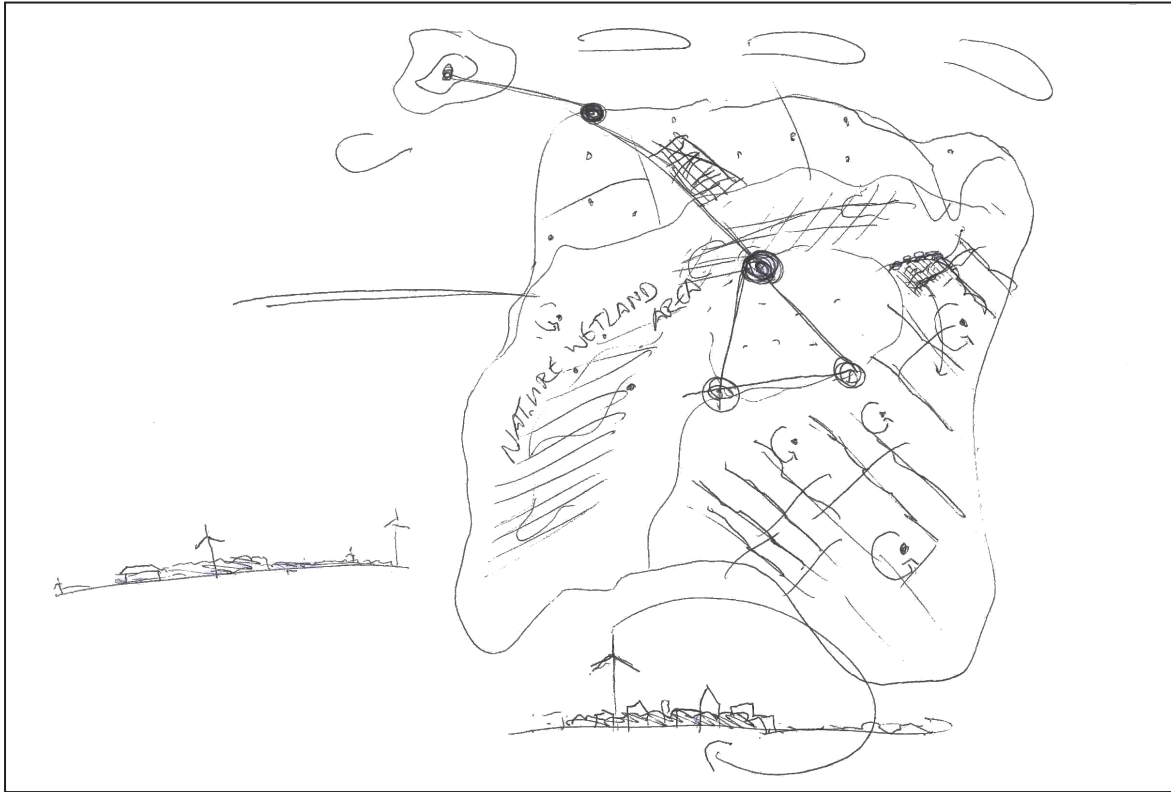


Figure NL7-L. Landscape architect

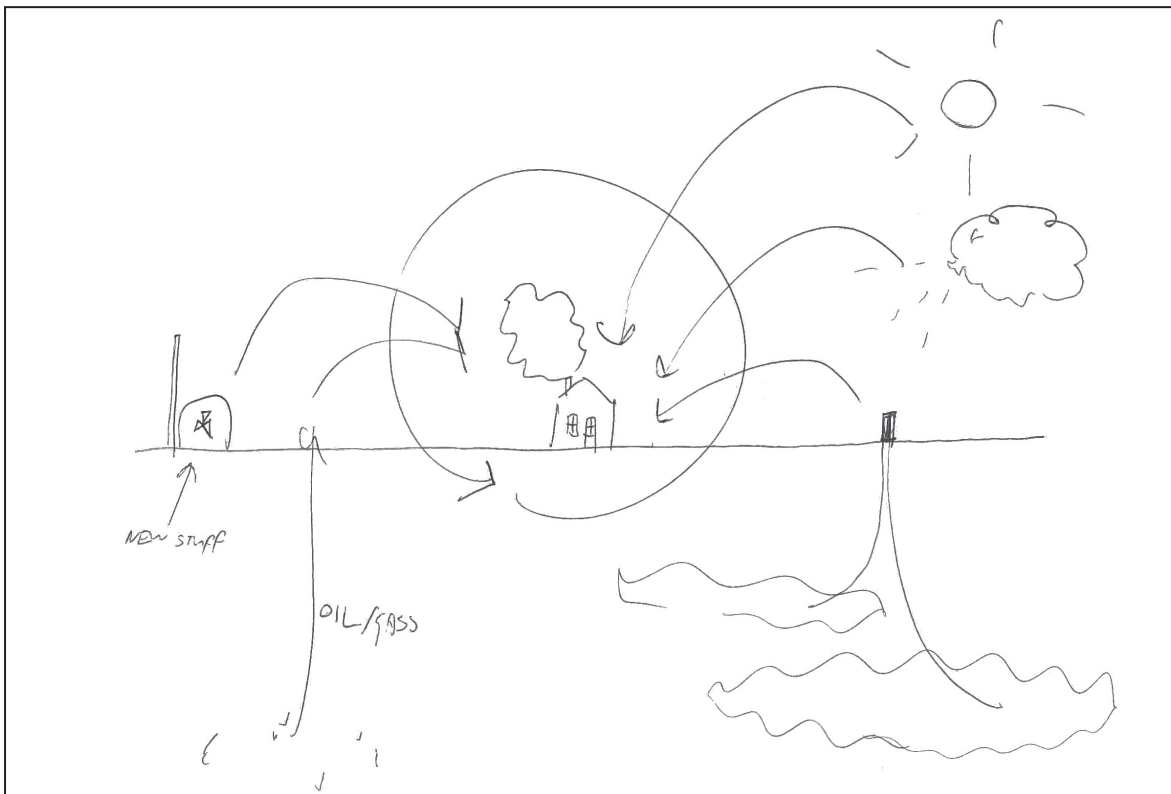


Figure NL8-L. Landscape architect

Landscape architects' drawings - France

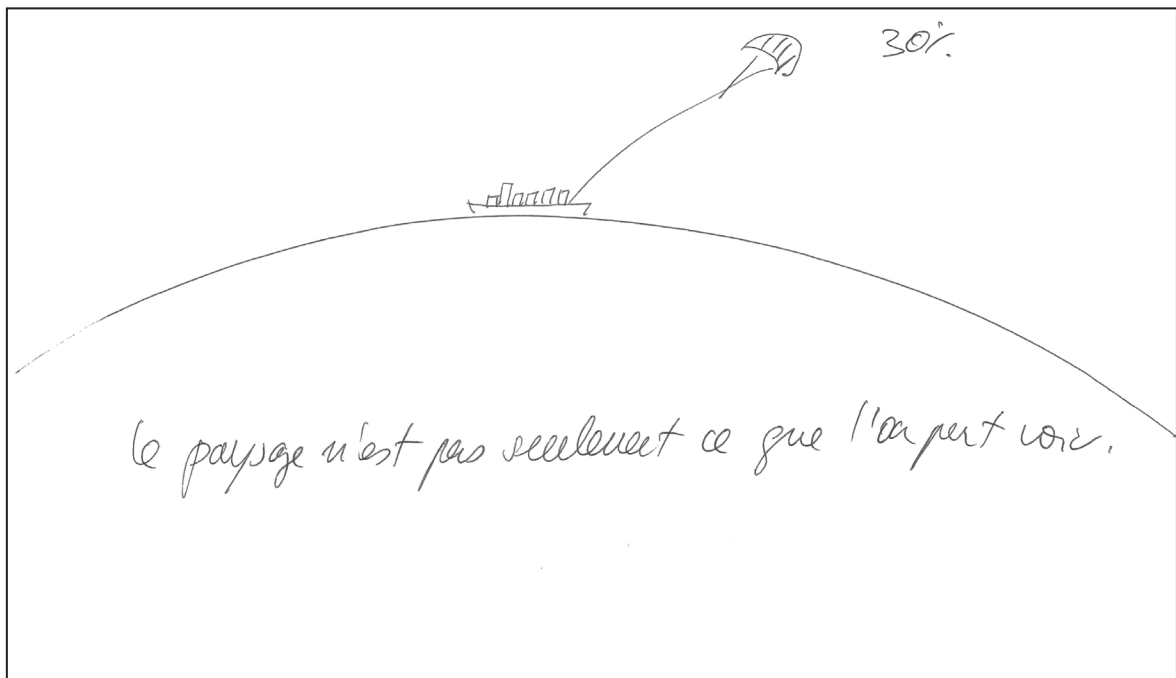


Figure FR2-L. Landscape architect

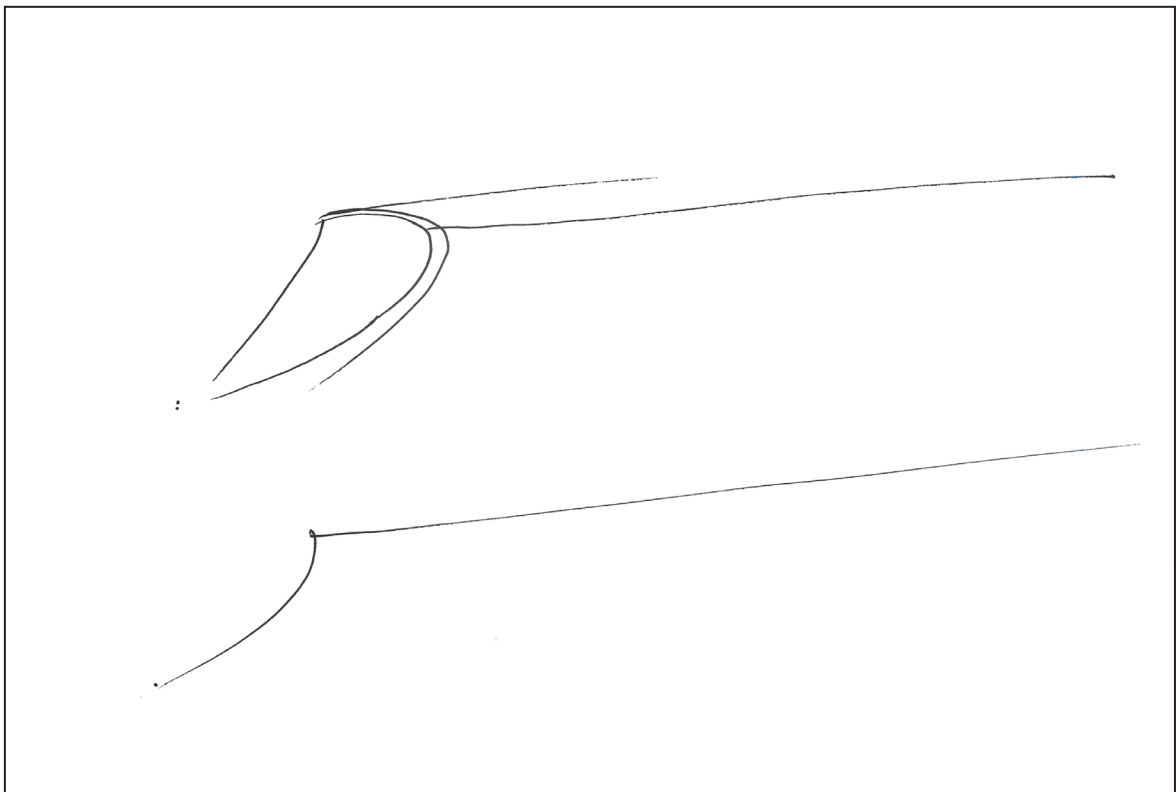


Figure FR3-L. Landscape architect

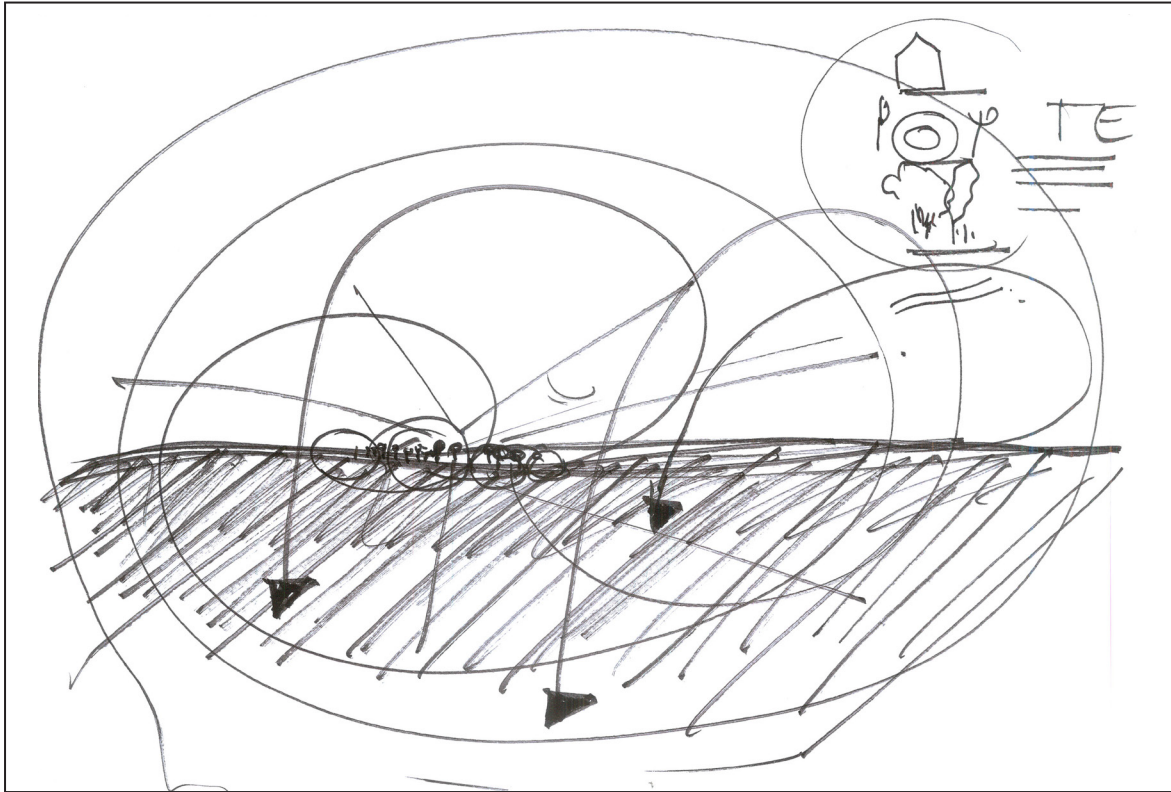


Figure FR4-L. Landscape architect. (Drawing in common with agents drawings analysis chapter 9)

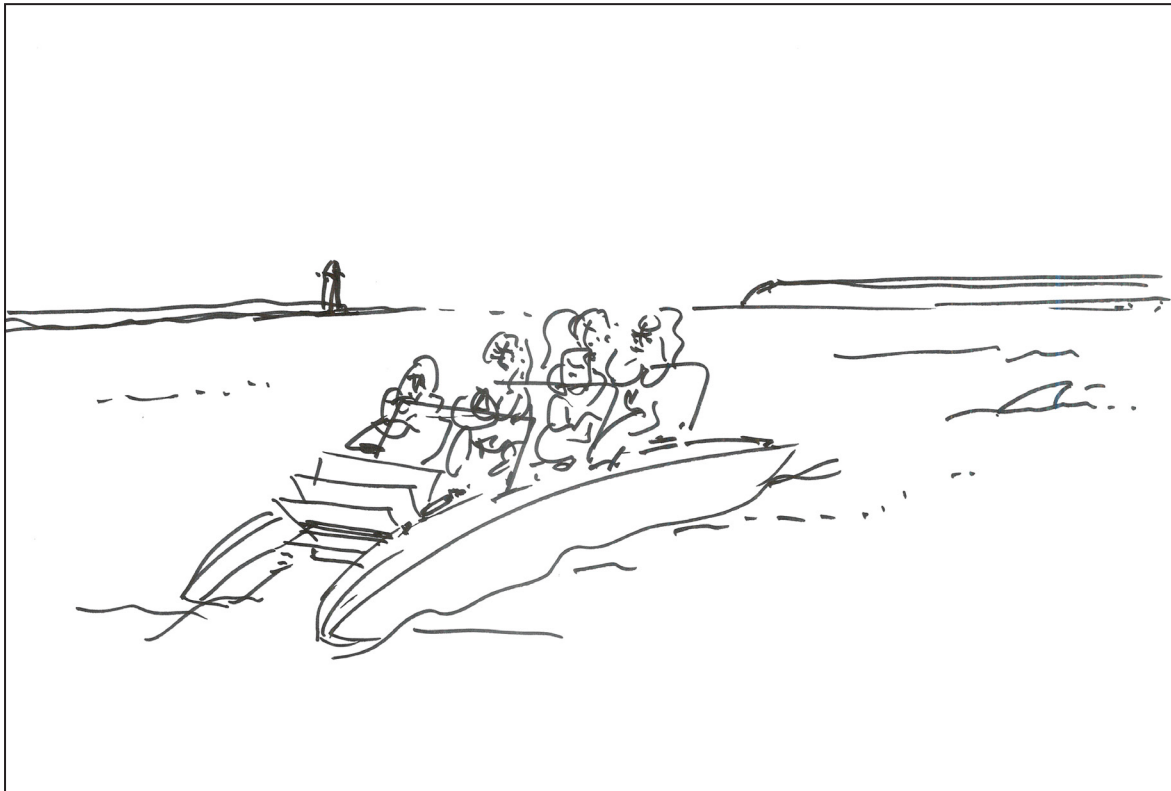


Figure FR5-L. Landscape architect.

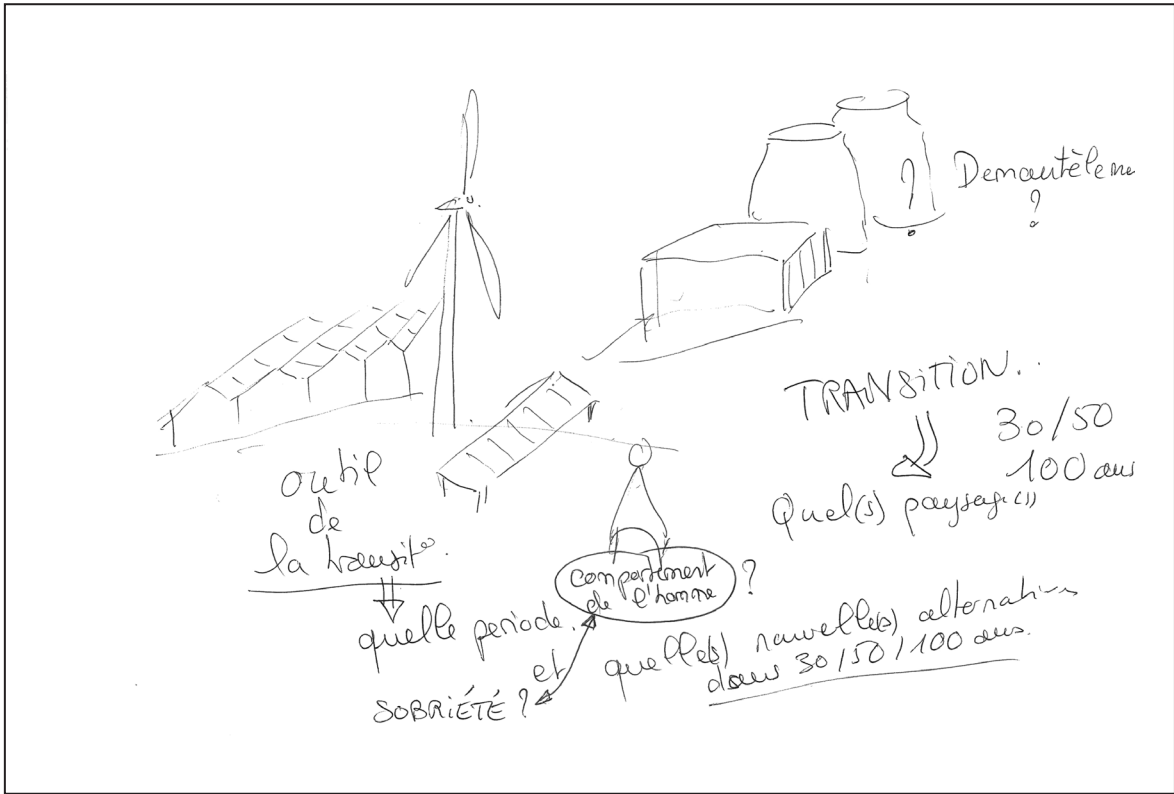


Figure FR6-L. Landscape architect.

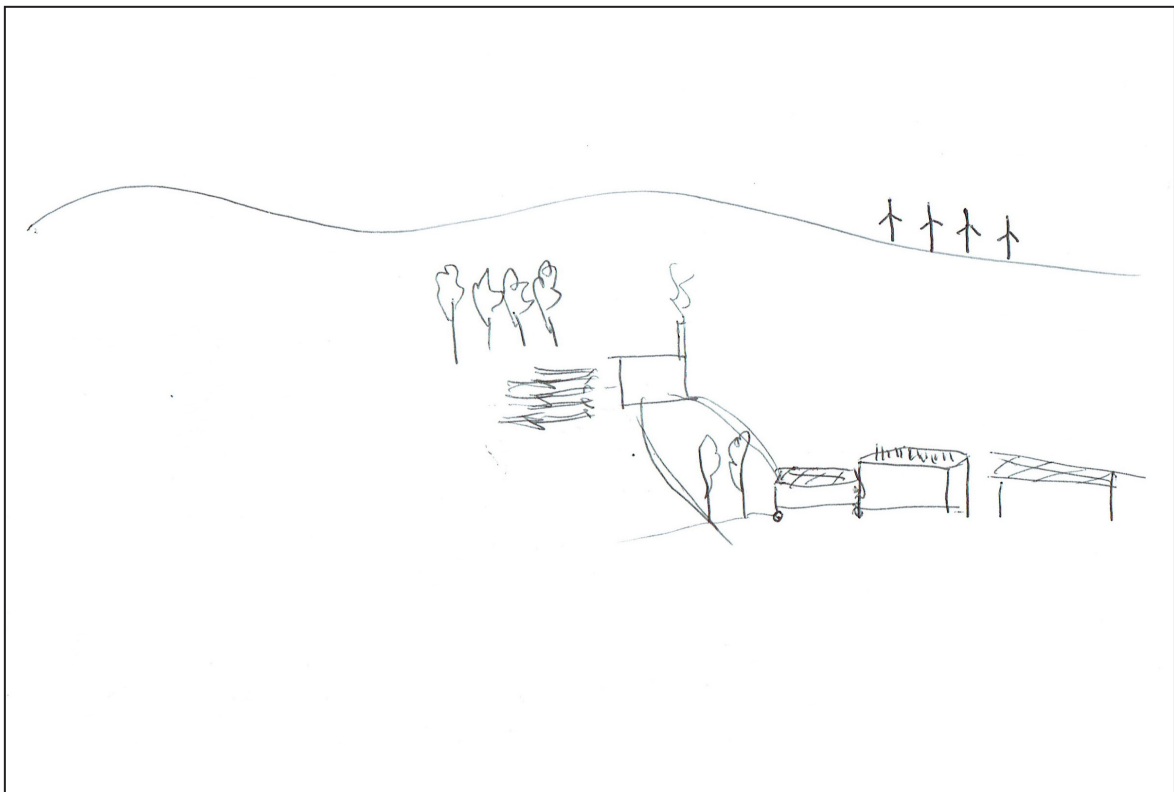


Figure FR7-L. Landscape architect. (Drawing in common with landscape architects' contribution in energy transition chapter 11).

13.1.2 Energy conscious designing principles

In the following part these principles, clusters of principles and their characteristics are discussed. 71 design principles have been collected from landscape architect's interviews, combining principles coming from oral narratives discussed in previous chapters with principles mentioned in the hand-drawing process (the table is in the annexes 14)

The design principles founded are clustered according to the three strategies of *Trias Energetica*, (Lysen 1996) in its updated formulation according to Tillie et al. (Tillie, Rotterdam Climate Initiative, and Project Group Hart van Zuid 2009) and further by Vandevyvere et al. (Vandevyvere and Stremke 2012), because they represent the three principal strategies for implementing energy transition: (1) *reduce demand*, (2) *optimize energy stream*, (3) *use RE sources*. This allows to understand which strategy landscape architects mainly address.

Results show that the design principles mentioned by landscape architects are more numerous relating RE production (20), followed by reduction of energy consumption (12) and the optimization of energy stream (12) (see global table 13.1 annex 14). This focus on RE production is in line to what found in other research that analyzing entries for a strategic landscape design competition on energy transition topic, where it is equally showed a low integration of reduction of energy demands strategies (de Waal et al. 2015).

However the higher number (27) of principles mentioned by landscape architects could not directly be connected to these three energy transition strategies being “transversal” principles, meaning that they address an approach to the process crossing other dimensions, not directly addressing the *Trias Energetica* strategies. These *transversal principles towards energy transition* in turn could be clustered in three main categories. The first group of principles (1) express the idea of elaborating design based on the specificity and characteristics of each territory or site for the projects; (2) the second is about the idea of considering multi-functionality and cross-sectoral concern when elaborating projects; (3) finally, the third include the principles highlighting the interaction with local inhabitants or other stakeholders with the idea of supporting in elaboration of shared project as much as possible.

This category of *transversal principles*, and its three sub-clusters, have much in common with the typologies defined as main landscape architect contributions to energy transition (see chapter 11): *grounding the ET in a territory*, *developing multi-functionality in energy projects* and *supporting the elaboration of a shared project*. This is because many design principles in these categories come from landscape architects' answers to questions discussed in chapter 11 and 12, but to which are added also principles coming from the drawings. This emphasizes the potentialities that landscape architect sees in these contributions, which are, however, all linked to the embedded contribution of *imagining and realizing future landscapes*, this being the core and final general goal of the design practice.

Table 13.1. Energy conscious design principles coming from landscape architects drawing an “energy transition landscape”. Source: landscape architect energy transition landscape drawings and semi structured interviews.

Principles (this column)		LA code
Reduction energy demand/consumption		
1	Designing landscape in order to reduce energy consumption	FR2
2	Encouraging the less energy consumption behaviors of people through landscape/spatial organization design	FR6
...		
Energy stream optimization		
13	Using local biomass for local energy production	FR7
14	Developing a local heat network, feed by local agricultural biomass	FR7, NL3, NL7
...		
Renewable energy production		
25	Thinking of other landscape induced effects, beyond the visual one, when designing RE projects	FR2
26	Making perceivable the power/strength behind RE production projects	FR3
...		
Transversal principles towards energy transition		
Considering specificity of each territory/site		
45	Defining energy transition projects coherent and thought across scale from the global territorial system to the house and site level	NL1, NL3, NL7, NL8
46	Differentiating the designing between RE energy production dominated landscapes and built inhabited ones	NL3
...		
Integrating multi-functional and cross-sectoral consideration		
53	Analyzing other topic such water, agriculture, biodiversity, etc. while working on ET in order to create possible synergies and problem solving across them	FR4, NL7
54	Defining energy transition strategies looking as much as possible at the global territorial system in order to create synergies among parts.	NL1
...		
Supporting the elaboration of a shared projects		
59	Developing new narratives in order to rise a “landscape feeling belonging” about ET landscape induced changes for local inhabitants in order to make better accept them	FR3-, NL5
60	Supporting in the elaboration of a territorial shared project by local inhabitants and other stakeholders, towards energy transition strategies, using participatory process (workshop, etc.)	FR5, FR4
...		

13.1.2.1 Transversality of design energy conscious principles

The result that the higher number of principles is grouped in the category *transversal principles towards energy transition* (27), strengthen the idea of landscape architects approach claimed to be generalist and transversal (see chapter 11 and 12), crossing in their design practice a broad range of disciplinary fields (Bell, Sarlöv Herlin, and Stiles 2012). In particular a sub-cluster of this category refers to multi-functional and cross-sectoral approach to design, integrating energy transition topic with other functions and sectors such as agriculture, water, biodiversity, for example mentioning the idea of “*analyzing other topics such water, agriculture, biodiversity, etc. while working on ET in order to create possible synergies and problem solving across them*” (e.g. see figure FR4-L and NL8-L). This aspect is recognized by landscape architecture literature consistent and as an important goal to reach in RE projects implementation (Oudes and Stremke 2020; Schöbel and Dittrich 2010; de Waal et al. 2015) and indeed keys principles to develop sustainable energy landscape is in itself need to multi functionality in order to preserve landscape quality, food production and other life-supporting ecosystem services (Stremke and van den Dobbelsteen 2013, 4).

Moreover beyond this transversal category many other principles attached to the *optimizing energy stream* are cross-sectoral, for example integrating agriculture with energy mentioning the “*developing a local heat network, feed by local agricultural biomass*” or industrial systems and energy through the principles “*developing energy cascading system from industries to households*”. This is true also to *reduce energy demand* category where connection to mobility sectors is established (e.g. “*Decreasing energy demand through the designing of mobility system*”).

This transversality could also be found in the fact that several general principles refer to importance to cross scales to develop a coherent and consistent projects across them (e.g. “*defining energy transition projects coherent and thought across scale from the global territorial system to the house and site level*”). Moreover the scale that seems mainly addressed is the one of territory, especially evident in Dutch drawings, allowing to develop a strategic design dimensions meaning to address the problem a large scale, and across scales and far terms visions providing recommendations and action framework to enable stakeholders to achieve a certain goal (Albrecht 2004). Moreover both urban than less-dense populated rural context are mentioned, and some principles relates to needed synergies between them, such illustrated by the principles of “*creating energy synergies between dense populated urban areas and their lower dense rural hinterlands*” (e.g. represented in figure NL1-L). Indeed in several drawings, especially Dutch ones, urban areas are represented (e.g. NL3-L, NL4-L NL5-L). Interestingly landscape architects mention several principles discussed in literature about urban planning and design for low energy and RE producing as mentioned by Vandevyvere et al. (Vandevyvere and Stremke 2012). These are the use of vegetation to reduce the heat island effects, and shade or expose building blocks to sun, but also some references to urban morphology such as its compactness and mixing function for saving energy in transports. This seems to show that at least from knowledge and awareness point of view there is not a too wide gap between research and practice.

Besides landscape architects also mentions few principles about the small building scale (e.g. “*Reducing energy consumption in buildings through insulation*”, see figure NL4-L), showing that even if they not directly work on these objects, they consider them part of the general reflection about

landscape and energy transition, they have not to be thought isolated from the rest. However the design principles addressed to this scale are few compared to what could be really integrated and acknowledge (e.g. Vandevyvere and Stremke 2012).

13.1.2.2 The potential of transversality in a multi-dimensional and complex challenge

It is recognized that energy transition is a multi-sectoral and multi-scales and multi-actors process (Loorbach and Rotmans 2010) and the landscape architect capacity to be transversal, addressing several topics and synthesize their issue through what some call system thinking, meaning the idea to embrace and address the topics as a whole, not addressing isolated elements in itself, is one of the potentialities of designers (e.g. Calthorpe 2011). System thinking is considered to be potentially needed supporting synthesis in a complex process (Sijmons 2012) such as the energy transition.

There is the need, however, to warn that landscape architects have to be careful not to turn the potentiality of transversality and generalist to superficiality in the projects, meaning a lack of deepening of topics. For this reason the collaboration among different experts more objects centered such engineers are important for a correct projects elaboration.

13.1.2.3 Landscape as a multi-dimensional entity for shared projects

It could be recognized that to deal with energy in connection to landscape is in itself a way to be transversal to energy transition process. This because landscape itself is an entity touching/grouping many dimensions sociocultural, ecological, economical (Antrop 2006) and it has been recognized to be at the same time a medium and method able to develop synthetic thinking across disciplines and among experts and stakeholders (Nassauer 2012).

In this framework landscape multi-dimensionality and landscape architect capacity to address its transversality is a way to reach a broad range of people (inhabitants, stakeholders). Several principles mentioned could be grouped in the cluster referring to the will to *support the elaboration of a shared project*. For doing that the fact to touch at different sectors (agriculture, mobility, etc.) and dimensions (e.g. aesthetics, ecology) is a way to raise interests in everybody. Indeed landscape architects refers not only to a final project “object”, but also to a landscape vision a shared landscape vision by inhabitants in a given territory. Landscape architects are at the cross road between physical environment and people (van den Brink et al. 2017) and this is a lever in itself to design energy transition landscape which material and immaterial are shared by the majority of people.

“Landscape architect gives insight about spatial perspective but are concerned with social values” (NL8, 2017)

13.1.2.4 Energy transition as an added value for landscape architects contribution in society?

If landscape architects still, in some cases, need to prove their abilities to deal with energy and they have to acquire their knowledge on the topic (see chapter 11 and 12), work on energy transition projects could allow them to legitimate their work contributing to a major world challenge. Some landscape architects both in France than in the Netherlands highlight this sort of feeling of the usefulness improvement of their work, going beyond the task to create a nice environment but also develop a design that has an additional function of high energy performance. In their words:

“The energy is treated from a point of view of the great territory, from a strategic point of view. On the contrary, what is good, is that it makes us go beyond...we address more questions of productive landscape and less about landscaping. And this, I like this. This is also one of the reasons because I like the energy topic. This is because I avoid systematically fall in...fall, but in any case to treat the landscaping aspect, of...to do the nice small path at the right place, to design the roadside, that frankly are not the questions for which I arrived to landscape” (FR4, 2017)

“it’s energy or something else and traditional design is that, that you are not only designing freely to make a nice space for people and which comes kind of, which could come from spatial analysis or which could come from your own creativity or which could come from good examples or whatever. But it’s also you actually generate a kind of program, an energy program let’s say that you, that you need, that you need to deal with when you design so that’s...it’s kind of an addition in that scene to other design projects.” (NL8, 2017)

Working on energy transition project could lead to overtake to address landscape only form an esthetical perspective and landscape architect as “decorators”.

13.1.2.5 Specificity of the design principles coming from drawing process

The drawing process allowed to collect a greater amount of energy conscious principles that could be clustered in the three *Trias Energetica* categories (see table 13.1 annex 14) compared to the principles coming from a synthesis of the other oral narratives that belong instead to the category *transversal principles to energy transition*.

Particularly almost all the design conscious principles clustered in the strategy *energy stream optimization*, such as “developing local heat network fed by local biomass” (see figure FR7-L and NL3-L) comes from drawing process. Moreover also referring to the *renewable energy production* strategy the most of the principles (17 to 20) comes from hand drawing process. The principles concern the spatial principles for siting the RE technologies (e.g. “concentrating wind turbines in clusters in order to avoid uncontrolled sprawl on the territory” – Figure NL6-L) but also sociocultural dimension such

1 “l’énergie elle se traite d’un point de vue du grand territoire, d’un point de vue stratégique. Par contre, ce qui est bien, c’est qu’ça nous fait dépasser... on tombe plus sur des questions de paysage productif et moins sur de l’aménagement paysager. Et ça, moi ça me plaît. C’est aussi une des raisons pour laquelle la question de l’énergie me plaît. C’est parce que j’évite de systématiquement tomber dans... tomber, mais en tous cas uniquement traiter l’aspect aménagement paysager, de... faire le bon p’tit chemin au bon endroit, d’aménager le bas- côté, qui sont franchement pas les questions pour lesquelles moi j’suis arrivée au paysage”

as “*designing RE production projects making them tell new stories*”. Moreover in the drawing process landscape architects also mentioned principles that are attached to the *transversal principles to energy transition* categories such as the idea of *developing multi-functionality in the landscape while working on energy transition* (Figure NL6-L).

The request of drawing has been useful to go deeper allowing highlights that landscape architects know and think, while designing, about all three strategies for energy transition implementation and beyond. Landscape architects’ practice claim to be site specific developing tailor-made solutions for every project, so the act of drawing support to go beyond the more genericity of oral answers about general projects. The drawing allow them to mimic the act of designing in a site specific imaginary landscape of their choice, allowing a more precise enumeration of principles.

Nevertheless this list of principles coming from the drawing it is not exhaustive of all that could be designed for a territory or a city, being all design principles general and needing to be adapted and grounded in every different site.

The fact of asking to draw to landscape architect, as a designer social category that daily work with drawing representations lead to overcome some limits that are recognized to exist when asked to social categories that normally does not draw. This is the difficulty that certain elements or idea could lead, resulting in their omission (e.g. Devine-Wright and Devine-Wright 2009). Generally speaking, landscape architects have a good proficiency/mastery of drawing allowing them to represent what they want. Indeed during the drawing process nobody mentioned the difficulty to represent something.

13.1.2.6 Differences between French and Dutch drawings

Moreover looking at the drawings, a difference could be seen between French and Dutch answers. The most of French landscape architects symbolize energy transition landscape emphasizing a main design principle. For example, figure FR3-L, synthesize the principles of *making perceivable the power/strength behind RE production projects*, and the figure FR5-L, *supporting in the elaboration of a territorial shared project by local inhabitants and other stakeholders, towards energy transition strategies, using participatory process*. Instead all Dutch landscape architects synthesize their design thinking progressively, composing an imaginary “energy transition landscape” enumerating a wider number of energy design principles, to show a picture as global as possible (e.g. see figure NL1-L, NL3-L, NL7-L). Indeed the number of principles coming from drawing is highlighted by Dutch practitioners in a higher number (19 vs 51). Nevertheless some principles are mentioned by practitioners in both nations, such as the principles of “*developing ET strategies/projects based on local landscape resources and characteristics*” and “*developing a RE production mix on territory (wind, PV, biogas, etc.) based on local characteristics analysis*”. The shared mentions of these principles show a common basis in the way of dealing with design, which refers to ground energy transition according to each territory characteristic (see chapter 11) developing tailor-made solutions, practice recognized to belong to landscape architecture discipline (Donadieu 2007; van den Brink et al. 2017).

13.1.3 A comparison between design principles coming from landscape architects practice and literature about three concepts

The principles mentioned by landscape architects could be put in relation to the spatial principles associated with the three concepts – *urban metabolism*, *circular economy* and *cradle-to-cradle* – analyzed through scientific literature in chapter 2 of this research. The scholarly literature exploration along with the experience of landscape architect practice could highlight similarities and differences leading to a wider and global vision about how to deal with energy transition projects (see table 2.1 concepts' principles and 13.1 LA principles in the annexes 3 and 14).

During the interviews I asked with a specific question if landscape architects know about the concepts of urban metabolism, circular economy, and cradle-to-cradle and if and which design principles they associated with these concepts. All landscape architects interviewed knows at least one of these concepts, however, when asked about design principles the principles mentioned result in a very low number. All the interviewees referred almost exclusively to the idea of energy circularity, reusing energy such through energy cascading as illustrates by the following interviews excerpt:

“I think it is good to look at the total streams and what happens with what, where does it come from, what is the input and what is the output and what can you do with it and how you can close cycles. [...] For example, looking at waste streams from agriculture and how that can be used to... or waste from waste power plants and see how that can be used for energy. And how the residual of that can be used again in agriculture or those ideas its maybe not new, but we definitely incorporate those in our plans”. (NL7, 2017)

This shows the main principles that they consciously associated with these concepts. Nevertheless looking at the set of principles collected through the answer to other questions and hand-drawing many more principles in common between the scientific literature analyzed in chapter two and principles mentioned by landscape architects could be highlighted.

13.1.3.1 Similarities and differences

A wide range of principles mentioned in literature are mentioned by landscape architects for each strategy of the *Trias Energetica*, as the ones coming from concepts, even if they are fewer in number. Concerning *reduction of energy consumption* common principles mentioned in both literature and landscape architects experiences refers to the improvement of spatial organization (e.g. mixed functions), to choose materials with low energy demand for their fabrication and transport, to improve people transport mobility systems, to use vegetation to reduce heat island effect in urban areas and also to encourage more energy reducing behavior in people.

Relating to the *energy stream optimization* strategy principles referring to the use of local resources for energy production and the improvement of the energy transport infrastructure network is mentioned in both in literature and landscape architect narratives.

Moreover in the third strategy of *use renewable energy sources*, they have in common principles, relating to the implementation of a RE production mix (e.g. wind, PV, biomass, etc.) on a territory. However the design principles from landscape architect perspective are more in

number than those found in concepts' literature. This is because landscape architects mention many principles about how and where site different RE technologies (e.g. "*siting PV panels on the roof in order to preserve agricultural land*"), and adding sociocultural perspectives such as aesthetic composition values, as illustrated by the principles "*designing RE production projects making them tell new stories becoming landmarks in the landscape*" and "*being attentive at the correct dimension/scale and proportion of RE technologies*" (table 13.1). These are points of view lacking in the analyzed literature about the concepts.

Landscape architects bring, in the way of dealing with energy, a stronger focus on spatial implication and spatial localization, this being a sort of DNA of the profession.

Moreover if in the literature about the concepts it is found a higher number of principles attached to the *reduction of energy consumption* from landscape architects perspective the higher number of principles relates the *renewable energy production*, in which landscape architects seems to have more things to design about.

Another difference that could be noted is the absence of principles connected with the industrial system from landscape architects' perspective, that, generally speaking, it is not a landscape architecture domain, being more related to technology efficiency, clean-tech production, etc. However some landscape architects mention the "*development of energy cascading system from industries to households*" (e.g. see figure NL7-L), showing how landscape architects trying to look to the whole territorial system transversally crossing sectors and functions are acknowledged that the presence of industries could be considered a resource for the improvement of the territorial energy system.

Interestingly from both perspectives the scale to which implement the principles range across different scales from territories, to building, and in different territorial context both rural (e.g. "*siting PV panels on the roof in order to preserve agricultural land*", table 13.1) than urban ones (e.g. "*using trees in order to reduce the heat island effect in urban areas, in order to decrease energy consumption for cooling*", table 13.1). Indeed, how mentioned above, only few landscape architects mentions house building energy principles (e.g. "*reducing energy consumption in buildings through isolation*", table 13.1), because even if they are aware of the topic, is not, generally speaking, the object to which they are actively involved being mainly addressed by architects. Instead, in the concepts' literature the design of building to reduce energy demands is often addressed (11 principles, table 2.1 concepts). The main difference that could be mentioned between the literature about the concepts and landscape architect narratives is the very broad presence in landscape architect of transversal principles towards energy transition, meaning with that expression, those principles that could not be directly clustered in the *Trias Energetica*.

These principles reveals of some main claimed characteristics of the approach of landscape architecture to energy transition planning and designing, connected to the need to adaptation of projects according to specific site/territory characteristics, the integration of different functions crossing different sectors and connected to this last one the aim to mobilize local inhabitants and stakeholders to make them appropriate the vision for their territory.

In few principles coming from concepts the idea of local characteristic is mentioned, for example, "*using of various RE sources adapted to local conditions*". Besides some principles refer to the idea of crossing sectors to create synergies, especially in the cluster *energy stream optimization* such as "*analyzing energy and resource flows in order to create synergies among resources to produce energy and*

reduce waste in different fields”. Nevertheless the idea of integrating multi functions while working with energy do not appear. Moreover in the concepts literature the social perspective, beyond the idea of inducing more energy efficient behavior, through the implication of inhabitants, and instauration of dialogue among parts it is not addressed.

In landscape architects interviews these dimensions comes along with the possibility of share a dialogue through the basis of landscape, with its material (e.g. physical resources) and immaterial (e.g. cultural, sentiment of belonging) components. This social, immaterial components that could be reached through landscape perspective is something that is not yet attached to the concepts.

13.1.3.2 Concepts and practices integrating each other

Landscape architect could embrace some principles that we found in literature in their practice especially for what concern the *reduction of energy consumption* and *energy flow optimization*, nourishing their practice with additional elements. And the other way around concepts could integrate a more transversal and socio-cultural components, and one way to do that could be integrating landscape concern. Landscape being in itself a complex entity touching to many dimensions (e.g. Antrop 2006; Selman 2010)

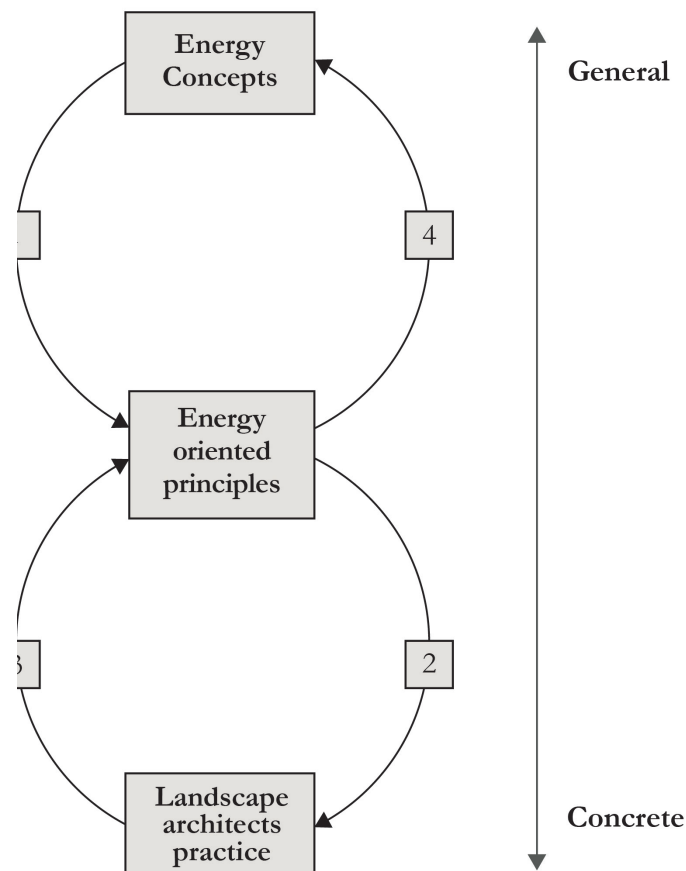


Figure 1. Framework of possible influences between literature concepts and landscape architect practice. Source: author

Figure 1, illustrates how through a double loop, theory and practice could nourish and combine each other, merging research and practice, in order to have more complete overview of energy conscious design principles. The exploration about concepts in scientific literature (1) allows to elaborate a corpus of energy conscious principles, that (2) could be used and applied by landscape architect in their practice. At the same time landscape architect practice (3) could feed and add energy conscious principles to the corpus coming from a theoretical level (4). So the now more boarder corpus of energy conscious principles could in turn nourish and lead to new additions and re-thinking concepts in scientific literature.

13.1.3.3 Landscape architects practitioners and concepts

Moreover, in the literature some landscape architect and other designers begin to address directly one or more of these concepts in connection with energy in their practices and narratives. For example, Sijmon (Sijmons 2015) explicitly mentions the concept of urban metabolism and how “Energy is a perfect example of the second angle of how metabolism could be an interesting design topic. Thinking in flows makes it possible to improve the environmental performance of the urban landscape.” (Sijmons 2015, 35). In addition, in the Netherlands the “International Architecture biennale of Rotterdam” (IABR) of 2014 “urban by nature” of which the landscape architect and (then) TU Delft Professor Dirk Sijmons was the curator has among the themes urban metabolism perceived as a tool supporting in solving global environmental problems, with a main focus on urban areas (Sijmons 2014).

Furthermore in the Netherlands, design experimentations exist both at metropolitan and neighborhood scale, explicitly referring to the urban metabolism concepts (Pistoni and Bonin 2017).

Another example of a direct mention of one of these concepts by designers could be found in the report developed by an architect and urban planner Paola Viganò et al. “énergie et recyclage” [energy and recycle] developed in the framework of the French program “Ignis Mutat Res. Looking at Architecture, the City, and the Landscape through the prism of energy” (2011-2013). In this report analyzing Grand Paris and Venetian region, one of the “world vision” at the end is called “cradle-to-cradle” (Viganò 2014a; 2014b) where a new paradigm is established to solve energy problems and how the necessity to cascade energy questions the necessary consumption decrease. Moreover the idea of design is somehow embedded in cradle-to-cradle, because the concept has been mainly developed by a chemistry and an architect (McDonough and Braungart 2002). Also in France a studio has been developed in the architecture school of Versailles in which students have to study and develop project solutions through the concepts of urban metabolism and resilience for Bangkok city, leading to the publication “Metabolism and resilience : from Bangkok to Paris” (Coulais and Stacher 2017).

These examples, even if probably other exists, illustrate a beginning of appropriation of these concepts by landscape architects and other designers and the possibility of establishing mutual influences, able to improve the general energy planning and designing of energy transition that “it’s a challenge [energy transition], and we still struggle with it” (NL8, 2017).

13.2 Landscape architecture's main challenges to deal with energy transition

Several main challenges emerged during the interviews for landscape architects while working in energy transition related projects. Some of these have been mentioned across discussions in previous chapters mentioned by landscape architects while answering other questions, while yet other challenges were collected through a direct question during the semi-structured interviews (see chapter 10 for the method). In this section these challenges mentioned by landscape architects are grouped in typologies in order to build knowledge from them (Deming and Swaffield 2011). These challenges concern internal factors in landscape architecture practice and external ones, both having repercussions on their practice. These challenges are discussed through the framework of the European Landscape Convention (ELC) (Florence, 2000), a framework recognized and ratified both in France and the Netherlands, but for which implementation depends on many factors such as institutional structures for landscape policy, historic landscape planning, etc. (De Montis 2014).

Concerning the topic of our research this framework of discussion could support to understand if some of the principles stated in the ELC are or could be applied to assist landscape architects facing the challenges of the energy transition process.

Table 13.2, categories of main challenges mentioned by landscape architects for working in energy transition process, illustrated with quotes and with the number of interviews in which the challenge is mentioned. The table includes quotes selected as representatives of the main categories listed in the table, in order to provide a clear image of the contribution facets, but avoiding repetitions. A total of 16 interviews. Source: author from elaboration of the landscape architect semi-structured interviews.

Category	Quote	Code
Challenges internal to LA profession		
Additional knowledge acquisition – 4 times	“That’s to say that there is always a fuzzy part...of...lack of culture actually. To really understand all the energetic springs, to understand all the functioning. Because after you really need to access to a technical level. How it works a biogas power plant, finally what it needs, the play among stakeholders. For example, the photovoltaic, the laws, the legislative aspect of it. The same for the wind turbine...that’s it. That to say a whole number of parameters on which I as a landscape architect would like to learn/be trained.” ² (FR4, 2017)	IC1
	“I think, one is that everything is changing very fast so you need to be	DO1
	² “C’est-à-dire qu’il y a toujours une part un peu nuageuse de pas... de... d’inculture en fait. De vraiment comprendre tous les ressorts énergétiques, comprendre tous les fonctionnements. Parce qu’après ça demande vraiment d’accéder à un niveau technique. De comment ça fonctionne une méthanisation, enfin c’que ça demande, des jeux d’acteurs. Par exemple le photovoltaïque, les lois, le législatif dessus. Pareil pour l’éolien... voilà. C’est-à-dire tout un tas de paramètres sur lequel moi en tant que paysagiste j’aimerais me former.”	

on top of everything because otherwise your implementing old numbers or old techniques and the other one is that it is so complex, it is so broad that well there is always more or better or newer information somewhere available.” (NL3, DO 2017)

Dealing with additional complexity in design process – 2 times

“Another practical difficulty at the time was for example to combine the findings from the savings study and from the potential renewable energy, potential study, that was kind of a technical difficulty in bringing these two together because you’re calculating with different time frames or primary versus secondary energy or different energy carriers electricity, heat. So balancing these findings proved to be a bit difficult...” (NL3, 2017)

DO2

“yes so dealing with energy data is one difficulty, so elaborating, crossing them, etc. and also the availability of data in general is for us also a difficulty. Drowning in it is that has to do with the availability and dealing with it.” (NL8, 2017)

RW1

Landscape architect preference – 2 times

“it’s moral even. Sometimes I think is good to have less [wind turbines], I only talk about wind energy then, to have less wind energy windmills because it is better for landscape. I mean I like it better...but I support sustainable energy transition too...it’s a very important topic.” (NL5, 2017)

FS1

Challenges external to LA profession

Multidisciplinary collaboration - 12 times

“Well, the dialogue with people...the elected members, technicians, etc. Yes, indeed, it’s sometimes a bit complicated to enter into discussion with people that don’t understand really what we are saying, because we don’t talk about the same thing that is simple. Finally, we speak of the same object, but not from the same point of view and so there is a time in which it is necessary to find...this kind of intermediary language that will allow us to understand each other and that we are able to talk to each other’s, that’s it. On which we’ll be able to agree, because it’s a matter to understand, but more it’s a matter to be more or less in agreement to go towards such an objective”³ (FR5, 2018)

PH1

“that there’s so much interaction between all the different flows of energy that the way it was divided or any type of dividing the project makes it that you need to communicate really intensively and secure all different firms

RW2

3 “Bon, le dialogue avec des gens...les élus, les techniciennes etc. Oui, effectivement, c’est parfois un peu compliqué de rentrer en discussion avec des gens qui comprennent pas réellement c’qu’on dit parce que, parce qu’on parle pas de la même chose quoi c’est simple. Enfin, on parle du même objet, mais pas du même point de vue et donc y a un moment il faut trouver le... cet espèce de langage intermédiaire qui va permettre qu’on s’comprenne et qu’on arrive à peu près à s’dire des choses, bon, voilà. Sur lesquelles on va pouvoir se mettre d’accord, parce qu’il s’agit de comprendre, mais il s’agit en plus d’être à peu près d’accord pour aller vers tel objectif”

in different places in the Netherlands that cost a lot of organization.”
(NL8, 2017)

Acknowledgment of landscape architect profession – 7 times	“I think that the commission also, there is not commissioners’ sensitivity. Globally there is a deficit of visibility of our work, which is evident and strong.” ⁴ (FR1, 2016)	PA1
	“I think that there is a true problem of project management, in France it’s the commission. The commissioners are not aware of what we could do, of what we could bring.” ⁵ (FR2, 2016)	AB1

Late inclusion of the landscape perspective in ET process – 7 times	“What is difficult in fact, but that I see, but about subjects...when there are extremely technic subjects like that, it’s that ...we tent to call a landscape architect too much downstream of the reflection. Whereas...when...if It was upstream, we could negotiate, make sure that for the organization quality we negotiate better with the one which....Which prevents or...or finally...you see. To be upstream, it means to make possible things that if we arrive downstream ...Everybody told me: ah well that’s not possible for that reason that it’s not possible for that other reason, that it’s not possible for that other reason. Then there are reasons that are prohibitive, but there are other that are not. And so, this this could not be unlocked if we are not [involved upstream]: either everything is too blocked, so we have to go back to an upstream approach again” ⁶ (FR8, 2018)	LP1
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“The first difficulty is to arrive early enough and...and in a sufficiently favorable context to be able to choose the most appropriated places. That means that today projects are often done by default because we are... we have to either place the wind turbines in definitive plots, or to install photovoltaic panels in defined plot, etc., etc. And sometimes these plots are not the more appropriated, so it would be good if we could intervene early enough to choose, on the territory, the interesting parts of the

4 “Je pense que la commande aussi, il n’y a pas de sensibilité auprès des commanditaires. Globalement on a un déficit, de visibilité de notre métier, que est manifeste est forte.”

5 “Je pense qu’il y a un vrai problème de maîtrise d’ouvrage, en France est la commande. Les commanditaires ne sont pas au courant, de ce que on peut produire, de ce que c’est notre apport.”

6 “C’est qui est difficile en fait, mais ça je le constate, mais sur des suj... quand y a des sujets extrêmement techniques comme ça, c’est que... on a tendance à faire appel au paysagiste trop en aval de la réflexion. Alors que... quand... s’il était en amont, on pourrait justement négocier, faire en sorte que pour la qualité de l’organisation on négocie mieux avec celui... qui empêche ou... ou enfin... voyez. Être en amont, c’est rendre possible des choses qui si on vient en aval... Tout le monde m’a dit : ah ben ça c’est pas possible pour telle raison, ça c’est pas possible pour telle raison, ça c’est pas possible pour telle raison. Alors y a des raisons qui sont rédhitoires, mais y en a d’autres qui ne le sont pas. Et donc, du coup, ça... ça ne peut se débloquent que si on est : soit tout est trop bloqué, donc on est obligé à nouveau de revenir dans une approche amont”

territory, and in these parts of territory the more pertinent places”⁷ (FR3, 2017)

**Preservation
attitude towards
landscape –
7 times**

“the big thing in the in the energy transition is that energy production comes above the ground again. [...] Which means that we will see where our energy is produced, like we see where our food is produced, and a lot of people don’t like the image of that landscape. [...] And also it’s not only about designers but also about the people in the Netherlands, we need to face the fact that the energy production will be visible and, on the other hand, we should make good choices in it of where we think it can be implemented and where not” (NL6, 2017)

BS1

“for instance, when I was dealing with solar panels, if we show a suggestion where there is planting all around, there are trees or whatever, bushes all around so basically you don’t see them, people say “ok”. Great solved! Yeah but I think our fault..., is more like...we don’t see the landscape as something that has to be preserved as it is now and few many people see the landscape that way, we see more as a dynamic expression of the need of society and one of the great needs of society is energy” (NL2, 2017)

JH1

“That, they are not in this approach. They are more in an approach...very backward-looking, conservative, in which everything that the modernity want to propose to have to hide or integrated, but it could not be shown as it is. [...] In any case, if we don’t follow this movement, the open-minded will occur, but without us and without these projects. So, the projects tomorrow will be seen even in a more mediocre/poorly way than what could be...what they could be today. You see? There is a gap...”⁸ (FR3, 2017)

CC2

**Non-
acknowledgement
and
understanding
of ET –
4 times**

“And of course, everybody knows that water safety is important because we deal with dikes for hundreds of years, but society doesn’t take the energy transition really seriously, because when we switch on the light

JJ1

⁷ “La première difficulté c’est celle d’arriver suffisamment tôt et... et dans un contexte suffisamment favorable pour pouvoir choisir les lieux les plus judicieux. C’est-à-dire que aujourd’hui on fait souvent des projets par défaut parce que on est... on doit soit implanter les éoliennes dans des parcelles définitives, soit installer des panneaux photovoltaïques dans des parcelles définies, etc., etc. Et... parfois ces parcelles-là sont pas les plus judicieuses, donc ça serait bien si on pouvait intervenir suffisamment tôt pour choisir, sur le territoire, les parties de territoire intéressantes, et dans ces parties de territoire les lieux les plus pertinents”
⁸ “Ça, ils sont pas dans cette démarche-là. Ils sont plutôt dans une démarche... très passéiste, conservatrice, dans lesquelles tout ce que la modernité veut proposer ça doit se cacher ou s’intégrer, mais ça peut pas être montré tel que. [...] De toute façon, si on suit pas ce mouvement-là, l’ouverture d’esprit se fera, mais sans nous et sans ces projets-là. Donc, les projets demain seront vus encore plus ringards que c’qu’ils peuvent être ... que c’qu’ils pourraient être aujourd’hui. Tu vois? Y a un tel décalage...”

there is light and we're used to that. So a lot of resistance.” (NL1, 2017)

“When you begin...I mean many people have no idea about energy, it's just you turn on and switch and it's light! And people don't know where it really comes from, so do not really understand about why worrying about its production...”(NL2, 2017) JH2

**Long project duration–
4 times**

“And sometime a difficulty is that...you develop such scenarios, but it's a possibility... and somebody, actually many people, have to work for their implementation and they require many years in the future...so maybe we are not there anymore working on the territory and also people changes and so yes...you have to deal with great great uncertainty” (NL2, 2017) JH3

“To carry out a project from the beginning to the end, so that it doesn't become nonsense/anything, you have to keep the objectives from the start. [...]. And when the project takes long times to be realized...well things, the issue of a territory also evolves...so things are not set in the stone and when we said a things we don't go all the way stupidly without thinking, saying... Thankfully that in ten years things happen, but to make projects evolve to transform them it's not always easy. And still the big goals, yeah the big/main goals that are set for launching such projects, at least it's necessary to keep them to the end” (FR5, 2018) PH2

**Low funding for landscape –
3 times**

“If your landscape entity is relatively small, you will not be expensive for your commissioner, but if they say it's your responsibility for a wind turbine central in Brittany, it may cost a bit. I'll read the existing atlas de paysage, but I'll also do a lot of field work and the field work it's expensive, it's for that we do it less and less. Nowadays we do not have landscape study that worth their name. You go on the internet you look at google and we avoid going on the field. That's it, it's like that that you do PA2

9 “Pour mener un projet d'un bout à l'autre, pour pas qu'ça devienne n'importe quoi, il faut tenir les objectifs du début. [...]. Et quand le projet ça mets longtemps à se réaliser...beh les choses, les sujets du territoire évoluent aussi... Alors, les choses sont pas gravées dans le marbre et quand on a dit un truc on va pas jusqu'au bout bêtement, sans réfléchir en se disant... Heureusement qu'en dix ans il se passe des choses, mais faire évoluer les projets le transformer ce n'est pas toujours facile. Et quand même quoi les grands objectifs, ouais les grands objectifs qu'on s'est donnés pour lancer tel projet, au minimum faut les tenir jusqu'au bout, quoi.”

cheap studies”¹⁰ (FR1, PA 2016)

“well this energy goals will never achieve. It will never be achieved unless there are economic incentives to make all consumers and industries... well they have to change their routines and behavior to reach this energy neutrality or CO2, you not only need a lot of renewable energy but also you have to reduce the actual use of energy, it’s both, so that you can come to zero at certain point. But it’s difficult sometimes to say this... well not to say but it’s difficult to make accept this or really to make implement this, because at the beginning there is a need of a lot of money...” (NL1, 2017) JJ2

Private/public land ownership for projects’ implementation– 3 times

“The wind turbine layout have to be possible at the plots levels, because the plots are or public plots, municipal, or ...more often private plots... so, there are landowners that could refuse...so, sometimes, we say well here, from a landscape point of view, it should be like that, but...at the level of land propriety agreement we see that’s not possible, so you need to try in the site, in one site...More the site has a loose form , the better it is because we know that we will be able to provide different variants...finally, different...projects with different geometries.”¹¹ (FR7, 2018) MM1

“It’s tricky because you could calculate the amount of surface of PV panels for a certain production in the region and find suitable roofs or others surface, but you cannot oblige people to put solar panels on their roofs, so you take the risk, and it’s good also to look at the areas owned by Dutch government.”(NL8, 2017) RW3

“There is always a strategy more suitable, finally specific to each territory. For example, here [plan de paysage PNR de la Brenne], the strategy is that we are in a territory where there are many hedge system and a lot of wood and ... but it’s private...so the question is how you touch...we know that there is an important potential for wood energy sector, but how do you reach the private owners? So that’s it. The strategy is going to be this. This CL1

10 “si votre entité paysagère vas être relativement restreinte, vous n’allez pas couter chère à votre client, mais si on dis c’est t’a la responsabilité d’une centrale éolienne en Bretagne, la ça risque de couter un peu. Je vas relire les atlas de paysage qu’existent, mais je vas aussi à faire beaucoup de travail de terrain et le travail de terrain ça coute chère c’est pour ça que on ne fait de moins en moins. Maintenant aussi on a pas des études paysagères digne de cet nome. On vas sur internet on regarde Google et on évite d’aller sur place. Voilà c’est comme ça que on fait des études pas chère.”

11 “Le positionnement des éoliennes faut que ce soit possible au niveau des parcelles, parce que les parcelles, c’est soit sur des parcelles publiques, parc communal, ou alors... plus souvent sur des parcelles privées... donc, il y a des propriétaires qui peuvent refuser... donc, des fois, on dit ben voilà, d’un point de vue paysager, faudrait que ce soit comme ça, mais... au niveau des accords fonciers on voit que ce n’est pas possible, donc faut essayer dans le site, sur un site... Plus le site a une forme un peu plus lâche, mieux c’est parce qu’on sait qu’on va pouvoir proposer vraiment différentes variantes... enfin, différents... des projets à des géométries différentes.”

is the incentive strategy to mobilize people, private, to engage in this topic.”¹² (FR6, 2018)

12 “Il y a forcément une stratégie plus adaptée, enfin spécifique à chaque territoire. Par exemple, ici, la stratégie c’est quand même qu’on est dans un pays où il y a beaucoup de bocage et beaucoup de bois et... – mais privé... Donc, la question, c’est comment tu touches... alors qu’on sait qu’il y a un potentiel de bois énergie important, mais comment est-ce que tu touches au privé? Donc voilà. La stratégie, ça va être ça. C’est la stratégie incitative pour mobiliser des personnes... privées, pour s’engager dans ce domaine-là, quoi.”

In the following sections each typology of challenges mentioned by landscape architect and summarized supported by interviews excerpt is discussed, in order to deep and explain the different topic.

13.2.1 Internal challenges to landscape architecture

In landscape architects’ narratives several challenges concerning the internal landscape architecture profession are addressed. In this section these internal challenges are described and discussed.

13.2.1.1 Additional knowledge acquisition

A first challenge highlighted concern the possible acquisition of new additional energy transition knowledge supporting dealing with energy transition focused projects as the quote IC1 express. The knowledge mentioned is broad and consists of rudiments about energy technical aspects but also the law and rule that frame the implementation of RE projects or more strategic energy transition visions (see chapter 12 for more details). Moreover as the same quote mention, it is raised the idea to establish specific training classes about these subjects to train landscape architects that for the quote novelty of the topic, have not received these kinds of knowledge during the school years.

Concerning the same topic the quote DO1, express that RE or other technologies are constantly updated and improved so beyond the difficulty to acquire knowledge about these topics there is also the challenge to continuously stay informed about these rapid changing.

As the following quote illustrates this knowledge could support acquiring credibility towards the other experts and institutions involved (elected members, etc.) in presentation and discussion about the projects and at the same time to implement better designing solutions.

“This allows you to have a basis when you are talking. We may be convinced of what we are talking about, as soon as one elected member who tells us: ‘yes, but the question about fire for photovoltaic panels, the question of land use, etc.’, about which we have not the basis it’s...well it’s destabilizing. Well, not

destabilizing, of course, but it's ...we lose credibility”¹³ (FR4, 2017)

These findings could have some repercussion on the training program in landscape architecture school, but also in landscape architecture associations, such as FFP, APCE and NVTL that could organize specific training sessions open to practitioners.

13.2.1.2 Dealing with additional complexity in design process

Two Dutch landscape architects working in projects having the goal to elaborate *landscape energy transition quantitative scenarios* (NL3 and NL8 table 12.1 chapter 12) highlights as one major challenge the fact of dealing and working with energy data quantities as the quote DO2 and RW1 illustrate. These projects, as explored in the previous chapter, seem to be quite new for landscape architects to work on, leading a certain number of challenges on the way to perform some steps in the design process such as matching calculation or energy unit of measurement conversion (see chapter 12 for further details).

Connected to this data management the quotes RW1 also points not only the challenge of dealing with them but also founding them to analyze the territorial energy systems. This is in line with other researches that highlights the difficulties to find energy disaggregated data that could be useful to develop more adapted planning and design strategies (e.g. Pincetl et al. 2016; Voskamp et al. 2016).

13.2.1.3 Landscape architect personal preference

Finally, considering the challenges inherent to landscape architecture profession two landscape architects also mention the challenge sometimes to go beyond their aesthetic preferences for landscape as the quote FS1 (table 13.2) explains. In narrative this is particularly connected with wind turbines and their high density in certain landscapes. This topic points out that speaking about landscape and designing a landscape in a way or another is also a matter of subjective personal taste, and landscape architects make no exception. This could be a factor leading professional landscape architects to answer or not to RE or other energy related commissions. Nevertheless respondents affirm to be aware of energy transition importance and believe in the need of its implementation trying to get over their personal aesthetical taste (e.g. quote FS1). In the words of one of the interviews:

“Energy transition is a real necessity and sometimes even if there are landscapes I don't like very much, I think it important to contribute to it, we have to.”¹⁴ (FR3, 2017)

However how a landscape architect points out : “In some cases it is good that a lot of people

13 “c’qui permet d’avoir une assise quand on parle. On a beau être convaincu qu’on parle, dès qu’y a un élu qui nous dit : ‘oui, mais la question d’incendie pour les panneaux photovoltaïques, la... la question du foncier, etc.’ dans lesquelles on n’a pas de prise c’est... ben c’est assez déstabilisant. Enfin, pas déstabilisant bien sûr, mais c’est... on perd en crédibilité.”

14 “La transition énergétique est une nécessité réelle et quelque fois même si il a des paysages que je n’aime pas, je pense que c’est important de y contribuer, on doit le faire“

have influence on energy transition and not only the landscape architects” (NL5, 2017).

13.2.2 External challenges to landscape architecture

Even if we mentioned some internal difficulties belonging to the profession, much more are connected to external factors concerning the social perspective towards, landscape and energy transition issues of people, but also concerning practical/operational factors in the commission and data gathering.

13.2.2.1 Multidisciplinary collaboration

The collaboration and exchange with experts coming from different disciplinary fields (engineer, ecology, etc.) during project design and implementation is an important step to be performed, considering the complexity and the many subjects that energy transition touch (see chapter 12). However even landscape architects acknowledge the necessity also mentions its challenging nature as the quote PH1 illustrates (table 13.2), because of the different way to approach the projects and differences in vocabulary, possibly leading to difficulties in the dialogue. This challenge have connections with the highlighted necessity to acquire additional energy knowledge (above), that beyond potentially supporting to provide better design solutions, it also allows to develop a more energy focused and technical vocabulary that could allow to improve dialogues. Moreover, beyond the challenges of dialogue, the organizational issues required by projects involving multidisciplinary collaboration multiplicand project partners is also highlighted, as expressed by the quote RW2. The fact of addressing energy transition from cross-sectoral perspective, especially at large scale, allow to better create possible synergies among parts but also requires to involve much more partners and experts adding a great complexity to the organization and combination of all these partners together.

Interestingly almost all landscape architects add some insights about their collaboration with two main professional figures they work with in energy related project: ecologist and engineers.

Collaboration with ecologist

Concerning the collaboration with ecologist it is well perceived, sometimes with discussion, but landscape architect feel to have the basis knowledge to communicate and establish a constructive dialogue with them (see chapter 12), as the following quote illustrates:

“When for instance we present an idea like wind turbines in the forest to ecologists that never heard of it, then immediately there is a problem or there are questions. But then you explain that you have some basic ecological knowledge and that you think that this could work like this or could work like that. And then you don’t have the discussion like ‘ok, they proposed this and we don’t think that it is a good idea’. We have more discussions that are towards optimization of a concept and this is what I think that why do you involve specialist or do it better. it’s really helps if you share a basic level of knowledge so I think as landscape architect we have this basic ecological knowledge”. (NL2, 2017)

This reinforce the landscape architect practice as a “life science” based one (Donadieu 2012)

even if other researches exploring the collaboration between the two professions point out how improvement still need to be done for the communication (Morin, Bonthoux, and Clergeau 2016).

Collaboration with engineers

Concerning the other disciplinary field addressed, the engineer one, it is unanimously highlighted as crucial and necessary. However towards this professional figures emerged more attention points and difficulties compared to the ecologist. Some landscape architect shares good experience and constructive dialogue other the opposite. This could be due to many factors included specific project context, personal behavior and character. However, some key points that could improve future collaboration emerge from the discourse from a landscape architecture perspective.

Firstly, even in cases when the collaboration went well, is highlighted by the most of respondents the need to acquire some energy/technical focused knowledge, in order to be able to lead a constructive dialogue with them able to improve the project and lead to optimal and shared solutions from every point of view. This is in line with the results discussed above about the expressed need of practitioners to acquire this kind of knowledge.

“we have built up quite substantive amount of technological knowledge that we can quite easily communicate with them and, of course, they are often in a situation where other people don't understand what they say... so they are used to explaining well” (NL3, 2017)

This seems to imply a progressive specialization of landscape architecture firms that have to invest to develop their internal expertise to properly deal with the subject. Indeed, we see that there are several Dutch landscape architecture firms that are being specialist about the energy transition subject.

Another aspect pointed out is that, the other way around, engineers need to be open and receptive towards the landscape component of the energy project.

“They only listen to us if we listen to them. And at some point, you couldn't ask to locate [renewable energy production devices] in a place where it's impossible to produce energy, for example. So we have to deal with that and this's...this's essential that people like that consider us as theirs. That's to say ...and we must listen to their own constraints, of their concerns”¹⁵ (FR3, 2017)

And, this point seems still to generate some tensions especially in French practitioners, where several mentions having the feeling that their work is not valued and they are not really listened during the desing process.

“Finally, there are some....Who weren't necessarily convinced of the landscape design approach to landscape. [...] There are many that are in technic more in the engineer, that means that we take away all the constraints and we work only on the...and we know that there are not constraints. So, but for me

15 “Ils ne nous écoutent que si nous on les écoute. Et à un moment donné, on ne peut pas demander une implantation à un endroit où ça rendrait impossible la production d'énergie, par exemple. Donc on doit composer avec ça et c'est... c'est indispensable que ces gens-là nous considèrent comme des leurs. C'est-à-dire euh... Et nous il faut qu'on se mette à l'écoute de leurs contraintes à eux, de leurs préoccupations.”

it's rare that a good landscape project could be made"¹⁶ (FR2, 2016)

Considering the relative novelty of the energy transition topic and of the involvement of the landscape architect about the energy focused project, for several of these technical professional to collaborate with landscape architect is probably a new challenge as well, to which both part needs to be accustomed.

13.2.2.2 Acknowledgment of landscape architect profession

Seven French landscape architects out of eight mentions as a main challenge to obtain a better visibility and acknowledgement of their profession as quotes PA1 and AB1 illustrate (table 13.2). As the same quote stress, from their perspectives this blurriness about their practice and their skills have repercussion on the kind and number of commissions they could get in energy transition process, having a great influence on their involvement and contribution in the process. This is a high rate concerning the French answers and it is also interesting that none of the Dutch interviewed raise this issue. Considering the high rate of interviewed concerning these challenges and the difference between the two nations this challenge is explored and discussed more in depth in the following section 13.2.3.

13.2.2.3 Late inclusion of landscape perspective in energy transition process

The interviewed landscape architects obviously bring landscape perspective in energy transition projects in which they worked, nevertheless seven of them, especially for the French case, mention the issue of the late involvement of landscape design the project timing process, as expressed by the quote LP1 and CC1 (table 13.2). Landscape architects highlight this challenge especially for the RE technologies projects, in which they are called to intervene when the site of implementation is already settled so very downstream in the process, greatly restricting the room for maneuver to develop projects fitting in the territory and its landscape.

Landscape architects stress the idea that to be involved in these projects at an early stage could be beneficial allowing to find more conscious and adapted location for RE technologies, especially wind turbines, and not just concerning their layout on a defined plot (in one lines, circular, etc.). However as mentioned by the following quote for now in many cases the plot are the results of the different ecological, heritage, etc. constrains.

"But in any case, we always end up with a Gruyere cheese, finally Emmental cheese, because in the Gruyere there aren't holes. It's that we put ourselves...we position ourselves by default there where we don't bother and not there where we could do really something, an artwork from landscape perspective. So I understand that it does not have to bother people, that it does not have to bother animals, it does not have to bother this, it dose not have to bother that. If you want, I understand the sum of the constraints,

16 "enfin il y en a qui... qui n'étaient pas forcément convaincus de la démarche du projet de paysage. [...] Y en a quand même beaucoup qui sont dans la technique plus d'ingénierie, c'est-à-dire qu'on enlève toutes les contraintes et on travaille uniquement sur le... et on sait qu'y a pas de contraintes. Donc, mais ça pour moi c'est rare que ça puisse faire un bon projet de paysage quoi."

*but there is a moment...*¹⁷ (FR8, 2018)

Moreover a similar concern, of a late take into account of landscape, is also highlighted by a landscape architect (FR4 table 12.1) working on a *plan de paysage*, including energy transition landscape strategies, for a territory committed to be TEPOS [Energy Positive Territory] for 2050 (see part 2). Even if the energy transition topic is treated in the plan the *paysage*, its commission and elaboration arrive once the TEPOS goals were already settled. So the landscape document could mainly take into account and provide some ideas on how implement into the landscape some of these goals (e.g. photovoltaic park on the roof implementation) but not concurring and supporting in the elaboration of these goals from a landscape perspective. This is illustrated by the following quotes:

*“And then it’s good to be involved but... to arrive after, actually after the start of the TEPOS [to elaborate the plan the paysage]... finally we could bring more things if we were present before...”*¹⁸ (FR4, 2017)

It is, however, interesting to highlight that one Dutch practitioner talking about the landscape architects’ contribution in energy transition (chapter 11) pointed out that involving landscape architects at the early stage of energy transition process representing spatially the energy goals defining where and how much land of a territory is needed to achieve them, could be scaring for local institutions and other stakeholders, potentially slowing down the process (see sub-chapter 11.1.1.4). This point of view shows that also thinking about landscape in connection with energy quantitative data at the early stage of transition process could lead to some blockage.

These two perspectives show the sensitivity of the topic, and even with a shared agreement about the interest to consider early landscape, while establishing energy transition goals for the territory, supporting in the choices of the strategies thank to the landscape analysis of local resources and/or designing the physical projects implementing them, there is a need to be careful about the representation.

13.2.2.4 Preservation attitude towards landscape

The often conservative/preservative vision of people, such as inhabitants or/and stakeholders of a territory, towards landscape is highlighted as a challenge from landscape architect perspective in both nations. This is illustrated by the quotes BS1 and JH1 (table 13.2), which point forward this issue especially for RE technologies projects that being aboveground are visible and lead to landscape changes. Moreover as the quote CC2 point out this suggests the need for an even stronger involvement of landscape architects in these kinds of projects, in order at least to try to have a careful landscape design, at least trying to develop a territorial grounded and shared

17 “Mais dans tous les cas, on se retrouve toujours avec l’effet de gruyère hein, enfin d’emmental, parce que dans le gruyère y a pas de trous. C’est que on se met... on se positionne par défaut là où on gêne pas et pas là où on pourrait faire vraiment quelque chose, une œuvre d’art sur le plan du paysage. Alors j’entends, hein, que faut pas gêner les gens, qu’il faut pas gêner les animaux, qu’il faut pas gêner ci, qu’il faut pas gêner ça. Si vous voulez, je comprends la somme des contraintes, mais y a un moment...”

18 “Et du coup c’est bien d’y participer mais enfin...le fait d’arriver après, en fait, après le mise en route du... TEPOS [pour élaborer le plan de paysage]... on pourrait apporter plus des choses si on était présent avant...”

project.

In part two of this thesis, we found many agents mentioning this conservative perception of landscape. This perception of landscape as static and untouchable is one of the reasons why landscape architects pointed out their role to act as an interface between people and their landscape, in order to guide them in, as much as possible, shared and conscious evolution (see chapter 11). This difference in how to see landscape or as design evolving entity or as a conservationist preservation one could be a blocking point for projects. In the words of one of the interviewed:

“we don't see the landscape as something that has to be preserved as it is now and few many people see the landscape that way, we see more as a dynamic expression of the need of society and one of the great needs of society is energy. We don't want to use fossil fuels, so we have to use a new way and feel so we think the landscape could also express that landscape of the future should in a way all be energy landscapes” (NL2, 2017)

Some practitioners also connect this difficulty about landscape conservative perception of people to the top-down character of many RE project, launched by private developers external to the territories. So people opposing to landscape changes also because they do not see beneficial relapse of these RE projects, such as the economical one, on the territory. And in this top-down RE projects their position as landscape architect could become difficult, “crushed” between the commissioners and local inhabitants. One landscape architect especially expresses the difficulty to deal with this situation when working on a wind turbine park set up by private RE developers on a territory:

“We were the damper. [...] So, we were always very very present at a public meeting. But at a public meeting, you heavily get all...all the anger of people the undergoing the development done by others. Because it wasn't understood at all as a territory project”¹⁹ (FR2, 2016)

The landscape architect being at the interface as a mediator proving to be a difficult position in some circumstance.

13.2.2.5 Non-acknowledgement and understanding of energy transition

Another reported challenge is the resistance especially from local inhabitants that energy transition projects on territories could face because of a non-acknowledgement and mistrust about the meaning and seriousness of the problem of reducing CO₂ or other greenhouses (IPCC, 2018) emissions that urges nations to elaborate energy transition scenarios. This is expressed by the quotes JJ1 and JH2 that argue about the gap existing between the daily use of energy and concern from where and what it comes from.

Concerning this challenge one of the interviewed suggest that there is a need for education leading people to understand, encouraging participatory process with also the goal of raising awareness about energy transition topic as the quotes below illustrate:

19 “On était l'amortisseur quoi. [...] Donc, on était toujours très très présents aux réunions publiques. Mais aux réunions publiques, tu te prends en pleine gueule toute la... toute la colère quoi des gens qui subissent le développement fait par d'autres quoi. Parce que aussi ça n'a pas du tout été compris comme un projet de territoire”

“there is knowledge it’s lack of still...lack on...like my mother or grandmother have no idea. So it’s an unknown issue for most people. And it’s also the goal of those ateliers [for the development of the regionale energie strategie]: get involved more and more people with the energy transition and in education” (NLA, 2017)

This challenge is connected to the previous one concerning the conservative attitude towards landscape of local inhabitants, because a better awareness and understanding of the reason for why engage in an energy transition process and the inevitable landscape relapse could lead people to be more collaborative in the process.

13.2.2.6 Long project duration

The project duration, meaning the time frame needed for the elaboration and the subsequent implementation of the projects, is also mentioned as a challenge, because of the long length of time that, generally speaking, energy transition vision/scenario implementation request. This issue is specifically highlighted by landscape architects referring to projects that have to define a strategies’ roadmap for a territory which on the basis of territorial grounded analysis could suggest the development of specific RE production sector, or energy savings measure and design guidelines for their implementation.

Once defined the energy goals for a territory and the strategies to achieve them from a landscape/spatial perspective, their implementation is still very challenging involving many institutional level, the private and the public sector as well as agriculture, industries, etc. involving many stakeholders leading to long times of negotiation and/or found rising for the implementation. Moreover from the beginning the goal achievement are put at a horizon of 20-30 years in the future, this is the case of almost all TEPOS territories in French context. This long time frame is considered a challenge because agents and other stakeholders involved in the projects could change during the process as the quotes JH3 mentions, jeopardizing its success/achievement. At the same time, as the quote PH2 highlights in such a long time also territory and its necessities could evolve, so there is the need to maintain the major energy goals but also to be flexible and to adapt to new need or new opportunity. This could suggest a need to update the landscape territorial analysis in connection with an energy system in order to understand if the issues have changed, implying a follow up of landscape architect in the long terms process.

However the possible noninvolvement of landscape architects all long of the process in order to assure a correct project following up is highlighted as another difficulty point, as stressed by the quote JH3. This is specifically put forward for the French case where landscape architects are called to elaborate a plan de paysage but very rarely to following up the implementation of the strategies that they mentions in the documents. As one of the interviewed expresses:

“Regarding the plan the paysage, we are there [on the territory] to elaborate the document and make the fiche actions [defining the energy landscape design strategies], but after it’s finished...we are not there anymore to follow the strategies of the fiche actions for the implementation...if they are implemented”²⁰ (FR4, 2017)

20 “Pour e plan de paysage on est là pour élaborer le document faire les fiche actions, mais après c’est fini... on est plus là pour le suivi de stratégies des fiche actions pour leur mise en place...si elles sont mise ne place...”

So the possible gap/mismatch between the elaboration and implementation phase in such long-time frames is perceived as something that could compromise the quality of the final results.

13.2.2.7 Low funding for landscape

The involvement and the extent of the contribution of landscape architect in energy transition process/projects, is also a matter of cost/budget. This is a point raised, as the previous one for energy transition landscape strategic projects having the goal to define an actions roadmap towards the energy transition.

Three landscape architects, in French context mention the limited budget they have to deal with to elaborate the documents as the quote PA2 illustrates. Indeed the initial budget allocated for a project has repercussions on the project itself, changing in the time frame a landscape architect could dedicate it, also restrains the number of other specialists and collaborators that could be involved for the benefit of the projects.

Moreover, as the same quote expresses, this has direct repercussion on the possibility of landscape architects to make field work on the territories. This practice is at the basis of landscape analysis in order to answer to the specific issues of each territory developing tailor-made grounded projects that how seen in chapter 11, it is mentioned as one of the main landscape architects' contribution in energy transition process.

These restraints budget beyond the means and time frame provided to landscape architect for design have also repercussions on the development or not of landscape perspective in energy transition process. This point of view is especially expressed for the French case where two practitioners highlight that in many cases local institutions, generally speaking, have little economic resources for project implementations and landscape is not considered as a priority issue. As one interviewee puts it:

*“They...they function with few means. That's also why landscape is very secondary, because they have very few means. And so they are ...they make very tight choices and they put high priority issues firsts.”²¹
(FR4, 2017)*

Another attention points, referring to the economical perspective is mentioned in the Dutch context, and concern the challenge of the implementation phase once the strategies being set. The quote JJ2, stresses this point highlighting how the actions listed in the projects often need economical effort for the public and private sectors, and all inhabitants, demanding great investment at the begin but that become profitable on the long terms, such is the case for the RE production.

So considering the economical context the challenge concerns the entry or not of landscape perspective in energy transition process, the extent of landscape intervention, as well as the project's implementation phase.

21 “Ils... ils roulent avec peu de moyens. C'est pour ça aussi que le paysage est très secondaire hein, c'est parce qu'ils ont très peu de moyens. Et donc ils sont dans des... voilà dans des choix très très serrés et ils font passer d'abord des questions très prioritaires.”

13.2.2.8 Private/public land ownership for projects' implementation

The land ownership for the implementation of energy transition projects and strategies is something highlighted as very challenging by landscape architects. This because when they are called to work on projects with the goal to define areas for RE technologies on territories, plot that are suitable from a landscape perspective could be private, and not always private owners agree to possible negotiation for the projects implementation as the quote MM1 illustrates (table 13.2). Moreover as the quote RW3 stress this fact could create gap/mismatch between the calculation of energy potential production, for example from PV panels on a territory, and the real implementation if the private owners refuse to have them.

Besides the same issue also exists for other energy transition strategies that landscape architect could suggest, based on the analyses of local resources for the development of energy sector. For example, the quote CL1 explain how in the elaboration of the *plan the paysage* for a territory rich in forests and hedges systems have the potential to develop energy-wood sector, but once stated this how you could persuade private owners to exploit it? The persuasion could come through economic benefits argument but this challenge probably could also be connected with the need for education and raising awareness about the reason why to engage energy transition process.

13.2.3 One main challenge: Landscape architect a still blurry profession?

The inquiry of landscape architects' challenges in energy transition has highlighted differences between France and the Netherlands, and the biggest one concerns the *acknowledgment of landscape architect profession and practice*. This issue is mentioned by seven out eight French landscape architects, and by none of the Dutch. Considering the high number of comments in the interviews (seven times) and the difference between the two national contexts, a further discussion is made in this section.

Beyond the landscape architects' narratives also the agents interviewed, that are working on the energy transition process of the three analyzed territories in part two of this research, reacted differently to the question about landscape architects' work in the two nations, suggesting differences in the recognition of the profession. This difference could have roots in cultural/historical background towards landscape designing in the two nations. We are going to first discuss the French situation and then the Dutch one to see what differences are found through the semi-structured interviews, exploring both landscape architects' and agents' discourse.

13.2.3.1 The sense of a lack of recognition by French landscape architects

Agents' perspective

During French interviews several agents mentioned that just recently they really became aware of the landscape architecture profession. Most of them, in both French territories, affirmed to have made contact with landscape architecture practitioners thanks to elaboration of the *plan de paysage* in the territory and some admitted to having made a previous acquaintance with them through wind turbine or biogas production facility landscape impact study, which are part of an environmental impact study. As the following quote expresses:

*“Because few years ago [before the plan de paysage], I didn’t know. For me, the landscape architect was that who trimmed the hedges, maintained gardens. And so, I’ve come since a long way to know the landscape architect’s work, and it’s good because I’ve carpooled long time with Isabel [the landscape architect elaborating the Monts du Lyonnais’ plan de paysage], I think that allowed me to...to better know her actions.”*²² (responsible energy transition service, Parc Eco Habitat-ML 2017)

As this same quote highlights, landscape architecture profession is still associated, in the collective imagination, to garden design and maintenance, so connected to one of the historical origins of the profession in France (Donadieu 2007).

Something else that points out the existing blurriness concerning the profession is that three French agents when asked about landscape architects, answered at first by speaking about the architects profession, focusing on energy retrofitting design on buildings as the following quote represents:

*“When you know that the residential sector it’s the first sector for energy consumption and greenhouse emissions...not pollutants, because that’s the agricultural sector, but...well you see that they have a role to play, and that nowadays there are...there are architects that build houses that are not protected during the summer from overheating...”*²³ (PCAET project manager-ML 2017)

And one agent does not answer the question about landscape architects’ role in energy transition process because he does not know what a landscape architect does exactly. He explicitly asks: “what is the difference between an architect and landscape architect?”²⁴ (PJC responsable projets CoopaWatt-ML 2018). This ambivalence between architect and landscape architect professions being also more relevant/unexpected, because in France a *landscape architect* is named “paysagiste”, and I used this term in the interviews and *architect* in French is called “architecte”. So even from a linguistic perspective there are no similarities or assonance between the two words in the French language that could create confusion and possible overlapping.

22 “parce qu’il y a quelques années je ne connaissais pas. Pour moi, le paysagiste c’était celui qui taillait les haies, qu’entretenait les jardins... Et donc, je parlais de loin pour connaître le métier de paysagiste, et ça tombe bien parce que j’ai covoituré longtemps avec Isabel [paysagiste en charge du plan de paysage des Monts du Lyonnais], ce qui m’a permis de... mieux connaître son action”

23 “quand tu sais que le secteur résidentiel c’est le premier secteur de consommation et d’émissions de gaz à effet de serre... pas de polluants, parce que ça, c’est l’agriculture, mais...Eh ben, tu t’dis qu’ouais ils ont un rôle à jouer, et qu’encore aujourd’hui y a des... y a des architectes qui construisent des... des maisons qui... qui, en fait, ne sont pas protégées face aux surchauffes estivales...”

24 “Quelle est la différence entre un architecte et un paysagiste?”

These points, raised in the discourse, put the accent on the specificity of landscape architecture in regards to other environmental designers such as architects, urban planners and urban designers, because these professions have progressively broadened their field of intervention from urban areas to more rural and natural ones and now embrace the territorial scale, while landscape architects too have expanded from garden and park design towards urban public spaces, infrastructure, etc. (Van Damme, Leinfelder, and Uyttenhove 2013).

This could contribute to creating overlapping among disciplines and increases the blurriness around the profession. This overlap was highlighted by French practitioners as the following quote illustrates:

“To define ourselves today in the world...in the working world, we are not clear. Landscape architects are still not very clear about their specificity. We are too often in competition with people who are not landscape architects, who...- because we work on areas that are close - I think about ...I think about architects, among others, urban planners [...] sometimes with geographers, sometimes with ecologists, because we are not clear about our specificity, or that our specificities it's not clear and perfectly identified by other, well, there are a lot of misunderstandings and because of...of slippage.”²⁵ (FR3, 2017)

Indeed, landscape architects that also become urban planners exist, such as Jacques Sgard. Moreover several landscape architects received the French “Grand prix de l'urbanisme” [Urbanism main prize], such as the landscape architect *Michel Desvigne* (2011) and *Agence Ter* (2018), showing the transversality and interconnection that exists between these disciplines. The difficulties to identify defined and respective fields of action for these professions could prevent them from establishing a constructive collaboration for improving the living environment (Champy 2000).

Moreover the quote above shows that from a landscape architects' perspective, possible partial overlapping exists with disciplinary fields that do not focus on “designing” such as ecology and geography. Landscape bridges the natural and human sciences (Tress et al. 2001), and so landscape architecture touches in its practice both the domains making it difficult to define the precise boundaries of the profession, that for the nature of its work object is hybrid and transdisciplinary (Meijering et al. 2015).

The purpose of this research is not to define specific boundaries that exist among disciplines working on “space” and “landscape”, but to acknowledge that this ambiguity exists among professions and blurriness about landscape architecture itself could have impact on the commission landscape architects could receive in the energy transition process. This point that emerges from the semi-structured interviews is important to mention.

25 “Pour se définir aujourd'hui dans l'monde... dans l'monde du travail, on n'est pas clair. Les paysagistes ne sont pas encore très clairs sur leur spécificité. On est beaucoup trop souvent en compétition avec des gens qui ne sont pas paysagistes, qui... – parce qu'on travaille sur des domaines qui sont proches –, j'pense aux... j'pense aux architectes, entre autres, urbanistes [...] parfois avec des géographes, parfois avec des écologistes, puisqu'on n'est pas clairs sur notre spécificité, ou que notre spécificité n'est pas limpide et ident... parfaitement identifiée par... par les autres, eh bien, y a des... beaucoup d'incompréhensions et beaucoup de... de dérapages.”

French Landscape architects' perspective

Landscape architects seem to be conscious of this blurry understanding about their profession and connect it to their sentiment of low/small involvement in the energy transition process, as expressed by the following quote:

“I have often the impression that...that we intervene...finally I know that we...that landscape architects intervene because it's compulsory. Because there are environmental impact studies...it's compulsory.”²⁶ (FR3, 2017)

A particular event is mentioned by six French landscape architects as something that has greatly decreased their active role and marge of maneuver in the energy transition process of territories. This is the disappearance of the “zone de développement de l'éolien” [wind development area] (ZDE). The ZDE was an electric document, not urbanism one, that conditioned a good fee for wind turbines implanted in defined areas. These were not compulsory documents but they encouraged local institutions or private developers to locate wind turbines in these areas, introducing economic benefits. In this way the implementation of wind turbine parks was thought out on large scale in a territory including the landscape component (see chapter 3 for more information). Two interviewed agents explained:

“So, it was interesting because we studied in a territory the potential to receive wind turbines, from the wind point of view, and from the landscape point of view. And so I had the occasion to develop several studies in that time and... I had really the feeling that I was working, as a landscape architect, for landscape. And not for a wind turbine developer. And I was, I was mostly paid by a local community that – you have not to deceive yourself – that asked for a ZDE study because there were wind turbines developers that came to see them to ask where...if it was possible, etc. So there were arrangements between local communities and the developers. And the local communities launched studies for the ZDE, often financed by developers and we were working...but in that organization landscape had a major role”²⁷ (FR3, 2017, 3)

“And then, since the ZDE have been abandoned and this is dramatic. [...] Each year, we make an assessment with the State. And so we, as the advisory landscape architect, we'll bring up the idea that there is a need to do the ZDE again”²⁸ (FR8, 2018)

The fact of being involved in the development of ZDE allowed landscape architects to play a role in the definition of site locations for wind turbines in a defined territory, developing large scale landscape analyses in order to choose the most appropriate site. This work related to a

26 “J’ai souvent l’impression que... qu’on intervient... enfin je sais qu’on... que les paysagistes interviennent parce que c’est obligatoire. Parce que y a les études d’impact...c’est obligatoire.”

27 “Donc, c’était intéressant parce qu’on étudiait sur un territoire la potentialité de recevoir de l’éolien, du point de vue du vent, et du point de vue du paysage. Et donc moi j’avais eu l’occasion d’en faire plusieurs à c’époque-là et j’avais... j’avais vraiment le sentiment que j’travaillais, en tant que paysagiste, pour le paysage. Et pas pour un développeur éolien. Et j’étais... j’étais la plupart du temps payé par une collectivité, qui – faut pas s’leurrer non plus – qui demandait une étude ZDE parce que y avait des développeurs qui étaient venus la voir pour lui demander où... si on pourrait, etc. Donc y avait des arrangements entre les collectivités et les développeurs. Et les collectivités lançaient des études des ZDE, souvent financées par les développeurs d’ailleurs, et on travaillait... Mais dans cette organisation-là le paysage avait une place majeure”

28 “Et puis, depuis les ZDE ont été abandonnées et ça c’est dramatique. [...] Chaque année, on fait le point avec l’État. Et donc nous, en tant que paysagistes conseil, on fera remonter l’idée qu’il faut absolument refaire des ZDE.”

strategic contribution by landscape architects exploring landscape possibilities for the future, merging different scales, stakeholders' interests and issues, were perceived as very positive because it allowed them to work on landscape large scale.

Reinforcing this feeling of lack of involvement in strategic decision making for landscape architects, one emphasized the landscape architects lack of implication in the TEPCV [Energy positive territories for the green growth], call for projects launched in 2014/2015 by the former *Ministère de l'environnement, de l'énergie et de la mer* [Ministry of environment, of energy and sea]. A ministry that, as it has been already mentioned is in charge both of landscape and energy transition and at the time, did not establish a link between the two components (see chapter 4 for more details):

*"Whereas I, five or six years ago, I thought that it was...that we were going to be in...for the TEPCV, that we were going to be ... much more mobilized. But at the end, not at all."*²⁹ (FR6, 2018)

Nevertheless things are changing very fast and the recent call for projects for the *plan de paysage* (see chapter 4 for more details) launched in 2019 by the *Ministère de la transition écologique et solidaire*, in which possible extra funding could be provided by the ADEME [Agency of the environment and the energy management] for *plan de paysage* wishing to address energy transition, seems to provide a new opportunity for landscape architects to collaborate on the strategic large scale side of energy transition.

Moreover, landscape architects testify an improvement in landscape impact assessment studies for wind turbines as part of global environmental impact. Indeed, in the guide for environmental impact studies for wind turbines, elaborated by now named *Ministère de la Transition écologique et solidaire* [Ministry for ecological and solidary transition], the chapter about landscape have become longer and more detailed, adding diagrams and topics in the three successive versions (2005-2010-2016).

*"That said, the landscape studies in the [environmental] impact studies are, technically, better and better. The documents are much more mature compared to seven or eight years ago. But the projects are still badly done, because they are constraints on results."*³⁰ (FR6, 2018)

However, even if impact study documents are more demanding in terms of contents, all the landscape architects interviewed are called to work on these projects when the site is already chosen and they are not present at the beginning and strategic level of decision making, that reduces their room for maneuver.

All this suggests that landscape architecture in France is still a profession searching for its own recognition, even if it has a long tradition in the country (see chapter 10). Maybe part of the problem is this long historical tradition of garden design practice, in which people still "enclose" landscape architects practice, obstructing a better merging with a large strategic global practice, of which many realized examples exist.

29 "Alors que moi, il y a cinq-six ans, je pensais que c'était... voilà, qu'on allait être dans... pour les TEPCV, qu'on allait être... voilà, beaucoup plus mobilisés. Alors que pas du tout."

30 "Ceci étant dit, les études de paysage dans les études d'impact sont, techniquement, de mieux en mieux quoi. Les dossiers sont beaucoup plus au point qu'il y a sept ou huit ans, quoi. Mais, les projets sont toujours aussi mal faits, parce que c'est le résultat de la contrainte, quoi."

The generalist attitude (Bruns et al. 2010) seems to be, somehow, also an obstacle making people think of them as “*neither fish nor fowl*” but at the same time, this attitude is a potential to manage complex problems and have a systemic project approach, both are important points to collaborate on energy transition processes. Indeed, we explored these attitudes in landscape architecture’s contribution to energy transition (chapter 11), where the fact of being generalist is seen as a potential strength (e.g. supporting a shared projects).

13.2.3.2 Landscape architecture: a profession acknowledged in the Netherlands

None of the Dutch agents’ respondents hesitated to answer about the landscape architects’ role in energy transition processes or specifying only a recent knowledge of the profession or mentioning architects or other environmental designers. This suggests a better understanding of the landscape architecture profession in the Dutch context, at least in a territory where several landscape documents succeed each other along with the evolution of the energy transition process, such as in Goeree-Overflakkee. Here maybe this situation brought particular attention to the profession, compared to other territories.

Moreover, no landscape architect mentioned during the semi-structured interviews the impression of a misknowledge about their profession, as in the French case.

Instead several Dutch practitioners, freely expressed the feeling of good involvement in energy transition process while connecting their participation directly with the recognized strong Dutch background for spatial planning and design of which they are well acknowledged.

As the following quotes illustrates:

“So it’s really very big functions...and what we should do I think in that moment in the Netherlands... we are already quite well involved, also on policy making on the National level. So I wouldn’t complain too much about that.” (NL2, 2017)

“Planning designs, spatial planning, landscape design then working on a regional and national scales is quite spatial for the Netherlands. We have a tradition in this domain and so maybe we are a bit further than other countries.” (NL1, 2017)

“Yeah I think we are... because of what we already mentioned the long planning traditions in the Netherlands is that we are used to thinking about what we do before we do it. So there is also part of the problem of the Netherlands, we maybe think and design too much and perform and construct a bit less” (NL3, 2017)

Indeed Dutch governmental authorities traditionally have used “*ruimtelijke ordening*” [spatial planning] to spatial land use development and conservation (Faludi and van der Valk 2013), involving landscape architects in strategic planning systems since the end of the second World War (de Jonge 2009).

However, even if they mention the feeling to be involved, they also highlight some points of precaution for future commissions and challenges for them during the progress of the energy transition process. These concern to a greater extent the low operational, spatial and short term implementation phases of projects they participated in elaborating, as the following quote

illustrates.

“what I do think in the Netherlands, is that we are working a lot on the knowledge, but acting upon it, we don't really do a lot. So for instance, in Germany, there is not so much systematic research, but they put wind turbines and solar energy everywhere.” (NL8, RW 2017)

Moreover, a quotation by a landscape architect working as adviser to *Ruimte & Energie* in the province of Zuid Holland, highlights how this implementation phase it still not advanced yet:

“I think the next step would be to start designing those places, that is I think what's coming in the next years. Now or up until now we are talking about ambitions, and I think that from now on to the next 5-10 years we'll see more projects coming into realization. And the whole work of landscape architects will come into place. Designers work on sites, but also everything around them, the all processes. How policy can become a realization.” (NL7, 2017)

So also, in the Dutch case new challenges and additional opportunities for involvement of the profession are put forward, but with a more optimistic attitude compared to the French. Here Dutch landscape architects refer to the fact that renewable energy production and the number of RE technologies is still quite small in the Netherlands (18 % electricity consumption comes from RE, CBS 2019) considering the high ambitions stated by the European Union (directive 20-20-20) and in the now approved *Klimaatakkoord* [climate agreement] (2019). Beyond the definition of roadmaps and strategies, actions need to be implemented as well.

13.2.3.3 Different perceptions of landscape architects in France and the Netherlands

This inquiry reveals a difference between the two national contexts regarding the recognition given to landscape architecture as a the profession, acknowledgement garnered from both the internal perspective of landscape architects themselves then from other external agents.

A survey developed in 1986 by the Ministry of the equipment revealed that French landscape architects faced difficulties for the recognition of their profession, about making their skills and specificities understood (Cice and Dubost 1986). Thirty years later the problem seems to be the same, and according to our inquiry persons still have blurry vision towards the profession, often anchored in garden and park projects. Dubost (1983) associated the difficulty to understand the landscape architects profession to the broad significance that landscape itself has. Nevertheless, the fact remains that this blurriness about the profession could lead to problems about getting commissions that correspond to true capacity. This problem could be sustained by the results coming from the on-line survey developed with the FFP and NVTL (chapter 10). The survey illustrates that the first four project categories in which French landscape architects mainly work, address energy questions in projects that are not primarily focused on energy transition and, therefore, often relate to landscape architects will and drive. This differentiates from the Dutch practitioners, that instead worked mainly on energy focused projects (e.g. energy long term scenarios). This could suggest a lack of commissions for energy focused projects in France. In order to have a more precise idea of the phenomenon, a survey of calls for tenders for categories treating energy transition projects could be performed, analyzing if and with which

roles landscape architects are called to be part of projects' teams. This could dress a more complete overview of the kinds of projects landscape architects are involved in.-

However Vroom (2006) in the Netherlands states that the domain of landscape architecture and of planning and urban design is blurred and indistinct, but according to this research the problem did not emerge. This lack of clarity about the profession from outside a landscape perspective could be due to the fact that I interviewed agents that are working in Goeree-Overflakkee, that have entered into contact several times (see chapter 6) with the landscape architect's profession, therefore learning about it.

According to other international research, landscape architects are still often seen from the outside as predominantly dealing with "planting" and "greenery" (Roe 2012, 302), which suggests how the Dutch context is more of an exception than the rule.

13.2.4 Challenges in the framework of the European Landscape Convention

In the previous section, I explored the challenges landscape architects are facing while working in energy transition. In the following section, these challenges are discussed and put in relation to points found in the European Landscape Convention (ELC), a document that has been agreed to both by France and the Netherlands.

Even if the energy transition topic is not directly addressed in the ELC, looking at the mentioned challenges through this framework could give insights about the possible application of ELC principles to sustain landscape architects facing the challenges of the energy transition process.

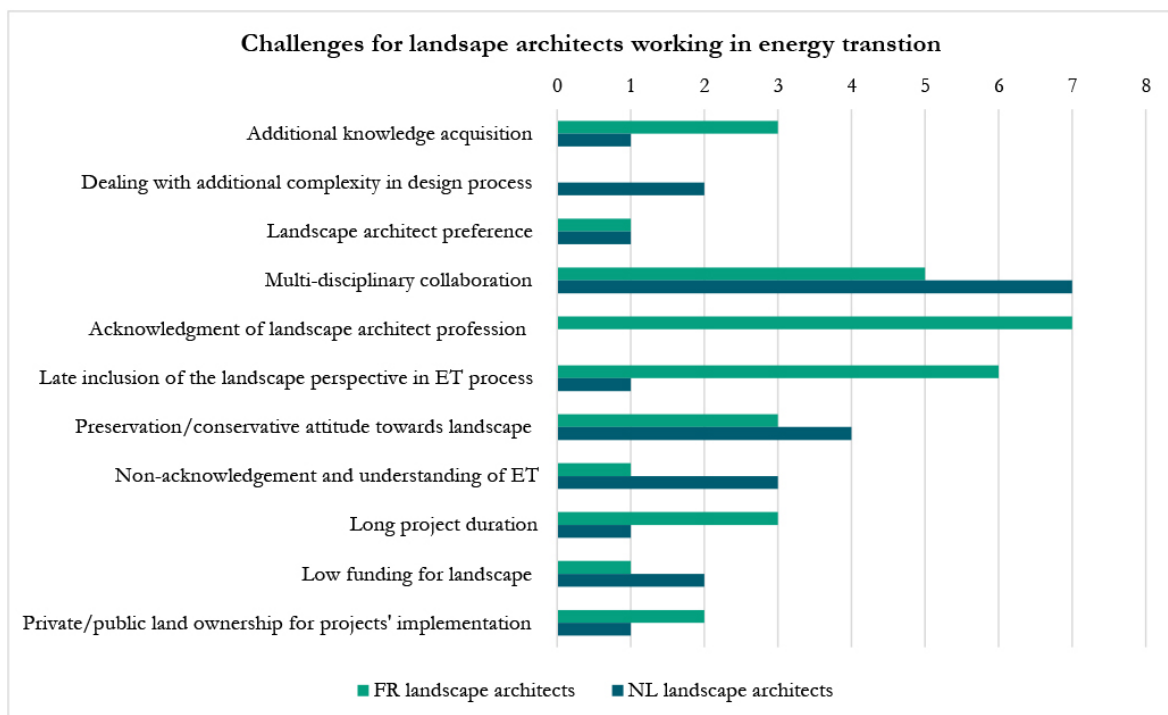


Figure 2. Challenges internal and external to the landscape architect practice subdivided for nation. Source: author from elaboration of semi-structured interviews

This because energy transition could be considered as one of the many factors (development of agriculture etc.) that “is accelerating the transformation of landscapes” (ELC 2000, Preamble). Figure 2, gives an overview of the challenges subdivided by nation, showing the main differences and similarities.

13.2.4.1 European Landscape Convention general measures

The ELC encourages “to integrate landscape into its regional and town planning policies and in its cultural, environmental, agricultural, social and economic policies, as well as in any other policies with possible direct or indirect impact on landscape” (ELC 2000, article 5-d). Energy transition policies, even if they do not appear in the ELC, have both direct and indirect impact on landscape. So the mentioned challenge of *late inclusion of the landscape perspective in ET process*, seems to suggest that from the landscape architects perspective, the integration of landscape in this sectoral policy is not satisfying. This challenge is an issue found highlighted in other research regarding different European communities engaged in energy transition, where it is illustrated how landscape, in connection with the transition process, is rarely proactively considered. Instead it is mainly addressed in terms of landscape impacts for RE technologies (EIA-environmental impact assessment) (de Waal and Stremke 2014). Research highlights the need to have an understanding of landscape - prior to renewable energy planning and implementation, in order to embed energy projects into human and natural systems (Pasqualetti 2011). Moreover, landscape should be addressed in a transversal manner, by territorial planning of energy and not on separate sectors, based on policy (Frolova, Prados, and Nadaï 2015). This could allow an early emergence of landscape perspective, and all then along the process. In part two of this research it is illustrated how for the French territories that are studied, strategic landscape perspectives to address a global vision for energy transition, are elaborated late, if compared to the introduction of a set of energy transition goals, by local institutions. For the Dutch case, on the contrary, a landscape perspective accompanied the setting of energy goals (see chapter 6). Considering this challenge, it is mentioned mainly by French landscape architects and by only one Dutch professional, suggesting a national difference on this topic (see figure 2).

Another challenge, mentioned by landscape architects that could be connected with the above, mentioned one point in the ELC is the *long project duration*, because policies addressing energy transition are recognized to be challenging because of their multi-level, cross-sector, multi-actor, long-term nature (Knieling and Leal Filho 2013). Indeed, both the French law LTECV sets energy consumption reduction goals for 2050 and the Dutch *Klimaatakkoord* set RE production goals for 2030. So, the *long project duration* as a challenge to achieve energy goals, is something embedded in the process itself. Nevertheless the possibility to subdivide the long-term process into short-term targets and actions is something that could be encouraged and developed in order to encourage a better following of the whole transition process and to reduce uncertainty (Loorbach and Rotmans 2010). The possibility to solve complex problems, such energy transition, relates to the capacity to identify and solve present problems through a framework able to make achieve long term desired futures (Albrecht 2004). And to develop a sustainable energy landscape planning and design in territories, means to conceive together and to combine operational short-term projects, with strategic long-term vision (Stremke, Van Kann, and Koh

2012). This could allow landscape architects to be more involved in the process and follow it. Always in connection with the integration of landscape in sectoral policy, the challenge of *private/public land ownership for projects' implementation*, could be settled because it concerns the material construction phase of landscape projects, concurring to cope actions based on energy policies. This is a complex challenge, because while landscape architects develop strategic design visions for energy transition landscape in a territory areas that are suitable for the projects' implementation or actions, these areas could not be available depending on landowners' will. For RE technologies' implementations the choice of the site is crucial to ensure a project's success. It is recognized that there is a greater acceptance of RE projects, and so higher probabilities of success for RE projects are developed as shared investments by a community that owns them, providing economic benefits and in this case, private owners agree to erect the collectively owned wind turbines with a specific contract (e.g. Warren and McFadyen 2010; Radzi and Droege 2013). An alternative, as stressed in the interviews, (see RW3 table 13.2) is that is much easier to implement projects on governmental institutional land, because they are, generally speaking, commissioners for energy related strategic visions for landscape and willing to reach energy targets set for the territory. However, land ownership is not only relevant for RE production from technologies, but also for energy saving actions such as those provided by thermic insulation for buildings even if it is less prevalent in the interviews. These actions enter the private sphere too, where land ownership plays an important role, where private incentives could be helpful convincing people to accomplish energy actions. However economic incentives needs to be treated carefully where they may possibly result in an opportunist, sprawled development and an incoherent "landscape of energy incentives" (Magoni and Adami 2018). Another example of a landowner category addressed by landscape architects connected to landscape is the wood energy sector (e.g. *plan de paysage de la Brenne, plan de paysage des Montrs du Lyonnais*). In this field, research explores that other aspects, along with the economic benefits, influence people to grow wood biomass for bioenergy production, and these are: landowners' socio-demographic characteristics, personal values and also local landscape patterns (Dorning et al. 2015). However, every energy action mobilizes one or more landowner categories (farmers, industries, public institutions, etc.) creating great complexity, so that landscape architects have to think about them while designing to ensure the feasibility of these energy strategies.

13.2.4.2 ELC specific measures: raising awareness

Another principle encouraged by the ELC is to "*increase awareness among the civil society, private organizations, and public authorities of the value of landscapes, their role and changes to them*" (ELC 2000, article 6-a). The challenge that landscape architect are facing that concerns *preservation attitude towards landscape* seems to suggest that awareness about "changes" in landscape is still complicated considering energy transition process. This challenge highlights how inhabitants or other territorial stakeholders do not want the landscape changes that energy transition leads to landscape, especially those due to RE technologies' implementation. The preservation of scenic values in landscape is a controversial and sensitive subject and several authors have explored this challenge. Apostol et al. (2016) mentions how many difficulties arise from the sheer scale of renewable energy harvest systems, even dynamic visual changes, including those occurring in

the night too. And the research suggests that a partial answer can be found on the issue through accurate landscape analyses and an evaluation of residents' and visitors' point of view, along with the determination of visibility across landscapes and the integration of other environmental functions. Selman (2010) instead speaks about an “acquired aesthetic” suggesting the need to develop new landscape narratives or undergoing landscape stories, in order to develop a taste for new emerging landscapes. Moreover beyond aesthetics this challenge also points out the importance of raising awareness about landscape changes in connection with the idea of local acceptance for RE projects, and the recognition of the influence by many social factors such as the economy and local participation in the project (Devine-Wright 2011). The social barriers to renewable energy landscapes are considered to be an important challenge for energy transition implementation (Pasqualetti 2011), and the possibility to overcome them relates to the consideration given to landscapes' social aspects from the beginning and making sure that local inhabitants receive benefits from the changing landscapes (*ibid.*).

In connection with this it has to be mentioned the challenge *non-acknowledgment and understanding of ET*, about which it is mentioned how there is still a lack of communication and acknowledgment from peoples' perspectives, about why the process to transit towards a low carbon and renewable energy system is necessary. The degree of awareness and understanding is recognized as a factor leading toward more favorable attitudes about landscape changes due to RE technologies (Devine-Wright 2008), even if it is not the only positivizing factor.

Another challenge connected to the awareness about the “*value of landscapes, their role and changes*” (ELC 2000, article 6-a) is the *low funding for landscape*. This because judgmental values that are attached to the importance or usefulness of landscape, influence the possible cost to take into account for planning and designing landscape. For example, in France in 2015 the funds allocated by the Ministry for the development of a *plan de paysage* were much lower than for other developments attached to energy transition actions in territories for TEPCV [Energy positive territories for the green growth] (15.000 € vs 500.000 €), and no connections between the two actions were established. Moreover, the cost-benefits balance often goes beyond an immediate awareness, since it is distant in time. Landscape architects' work on the long term could potentially contribute to diminish the cost of energy reduction consumption (e.g. slow mobility, use of local resources) in addition to RE production, by collaborating on their site choice and advising their implementing. Nevertheless, this potential does not seem to be acknowledged by the commissioners where future economical savings are not contemplated.

13.2.4.3 ELC Specific measures: training and education

Another section of the ELC refers to “training and education” where the idea is stated to promote “(a) training for specialists in landscape appraisal and operations; (b) multidisciplinary training programs in landscape policy, protection, management and planning, for professionals in the private and public sectors and for associations concerned; (c) school and university courses which, in the relevant subject areas, address the values attaching to landscapes and the issues raised by their protection, management and planning” (ELC article 6-b). These points encourage the training of landscape architects, among others, and especially point (c) for which the “issues” for landscape are “protection, management and planning” energy could

be mentioned too. In this perspective challenges concerning *additional knowledge acquisition* and *dealing with additional complexity in the design process* highlights how educational training needs to be updated by progressively integrating the risen topic. Indeed landscape architecture is by nature a discipline that requires a very broad knowledge base (Bruns et al. 2010), that nowadays needs to include energy as well to allow practitioners to integrate it in their landscape planning and design. Energy transition requires technical components, along with a social ones (Miller, Iles, and Jones 2013), and design and planning sustainable energy landscapes requires a minimum of *sustainable technical criteria* (Stremke 2015). Landscape architects' interviews align with these requirements because much of the *additional knowledge* needed, refers to RE technologies in order to better design and the *additional complexity in the design process* widely refers to additional difficulties that are experienced by dealing with energy quantities, energy calculation and technological processes (see chapter 12 for further details). Donadieu (2009a) mentioned the evolution of the profession in the years to come on how landscape architects will need to learn and use innovation technologies for energy infrastructure, among others, in order to respond to society's expectations.

However, the challenge mentioned about *landscape architect preference* implies that there is also the subjectivity component on what a landscape architects as every other individuals like or dislike in a landscape, for which aesthetic preferences could play a role. Indeed designers exercise, to different extents, subjective judgment in their practice (Lawson 1980).

Point (b) of the above mentioned article 6 of the ELC "multidisciplinary training programs" could be connected with the challenge mentioned by landscape architects about *multidisciplinary collaboration* that refers to the need to connect and exchange with many other experts in order to take into account different aspects of the project (e.g. engineering). If these, other experts have some basic knowledge about landscape issues dialogue could be greatly improved. Especially since the working collaboration with engineers, economists, geographers, architects, etc. is considered of great importance for landscape architects in the XXI century, in order to give adequate design answers to the current problems (Donadieu 2009a, 168). About this need for collaboration, some researchers are pointing out the need to shift from a multidisciplinary approach to an interdisciplinary and transdisciplinary one in order to cross subject boundaries and not only exchange knowledge (Roe 2012).

Moreover, in the ELC article about "training and education" the focus is to learn about landscape. Nevertheless, even if landscape architects are just part of the group of "human factors" (ELC, article 1-a) that with the "natural" ones act on landscape character, from a French perspective it seems that an improvement about the *acknowledgment of landscape architect profession*, a profession that has at its core landscape, could be useful as well. The lack of acknowledge for the profession and its potential in developing landscape analyses and design, could lead to under estimating the possible benefits of landscape consideration in the energy process and lack of involvement of landscape architects in policy, plans, programs, etc. Indeed it seems that blurriness exists among architects, urban planners and the landscape architect professions in the French context (Champy 2000) (see section 13.2.3).

Landscape architects could find input and support to face the challenges they are experiencing in the energy transition process in the ELC framework.

Several measures about "raising awareness" and "training and education" on landscape topics

and policy integration of landscape would be beneficial to support landscape architects facing energy transition challenges. Beside some measures stated in the convention could be applied with a more direct focus on the energy transition topic specifically.

13.3 Transversality a potential or a challenge for landscape architecture?

Calthorpe (2011) explains how to contrast climate changes, engineering and designing are both necessary and complementary because while engineering focuses on single problem optimization, designing develops multidimensional approach that develops trade-offs and integrates parts. In the energy conscious principles addressed by landscape architects it could be seen this transversality and considering that energy transition is recognized as a multi-sector, multi scale and multi actor process (Loorbach and Rotmans 2010), this transversal vision of landscape architects could be a potential to consider all these dimensions.

The transversal vision is recognized as a part of a landscape architecture approach (e.g. Meijering et al. 2015; Bruns et al. 2010), beyond the energy transition topic.

For example, Alexandre Chemetoff, a French landscape architect explained in the '80s how: "we are in a world that has dispersed the puzzles' pieces and which is in the process of asking: 'What's happening with every puzzle piece?' The true question is to bring together these pieces on the territory"³¹ (Chemetoff et al. 1989, 34). So, he recognized his work as a way to consider and put into relation different puzzle pieces by looking in a transversal way on the territory. This transversal and multilevel thinking is also recognized as that used by landscape architects when working on RE technologies projects (Minichino 2014).

Recent work that explores landscape architects' practices also points out the transversal role of landscape architect approach applied to ecological neighborhood design in France and the United Kingdom (Leger-Smith 2014). The author shows how landscape architects address sustainable water management, biodiversity, improving soil quality, management of waste and material recycling, sustainable mobility and renewable energy production, thus developing a transversal approach through these dimensions, in which design solutions are tailor made for each site because they are grounded in its specificity and characteristics. Other research pointed out how landscape architects while working on water management in cities tried to provide synergies by also improving the biodiversity and green spaces in the city as well as human health (Backhaus, Fryd, and Dam 2017).

This has similarities with our results on the practice in the energy transition process, where clusters of principles *considering specificity for each territory/site* and *integrating multi-functional and cross-sectoral considerations* (section 13.1) address the same idea of looking at the territory and project-site characteristics concerning water, agriculture and other sectors to cross reference them and give a global, anchored design solution.

31 "Nous sommes dans un monde qui a dispersé Les pièces du puzzle et qui est en train de se poser La question: 'Qu'est-ce qui se passe sur chacune des pièces du puzzle?' La vraie question, en fait, c'est de rassembler ces pièces sur le territoire." Translate by the author.

Similarities could also be seen with results illustrated by Kempenaar et al. (2018) which explores landscape architects' practice in regional designing by deriving general design principles that reflect a system perspective, across scales, across topics, and among stakeholders namely: *taking a systems perspective, addressing multiple geographical scales, looking from history to future, creating a continuing dialogue with stakeholders, reframing the region, sensing and responding, balancing direction and openness*. These findings align with our results showing common points with principles founded in energy transition that suggest this transversal approach by landscape architects that try to think about interactions and relationships between dimensions, scales, sectors, etc. (see also chapter 11).

Moreover the principles *creating a continuing dialogue with stakeholders* connected with *balancing direction and openness* and *sensing and responding* have similarities with our cluster *supporting the elaboration of a shared projects* (section 13.1), which groups principles based on the idea of sharing discussions with agents and stakeholders in order to develop a territorial grounded project that is based both on the geographical or other characteristics and the expectations of local stakeholders.

Besides *addressing multiple geographical scales* and *looking from history to future* are both principles that we find addressed by landscape architects narratives across the defined clusters such as those illustrated by the principles: *defining energy transition projects coherent and thought across scales from the global territorial system to the house and site level* (principle 45 table 13.1) and *developing landscape ET vision on short term basis, but also long term basis (30/50 years)* (principle 71 table 13.1).

These results show that landscape architects' practice in energy transition does not differ substantially from their way of thinking when energy transition is not the central topic. Some differences exist but they are mainly linked to the specificity that working on the topic of energy could enhance, such as the importance to address a more quantitative perspective and to deal with RE technologies' characteristics.

Nevertheless, these differences are estimated as challenging by several landscape architects that point out the difficulties to acquire additional knowledge and to deal with additional complexity in the design process because of the technical and quantitative component of energy.

On this subject Leger-Smith (2014) mentions, as in ecological neighborhood projects, landscape architects hardly concentrate on the choice and implementation for energy management, because they assume they lack the technical background. Even if, according to our results landscape architects undertake and are involved in the energy topic, several of them still share the difficulties in dealing with it, because it is an additional component that they need to incorporate into their transversal thinking on projects. Nevertheless, this idea to be transversal should not lead to the idea of "standing alone" while working on projects. On the contrary general knowledge on different topics could be useful to set up synergies and points in common that have to be discussed with experts in different fields, making the collaboration even more important and advantageous.

Challenges coming from a sectoral perspective towards landscape

In contrast to this transversal and systemic approach towards projects that landscape architects try to adopt, the main external challenges that they are facing seem to come, on the contrary, from sectoral perspectives towards landscape. By sectoral perspective we mean that these challenges reflect a vision of landscape as something that does not go beyond the idea of

landscape itself, not seeing it as a dynamic entity resulting from many factors and from the action of many sectors (e.g. agriculture).

This could especially be noticed about the *preservation attitude towards landscape, late inclusion of the landscape perspective in ET process, low funding for landscape, private/public land ownership for projects' implementation*. All these challenges have a common viewpoint on landscape as an entity somehow detached from the energy transition process, making it difficult for landscape architects to deal with these perspectives while designing. This also makes it harder still when considering the problem of the *acknowledgment of landscape architect profession* itself and the difficulty of being recognized as able to contribute viable answers to energy transition from a landscape design perspective.

The ELC is trying to change this sectoral vision, promoting a dynamic and multidimensional character to landscape (Pedroli, Antrop, and Pinto Correia 2013) as well as the application of several measures such as “raising awareness”, “training and education” and integration of landscape in policies (see pervious section) that could support overcoming the challenges that landscape architects are facing.

Especially the importance of integrating landscape into other policies is also strengthened by “Recommendations on the guidelines for the implementation of the European Landscape Convention” of the Committee of Ministers to member states, that declares: “Landscape should be fully taken into account via appropriate procedures allowing systematic inclusion of the landscape dimension in all policies that influence the quality of a territory” (CM/Rec(2008)3, 1-F), among which energy transition could be fully recognized.

However these are the perspective of landscape architects, and as was discussed in part two of this research integration between landscape and energy transition exists in some territories and seems to be progressively encouraged (e.g. call for *plan de paysage* with energy transition component in 2019 in France, *Regionale Energie Strategieën* in the Netherlands). But the process is still just beginning and not widely adopted.

Olwing (2011) points out how, while addressing the relationship between ELC with the UN Climate change conference, that there is need to carefully undertake the global isotropic approach about climate change, that in our case is addressed from the changing perspective on energy systems, with the complexity and differences found within the local landscape approach.

Box 13. Contribution of chapter 13 to the part 3 research question

Landscape architects have the potential to develop energy conscious principles for all three main strategies of energy transition, thus according to the *Trias Energetica*, the reduction of consumption, optimization of energy streams and RE production. It is in this latter strategy that the majority of principles can be clustered, probably because these are the most visible changes that are now starting to appear in the landscape, leading to aesthetic, composition, and functional questions. Moreover, landscape architects highlight in higher numbers, transversal principles to respond to the three strategies of energy transition, addressing the adaptation to site/characteristics, multi-functional and cross-sectoral, appropriation by inhabitants and sharing of projects. The generalist background of landscape architects could be seen as a potential when addressing the complex processes of energy transition involving many spatial scales and dimensions (e.g. technological, social, etc.). At the same time landscape architects are facing several challenges while working on energy transition projects; there are both internal and external challenges for the profession. The external challenges come especially from a sectoral perspective by people towards landscape (e.g. preservation of landscape). The application of the measures stated in the European Landscape Convention that advocates raising awareness and training and education about landscape and its integration into national policy could be beneficial when supporting landscape architects that face these challenges. The transversal approach to energy transition is shared between French and Dutch practitioners, but some challenges are primarily mentioned by French landscape architects, particularly about the recognition of the landscape architect profession and the late inclusion of landscape in the energy transition process. These differences could come from different landscape grounded tradition in the national context, where in the Netherlands, landscape, according to our research (see chapters 4 and 6), seems to be taken into consideration at the same time than the setting of energy transition goals for territories. And Dutch landscape architects seem to be perceived by agents and to perceive themselves as a more recognized profession compared to the French.

Conclusions and general discussion

1. Main objective of the research

The “Earth is not a globe” states the landscape architect Kenneth R. Olwig (2011), an expression that wants to point out the danger that global agenda results in the application of abstract strategies, regarding the Earth as an isotropic space. As sustained by the sociologist Bruno Latour “it is urgent to shift sideways and to define politics as what leads toward the Earth and not toward the global or the national” (Latour 2017). These are the premises to start this research, advocating the need to find viable solutions for the energy transition, also based on local and territorial characteristics.

It is important for landscape research to address global landscape issues (Meijering et al. 2015) such as the transition to more efficient and renewable energy systems. Calls have been made for an integration of a social-human perspective in energy topic (e.g. Sovacool et al. 2015), for which the lack of human perspective has led to a gap between technological solutions and “consumers” (*ibid.*). The entry through landscape prism in the energy transition topic allows to explore this more human perspective because it assembles its material-physical reality and its immaterial socio-cultural values and symbols (Antrop 2006).

The main goal of the research is to explore the connection between the ongoing process of energy transition, on the one hand, and landscape planning and design, on the other hand, in order to establish and advance the knowledge on energy conscious landscape planning and design.

This relation was analyzed from different perspectives: institutional (planning instruments, landscape focused policy documents), and social (energy transition agents and landscape architects).

This choice allowed to collect a broad range of results and is believed to provide useful insights for further implementation of energy transition including landscape considerations.

2. Conclusions

This section summarizes the conclusions developed for each chapter, to present and remind the reader on the main results of each of the three parts of this research.

Research Questions part 1:

What are the relations between energy management/development and landscape planning/design in the energy transition framework?

Which concepts and operational principles are available to inform energy-conscious planning and design in the context of sustainable energy transition?

The goal of this first part of the research was to understand the relationship between energy management and landscape planning and design in an energy transition framework. Researches point out how spatial and landscape components have been neglected for long in connection to energy transition, despite the connection that exists between the two dimensions. More recently, the subject has gained in importance and calls for a better consideration of the landscape and the spatial dimension have been launched, recognizing that energy is one of the main forces transforming landscape. Moreover, from a design and planning perspective, several researchers work on energy development. They address the connection from different entries to support the transition to a more sustainable system through landscape planning and design, dealing with RE technologies site choices and development, reduction of energy consumption through spatial organization, development of GIS tools, analysis of concepts as a source of inspiration. This shows a concern from designers' perspective, among whom landscape architects try to actively participate in the debate.

Regarding the latter topic, analysis of the scientific literature revealed 44 concepts, drawn from a broad range of disciplines (e.g. physics and ecology), which may inform energy-conscious spatial planning and design practice. The analysis of three of these concepts – *urban metabolism*, *circular economy* and *cradle-to-cradle* – resulted in a list of 105 operational energy principles that cover both technological aspects and spatial design thinking, covering energy producing, saving and efficiency, and together provide ingredients for a more systemic approach to sustainable energy transition. Nevertheless, while having spatial characteristics, these principles lack cultural and esthetical aspects.

The analysis of the institutional perspective in France and the Netherlands revealed that many planning instruments have the potential to establish a connection between energy transition development and landscape (e.g. the SCoT and PLUi in France and *structuurvisie* and *bestemmingsplan* in the Netherlands). However, the decision to establish this relation is left to the discretion of municipalities and inter-municipalities in France and provinces and municipalities in the Netherlands, leaving a lot of uncertainty for the development of a real interconnection. The landscape focused documents could establish a relation between the two topics, but in both nations these documents are neither mandatory nor binding, so they are based on the voluntary involvement of these local institutions. The implementation of the strategies they state, in other

words, is very much uncertain. However, the energy topic has increased in terms of importance in planning instruments and is now addressed at national scale. In the French planning systems, all the territorial levels have to develop energy focused instruments. In the Netherlands, energy has to be included at provincial and municipal level in cross-sectors instruments. (reference to WRO 2008).

To conclude, even if in scientific literature the *relation between energy development and landscape planning/design in the energy transition* is recognized, scholars highlight a sense of unease about a lack of spatial and landscape dimension in the energy transition. From an institutional perspective of planning instruments, the development of this connection is very much left to the appreciation and voluntarism of territorial (municipal, inter-municipal, provincial) institutions.

Research Question part 2:

In the energy transition process what role does landscape as well as landscape planning and design play in the energy transition process at a territorial level? And what is the comprehension that territorial agents have of the connection between energy and landscape?

In this regard, what are the differences – if any – between France and the Netherlands?

This part explores how landscape and landscape planning and designing are mobilized and involved in territories committed to an energy transition process. It is developed as a comparison between French and Dutch cases, through the analysis of the landscape focused documents, planning instruments and narratives and drawings of a range of local agents.

This part of the research explored the role that landscape planning and design play in the energy transition process in French and Dutch territories with ambitious short- and long terms energy goals. Secondly, it surveyed what vision agents have on the connection between landscape and energy transition.

At national institutional level, progressive efforts are established to encourage this connection in territories both in France and the Netherlands (see calls for project *plan de paysage* launched by the Ministry of ecological and solidarity transition in France, 2019 and 2020, and *Regionale Energie Strategieën* in the *Nationale Klimataak* in the Netherlands). In the Netherlands, it appears that the need to take landscape into account is compulsory for all *regio*, while the development of a *plan de paysage* remains voluntary in France. Nevertheless the inquiry of French “Energy positive territories network” (TEPOS) points out that from their perspective landscape is an important dimension of energy transition, even if not broadly addressed yet.

The exploration of the three selected territories (embedded cases) notices a general weakness in their consideration on the landscape in connection with their territorial energy transition process, especially in France. These landscape concerns come relatively late, several years after local institutions settled energy goals for the territories and the starting of its implementation in the French cases, while for the Dutch case energy transition is explored by a landscape perspective almost at the same time as the energy transition goal definition for 2020 and it accompanies every new step, supporting further energy transition goals setting.

The landscape focused documents in France, even if acknowledged or developed by local institutions, do not seem to be perceived to the same extent of utility and support for energy

transition process compared to the Dutch ones, even though both are voluntary and not legally binding. This could be due to the differences in the contents of the French and Dutch landscape documents. The French *plan de paysage* details possible strategic and operational principles to implement specific energy actions (e.g. developing wood-energy sectors using the *bocage* [hedge system], photovoltaic panels on roofs), but it fails to develop a connection between the quantitative energy goals it expresses and its landscape component, for example through the use of maps, graphically representing the energy scenario. Such quantitative energy landscape scenarios are on the contrary addressed in the Dutch landscape documents, which seem to raise more the interest of territorial agents.

Moreover, planning instruments in the cases mainly focus on RE technologies in connection with landscape. Energy consumption reduction and optimization of energy flows, even if acknowledged, are not directly connected with landscape nor landscape planning and design. Moreover, French and Dutch planning instruments reveal a preservative aesthetic and heritage vision of landscape when discussing energy transition. In the Netherlands, this attitude seems to come along with a landscape design attitude, illustrated by the fact that the design principles developed in the first landscape energy report for Goeree-Overflakkee (H+N+S, 2012) have been used, combined with other considerations, to site wind parks in the municipality.

This difference could have roots in the different traditional attitude towards landscape in the two nations. In France, landscape has been for long associated with nature and heritage in legislation (Donadieu 2012). In the Netherlands, this attitude coexists with a strong planning and designing perspective (see e.g. de Jonge 2009).

Concerning the perspective of agents involved in the territorial transition process, these agents are aware of landscape connection for all three strategies of energy transition: reduction of energy consumption, energy stream optimization and RE production. The third strategy remains the one most mentioned and the one raising more concern in its implementation on landscape. This could be explained by the high *visibility* of RE technologies. Nevertheless, agents point out several positive factors for the development of energy transition from a landscape perspective. These factors come mainly from a positive feeling when energy projects are based on “local” and “natural” characteristics (*ecocentric*), but also when highly efficient technical solutions are used (*technocentric*), and when projects or actions are built in human built areas and could interact with human behavior (*anthropocentric*). This illustrates a broad range of possible positive entries into the subject, that goes beyond a technological point of view, often attached to energy transition. This may provide an understanding that could support a more shared dialogue about landscape. Finally, agents’ perspectives towards energy transition landscapes (collected through their hand drawings) lead to understand that agents have a broader vision compared to which emerged from oral answers. And through the drawings they were able to articulate more energy conscious principles and more qualitative landscape details. Even with differences, agents do not have an entirely different vision of energy transition landscape and this allows to think that a dialogue among them could be established to develop planning and design in their territories. Nevertheless a difference in the drawing process emerge comparing French and Dutch agents. French agents start drawing the geography and topography of landscape such as mountains and hills and then energy topic comes to superpose as a layer. Dutch agents develop more a systemic vision where elements progressively overlap, resulting in a new or transformed landscape.

To conclude, the role that landscape planning and design plays in energy transition is primarily connected with the implementation of RE technologies; something that was also mentioned by territorial agents. Nevertheless, results show that many agents connect all the three strategies of energy transition with landscape. This could lead to consider that this connection is progressively increasing in awareness and in the years to come more attention will be given also in planning instruments to landscape concerns in connection with all three strategies.

Concerning the differences between the two analyzed countries, it appears that in the Netherlands the need to take landscape into account is more mandatory (see *Regionale Energie Strategieën*) and, in the analyzed territory, more valued and used as a proactive support. This could come from historical and cultural characteristics in the Netherlands where the constraints of being a relatively small and densely populated country lead Dutch institutions to have an attentive and continued concern about spatial challenges (Faludi and van der Valk 1994).

Research Question part 3:

What could be the contribution of landscape architecture to energy transition and how is landscape architecture affected by the energy transition? What are the differences – if any – between France and the Netherlands regarding the role and practice of landscape architects in this field?

This part explored the contribution of landscape architecture practice to the energy transition and, conversely, how the involvement in energy transition is affecting landscape architects.

In the Netherlands, an involvement of landscape architects in the siting of energy technologies and the creation of long-term scenarios (sectoral-energy focused) has been observed. In France, a focus on mobility and energy savings (cross-sectoral- energy integrated) has been observed. This suggests that the different landscape architecture legacies in the two countries led to different activities in energy-related projects.

Landscape architects see their main contribution to energy transition from a *strategic designing* approach, but also addressing an *operational designing* and shifting to *service designing* (a process defining rules and functioning system more than resulting in a single product). On the contrary energy transition agents in territories mainly point out *operational designing* approach for landscape architects' contribution to energy transition, specifically emphasizing their contribution to integrate RE technologies in landscape. This could show a gap between the landscape architects' aspirations and the commissions that they could more easily get. This could be partially due to a lack of understanding towards the landscape architect profession, particularly observed in the French cases, where agents express a vagueness about what landscape architects do. A lack of acknowledgment of the profession that does not appear in the Dutch discourse, neither from landscape architects nor energy transition agents. This suggests the need for French landscape architects to better put forward their professional capacities and skills in order to contribute to energy transition more meaningfully.

Inquiries about the knowledge and design steps needed for energy projects reveal that landscape architects use both conventional landscape architecture knowledge (e.g. design, ecology) and additional energy specific knowledge (e.g. RE technologies and energy related such as the energy units' measures). Moreover, landscape architects mainly refer to conventional design steps (e.g.

representing project graphically and developing landscape analysis). However additional design steps are also mentioned. In particular, the attention to the reduction of energy consumption is seen as an important step to be applied in all kinds of projects also when not directly related to energy, such as parks, but in which the choice of material for example could be carefully thought to save energy for their transport. Landscape architects mention additional energy focused knowledge, thus leading to think that this is needed for them to compute somehow with energy quantitative numbers and units. But only Dutch landscape architects working on energy scenarios mention additional and new energy focused design steps, referring to a quantitative component of energy (e.g. collecting and processing energy quantitative data). This activity could be considered quite new in the commissions landscape architects could get and seems to stress an increasing importance for landscape architects to learn even more about how to manage energy quantitative data. Ultimately, the amount of energy knowledge seems to depend on the project category they work on.

Landscape architects addressing energy transition act on all three strategies of the *Trias Energetica* (reduction of energy consumption, energy stream optimization and RE production). It seems that their generalist background leads them to address energy transition also through transversal approaches crossing the three strategies, integrating multi-functional and cross-sectoral consideration, supporting the elaboration of shared projects, concerning specificity of each territory or project site.

Landscape architects also face challenges while working on energy transition. These challenges are both internal and external to the profession. Internal challenges refer to the difficulties that arise when addressing of a new topic. External challenges (e.g. late inclusion of the landscape in ET process, low funding for landscape) seem to be the results of a sectoral perspective of people toward landscape (e.g. landscape preservation). From a sectoral perspective, it is meant that these challenges reflect a vision of landscape as something that does not go beyond the idea of landscape itself, not seeing it as a dynamic entity resulting from many factors and from the action of many sectors (e.g. agriculture), somehow detaching landscape from the energy transition process.

It could be argued that application of the measures stated in the European Landscape Convention - which encourages the rise of awareness and to educate people about landscape and its integration to public policies - could be beneficial to support landscape architects facing these challenges.

3. General discussion

Bring back to Earth?

For what concerns the premises of this research about the possibility through the prism of landscape of grounding energy transition in territories, different attitudes appear through the research according to different analyzed perspectives.

With respect to concepts and principles found in literature, as stated in chapter 2, a general lack of attention to the socio-cultural dimension has been observed. Taking into account this dimension, along with the more technical and functional one, broadly mentioned in the principles, could support a better anchoring on the territory characteristics. For example, many scholars support that avoiding sprawled built environment, generally speaking, is a good option to reduce energy consumption for transport. However, researchers show that this is sometimes incompatible with the local culture of a place (see e.g. Roy, Curry, and Ellis 2015). The principles found are valuable and important to advance energy transition but changes in the living environment cannot be isolated from these qualitative considerations.

Looking at what is happening in the analyzed territories, the results illustrate that agents seem to attest a certain desire for a territorial grounded transition. This is expressed in the commission of documents focused on landscape (e.g. *plan de paysage* in France), which include the energy topic in order to support the process, connecting it to the landscapes of the territory. Nevertheless in France the *plan de paysage*, especially as observed in the CC Monts du Lyonnais (chapter 6), once drafted is not really considered as a support tool for the transition process in the territory. The fact of having a *plan de paysage* has not really affected transition strategies, even if it has raised sensitiveness and awareness on the topic. On the contrary, in the Dutch case, the documents focusing on landscape have been commissioned by local institutions every time that energy targets had to be settled. This in order to better understand in spatial and landscape terms the development of energy goals, so to speak ‘grounding’ them in the municipality. Different to the French *plan de paysage*, the Dutch landscape studies include energy from a quantitative perspective but interconnect those numbers with the morphological, historical, geographical and other characteristics of the territory, which together provide the foundation for design scenarios.

In the French case, it could not be asserted that the *plan de paysage* plays a very active role in grounding energy transition in the territory, because agents have not fully appropriated it.

This lack could also be seen through the fact that landscape documents are not fully taken into account or included in the planning instruments elaboration where the energy topic is addressed (chapter 7). The planning instruments potentially could support to anchor the energy transition process in territories, because they define a framework of actions and strategies for energy and landscape that have to be implemented in the territories. If the actions and strategies stated in them come from a deep analysis of characteristics of the landscape in those territories, the energy transition implementation could be tailor-made for each territory.

This connection between energy and landscape is briefly addressed in the CC Thouarsais and

Goeree-Overflakkee, where, only concerning wind turbine parks, elements of the documents focused on the landscape are used to guide wind turbine parks implementation. In the CC Thouarsais the sites for the future wind parks development are already settled and the landscape point of view is more expected to define the layout of the technologies on the preselected plots. In Goeree-Overflakkee, the design concepts expressed in landscape documents are used for the choice of parcels (siting) and the actual design of the wind parks.

The territorial agents revealed to imagine a “grounded energy transition” for their territories, expressed especially by the drawings they made about “energy transition landscape”. Through the prism of landscape, agents illustrate a concern about the importance that energy strategies and actions, for the reduction of energy consumption, energy stream optimization and RE production, are local and anchored on the territory (chapter 9). This is an encouraging result considering our premises, because it could allow to establish further connection with landscape architects, whose practice in this thesis is defined as “grounded”. This term wants to illustrate how the results show that in their projects the starting point is always the locality or landscape, whatever the scale is (site or a large scale territory), its observation and the analysis of its material and immaterial characteristics (chapter 11).-

This is also the case when they apply energy quantitative modeling, used by landscape architects when developing energy transition scenarios in Dutch context, because they make the effort to combine these quantitative data with the territorial landscape characteristics (chapter 12). In order to do this, as argued in chapter 7 and as other researchers sustain (see e.g. Pincetl et al. 2016; Voskamp et al. 2016) there is a need for detailed energy data. For example, in the CC Thouarsais in the PCAET the energy data concerns the whole CC, that for sure gives a global picture of the energy situation but do not allow to go in detail in the municipalities differences. A more detailed understanding at municipal level could allow some more specific energy actions. This because high resolution and spatially explicit data can help to connect territorial energy system and landscape. The importance of this connection is something that is also emerging as an important attention point in the research literature about landscape architecture (see e.g. Sijmons et al. 2014; van den Dobbelen, Broersma, and Stremke 2011; Oudes and Stremke 2018).

The approach to the energy transition topic from a landscape architect’s perspective, because of the very nature of the discipline, could support to “bring back to earth” the energy transition process. This relies on what McHarg already advocated in 1969 as a “design with nature”, as an approach to planning and design based on the characteristics of landscape, addressing “the power and importance of sun, moon, and stars, the changing seasons, seedtime and harvest, clouds, rain and rivers, the oceans and the forests, the creatures and the herbs” (McHarg 1992, 5).

Landscape and territorial metabolism

The expressed attention of agents on the local development of energy stream, which emerge from the analysis of drawings, but also the way landscape architects value and base their practice on the characteristics of the site, could allow to create connections with the territorial ecology. Territorial ecology is a rising discipline that focuses on flows of energy or materials in

territories, putting them in their societal and biosphere context (Buclet et al. 2015; Barles 2014), both to characterize them but also to identify transformation paths. Research on territorial ecology points out how the metabolism of territories have to change in order to implement a socio-ecological transition (Barles 2017). In one of the founding work of the territorial ecology “Essai d’écologie territoriale. L’exemple d’Aussois en Savoie” [An essay in territorial ecology. The example of Aussois in Savoie] (Buclet et al. 2015) the Aussois territory is analyzed from the perspective of materials and flows through several diagrams and modeling that are also attached to the economic and social characteristics of the territory, but to which a detailed landscape perspective lacks. The entry through landscape and the other one more based on modeling could be complementary and support each other.

The focus of this thesis on ‘landscape’ shows what agents think about the energy metabolic process in the territories in an energy transition framework, a prism that could contribute to the understanding of the relationship between society and biosphere in a territorial ecosystem advocated by territorial ecology. A relationship that landscape architects also address while designing, combining material and immaterial components, and that could contribute to geographically engrave on the earth metabolic processes (Ibañez and Katsikis 2014). This is the basis of “Territorialism” as a “design tool with which to read situations where geographies of variable positions, individual and collective practices, and flows [of material and energy] define territories” (Viganò 2014, 139).

Considering these elements, landscape entry in the topic could also be useful in “energy geography” researches, where it is argued that the goal for future researches is to understand how energy transition is spatially-constituted, rather than as a process that affects places (Bridge et al. 2013).

Contribution to landscape architecture research

The results of this research align with those of several other landscape architecture researchers. Concerning energy transition the idea of developing multi-functionality in energy projects is among the main highlighted contributions. This is in line with Schöbel and Dittrich (2010) who see landscape architects as being able to “reconciliate” RE technologies with existing structures in landscape, creating synergies. This idea of multi-functional landscapes is also addressed as positive dimension towards landscape from agents’ perspective which affirm a particular appreciation for energy related projects able to integrate other dimensions beyond energy development, such as recreational functions (chapter 8). This seems to lead preference to what Pasqualetti and Stremke (2018) call a “component energy landscape”, characterized by a lower energy spatial dominance, compared to “entity energy landscape” in which energy represents the predominant land use, making these landscapes compatible with other land uses and functions.

This seems an encouraging result, considering that multi-functionality is one of the basis for a sustainable landscape (Selman 2009). Moreover, this idea for multi-functionality aligns landscape architects’ and territorial agents’ concerns in the same direction, potentially allowing to develop projects satisfying both sides.

This capacity of landscape architects to address multi-functionality comes from the generalist

background (Bruns et al. 2010) that they have, which includes several disciplinary fields such as natural sciences and technical sciences (Bell, Sarlöv Herlin, and Stiles 2012). This results in a transversal approach to energy transition including different topics (e.g. water, biodiversity, etc.). A recent work that analyzes landscape architects' practice while designing ecological neighborhood in France and the United Kingdom aligns with the transversal role of the landscape architect (Leger-Smith 2014). The author shows how the practice of landscape architects working on ecology topics has not substantially changed, because landscape architects' practice already conventionally includes water management, biodiversity, soil, waste and materials concerns while designing. Moreover, this transversal character is also recognized in the treatment of biodiversity and human health by landscape architects while working on the management of water in the cities (Backhaus, Fryd, and Dam 2017). Similarities also appear with the practice of landscape architects in regional designing (Kempenaar and van den Brink 2018). These authors identified seven general design principles: taking a systems perspective, addressing multiple geographical scales, looking from history to future, creating a continuing dialogue with stakeholders, reframing the region, sensing and responding, balancing direction and openness. These principles reflect a strategic and systemic perspective (*ibid.*) and have a lot in common with the principles we find addressed by landscape architects while dealing with energy, especially for what concerns the *system perspective* that suggests this transversal approach of landscape architects that try to think about interactions and relationship among dimensions, scales, sectors, etc. (chapters 11 and 13).

This thesis contributes to the reflections about the boundaries of landscape architecture (Bell, Sarlöv Herlin, and Stiles 2012), showing how landscape architects are challenged every time a new topic enters the picture, but that they seem to have the “tools” to deal with it. Nevertheless another challenge illustrated by the results is also connected to this transversal ability of landscape architects that thanks to their generalist background and the wide range of projects they can work on (e.g. parks, territorial scale, urban areas etc.) may also give hold to criticism and lead to possible difficulties. This because it makes it difficult for other agents to understand the profession of landscape architect and what they are able to do. Results of this thesis show that this is especially true in the French context, where from territorial agents' perspective (chapter 13), the landscape architect figure is blurry. In France, this could also be due to the cultural context connecting the different environmental designer professions, where landscape architects, graduating from landscape architecture schools, could not use the name “architecte paysagiste”, while at the same time there is no regulation about the use of the “paysagiste” denomination by other professionals. The protected and recognized title designating “landscape architect” is now “paysagiste concepteur”, a term newly established by a law in 2016. This illustrates the great complexity of the subject and how what is a potential in a certain context could also become a challenge if the communication on it is not enough developed.

Methodological reflections

The method applied is a case study research developed through an international comparison between France and the Netherlands. It was chosen as able to investigate complex phenomena (Yin 2009). However limitations exist in this methodology that are connected to the selection and undertaking of the cases and the generalizability of their insights (Flyvbjerg 2006)

In this thesis, territories in the two nations have been chosen searching for contexts where our object of study (landscape and energy transition connection) was displayed at least in the intention of local institutions (part 2). As a complementary research strategy, interviews have been made with landscape architects that were and are working about energy (part 3). This leads to analyze territorial situations and professional practices that could not be considered as current. A way to better situate these cases in the wider context has been to develop surveys in French territories (IEPOS network) and landscape architects' professional associations (FFP and NVTL), allowing to put the selected cases in a broader context. And these surveys, especially for the French cases territories illustrate that the selected territories are still quite pioneers on the topic of connection between landscape and energy transition.

A possibility could have been to include cases with very different characteristics (Swaffield 2017), meaning for this research to inquire also territories that do not display landscape "intentionality" in energy transition, in order to see if they have very strong differences compared with territories that display this connection. This could be particularly interesting for the analysis of planning instruments and also from agents' perspective towards "energy transition landscape".

The choice of focusing on cases known for their process fits, however, the purpose of the research about the possibility of analyzing "good" practices and to highlight some recommendations.

For this purpose, the international comparison of French and Dutch context has been proven to be insightful. As expected, the geographical differences as well as the planning and design and professional context and characteristics allowed to find differences that even if grounded in different contexts, in which they have to be read, have led to formulate some reflections. For example, the study of the two nations has pointed out blurriness about landscape architects profession in France compared to the Netherlands. This is a topic that needs further careful exploration because the non acknowledgment of the profession could reduce the category of commissions landscape architects could get in energy transition processes and beyond. The comparison has also pointed out the differences in the landscape documents between the two nations, that could also be related to the different appropriation of the documents by agents.

However, there are limits to international comparison, as also of different contexts in general, because the highlighting of a critical point does not mean that it could be solved applying pastecopy from the other context. The vision we have of a landscape as well as its landscape planning and design in each place is specific and unique, because grounded on the socio-cultural and physical characteristics, so that something that works when developed somewhere would not necessarily work somewhere else (see e.g. Donadieu 2012). This point has been reminded also in another international research where it is acknowledged that landscape architects practice in France and the Great-Britain about ecology is also born from background and influence, that is not possible to reproduce elsewhere (Leger-Smith 2014). A similar attitude is also shared from the analysis of Italian and Dutch contexts concerning RE production implementation in the

landscape (Minichino 2014). And concerning the energy transition, the existence of “one, no one, one hundred thousand energy transitions in Europe” is recognized (Sarrica et al. 2016) and the same could be said for landscape. Nevertheless, it is always enriching to look at what happens elsewhere, may be allowing to think differently and understand other perspectives, that could be elaborated and tailor-made for the context.

A particular “fertile” methodology used in this research, that led to very interesting insights, is the drawing process, especially to get territorial agents perspective. The drawings of landscape architects have also been insightful and added further comprehension to their narratives about energy conscious planning and design principles (chapter 13). However, the agents’ drawings are particularly meaningful because they allow to get a landscape perspective of energy transition from people that work about it mainly from a public policy, or technical or quantitative perspective. The act of drawing and “designing” their own “energy transition landscape” supports them to overcome the technical and quantitative perspective towards energy transition, connecting with landscape dimensions. This allows to stress for example omissions in their thinking about energy transition landscapes such as electricity transmission’s lines that on the contrary are central to the process resulting from more decentralized ways to produce RE (see e.g. Lienert, Suetterlin, and Siegrist 2015).

Moreover, particularly meaningful is the analysis of the drawing process that allowed to get results about the cause-effect links (e.g. landscape characteristics VS RE sources used and vice versa), but also the sequence in which energy transition strategies (reduction of energy consumption, energy stream optimization, RE production) were drawn showing what was for them the most immediate one.

The collection of this material has been possible because of the individual semi-structured interviews methodology, that allowed to establish a face to face dialogue in order to record the drawing process for each interviewee, dimension that lacks in other researches about energy transition developed through collective workshops that focus on the contents (e.g. Devine-Wright and Devine-Wright 2009). Nevertheless, limits are acknowledged to this method and consist of the fact that maybe agents do not draw complex elements that are difficult for them to represent; for this reason it was asked to agents to describe with words while drawing, furthermore acknowledging that the visual representations provide only a partial picture of the landscape (Lange 2011).

Finally, researching about an ongoing process such as the energy transition leads to results that have to be considered and appreciated in a very evolving and changing context. For example, when this thesis started there was no explicit encouragement, from an institutional perspective, to connect the French *plan de paysage* and energy transition. Now this connection is a reality and was explicitly addressed in the recent call of the Ministry for the *plan de paysage* (2019) (chapter 4). This research for some points has been forerunner about the topic, and the first results of the French situation nourished by the Dutch one could provide a solid basis providing some recommendations, detailed in the next section.

4. Recommendations for policies, practitioners and future research

Policy recommendations

As previously argued in this thesis, the *Ministère de la transition écologique et solidaire* [Ministry of ecological and solidarity transition] is in charge both of energy transition and landscape, nevertheless it developed “Territoire à énergie positive pour la croissance verte” [Energy positive territories for green growth] (TEPCV) and subsequently the “contrat de transition écologique” [ecological transition contract] (CTE) to encourage through financial funding territories to commit to energy transition processes without establishing a relationship with the *plan de paysage*. *Plan de paysage* for which the same Ministry launched since 2019 annual calls for project that specifically encourage territories to treat landscape development with energy transition topic. Considering the same main goal of the two tools, that is to support the energy transition of territories, synergies should be established. For example, territories that are now committed to the “contrat de transition écologique” could have to develop simultaneously a *plan de paysage*, in order to include a landscape perspective in the ongoing process, and not as is often the case, to formulate landscape concerns once the strategies are settled, as a way to reduce possible local oppositions. This could also support solving one of the challenges mentioned by landscape architects in chapter 13, about the late inclusion of landscape perspective in the transition process. Addressing simultaneously the landscape perspective and the elaboration of a transition strategy could support having a greater embeddedness of energy projects in the human and physical landscape (Pasqualetti 2011). For this reason, the PCAET, a planning climate-air-energy focused document at municipal and inter-municipal level defining short and long terms energy goals, should also begin to include a concern about landscape. This could be done by establishing connections with the *plan de paysage*.

This could take some inspiration from what has been observed in the Netherlands (but without a paste-copy attitude), where through the *Regionale Energie Strategieën* stated in the national *Klimaatakkoord* (2019) territories have to develop an integrative approach combining energy goals and “spatial quality” covering the whole Dutch surface. Moreover, the PCAET could be extended including also municipalities or groups of them with less than 20.000 inhabitants, in order that every square meter of France has energy goals for the short and long terms. These two things combined could allow to have in France a whole cover of the national territory with landscape quality goals associated with energy transition ones. France is less densely populated and in many regions has more “free” space, but it is not a good reason to omit the idea of landscape quality in the whole national living environment.

Finally, a greater implication of landscape architects in the elaboration of planning instruments could be considered and encouraged because as shown in chapter 7, these instruments entail many decisions about landscape and energy transition, but the connection is weak and not directly established. And it is following this logic that local institutions in the CC Thouarsais have decided to develop an “Orientation d’aménagement et de programmation” [planning and

program orientation] (OAP), that gives a framework for local institutions to follow for the implementation of wind turbines in the landscape, and that is included in the PLUi, a binding compulsory document (see chapters 3 and 7).

Recommendations for landscape architects future practice

As mentioned by Cooper (2017), energy units should be used and acknowledged in social sciences in order to improve the impact of these latter and allow them to be taken more seriously in the energy realm that is still very much guided by quantitative engineering approaches.

Landscape architects, to be able to contribute to the energy transition, have to learn to deal with the quantitative and technical component of energy in order to have a broader impact. This is also supported by findings of de Waal *et al.* (2015) that through the analysis of the entries of a competition for the planning and design of a territory in the Netherlands for its energy transition, points out a gap between the energy science that exists in literature and the landscape architecture practice. The importance to acquire knowledge in this domain could be found also in the results about landscape architects' practice in neighborhoods, where they insufficiently address the RE production topic because they lack of background about the topic (Leger-Smith 2014).

The acquisition of knowledge allows to develop more adequate projects and to improve dialogue with other disciplines that are needed to work on these complex projects.

This could result in the need for specialization of some landscape architect professionals in the energy domains. Nevertheless, landscape architects have to collaborate with other experts in energy transition related projects, a cross-sectoral collaboration that is considered as crucial in guiding towards the goals of sustainability (Musacchio 2008).

At the same time, the landscape architect generalist and transversal approach have to be preserved, because this can support the development of synergies among topics (e.g. water, biodiversity etc.) developing a design able to integrate a more global vision and answering different issues. Indeed, results show that landscape architecture practices have not completely changed while working on energy. Landscape architecture conventional knowledge (e.g. topography, hydrography and geology knowledge, ecological knowledge) is considered valuable and needed, as well as conventional design activities (e.g. representing project graphically and conducting thorough landscape analysis).

Landscape architects highlighted the acquisition of additional energy specific knowledge as a challenge, and the majority of them learn "on the field".

These insights have impact on education in which energy topics could enter the landscape architecture academia curricula. This statement has not to be understood as meaning that energy has to become the main topic in education, but it should at least be addressed in some classes, both design studio and theoretical courses, to better prepare students once entered in the working world. This could be valuable from two perspectives. First, this could allow students to better deal with the topic if asked. Secondly, if they have knowledge about the topic, they could also take a proactive approach to it, including and addressing the energy topic also when dealing with other subjects. Considering that the transition to lower energy consumption and foster renewable energy generation is one of the ways to address climate change, this could be

of major importance for the years to come.

To go even further it could be beneficial in the students' curricula to include pedagogical activities, such as workshops, creating collaborations among landscape architecture students and other students from other disciplines, such as engineers. This could be beneficial allowing students to experience collaboration before getting in the work world and so being freer and more open to experimentation. These pedagogical collaborations could make students of each discipline understand potentialities and weaknesses of each other and join forces to the common goal of the final energy transition design.

In the ENSP Versailles some experience of this kind are going into this direction and can be mentioned. One was, in 2017, the international workshop "Imaginer le paysage énergétique du futur du Plateau de Saclay"¹ [To imagine energy landscape of the future Plateau de Saclay] during which students of landscape architecture, architecture, design and engineering collaborated in mixed groups in order to develop projects combining technical aspects with art, to provide innovative and somehow visionary solutions for renewable energy producing infrastructures, but territorially grounded and site specific.

Another workshop entitled "Stratégies énergétiques territoriales et paysagères, vers des paysages agricoles à énergie positive"² [Energy landscape and territorial strategies, towards energy positive agricultural landscapes] developed a collaboration between landscape architects and agronomist engineers focusing on rural areas. These workshops, even if enriching from a pedagogical perspective, are complex in their organization because they group together several universities with different schedules and pedagogical objectives. Moreover, they often necessitate external funding for the development of the project, the *Chaire paysage et énergie* for the first and the *Fondation Charles Léopold Mayer pour le Progrès de l'Homme* for the second. This also shows the complexity coming from the need to mobilize external pedagogical entities about the topic of interest in order to be able to develop these workshops.

Recommendations for ET agents future practice

For the majority of agents, the idea of developing energy transition in a territory is a matter of numbers and definition of energy quantities to describe the current situation and to set goals and strategies for the short and long terms, concerning RE production and reduction of energy consumption. The idea of a "grounded" energy transition in territories from agents' perspective is different from the landscape architects approach, but the two are equally needed and complementary. In other words, it is the difference between energy per square meters and energy per landscape considering all the dimensions that this includes.

Stremke (2015) elaborated a framework for designing "sustainable energy landscapes" which have to address sustainable technical criteria, environmental criteria, economical criteria and socio-cultural criteria. This means that all these criteria have to be considered in a landscape design of energy projects. In chapter 8 is illustrated how agents' social landscape representation

1 Collaboration among "Land Art Generator Initiative" (LAGI), the Chaire paysage et énergie of ENSP Versailles, CentraleSupélec, l'ENSA Versailles, le Design Center de Saclay, la Diagonale Paris-Saclay.

2 co-organised by l'École Nationale Supérieure de Paysage de Versailles, Centre d'Écodéveloppement de Villarceaux (CEV), École Nationale Supérieure d'Agronomie et des Industries Alimentaires de Nancy.

of energy transition includes these different criteria, even if they gain different weights of importance.

Addressing these criteria together, landscape design could support leading them in the same direction, always developing a collaboration with other agents and disciplines, bringing the energy project back to earth (figure 1 right). In this way, energy project is not constructed as a result of the different constraints that these criteria lead (figure 1 left).

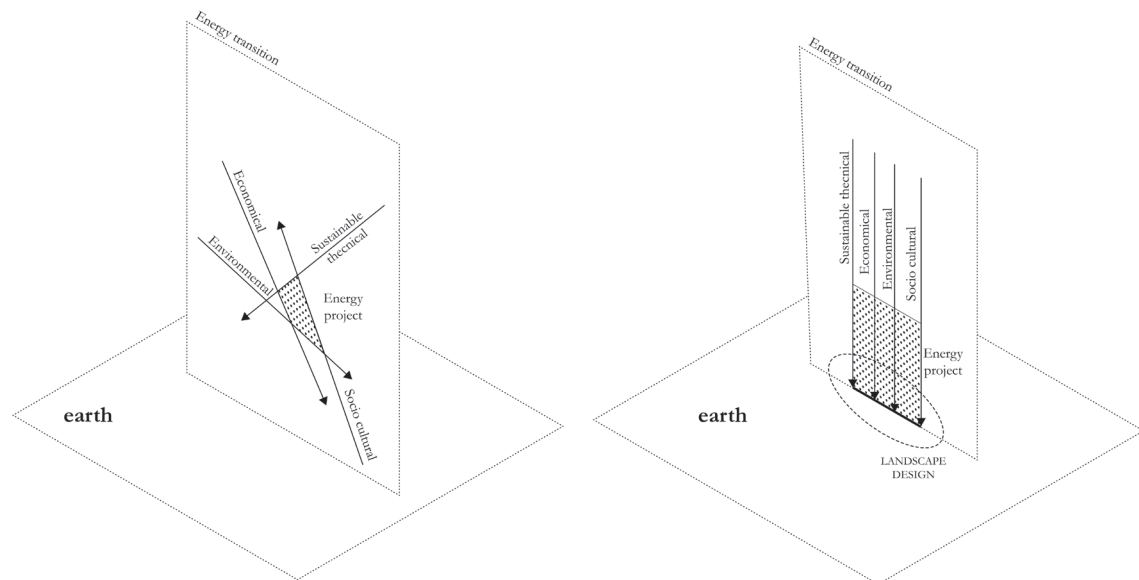


Figure 1. Schema of energy projects resulting from the different criteria constraints (left), and energy project with a landscape design integrated (right). Source: author

Future research opening

It has been explored if and to what extent the three energy transition strategies: (1) reduction of energy consumption, (2) energy stream optimization, and (3) RE production, are acknowledged and addressed in connection to landscape planning and design. Results show that the 1st and 2nd strategy even if acknowledged are insufficiently addressed compared to the 3rd one (see chapters 7, 8, 9, 12). Future research should contribute to the advanced understanding of the first two strategies from a landscape perspective, strategies that have progressively gained importance (e.g. *scenario négaWatt*, *LTECV*, *Klimatakord*). Also landscape architects highlight them, especially reduction of energy consumption as an important design step to be considered while designing, and how they do this could be the object of further inquiry. This point could lead to open this exploration on cities and metropolitan areas, which already are subject to and will continue to face changes and where energy flow optimization and energy consumption reduction are key challenges. This could go in the direction highlighted in other researches (see e.g. Castán Broto 2017) that see how the concept of energy landscape could support the analysis of urban energy systems for defining an urban energy transition.

Another point that could be further explored is connected to the meaning given to landscape by people especially when belonging to two different countries. As explained in the thesis introduction, “paysage” and “landschap” have different meanings and through the prism of energy transition some of these differences are starting to become visible. The most evident example comes from the drawing process (chapter 9), where French agents start drawing the “landscape” so hills, river and other morphological landscape elements to which they superpose the energy “layer” (Pasqualetti 2013), while the Dutch interviewees drew energy principles that progressively resulted in a landscape. It seems that agents have two different ways to think about what “landscape” is.

Energy transition is a process that is addressed by a wide range of environmental designers. In this thesis I focus on landscape architects, but it could be worthwhile to inquire also other designing disciplines (e.g. architects, urban planners) that often collaborate in energy related projects. Such an exploration may add an understanding of their respective roles, revealing differences and need to better develop a dialogue and advance the common projects.

To conclude

I would like to conclude this research with one last attention point using a metaphor mentioned by Lucretius, a Latin author of I century b.C., that explains how its own book “*De rerum natura*” [On the nature of things] will educate people while entertaining them. He compares his book to honey put on the edges of a glass in order to sweeten the medicine inside for the person drinking. Landscape design has often been considered as the honey on the glass to make the energy transition “medicine” more acceptable. Instead, I argue and in this thesis I sustain the idea that it has to be a component of the medicine itself.

Résumé en français de la thèse de doctorat /French summary of the thesis

1. Description de la problématique

« Nous sommes accros à l'électricité¹ » (Pasqualetti 2011, 201), affirme le géographe Martin Pasqualetti. Affirmation qui pourrait être généralisée en « nous sommes accros à l'énergie », si l'on considère aussi les combustibles pour les transports, le chauffage ou d'autres activités qui impliquent un besoin constant d'énergie pour développer nos activités quotidiennes. Et cette « addiction », très basée sur les énergies fossiles, est reconnue depuis longtemps comme contribuant au réchauffement et au changement climatique et à tous les effets que ces phénomènes impliquent comme la perte de biodiversité et les problèmes de santé humaine. La nécessité d'opérer une transition vers un système énergétique plus durable est désormais considérée comme indispensable au niveau international et elle est entrée dans les politiques nationales.

Cette recherche s'inscrit dans le débat actuel sur la transition énergétique, en prenant pour point de départ que celle-ci génère aussi une transition paysagère (Nadaï et van der Horst 2010). De tout temps, gestion de l'énergie et aménagement de l'espace ont entretenu une relation forte, la première ayant fatalement un impact sur le second (De Pascali 2008). La période que nous vivons ne fait pas exception.

Cependant, la notion d'énergie a été associée depuis le XVIIIe siècle à des processus techniques et d'ingénierie de production et transformation (Debeir, Deléage et Hémerly 2013), ce qui a conduit à aborder la question de la transition énergétique d'un point de vue principalement quantitatif, en oubliant sa dimension spatiale et paysagère. Cette dimension revêt pourtant d'autant plus d'importance que la transition énergétique suppose une progressive relocalisation et territorialisation des ressources du système énergétique (*cf.* loi TECV 2015), qui ne peut se limiter à la seule transformation des infrastructures (Miller, Iles et Jones 2013). Et la transition énergétique – dans ses trois stratégies : réduction des consommations, optimisation des flux et production d'énergie renouvelable (EnR) – est considérée comme l'un des principaux moteurs de la transformation du paysage (Bridge et al. 2013 ; Nadaï et van der Horst 2010).

En même temps, l'organisation spatiale et la prise en compte du paysage peuvent grandement influencer le système énergétique, par exemple en privilégiant une économie des ressources et la production d'énergie de source renouvelable à partir des ressources locales, sans compromettre la qualité paysagère, écologique et de biodiversité (Stremke et van den Dobbelsteen 2013). Le concept de paysage, qui est aussi attaché à une catégorie de projet, peut avoir un rôle central dans le processus de transition en servant de base à des prises de décision et des synthèses de connaissance (Nassauer 2012), grâce à ses composants visibles et invisibles, culturels et sociétaux.

¹ Traduit de l'anglais par l'auteur « We are addicted to electricity »

Dans cette recherche, nous faisons référence au paysage selon la définition de la Convention européenne du paysage, comme « cadre de vie », tel qu'il est perçu et conçu par les populations, et « dont le caractère est le résultat de l'action et de l'interaction de facteurs naturels et/ou humains et de leurs interrelations » (Conseil de l'Europe 2000). Le paysage comporte à la fois des éléments matériels et immatériels (Antrop 2006). En effet, le paysage est constitué d'éléments physiques, naturels ou construits par l'homme, tels que les montagnes, les rivières, les bâtiments, les voies de communication, etc. Il comporte également des éléments immatériels, qui existent dans la perception des habitants et, dans un cadre réglementaire de cartes, de normes, de systèmes de planification, en tant qu'entité sociale (Nadaï et Labussière 2015). Cette dernière dimension peut avoir des répercussions sur la partie matérielle du paysage et *vice versa*. Par exemple, les paysages qui sont reconnus pour leur valeur culturelle et patrimoniale immatérielle peuvent être protégés par une législation limitant l'implantation d'éoliennes (immatérielles versus matérielles). Dans le même temps, la mise en œuvre d'éoliennes introduisant un nouvel élément matériel visible dans le paysage pourrait induire des changements de valeur et de perception de celui-ci, altérant la composante immatérielle (matérielle versus immatérielle). Le paysage est également rattaché à une catégorie de projet à travers l'action de planification et de projet (*cf.* par exemple Stremke 2010), qui entraîne des changements intentionnels dans l'environnement physique, et qui pourrait également affecter les valeurs socioculturelles.

Le projet a un impact sur le changement matériel/physique d'un lieu, mais il a aussi des répercussions sociales immatérielles, ne serait-ce que sur les relations que les habitants entretiennent avec leur milieu de vie. Ces répercussions peuvent être directes ou indirectes. Les concepteurs doivent donc prendre en compte simultanément la composante matérielle et immatérielle du paysage, ses caractéristiques physiques, telles que la structure géologique, l'utilisation du sol, etc., mais aussi les valeurs culturelles, les comportements et les réglementations. L'architecture de paysage² fait partie des disciplines qui contribuent à la transformation consciente du paysage et elle est capable de développer des paysages durables (Antrop 2006).

De plus, l'architecture de paysage contribue au processus de transition énergétique (*cf.* par exemple Stremke 2010; Schöbel et Dittrich 2010; Folléa 2019). Comme l'affirmait (alors) le professeur et paysagiste Dirk Sijmons (2015, 35) : « Les infrastructures techniques telles que les champs photovoltaïques, les éoliennes, les lignes à haute tension et les infrastructures d'intermittence pourraient être l'agent de changement le plus important du paysage du XXI^e siècle et un nouveau champ de travail pour les paysagistes. »

Effectivement, comme l'affirme le paysagiste Kenneth R. Olwig, « La Terre n'est pas un globe » (2011), une expression qui veut souligner le danger que les programmes/agendas mondiaux aboutissent à l'application de stratégies abstraites, considérant la Terre comme un espace isotrope. Comme le soutient le sociologue Bruno Latour (2017) : « Il est urgent de changer de côté et de définir la politique comme ce qui mène vers la Terre et non vers le global ou le national. » Ce sont les prémisses pour démarrer cette recherche, prônant la nécessité de trouver des solutions viables pour la transition énergétique, également en fonction des caractéristiques locales et territoriales.

² Terme anglais « Landscape architecture » ici traduit littéralement pour s'accorder à la littérature scientifique internationale

2. Lacunes dans les connaissances actuelles

Bien que la dialectique entre paysage et énergie ait été discutée (par exemple Nadaï et van der Horst 2010; Leibenath et Lintz 2018), aussi à travers l'exploration de la connexion du point de vue du projet (par exemple Stremke et van den Dobbelen 2013; Oudes et Stremke 2020; Schöbel et Dittrich 2010; Folléa 2019), cette dernière perspective n'a pas été étudiée dans la même mesure. Une enquête dans des revues de paysage souligne que les recherches sur l'énergie ne sont pas encore un sujet de premier plan (Cushing et Renata 2015). Parallèlement, une enquête dans des revues liées à l'énergie montre que les sciences spatiales (comme l'architecture de paysage) y sont à peine abordées (Sovacool 2014).

La première lacune pourrait être comblée en comprenant mieux la relation entre la planification et le projet de paysage et le développement énergétique dans un cadre de transition énergétique, et en identifiant des concepts qui pourraient soutenir le développement de cette relation.

Dans ce domaine de la transition énergétique, les recherches sur la planification et le projet de paysage se concentrent principalement sur la production d'EnR (Picchi et al. 2019; Minichino 2014; Frolova, Prados et Nadaï 2015). Les connaissances sur la connexion du paysage avec les trois stratégies principales de transition énergétique (réduction de la consommation d'énergie, optimisation des flux et production d'EnR) sont encore insuffisamment étudiées.

Considérer ce point est d'autant plus important que les législations européennes et nationales encouragent à aborder les trois stratégies simultanément.

Dans le cadre de cette orientation générale de la recherche, deux autres lacunes dans les connaissances ont été identifiées. La première fait référence à l'échelle territoriale, pour laquelle les recherches sur la mise en œuvre de la transition énergétique manquent encore (Hoppe et Mediema 2020), notamment du point de vue de la planification et du projet de paysage explorant les trois stratégies de transition énergétique.

La seconde, à la pratique paysagiste dans un cadre de transition énergétique, qui n'a pas été largement discutée au-delà de la principale stratégie de production d'EnR (*cf.* par exemple Minichino 2014; Oudes et Stremke 2020). Il est nécessaire d'enquêter sur les pratiques des professionnels et d'identifier des principes ou des lignes directrices, concernant à la fois les connaissances requises et les étapes de projet appropriées qui permettraient de relever le nouveau défi énergétique.

Il est à noter que la recherche sur l'architecture de paysage est particulièrement sous-développée dans le contexte français.

3. Objectif principal de la recherche

L'aspiration à des paysages plus durables est le point de départ de cette recherche. Elle est développée à travers le prisme de l'énergie, qui est considéré comme l'un des principaux leviers d'action pour affronter et atténuer le changement climatique et la pollution de l'air.

La transition énergétique, comme globalement la recherche de solutions face aux crises écologiques, mobilise d'abord une aide à la décision, dans le domaine politique et juridique,

qui s'appuie désormais en priorité sur des données géophysiques, biologiques, et des méthodes scientifiques essentiellement basées sur la modélisation. Lorsque l'on passe à des projets situés, à la mise en œuvre sur des territoires qui sont habités, pratiqués selon des usages ancrés dans le temps, dans une complexité du vivant aussi bien humain, végétal, animal, les problèmes apparaissent très vite : non seulement des problèmes d'acceptation locale, mais aussi des problèmes d'adaptation des intentions aux spécificités des lieux, de résistance face à des dynamiques existantes, naturelles ou humaines. De nombreuses voix s'élèvent dans les milieux scientifiques et politiques pour critiquer cette suprématie de la modélisation. Bruno Latour, sociologue spécialiste des politiques environnementales, insiste sur la nécessité, pour aller dans le sens du terrestre, que le politique retrouve l'importance de décrire, « reprendre la description des terrains de vie devenus invisibles » (Latour 2017). L'intérêt du projet de paysage, c'est du moins ce que nous souhaitons éprouver/tester dans cette thèse, est précisément de retrouver ce lien avec le terrestre : notre contribution cherche à en dégager les conditions et les relais possibles, mais aussi les difficultés de ce passage.

En effet, la planification et le projet de paysage pourraient participer au défi de la transition énergétique (Sijmons et al. 2014), contribuant au déploiement de ses trois stratégies principales (réduction de la consommation d'énergie, optimisation des flux et production d'EnR).

Dans ce contexte, l'objectif premier de cette recherche est d'analyser et d'évaluer la planification et le projet de paysage « raisonnés sur l'énergie ». À cet égard, une attention particulière est accordée à la pratique de l'architecture de paysage (figure 1).

Par « raisonnés sur l'énergie » nous entendons que les activités de planification et de projet ont pour objectif d'imaginer les paysages du futur, en intégrant et en soutenant la mise en œuvre de la transition énergétique. Nous nous référons à cela dans un cadre de « paysage énergétique durable » qui a pour but d'améliorer le développement énergétique sans compromettre les qualités du paysage telles que l'esthétique, la biodiversité, la production alimentaire et d'autres

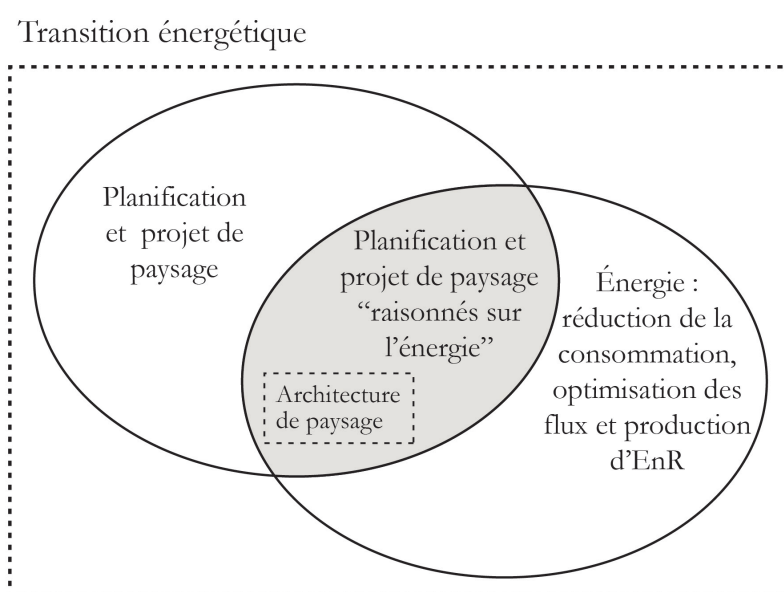


Figure 1. Schéma de l'objectif principal de la recherche. Source : auteur

services écosystémiques (Stremke et van den Dobbelsteen 2013). S'ils ne sont pas mis dans un cadre de durabilité, les principes soucieux de l'énergie pourraient conduire à des choix non durables tels que la production de biomasse en monoculture à des fins énergétiques.

Pour développer cet objectif dans la recherche, le choix a été fait d'analyser le sujet sous différents angles, afin de l'aborder le plus possible de manière globale. Différents matériaux, qui composent des facettes complémentaires du processus de planification et de projet, ont été collectés et analysés : instruments de planification, documents axés sur le paysage, perspectives des acteurs de la transition énergétique et des paysagistes sur leurs pratiques et leurs attentes.

Par ailleurs, la recherche explore deux contextes nationaux – France et Pays-Bas –, deux pays engagés dans un processus de transition énergétique et avec une forte tradition d'architecture de paysage. Cette comparaison permet de prendre du recul dans l'analyse et donc de replacer les résultats dans une perspective plus large.

Dans un processus de transition énergétique, de nombreuses dimensions doivent être prises en compte, telles que l'économie, la technologie, le comportement social et la planification, et le projet de paysage fait partie de ces dimensions. En nous concentrant sur le « paysage », nous ne nions pas l'importance d'autres aspects, mais nous explorons l'un d'entre eux, qui pourrait contribuer à la mise en œuvre de la transition énergétique.

4. Méthode générale

La méthode générale encadrant l'ensemble de la thèse est une recherche d'études de cas, reconnue comme capable de fournir une compréhension de phénomènes généraux se déroulant dans des contextes de la vie réelle (Yin 2009), dans notre cas la planification et le projet de paysage pour la transition énergétique. Les études de cas sélectionnées pour la recherche ont été choisies en France et aux Pays-Bas, car l'enquête est développée à travers une comparaison internationale.

Méthode partie 1

Dans la première partie, elle repose sur une analyse bibliographique de la notion de transition énergétique en rapport avec sa composante paysagère et avec l'aménagement spatial ainsi que sur les politiques publiques liant gestion énergétique durable et aménagement dans les deux nations pour s'interroger sur ce lien au fil du temps. Dans le même temps, une recherche bibliographique systématique en sciences sociales est développée à travers la base de données SCOPUS sur les concepts visant une gestion raisonnée de l'énergie.

Méthode partie 2

La deuxième partie est menée comme une *research on design* (van den Brink et Bruns 2014; Lenzholzer, Duchhart et Koh 2013), appliquée à la mise en œuvre du projet, mais aussi sur le processus de projet lui-même. Cette méthode correspond à l'objet de cette thèse, car elle s'interroge sur de nouvelles pratiques avec des changements en cours dans les processus et les

significations (y compris les apports réflexifs des acteurs de transition énergétique), afin d'en tirer des leçons.

Trois territoires sont analysés : deux TEPOS (territoire à énergie positive) en France, la CC (communauté de communes) des Monts du Lyonnais et la CC du Thouarsais, et un aux Pays-Bas, la commune de Goeree-Overflakkee (Province de Zuid-Holland/Hollande-Méridionale). Les trois territoires sont engagés dans une démarche de transition énergétique, avec une intention affichée de la lier au paysage. La CC des Monts du Lyonnais a développé en 2015 un plan de paysage (Isabel Claus paysagiste - *Atelier urba-site*) incluant les questions de transition énergétique, aujourd'hui intégré au SCoT (schéma de cohérence territoriale), et elle est en train d'élaborer un PCAET (plan climat-air-énergie territorial). La CC du Thouarsais a élaboré récemment un plan de paysage (Isabel Claus paysagiste - PAP), en visant son intégration dans le SCoT, le PLUi (plan local d'urbanisme intercommunal), le PCAET (en cours de révision), et la réalisation d'une OAP (orientation d'aménagement et de programmation) spécifique sur la question de la production énergétique et du paysage. La commune de Goeree-Overflakkee a pour sa part l'ambition de devenir neutre en énergie en 2020. En 2012, des scénarios paysagers/spatiaux de transition énergétique ont été développés par des paysagistes (H+N+S), et de nouvelles études reliant gestion de l'énergie et paysage ont été réalisées en 2017 (studio MarcoVermeulen) pour accompagner le territoire entre 2020 et 2030, période à partir de laquelle elle vise à devenir exportatrice d'énergie de source renouvelable. Les différences dans les temporalités de mise en place des actions de TEE (transition écologique et énergétique), entre les instruments de planification et dans le rôle attribué aux questions de paysage, permettent une remise en perspective des processus et des outils. Dans une approche multiperspective, l'analyse des terrains croise récolte des données statistiques, visites de terrain, participation aux réunions dans les territoires, analyse de projets, analyse des documents de planification, entretiens semi-directifs avec les acteurs (autorités locales, entreprises énergétiques, concepteurs... jusqu'au particulier ayant décidé par exemple de construire un méthaniseur).

Afin de donner un aperçu général de la situation française sur si et comment les territoires engagés dans une démarche de transition énergétique prennent en compte les enjeux du paysage, sa planification et son projet, une enquête sociale descriptive (Deming et Swaffield 2011) a été réalisée dans le réseau TEPOS.

Méthode partie 3

La troisième partie est également principalement développée comme une *research on design* (Lenzholzer, Duchhart et Koh 2013), interrogeant les paysagistes qui travaillent dans des projets liés à la transition énergétique. Cette partie pourrait également être conceptualisée comme une *research for design* (Lenzholzer, Duchhart et Koh 2013), car une série de principes et de recommandations pourraient être tirés de l'analyse de la pratique des paysagistes dans les deux pays, pouvant éventuellement informer le projet de la transition énergétique, et conduisant à des implications pédagogiques. Pour cette partie, une enquête sociale descriptive en ligne a été mise en place. Un questionnaire a été envoyé aux bureaux de paysagistes membres des associations professionnelles nationales – la Fédération française de paysage (FFP) et l'Association néerlandaise pour l'architecture de jardin et de paysage (NVTL). De plus, cette

partie réunit des entretiens semi-directifs menés avec des paysagistes français et néerlandais (8 dans chaque pays) qui développent des projets liés à la gestion de l'énergie à différentes échelles (scénarios énergétiques, etc.), avec différents savoir-faire et l'utilisation de différentes stratégies et technologies, et ces entretiens sont accompagnés d'une analyse des documents de projet.

Même si chaque partie de cette recherche a une méthode définie, certains résultats et contenus (par exemple des entretiens semi-directifs) recourent les parties et des extraits ont été utilisés pour alimenter et mettre en perspective d'autres parties de la recherche où le sujet était pertinent.

Comparaison internationale France et Pays-Bas

La recherche met en place une comparaison internationale entre la France et les Pays-Bas, deux nations qui ont intégré dans leur programme politique des stratégies de transition des énergies fossiles vers des sources d'énergies renouvelables et décarbonées, confirmées par les derniers documents : *Klimatakkoord* 2019, LTECV 2015, mais avec des différences dans la temporalité de leur engagement ainsi que dans les politiques publiques et instruments de planification liant espace et énergie. Elles ont également une longue tradition dans l'architecture de paysage (Donadieu 2012; de Jonge 2009), mais le rôle des concepteurs dans les projets relatifs à la gestion et à la production énergétique est différent. L'architecture de paysage néerlandaise est reconnue comme un exemple de l'importance croissante du paysage à un niveau stratégique dans plusieurs champs environnementaux.

Cette comparaison permet de mettre en perspective le processus de transition énergétique dans les deux pays, faisant ressortir les similitudes et les différences. La superficie des Pays-Bas est 1/13 de celle de la France, mais la densité de population y est quatre fois plus élevée; ces caractéristiques pourraient conduire à de nombreuses différences d'approche de la planification et du projet de paysage pour la transition énergétique.

Le choix de comparer deux nations, non seulement du point de vue des politiques publiques et des instruments de planification, mais aussi en matière de dimensions, de morphologie et de géographie, est délibéré. Cela est particulièrement pertinent puisque cette recherche porte sur le paysage. Des caractéristiques géographiques différentes pourraient conduire à une perspective et une vision différentes de la manière de planifier et de projeter le paysage. La comparaison devrait enrichir la discussion et peut-être ouvrir à des approches nouvelles et différentes dans les deux pays. L'objectif est de comprendre comment la transition énergétique se développe aux Pays-Bas, une nation qui, comme l'écrit le paysagiste français Jacques Sgard qui y a travaillé dans les années 1950, a une « vocation de l'aménagement du territoire » (Sgard 1959, 32). Les Pays-Bas sont constitués d'un territoire fortement artificialisé (van der Cammen et al. 2012), se trouvant pour une grande partie sous le niveau de la mer et entouré de digues. Ces caractéristiques morphologiques et littorales exposent le territoire aux risques liés au changement climatique, et elles accroissent la sensibilité des populations à l'adaptation à ce changement et à son éventuelle atténuation.

5. Résultats des trois parties

Cette section résume les conclusions développées pour chaque chapitre, afin de présenter et de rappeler au lecteur les principaux résultats de chacune des trois parties de cette recherche.

Partie 1

Question de recherche :

Quelles sont les relations entre gestion/développement de l'énergie et planification et projet de paysage dans le cadre de la transition énergétique ?

Quels concepts et principes opérationnels sont disponibles pour informer une planification et des projets prônant une gestion, un usage et une production raisonnés de l'énergie dans le contexte de transition énergétique durable ?

L'objectif de cette première partie de la recherche était de comprendre la relation entre la gestion de l'énergie et la planification et le projet de paysage dans le cadre de la transition énergétique. Les recherches montrent/soulignent que les composantes spatiale et paysagère ont été longtemps négligées dans le cadre de la transition énergétique, malgré le lien existant entre les deux dimensions. Plus récemment, le sujet a gagné de l'importance et des appels pour une meilleure prise en compte de la dimension spatiale et paysagère ont été lancés, ce qui est dû à la compréhension que l'énergie est l'une des principales forces de transformation du paysage.

En plus, du point de vue du projet et de la planification, plusieurs chercheurs travaillent sur le développement de l'énergie. Ils abordent la connexion depuis différentes entrées pour soutenir la transition vers un système plus durable à travers la planification et le projet de paysage, en traitant du choix du site pour le développement de technologies pour la production d'EnR, de la réduction des consommations d'énergie à travers l'organisation spatiale, le développement d'outils SIG (système d'information géographique), l'analyse de concepts comme source d'inspiration. Cela montre un intérêt/une préoccupation pour la perspective des concepteurs, parmi lesquels les paysagistes concepteurs essaient de participer activement au débat.

En ce qui concerne ce dernier sujet, l'analyse de la littérature scientifique a révélé 44 concepts, issus d'un large éventail de disciplines (par exemple la physique et l'écologie), qui peuvent éclairer la planification spatiale et les pratiques de projet prônant une gestion, un usage et une production raisonnés de l'énergie. L'analyse de trois de ces concepts – métabolisme urbain, économie circulaire et *cradle to cradle* (du berceau au berceau) – a abouti à une liste de 105 principes énergétiques opérationnels qui couvrent à la fois les aspects technologiques et la conception spatiale, couvrant la production d'énergie, l'économie et l'efficacité, et fournissent un ensemble d'ingrédients pour une approche plus systémique de la transition énergétique durable. Néanmoins, tout en ayant des caractéristiques spatiales, ces principes manquent d'aspects culturels et esthétiques.

L'analyse de la perspective institutionnelle en France et aux Pays-Bas a révélé que de nombreux instruments de planification ont le potentiel d'établir un lien entre le développement de la transition énergétique et le paysage (par exemple le SCoT et le PLUi en France et la *structuurvisie*

[vision structurelle] et le *bestemmingsplan* [plan d'aménagement] aux Pays-Bas).

Cependant, la décision d'établir cette relation est laissée à l'appréciation des communes et EPCI (établissement public de coopération intercommunale) en France et des provinces et communes aux Pays-Bas, laissant planer beaucoup d'incertitudes quant au développement d'une véritable interconnexion. Les documents axés sur le paysage pourraient établir une relation entre les deux sujets, mais dans les deux pays ces documents ne sont ni obligatoires ni contraignants, ils sont donc basés sur la participation volontaire des collectivités locales et territoriales. En d'autres termes, la mise en œuvre des stratégies qu'ils énoncent est très incertaine. Cependant, le thème de l'énergie a gagné en importance dans les instruments de planification et il est désormais traité à l'échelle nationale. Dans les systèmes de planification français, tous les niveaux territoriaux doivent développer des instruments axés sur l'énergie. Aux Pays-Bas, l'énergie doit être incluse aux niveaux provincial et communal dans des instruments intersectoriels (référence à WRO 2008).

Pour conclure, même si dans la littérature scientifique la relation entre développement énergétique et planification et projet de paysage dans la transition énergétique est reconnue, les chercheurs mettent en évidence un sentiment de malaise face à un manque de dimension spatiale et paysagère dans la transition énergétique. Du point de vue institutionnel des instruments de planification, le développement de ce lien est en grande partie laissé à l'appréciation et au volontarisme des collectivités territoriales (communes, EPCI, provinces).

Partie 2

Question de recherche :

Dans le processus de transition énergétique, quel rôle jouent le paysage ainsi que la planification et le projet de paysage au niveau territorial? Et quelle est la compréhension qu'ont les acteurs territoriaux du lien entre énergie et paysage?

À cet égard, quelles sont les différences – le cas échéant – entre la France et les Pays-Bas?

Cette partie explore comment le paysage et la planification et le projet de paysage sont mobilisés et impliqués dans des territoires engagés dans une démarche de transition énergétique. Elle est développée à travers une comparaison entre des cas français et néerlandais, par l'analyse des documents relatifs au paysage, des instruments de planification, et des témoignages et des dessins d'une gamme d'acteurs locaux.

Cette partie de la recherche a étudié le rôle que jouent la planification et le projet de paysage dans le processus de transition énergétique des territoires français et néerlandais avec des objectifs énergétiques ambitieux à court et long terme. Dans un second temps, elle a interrogé la vision des acteurs sur le lien entre paysage et transition énergétique.

Au niveau institutionnel national, des efforts progressifs sont mis en place pour favoriser cette connexion dans les territoires tant en France qu'aux Pays-Bas (*cf.* les appels à projets plan de paysage lancés par le ministère de la Transition écologique et solidaire en France, 2019 et 2020, et *Regionale Energie Strategieën* dans *Nationale Klimataak* aux Pays-Bas). Aux Pays-Bas, il apparaît que la nécessité de prendre en compte le paysage est obligatoire pour toutes les *regio*, tandis que l'élaboration d'un plan de paysage reste volontaire en France. Néanmoins, l'enquête auprès du

réseau TEPOS montre que de son point de vue le paysage est une dimension importante de la transition énergétique, même si elle n'est pas encore largement abordée.

L'exploration des trois territoires sélectionnés montre une faiblesse générale dans leur prise en compte du paysage en lien avec leur processus de transition énergétique territoriale, surtout en France. Ces préoccupations paysagères arrivent relativement tard, plusieurs années après que les collectivités locales se sont fixé des objectifs énergétiques pour les territoires et ont commencé leur mise en œuvre. Pour le cas néerlandais, la transition énergétique est explorée dans une perspective paysagère presque en même temps que la définition des objectifs de transition énergétique pour 2020 et elle accompagne chaque nouvelle étape, en soutenant davantage la définition des objectifs de transition énergétique.

Les documents centrés sur le paysage en France, même s'ils sont connus ou développés par les collectivités locales, ne semblent pas être perçus avec autant d'utilité et de soutien au processus de transition énergétique que les documents néerlandais, même s'ils sont tous les deux volontaires et non juridiquement contraignants. Cela pourrait être dû aux différences dans le contenu des documents de paysage français et néerlandais. Le plan de paysage français détaille les principes stratégiques et opérationnels possibles pour mettre en œuvre des actions énergétiques spécifiques (par exemple développement des filières bois-énergie à partir du bocage, panneaux photovoltaïques sur les toits), mais il ne parvient pas à développer un lien entre les objectifs énergétiques quantitatifs qu'il exprime et sa composante paysagère, comme pourrait y contribuer par exemple l'utilisation de cartes représentant graphiquement le scénario énergétique. De tels scénarios quantitatifs de paysage énergétique sont au contraire abordés dans les documents de paysage néerlandais, qui semblent susciter davantage l'intérêt des acteurs territoriaux.

De plus, dans les cas analysés, les instruments de planification se concentrent principalement sur les technologies EnR en relation avec le paysage. La réduction de la consommation d'énergie et l'optimisation des flux d'énergie, même si elles sont reconnues, ne sont pas directement liées au paysage ni à sa planification et au projet. Par ailleurs, les instruments de planification français et néerlandais révèlent une vision esthétique et patrimoniale conservatrice du paysage lors de la réflexion sur la transition énergétique. Aux Pays-Bas, cette attitude semble s'accompagner d'une perspective de projet de paysage, illustrée par le fait que les principes de projet développés dans le premier rapport sur le paysage de l'énergie de Goeree-Overflakkee (H+N+S, 2012) ont été appliqués, combinés avec d'autres considérations, pour implanter des parcs éoliens dans la commune.

Cette différence pourrait avoir des racines dans l'attitude traditionnelle envers le paysage, différente dans les deux nations. En France, le paysage est depuis longtemps associé à la nature et au patrimoine dans la législation (Donadieu 2012). Aux Pays-Bas, cette attitude coexiste avec une forte perspective de planification et de projet (*cf.* par exemple de Jonge 2009).

Concernant le point de vue des acteurs du territoire impliqués dans le processus de transition, ceux-ci sont conscients de la connexion avec le paysage pour les trois stratégies de transition énergétique : réduction de la consommation d'énergie, optimisation du flux énergétique et production d'EnR. Cette dernière reste la plus mentionnée et celle qui suscite le plus de préoccupations dans sa mise en œuvre dans le paysage. Cela pourrait s'expliquer par la grande visibilité des technologies EnR. Néanmoins, les acteurs signalent plusieurs facteurs positifs pour le développement de la transition énergétique au prisme du paysage. Ces facteurs proviennent

principalement d'un sentiment positif lorsque les projets énergétiques sont basés sur des caractéristiques « locales » et « naturelles » (écocentriques), mais aussi lorsque des solutions techniques très efficaces sont utilisées (*technocentriques*), et lorsque des projets ou des actions sont développés dans des zones bâties et pourraient interagir avec le comportement humain (*anthropocentriques*). Cela illustre un large éventail d'entrées positives possibles sur le sujet, qui dépasse un point de vue technologique, souvent lié à la transition énergétique. Cela peut donc fournir une compréhension qui pourrait soutenir un dialogue plus partagé sur le paysage.

Enfin, les points de vue des acteurs sur les paysages de la transition énergétique recueillis à travers leurs dessins à la main conduisent à comprendre que ces acteurs ont une vision plus large que celle qui ressort de leurs réponses orales. À travers les dessins, ils ont pu articuler davantage les questions énergétiques avec des éléments qualitatifs du paysage. Même si des différences demeurent, les acteurs n'ont pas une vision totalement distincte du paysage de la transition énergétique, ce qui permet de penser qu'un dialogue pourrait s'établir pour développer la planification et le projet sur leurs territoires. Néanmoins, une différence dans le processus de dessin apparaît en comparant ceux des acteurs français et néerlandais. Les acteurs français commencent par dessiner la géographie et la topographie des paysages tels que les montagnes et les collines, puis le thème énergétique vient se superposer comme une couche.

Les acteurs néerlandais développent davantage une vision systémique où les éléments se chevauchent progressivement, aboutissant à un paysage nouveau ou transformé. Pour conclure, le rôle joué par la planification et le projet de paysage dans la transition énergétique est principalement lié à la mise en œuvre des technologies EnR; quelque chose qui a également été mentionné par les acteurs territoriaux. Cependant, les résultats montrent que de nombreux acteurs font la connexion entre les trois stratégies de transition énergétique et le paysage. Cela pourrait conduire à considérer que cette connexion est de plus en plus prise en compte et que dans les années à venir une plus grande attention sera également accordée dans les instruments de planification aux préoccupations paysagères en lien avec les trois stratégies.

Concernant les différences entre les deux pays analysés, il apparaît qu'aux Pays-Bas la nécessité de prendre en compte le paysage est plus impérative (*cf. Regionale Energie Strategieën*) et, sur le territoire analysé, plus valorisée et utilisée comme un support proactif. Cela pourrait provenir des caractéristiques historiques et culturelles des Pays-Bas où les contraintes d'être un pays relativement petit et densément peuplé conduisent les institutions néerlandaises à se préoccuper de manière attentive et continue des défis spatiaux (Faludi et van der Valk 1994).

Partie 3

Question de recherche :

Quelle pourrait être la contribution de l'« architecture de paysage » à la transition énergétique et comment l'architecture de paysage en est-elle affectée ?

Quelles sont les différences – le cas échéant – entre la France et les Pays-Bas concernant le rôle et la pratique des paysagistes dans ce domaine ?

Cette partie a exploré la contribution de la pratique de paysagiste à la transition énergétique et, inversement, comment l'implication des paysagistes dans la transition énergétique modifie leur

pratique.

Aux Pays-Bas, une implication des paysagistes dans l'implantation des technologies énergétiques et la création de scénarios à long terme (sectoriel-focalisé sur l'énergie) a été observée. En France, une focalisation sur la mobilité et les économies d'énergie (intersectorielle-énergie intégrée) a été observée. Cela suggère que les héritages paysagistes, différents dans les deux pays, ont conduit à des activités différentes dans les projets liés à l'énergie.

Les paysagistes voient leur principale contribution à la transition énergétique à travers une approche de projet stratégique, mais alliée à une approche de projet opérationnelle et allant aussi vers un « *design* des services » (un processus définissant des règles et un système de fonctionnement, plutôt que débouchant sur un seul produit). Au contraire, les acteurs de la transition énergétique dans les territoires soulignent principalement une approche de projet opérationnelle pour la contribution des paysagistes à la transition énergétique, en insistant spécifiquement sur leur contribution à l'intégration des technologies EnR dans le paysage. Cela pourrait montrer un écart entre les aspirations des paysagistes et les commandes qu'ils pourraient obtenir plus facilement. Ce qui pourrait être en partie dû à un manque de compréhension de la profession de paysagiste, particulièrement observé dans les cas français, où les acteurs expriment un sentiment flou sur ce que font les paysagistes. Un manque de reconnaissance du métier qui n'apparaît pas dans le discours néerlandais, ni de la part des paysagistes ni des acteurs de la transition énergétique. Cela suggère la nécessité pour les paysagistes français de mieux mettre en avant leurs capacités et compétences professionnelles pour contribuer de manière plus significative à la transition énergétique.

Les enquêtes sur les connaissances et étapes de projet nécessaires pour le développement de projets énergétiques révèlent que les paysagistes utilisent à la fois des connaissances « traditionnelles » de la profession (par exemple écologie, dessin) et des connaissances supplémentaires et spécifiques à l'énergie (par exemple technologies EnR, unités de mesure). En plus, les paysagistes utilisent des étapes de projet « traditionnelles » (par exemple l'analyse de paysage et la représentation graphique du projet). Cependant, des étapes de projet supplémentaires sont également mentionnées. En particulier, l'attention portée à la réduction de la consommation d'énergie est considérée comme une étape importante à introduire dans tous les types de projets même lorsqu'ils ne sont pas directement liés à l'énergie, tels que les parcs, mais dans lesquels le choix des matériaux et des essences de végétaux par exemple pourrait être soigneusement pensé pour économiser de l'énergie durant leur transport. Les paysagistes mentionnent des connaissances supplémentaires axées sur l'énergie, ce qui conduit à penser que cela leur est nécessaire pour traiter d'une manière ou d'une autre avec des calculs, des quantités et des unités de mesure d'énergie. Mais seuls les paysagistes néerlandais travaillant sur des scénarios énergétiques mentionnent des étapes de conception supplémentaires et nouvelles axées sur l'énergie, faisant référence à une composante quantitative de l'énergie (par exemple la collecte et le traitement de données). Cette activité pourrait être considérée comme tout à fait nouvelle dans les missions que les paysagistes pourraient obtenir et semble insister sur l'importance croissante pour les paysagistes d'en apprendre encore plus sur la gestion des données quantitatives énergétiques. En fin de compte, l'importance de connaissances énergétiques semble dépendre de la catégorie de projet sur laquelle ils travaillent.

Les paysagistes qui abordent la transition énergétique agissent sur les trois stratégies du *Trias*

Energetica (réduction de la consommation d'énergie, optimisation du flux d'énergie et production d'EnR). Il semble que leur parcours généraliste les amène à l'aborder également à travers des approches transversales aux trois stratégies, intégrant une réflexion multifonctionnelle et intersectorielle, soutenant l'élaboration de projets partagés, concernant la spécificité de chaque territoire ou site de projet.

Les paysagistes doivent aussi faire face à des défis lorsqu'ils travaillent sur la transition énergétique. Ces défis sont à la fois internes et externes à la profession. Les défis internes se réfèrent aux difficultés qui surviennent lors de la nécessité de traiter un nouveau sujet. Les défis externes (par exemple, inclusion tardive du paysage dans le processus de transition énergétique, faible financement pour le paysage) semblent être le résultat d'une vision limitée des habitants envers le paysage (par exemple, la préservation du paysage). Cette vision patrimoniale, sous-tendue par l'idée erronée d'une permanence et qui ne va pas au-delà de l'image que l'on a/se fait du paysage, est en contradiction avec la réalité du paysage comme entité dynamique résultant de nombreux facteurs et de l'action de nombreux secteurs (par exemple l'agriculture), et ne peut que détacher en quelque sorte le paysage du processus de transition énergétique.

On pourrait faire valoir que l'application des mesures énoncées dans la Convention européenne du paysage – qui encourage la prise de conscience et l'éducation des citoyens au paysage et à son intégration dans les politiques publiques – pourrait être bénéfique pour soutenir les paysagistes face à ces défis.

6. Discussion générale

Ramener à la Terre ?

Pour ce qui concerne les prémisses de cette recherche sur la possibilité à travers le prisme du paysage de « ramener sur Terre » la transition énergétique dans les territoires, différentes attitudes apparaissent à travers la recherche selon les différentes perspectives analysées.

En ce qui concerne les concepts et principes retrouvés dans la littérature scientifique, comme indiqué dans le chapitre 2, un manque général d'attention à la dimension socioculturelle a été observé. La prise en compte de cette dimension, ainsi que de la dimension plus technique et fonctionnelle, largement évoquée dans les principes, pourrait favoriser un meilleur ancrage aux caractéristiques du territoire. Par exemple, de nombreux chercheurs soutiennent qu'éviter un environnement bâti étalé, d'une manière générale, est une bonne option pour réduire la consommation d'énergie dans les transports. Cependant, certains chercheurs montrent que cela est parfois incompatible avec la culture locale d'un lieu (*cf.* par exemple Roy, Curry et Ellis 2015). Les principes formulés sont précieux et importants pour faire avancer la transition énergétique, mais les changements dans le cadre de vie ne peuvent pas être isolés de ces considérations qualitatives.

En regardant ce qui se passe dans les territoires analysés, les résultats montrent que les acteurs semblent témoigner d'un certain désir pour une transition territoriale ancrée. Cela se traduit par la commande de documents centrés sur le paysage (par exemple le plan de paysage en

France), qui inclut le thème de l'énergie pour accompagner le processus, le reliant aux paysages du territoire. Néanmoins en France, le plan de paysage, notamment tel qu'observé dans la CC des Monts du Lyonnais (chapitre 6), une fois rédigé, n'est pas vraiment considéré comme un outil d'accompagnement du processus de transition pour le territoire. Le fait de disposer d'un plan de paysage n'a pas concrètement affecté les stratégies de transition, même s'il a suscité une sensibilité et une prise de conscience sur le sujet. Au contraire, dans le cas néerlandais, les documents axés sur le paysage ont été commandés par les collectivités locales à chaque fois que des objectifs énergétiques devaient être fixés. Cela afin de mieux comprendre en matière d'espace et de paysage le développement des objectifs énergétiques, pour ainsi dire : de les « ancrer » dans la commune. À la différence du plan de paysage français, les études de paysage néerlandaises incluent l'énergie d'un point de vue quantitatif, mais interconnectent ces chiffres avec les caractéristiques morphologiques, historiques, géographiques et autres du territoire qui, ensemble, constituent la base des scénarios de projet.

Dans le cas français, il ne peut pas être affirmé que le plan de paysage joue un rôle très actif dans l'ancrage de la transition énergétique au territoire, car les acteurs ne se le sont pas totalement approprié.

Ce manque peut également être perçu dans le fait que les documents de paysage ne sont pas pleinement pris en compte ou inclus dans l'élaboration des instruments de planification où le thème de l'énergie est abordé (chapitre 7). Les instruments de planification pourraient pourtant aider à ancrer le processus de transition énergétique, car ils définissent un cadre d'actions et de stratégies pour l'énergie et le paysage à mettre en œuvre dans les territoires. Si les actions et les stratégies qui y sont énoncées proviennent d'une analyse approfondie des caractéristiques du paysage de ces territoires, la mise en œuvre de la transition énergétique pourrait être définie sur mesure pour chacun d'eux.

Ce lien entre énergie et paysage a pu être partiellement établi dans la CC du Thouarsais et à Goeree-Overflakkee, où des éléments des documents centrés sur le paysage ont été utilisés pour guider l'implantation des parcs éoliens. Dans la CC du Thouarsais, les sites pour le développement futur des parcs éoliens sont déjà retenus et le souci du paysage devrait davantage définir la répartition des équipements sur les parcelles présélectionnées. À Goeree-Overflakkee, les concepts de projet exposés dans les documents de paysage sont utilisés pour le choix des parcelles (emplacement) et la conception même des parcs éoliens. Les acteurs territoriaux ont révélé qu'ils imaginaient une « transition énergétique ancrée » dans leurs territoires, exprimée notamment par les dessins qu'ils ont réalisés sur le « paysage de la transition énergétique ». À travers le prisme du paysage, les acteurs mettent en lumière l'importance que les stratégies et actions énergétiques, pour la réduction de la consommation d'énergie, l'optimisation des flux d'énergie et la production d'EnR, soient locales et ancrées au territoire (chapitre 9). C'est un résultat encourageant compte tenu de nos prémisses, car il pourrait permettre d'établir des liens supplémentaires avec les paysagistes, dont la pratique dans cette thèse est définie comme « ancrée » (*grounded*). Ce terme veut illustrer combien les résultats montrent que dans leurs projets le point de départ est toujours la localité ou le paysage, quelles qu'en soient l'échelle (site ou territoire), son observation et l'analyse de ses caractéristiques matérielles et immatérielles (chapitre 11).

C'est également le cas lorsqu'ils appliquent la modélisation quantitative énergétique, utilisée

par les paysagistes lors de l'élaboration de scénarios de transition énergétique dans le contexte néerlandais, car ils s'efforcent de combiner ces données quantitatives avec les caractéristiques territoriales du paysage (chapitre 12). Pour ce faire, comme indiqué au chapitre 7 et comme le soutiennent d'autres chercheurs (*cf.* par exemple Pincetl et al. 2016; Voskamp et al. 2016), des données énergétiques détaillées précisément sont nécessaires. Par exemple, dans le PCAET de la CC du Thouarsais, les données énergétiques concernent l'ensemble de la CC; cela donne certainement une image globale de la situation énergétique, mais ne permet pas d'aller en détail dans les différences entre les communes. Une compréhension plus détaillée au niveau communal pourrait permettre des actions énergétiques plus spécifiques.

En effet, des données détaillées précisément et spatialement explicites peuvent aider à connecter le système énergétique territorial et le paysage. L'importance de ce lien est quelque chose qui émerge également comme un point d'attention important dans la littérature scientifique sur l'architecture de paysage (*cf.* par exemple Sijmons et al. 2014; van den Dobbelsteen, Broersma et Stremke 2011; Oudes et Stremke 2018). L'approche du thème de la transition énergétique du point de vue du paysagiste, en raison de la nature même de sa discipline, pourrait permettre de « ramener sur Terre » le processus de transition énergétique. Cela s'appuie sur ce que McHarg préconisait déjà en 1969 comme un *design with nature*, comme une approche du projet basée sur les caractéristiques du paysage, abordant « la puissance et l'importance du soleil, de la lune et des étoiles, les saisons changeantes, le temps des semences et la récolte, les nuages, la pluie et les rivières, les océans et les forêts, les créatures et les herbes³ » (McHarg 1992, 5).

Paysage et métabolisme territorial

L'attention exprimée par les acteurs sur le développement local du flux énergétique, qui émerge de l'analyse des dessins, mais aussi la manière dont les paysagistes basent et valorisent leur pratique sur les caractéristiques du site, pourrait permettre de créer des liens avec l'écologie territoriale. L'écologie territoriale est une discipline naissante qui se focalise sur les flux d'énergie ou de matières dans les territoires, les replaçant dans leur contexte sociétal et de biosphère (Buclet et al. 2015; Barles 2014), à la fois pour les caractériser, mais aussi pour identifier les voies de transformation. Les recherches sur l'écologie territoriale montrent comment le métabolisme des territoires doit évoluer pour mettre en œuvre une transition socioécologique (Barles 2017). Dans l'un des travaux fondateurs de l'écologie territoriale, *Essai d'écologie territoriale : l'exemple d'Aussois en Savoie* (Buclet et al. 2015), le territoire d'Aussois est analysé sous l'angle des matériaux et des flux à travers plusieurs diagrammes et modélisations également attachés aux caractéristiques économiques et sociales du territoire, mais auxquels manque une perspective paysagère détaillée. L'entrée par le paysage et celle basée sur la modélisation pourraient être complémentaires et se soutenir mutuellement. Dans cette thèse, l'accent mis sur le « paysage » montre ce que les acteurs pensent du processus métabolique dans les territoires dans un cadre de transition énergétique, un prisme qui pourrait contribuer à la compréhension de la relation

³ Traduit de l'anglais par l'auteur « the power and importance of sun, moon, and stars, the changing seasons, seedtime and harvest, clouds, rain and rivers, the oceans and the forests, the creatures and the herbes »

entre société et biosphère dans un écosystème prôné par l'écologie territoriale. Une relation que les paysagistes établissent également lors du projet, combinant des composants matériels et immatériels, et qui pourrait contribuer à graver géographiquement sur la terre les processus métaboliques (Ibañez et Katsikis 2014). C'est la base du « territorialisme » comme « outil de projet à travers lequel lire des situations où des géographies de positions variables, des pratiques individuelles et collectives et des flux [de matière et d'énergie] définissent des territoires⁴ » (Viganò 2014, 139).

Compte tenu de ces éléments, l'entrée par le paysage pourrait également être utile dans les recherches sur la « géographie de l'énergie », où il est mis en avant que le but des recherches futures est de comprendre comment la transition énergétique est spatialement constituée, plutôt qu'un processus qui affecte les lieux (Bridge et al. 2013).

Contribution à la recherche en « architecture de paysage »

Les résultats de cette recherche concordent avec ceux de plusieurs autres chercheurs en « architecture de paysage ». Concernant la transition énergétique, l'idée de développer la multifonctionnalité dans les projets énergétiques figure parmi les principales contributions mises en avant. Cela est conforme à Schöbel et Dittrich (2010) qui considèrent les paysagistes comme étant capables de « réconcilier » les technologies EnR avec les structures existantes dans le paysage en créant des synergies. Cette idée de paysages multifonctionnels est également abordée comme une dimension positive du paysage du point de vue des acteurs, qui affirment une appréciation particulière des projets capables d'intégrer, au-delà du développement énergétique, d'autres dimensions, telles que les fonctions récréatives (chapitre 8). Cela semble conduire à une préférence pour ce que Pasqualetti et Stremke (2018) appellent un « paysage énergétique composant », caractérisé par une dominance spatiale énergétique moindre, par rapport au « paysage énergétique entité » dans lequel l'énergie représente l'utilisation prédominante dans l'utilisation des sols, rendant ces paysages compatibles avec d'autres utilisations et d'autres fonctions.

Cela semble un résultat encourageant, la multifonctionnalité étant l'une des bases d'un paysage durable (Selman 2009). De plus, cette idée fait se rejoindre les préoccupations des paysagistes et celles des agents territoriaux, permettant potentiellement de développer des projets satisfaisant les uns et les autres.

Cette capacité des paysagistes à aborder la multifonctionnalité vient de leur parcours généraliste (Bruns et al. 2010), qui comprend plusieurs domaines disciplinaires tels que les sciences naturelles et les sciences techniques (Bell, Sarlöv Herlin et Stiles 2012). Il en résulte une approche transversale de la transition énergétique incluant différents thèmes (par exemple l'eau, la biodiversité, etc.). Une étude récente, qui analyse la pratique des paysagistes lors de la conception de quartiers écologiques en France et au Royaume-Uni, s'aligne sur le rôle transversal du paysagiste (Leger-Smith 2014). L'auteure montre combien la pratique des paysagistes travaillant sur des sujets écologiques n'a pas beaucoup changé, car elle inclut déjà traditionnellement la gestion de l'eau,

4 Traduit de l'anglais par l'auteur « design tool with which to read situations where geographies of variable positions, individual and collective practices, and flows [of material and energy] define territories ».

de la biodiversité, des sols, des déchets et des matériaux lors de la conception. Par ailleurs, ce caractère transversal est également reconnu dans le traitement de la biodiversité et de la santé humaine par les paysagistes travaillant sur la gestion de l'eau dans les villes (Backhaus, Fryd et Dam 2017). Des similitudes apparaissent également avec la pratique des paysagistes dans la *regional designing* (Kempenaar et van den Brink 2018). Ces auteurs ont identifié sept principes généraux de projet : adopter une perspective systémique, aborder plusieurs échelles géographiques, regarder du passé vers le futur, créer un dialogue continu avec les parties prenantes, repenser le territoire, détecter et réagir, équilibrer direction et ouverture. Ces principes reflètent une perspective stratégique et systémique (ibid.), et ont beaucoup en commun avec les principes que nous avons trouvés utilisés par les paysagistes lorsqu'ils traitent de l'énergie, en particulier en ce qui concerne la perspective système qui suggère cette approche transversale des paysagistes qui tentent de réfléchir aux interactions et aux relations entre les dimensions, les échelles, les secteurs, etc. (chapitres 11 et 13).

Cette thèse contribue aux réflexions sur les limites (frontières) de l'architecture de paysage (Bell, Sarlöv Herlin et Stiles 2012), montrant comment les paysagistes sont mis au défi chaque fois qu'un nouveau sujet entre en jeu, mais qu'ils semblent disposer des « outils » pour l'affronter. Néanmoins, un autre défi illustré par les résultats est également lié à cette capacité transversale des paysagistes qui, grâce à leur parcours généraliste et au large éventail de projets sur lesquels ils peuvent travailler (par exemple parcs, agglomération, échelle territoriale, etc.), peut également donner lieu à des critiques et conduire à d'éventuelles difficultés. Parce que les autres acteurs ont du mal à comprendre le métier de paysagiste et ce que ces professionnels sont capables de faire. Les résultats de cette thèse montrent que cela est surtout vrai dans le contexte français, où du point de vue des acteurs territoriaux (chapitre 13) la figure du paysagiste est floue. En France, cela pourrait également être dû au contexte culturel reliant les différentes professions de concepteurs, où les paysagistes diplômés d'écoles supérieures de paysage n'étaient pas autorisés à utiliser le titre d'« architecte paysagiste », alors qu'en même temps il n'existait pas de réglementation sur l'utilisation de la dénomination « paysagiste » par d'autres professionnels (jardinier, artiste, entrepreneur...). Le titre protégé et reconnu désignant le « paysagiste » est désormais « paysagiste concepteur », terme nouvellement institué par une loi en 2016. Cela illustre la grande complexité du sujet et comment ce qui est un potentiel dans un certain contexte peut aussi devenir un défi si la communication à ce sujet n'est pas assez développée.

Réflexions méthodologiques

La méthode appliquée est une recherche par les études de cas, développée à travers une comparaison internationale entre la France et les Pays-Bas. Cette méthode a été choisie pour sa capacité à étudier des phénomènes complexes (Yin 2009). Cependant, des limites existent, qui sont liées à la sélection et à la généralisation des informations provenant de leur analyse (Flyvbjerg 2006).

Dans cette thèse, les territoires des deux nations ont été choisis en fonction des contextes où notre objet d'étude (paysage en lien avec la transition énergétique) était affiché, au moins dans l'intention, par les collectivités locales (partie 2). En guise de stratégie de recherche complémentaire, des entretiens ont été réalisés avec des paysagistes qui ont travaillé et travaillent

actuellement sur l'énergie (partie 3). Cela conduit à analyser des situations territoriales et des pratiques professionnelles qui ne peuvent pas être considérées comme habituelles/ordinaires. Pour mieux situer ces cas dans un contexte plus large, un moyen a été d'effectuer des enquêtes dans les territoires français (réseau TEPOS) et auprès des associations professionnelles de paysagistes (FFP et NVTL), permettant d'y placer les cas sélectionnés. Et ces enquêtes, notamment dans les cas des territoires français, montrent que les territoires sélectionnés sont encore assez pionniers sur le thème de l'articulation entre paysage et transition énergétique.

Une possibilité aurait été d'inclure des cas aux caractéristiques très différentes (Swaffield 2017), c'est-à-dire d'enquêter également dans des territoires qui ne présentent pas d'« intention » paysagère pour la transition énergétique, afin d'observer s'ils offrent de très fortes différences par rapport aux territoires affichant cette ambition. Cela pourrait être particulièrement intéressant pour l'analyse des instruments de planification et aussi pour étudier le point de vue des acteurs sur le « paysage de la transition énergétique ». Le choix de se concentrer sur des cas reconnus pour leur processus correspond cependant à l'objectif de la recherche d'analyser les « bonnes » pratiques et de mettre en évidence certaines recommandations.

À cette fin, la comparaison internationale entre les contextes français et néerlandais s'est avérée pertinente et fructueuse. Comme prévu, les différences géographiques ainsi que l'approche de la planification et du projet et le contexte et les caractéristiques professionnelles ont permis d'observer des différences qui, même si elles sont ancrées dans des contextes différents, dans lesquels elles doivent être lues, ont conduit à formuler des réflexions. Par exemple, l'étude des deux pays a mis en évidence un flou sur la profession de paysagiste en France par rapport aux Pays-Bas. C'est un sujet qui doit être approfondi, car la non-identification de la profession pourrait restreindre les catégories de missions que les architectes paysagistes seraient susceptibles d'obtenir dans le cadre du processus de transition énergétique et au-delà. La comparaison a également mis en évidence les différences dans les documents de paysage entre les deux nations, qui pourraient également avoir un impact sur l'appropriation différente des documents par les acteurs.

Cependant, il existe des limites à la comparaison internationale, ainsi qu'à celle de contextes différents en général, car la mise en évidence d'un point critique ne signifie pas qu'il pourrait être résolu en appliquant un copier-coller à partir d'un autre contexte. La vision que nous avons d'un paysage, ainsi que de sa planification et d'un projet le concernant est unique et spécifique à chaque lieu, car fondée sur ses caractéristiques physiques et socioculturelles, de sorte que quelque chose qui fonctionne lorsqu'il est développé quelque part ne fonctionnerait pas nécessairement ailleurs (*cf.* par exemple Donadieu 2012). Ce point a également été souligné dans une autre recherche internationale, où il est reconnu que la pratique des paysagistes en France et en Grande-Bretagne en matière d'écologie est également née d'une origine et d'une influence qu'il n'est pas possible de reproduire ailleurs (Leger-Smith 2014). Une attitude similaire est aussi partagée par l'analyse des contextes italien et néerlandais concernant la mise en œuvre de la production d'EnR dans le paysage (Minichino 2014). Et concernant la transition énergétique, l'existence d'« une, aucune, cent mille transitions énergétiques en Europe » est reconnue (Sarrica et al. 2016), et la même chose pourrait être dite à propos du paysage. Néanmoins, il est toujours enrichissant de regarder ce qui se passe ailleurs, cela peut permettre de penser différemment et de comprendre d'autres perspectives, qui pourraient être élaborées et adaptées sur mesure pour différents contextes.

Une méthode particulièrement « fertile » utilisée dans cette recherche, qui a conduit à des résultats très intéressants, est le processus de dessin, en particulier pour obtenir la perspective des acteurs territoriaux. Les dessins des paysagistes ont également amené des contributions fructueuses et ont ajouté une compréhension supplémentaire à leurs récits oraux sur les principes de planification et de projet soucieux de l'énergie (chapitre 13). Cependant, les dessins des acteurs sont particulièrement significatifs, car ils ont permis d'obtenir une perspective paysagère de la transition énergétique de la part de personnes qui y travaillent principalement d'un point de vue politique, technique ou quantitatif. L'acte de dessiner et de « projeter » leur propre « paysage de la transition énergétique » a aidé ces acteurs à dépasser la perspective technique et quantitative, en établissant des connexions avec les dimensions du paysage. Dans leur réflexion sur les paysages de la transition énergétique, par exemple, cela a permis de souligner des omissions, telles que celle des lignes de transport d'électricité, qui sont pourtant au cœur du processus résultant d'une façon plus décentralisée de penser la production d'EnR (*cf.* par exemple Lienert, Suetterlin et Siegrist 2015).

De plus, l'analyse du processus de dessin a permis de mettre en lumière les liens de cause à effet (par exemple les caractéristiques du paysage versus les sources d'EnR utilisées et vice versa) de manière particulièrement significative, mais aussi l'ordre dans lequel les stratégies de transition énergétique (réduction de la consommation d'énergie, optimisation du flux d'énergie, production d'EnR) ont été dessinées, montrant ce qui était pour eux le plus immédiat. La collecte de ce matériel a été possible grâce à la méthode des entretiens individuels semi-directifs, qui a permis d'établir un dialogue en face à face afin d'enregistrer le processus de dessin pour chaque interviewé, dimension qui manque dans d'autres recherches sur la transition énergétique développées à travers des ateliers collectifs, des ateliers qui analysent donc le contenu des représentations graphiques (*cf.* par exemple Devine-Wright et Devine-Wright 2009). Néanmoins, des limites sont reconnues à cette méthode du fait que les acteurs ne dessinent peut-être pas des éléments complexes qu'ils ont du mal à représenter; c'est pourquoi il a été demandé aux acteurs de décrire avec des mots ce qu'ils étaient en train de dessiner, reconnaissant en outre que les représentations visuelles ne fournissent qu'une image partielle du paysage (Lange 2011).

Enfin, la recherche sur un processus en cours tel que la transition énergétique conduit à des résultats qui doivent être considérés et appréciés dans un contexte très évolutif et changeant. Par exemple, au début de cette thèse, il n'y avait pas d'encouragement explicite, d'un point de vue institutionnel, à relier le plan de paysage français et la transition énergétique. Or, ce lien est une réalité et a été explicitement abordé dans le récent appel du ministère pour le plan de paysage (2019) (chapitre 4). Sur certains points, cette recherche a été précurseuse sur le sujet, et les premiers résultats sur la situation française nourrie par la situation néerlandaise pourraient fournir une base solide fournissant quelques recommandations, explicitées dans la section suivante.

7. Recommandations pour les politiques publiques, les praticiens et les recherches futures

Recommandations de politique publiques

Comme précédemment indiqué dans cette thèse, le ministère de la Transition écologique et solidaire est chargé à la fois de la transition énergétique et du paysage. Néanmoins, il a développé les TEPCV (territoire à énergie positive pour la croissance verte) et ensuite les CTE (contrat de transition écologique), pour inciter des territoires à s'engager dans des processus de transition énergétique à travers un support financier, sans établir de relation avec le plan de paysage. Plan de paysage pour lequel le même ministère a lancé depuis 2019 des appels à projets annuels qui incitent spécifiquement les territoires à traiter le projet de paysage en relation avec le thème de la transition énergétique. Les deux outils ayant le même objectif principal, qui est d'accompagner la transition énergétique des territoires, des synergies doivent être établies. Par exemple, les territoires désormais engagés dans un CTE devraient développer simultanément un plan de paysage, afin d'inclure une perspective paysagère dans le processus en cours, et non, comme c'est souvent le cas, de ne prendre en compte le paysage qu'une fois les stratégies réglées, comme moyen de réduire d'éventuelles oppositions locales. Cela pourrait également aider à résoudre l'un des défis mentionnés par les paysagistes au chapitre 13, à propos de l'inclusion tardive de la perspective du paysage dans le processus de transition.

Aborder simultanément la perspective du paysage et l'élaboration d'une stratégie de transition pourrait favoriser une plus grande intégration des projets énergétiques dans le paysage physique et humain (Pasqualetti 2011). Pour cette raison, le PCAET, un document de planification axé sur « climat-air-énergie » à l'échelon communal et intercommunal définissant des objectifs énergétiques à court et long terme, devrait également inclure une dimension paysagère, ce qui pourrait se faire en établissant des liens avec le plan de paysage.

Cela pourrait s'inspirer (mais sans une attitude de copier-coller) de ce qui a été observé aux Pays-Bas où, à travers la *Regionale Energie Strategieën* énoncée dans le national *Klimaatakkoord* (2019), les territoires doivent développer une approche intégrative combinant objectifs énergétiques et « qualité spatiale » couvrant tout le territoire néerlandais. De plus, le PCAET pourrait être étendu à des communes ou autres groupements de moins de 20 000 habitants, afin que chaque mètre carré de France ait des objectifs énergétiques à court et long terme. Ces deux éléments combinés pourraient permettre d'avoir en France toute une couverture du territoire national avec des objectifs de qualité paysagère associés à ceux de la transition énergétique. La France est moins densément peuplée et dispose dans de nombreuses régions d'un espace plus « libre », mais ce n'est pas une raison pour ne pas se soucier de qualité paysagère pour l'ensemble du cadre de vie national.

Enfin, une plus grande implication des paysagistes dans l'élaboration des instruments de planification pourrait être envisagée et encouragée, car comme le montre le chapitre 7 ces instruments impliquent de nombreuses décisions sur le paysage et la transition énergétique, mais le lien est faible et n'est pas directement établi. Et c'est dans cette logique que les institutions

locales de la CC du Thouarsais ont décidé de développer une OAP, qui donne aux institutions locales un cadre à suivre pour la mise en œuvre d'éoliennes dans le paysage, et cela est inclus dans le PLUi, un document obligatoire contraignant (chapitres 3 et 7).

Recommandations pour la pratique future des paysagistes

Comme le mentionne Cooper (2017), les unités énergétiques doivent être utilisées et reconnues en sciences sociales afin d'améliorer l'impact de ces dernières et leur permettre d'être prises plus au sérieux dans le domaine énergétique encore très guidé par des approches d'ingénierie quantitative.

Les paysagistes, pour pouvoir contribuer à la transition énergétique, doivent apprendre à prendre en compte la composante quantitative et technique de l'énergie afin d'avoir un impact plus large. Cela est également corroboré par les conclusions de De Waal et al. (2015) qui, à travers l'analyse des entrées d'un concours pour le projet d'un territoire aux Pays-Bas dans le cadre de sa transition énergétique, mettent en évidence un écart entre la science de l'énergie existant dans la littérature scientifique et la pratique des paysagistes. L'importance d'acquérir des connaissances dans ce domaine se retrouve également dans l'examen de la pratique des paysagistes dans les écoquartiers, où ils abordent insuffisamment le thème de la production d'EnR, faute de connaissances sur le sujet (Leger-Smith 2014).

L'acquisition de ces connaissances permet de développer des projets plus adéquats et d'améliorer le dialogue avec les autres disciplines, dialogue nécessaire pour travailler sur ces projets complexes. Cela pourrait entraîner un besoin de spécialisation de certains paysagistes professionnels dans les domaines de l'énergie. Néanmoins, les paysagistes doivent collaborer avec d'autres experts dans des projets liés à la transition énergétique, une collaboration intersectorielle est considérée comme cruciale pour atteindre des objectifs de durabilité (Musacchio 2008).

Dans le même temps, l'approche généraliste et transversale du paysagiste doit être préservée, car elle peut favoriser le développement de synergies entre thèmes (par exemple l'eau, la biodiversité, etc.) en développant un projet capable d'intégrer une vision plus globale et répondant à différentes problématiques. En effet, les résultats montrent que les pratiques des paysagistes n'ont pas radicalement changé quand ils travaillent sur l'énergie. Les connaissances traditionnelles des paysagistes (par exemple la topographie, l'hydrographie et la géologie, l'écologie) sont considérées comme précieuses et nécessaires, ainsi que leurs activités de projet habituelles (par exemple, représentation graphique du projet et réalisation d'une analyse approfondie de paysage).

Les paysagistes ont souligné que l'acquisition de connaissances supplémentaires spécifiques à l'énergie était un défi, et la majorité d'entre eux apprennent « sur le terrain ». Ces résultats pourraient avoir un impact sur la formation, en faisant entrer les sujets énergétiques dans les programmes académiques d'architecture de paysage. Cette affirmation ne doit pas être comprise comme signifiant que l'énergie doit devenir le thème principal, mais elle devrait au moins être abordée dans certains cursus, à la fois en cours magistraux et en atelier de projet, pour mieux préparer les étudiants à l'entrée dans le monde du travail. Cela pourrait être utile de deux points de vue : premièrement, cela pourrait permettre aux étudiants de mieux traiter le sujet si on le leur demandait ; deuxièmement, ils pourraient également adopter une approche proactive et aborder le sujet de l'énergie également lorsqu'ils traitent d'autres sujets.

La transition vers une réduction de la consommation d'énergie et la promotion de la production d'EnR étant l'un des moyens de lutter contre le changement climatique, cela pourrait être d'une importance majeure pour les années à venir.

Pour aller encore plus loin, il pourrait être bénéfique dans les programmes des étudiants d'inclure des activités pédagogiques telles que des workshops, en suscitant des collaborations entre étudiants paysagistes et issus d'autres disciplines, comme l'ingénierie. Cela permettrait aux étudiants de faire l'expérience bénéfique de la collaboration avant d'entrer dans le monde du travail et d'être ainsi plus libres et plus ouverts à l'expérimentation. Ces collaborations pédagogiques pourraient amener les étudiants de chaque discipline à comprendre les potentialités et les faiblesses de l'autre et à unir leurs forces pour atteindre l'objectif commun du projet pour la transition énergétique.

À l'ENSP (École nationale supérieure de paysage) de Versailles, certaines expériences de ce type vont dans ce sens et peuvent être mentionnées. L'une a été, en 2017, le workshop international « Imaginer le paysage énergétique du futur du Plateau de Saclay »⁵, au cours duquel des étudiants paysagistes et des étudiants en architecture, design et ingénierie ont collaboré en groupes pluridisciplinaires afin de développer des projets alliant les aspects techniques à l'art, pour apporter aux infrastructures de production d'EnR des solutions innovantes et en quelque sorte visionnaires, mais ancrées dans le territoire et spécifiques au site.

En 2019, un autre workshop, autour du monde rural, intitulé « Stratégies énergétiques territoriales et paysagères, vers des paysages agricoles à énergie positive », a été développé à travers une collaboration entre futurs paysagistes et étudiants en agronomie. Ces ateliers, même s'ils sont enrichissants d'un point de vue pédagogique, sont cependant complexes à organiser, car ils regroupent plusieurs universités aux calendriers et aux objectifs pédagogiques différents. De plus, ils nécessitent souvent un financement extérieur pour le développement du projet, la Chaire paysage et énergie pour la première et la Fondation Charles Léopold Mayer pour le Progrès de l'Homme pour la seconde. Cela montre également la complexité liée à la nécessité de mobiliser des entités pédagogiques extérieures au sujet d'intérêt afin de pouvoir développer de tels workshops.

Recommandations pour la pratique future des acteurs de la transition énergétique

Pour la majorité des acteurs, l'idée de développer la transition énergétique d'un territoire est une question de chiffres et de définition des quantités d'énergie pour décrire la situation actuelle et fixer des objectifs et des stratégies à court et long terme, concernant la production d'EnR et la réduction de consommation l'énergie. L'idée d'une transition énergétique « ancrée » dans les territoires du point de vue des acteurs est différente de l'approche des paysagistes, mais les deux sont également nécessaires et complémentaires. En d'autres termes, c'est la différence entre l'énergie par mètre carré et l'énergie par paysage compte tenu de toutes les dimensions

5 Collaboration entre "Land Art Generator Initiative" (LAGI), la *Chaire paysage et énergie* de l'ENSP Versailles, CentraleSupélec, l'ENSA Versailles, le Design Center de Saclay, la Diagonale Paris-Saclay.

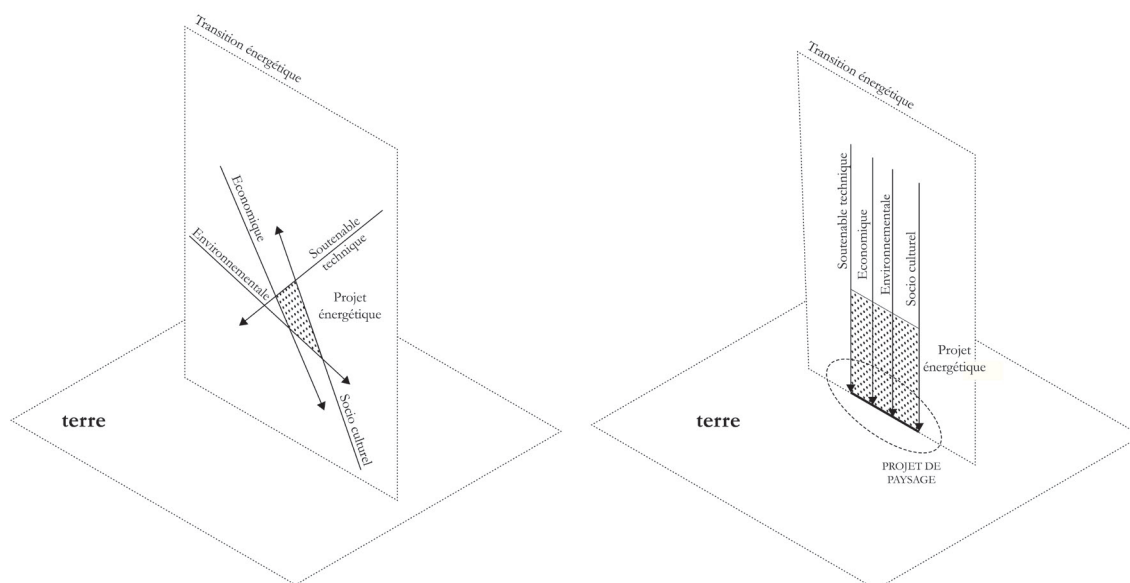


Figure 2. Schéma des projets énergétiques résultant des différentes contraintes des critères (à gauche), et projet énergétique avec un projet de paysage intégré (à droite). Source : auteur

que cela comprend. Stremke (2015) a élaboré un cadre pour le projet de « paysages énergétiques durables », qui doit tenir compte de critères techniques, de critères environnementaux, de critères économiques et de critères socioculturels. Cela signifie que tous ces critères doivent être pris en compte dans le projet de paysage pour des projets énergétiques. Le chapitre 8 montre comment la représentation sociale du paysage de la transition énergétique par les acteurs inclut ces différents critères, même s'ils présentent une importance différente en fonction de chaque situation.

En abordant ces critères ensemble, le projet de paysage pourrait aider à les conduire dans la même direction, en développant toujours une collaboration avec d'autres acteurs et disciplines, ramenant le projet énergétique sur Terre (figure 2 à droite). De cette manière, le projet énergétique n'est plus le résultat d'une simple addition quantitative et technique, mais construit comme synthèse des différentes contraintes que ces critères induisent (figure 2 à gauche).

Ouverture pour des recherches future

Dans cette recherche a été étudié si et dans quelle mesure les trois stratégies de transition énergétique – (1) réduction de la consommation d'énergie, (2) optimisation du flux énergétique et (3) production d'EnR – sont reconnues et traitées dans le cadre de la planification et du projet de paysage. Les résultats montrent que la 1^{re} et la 2^e stratégie, même si elles sont reconnues, sont insuffisamment abordées par rapport à la 3^e (cf. chapitres 7, 8, 9, 12). Les recherches futures devraient contribuer à la compréhension approfondie des deux premières stratégies du point de vue du paysage, stratégies qui ont progressivement pris de l'importance (par exemple scénario *négaWatt*, LTECV, *Klimatakkoord*). Les paysagistes les considèrent également, en particulier la réduction de la consommation d'énergie, comme des étapes de conception importantes à prendre en compte lors de tout projet, et la manière dont ils le font pourrait faire l'objet

d'une enquête plus approfondie. Ce point pourrait conduire à ouvrir cette exploration sur les villes et les métropoles, qui sont déjà soumises et continueront à faire face à des changements importants, où l'optimisation des flux d'énergie et la réduction de la consommation sont des enjeux majeurs. Cela pourrait aller dans le sens mis en évidence dans d'autres recherches (*cf.* par exemple Castán Broto 2017) qui montrent comment le concept de paysage énergétique pourrait soutenir l'analyse des systèmes urbains pour définir une transition énergétique urbaine.

Un autre point qui pourrait être approfondi est celui de la signification donnée au paysage par les habitants, surtout lorsqu'ils appartiennent à deux pays différents. Comme expliqué dans l'introduction de la thèse, « paysage » et « landschap » ont des significations différentes et, à travers le prisme de la transition énergétique, certaines de ces différences commencent à se renforcer. L'exemple le plus évident ressort du processus de dessin (chapitre 9), où les acteurs français commencent par dessiner le « paysage », donc les collines, la rivière et d'autres éléments morphologiques auxquels ils superposent la « couche » énergétique (Pasqualetti 2013), tandis que les interviewés néerlandais dessinent des principes énergétiques qui, progressivement, aboutissent à un paysage. Il semble par là que les acteurs aient deux manières différentes de penser ce qui « fait paysage ».

La transition énergétique est un processus abordé par un large éventail de concepteurs. Dans cette thèse, je me concentre sur les paysagistes, mais il pourrait être intéressant d'enquêter également sur d'autres concepteurs (par exemple les architectes, les urbanistes) qui collaborent souvent à des projets liés à l'énergie. Une telle exploration pourrait ajouter une compréhension de leurs rôles respectifs, révéler les différences et les nécessités pour mieux développer un dialogue entre disciplines et faire avancer les projets en commun.

Pour conclure

Je voudrais conclure cette recherche en utilisant une métaphore mentionnée par Lucrèce, auteur latin du I^{er} siècle av. J.-C., qui explique comment son *De rerum natura* [Sur la nature des choses] cherche à éduquer les gens tout en les divertissant. Il compare son grand poème au miel mis sur les bords d'un verre afin d'adoucir le goût du médicament pour la personne qui doit le prendre. Le projet de paysage a souvent été considéré comme le miel sur le verre pour rendre la « médecine » de la transition énergétique plus acceptable. Dans cette thèse, j'affirme et je soutiens au contraire l'idée qu'il doit être un composant de la médecine elle-même.

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Annex 1

The following search strings were used in SCOPUS:

TITLE-ABS-KEY ({Energy transition} AND (landscap* OR space OR spatial OR cit* OR region OR territ* OR urba* OR rural)) AND (EXCLUDE (SUBJAREA,"PHYS") OREXCLUDE (SUBJAREA,"CHEM") OR EXCLUDE (SUBJAREA,"BIOC") OR EXCLUDE (SUBJAREA,"COMP") OR EXCLUDE(SUBJAREA, "MATH") OR EXCLUDE (SUBJAREA,"CENG") OR EXCLUDE (SUBJAREA,"MEDI") OR EXCLUDE (SUBJAREA,"HEAL"))

719 documents founded in November 2018 of which at the end 90 were consistent with the research.

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65	Oudes, D., & Stremke, S. (2018). Spatial transition analysis: Spatially explicit and evidence-based targets for sustainable energy transition at the local and regional scale. <i>Landscape and Urban Planning</i> , 169(Supplement C), 1–11.
66	Paul, F. C. (2018). Deep entanglements: History, space and (energy) struggle in the German Energiewende. <i>Geoforum</i> , 91, 1–9.
67	Pesic, N., Calzada, J. R., & Alcojor, A. M. (2018). Natural ventilation potential of the Mediterranean coastal region of Catalonia. <i>Energy and Buildings</i> , 169, 236–244.
68	Poupeau, F.-M. (2014). Central-Local Relations in French Energy Policy-Making: Towards a New Pattern of Territorial Governance. <i>Environmental Policy and Governance</i> , 24(3), 155–168.
69	Rauner, S., Eichhorn, M., & Thrän, D. (2016). The spatial dimension of the power system: Investigating hot spots of Smart Renewable Power Provision. <i>Applied Energy</i> , 184, 1038–1050.
70	Ritchie, H., Hardy, M., Lloyd, M. G., & McGreal, S. (2013). Big Pylons: Mixed signals for transmission. Spatial planning for energy distribution. <i>Energy Policy</i> , 63, 311–320.
71	Rizzo, A. (2017). Managing the energy transition in a tourism-driven economy: The case of Malta. <i>Sustainable Cities and Society</i> , 33, 126–133.
72	Rocher, L. (2017). Governing metropolitan climate-energy transition: A study of Lyon’s strategic planning. <i>Urban Studies</i> , 54(5), 1092–1107.
73	Sareen, S., & Haarstad, H. (2018). Bridging socio-technical and justice aspects of sustainable energy transitions. <i>Applied Energy</i> , 228, 624–632.
74	Sarrica, M., Carman, P., Brondi, S., & Mazzara, B. M. (2015). Beyond Wind Turbines, Solar Panels and Beautiful Landscapes: Figurative Components of Sustainable Energy in Italy. <i>Revue internationale de psychologie sociale</i> , Tome 28(4), 81–112.

75	Schaffartzik, A., Brad, A., & Pichler, M. (2017). A world away and close to home: The multi-scalar 'making of' Indonesia's energy landscape. <i>Energy Policy</i> , 109, 817–824.
76	Scheidel, A., & Sorman, A. H. (2012). Energy transitions and the global land rush: Ultimate drivers and persistent consequences. <i>Global Environmental Change</i> , 22(3), 588–595.
77	Skjølsvold, T. M., Throndsen, W., Ryghaug, M., Fjellså, I. F., & Koksvik, G. H. (2018). Orchestrating households as collectives of participation in the distributed energy transition: New empirical and conceptual insights. <i>Energy Research & Social Science</i> , 46, 252–261.
78	Späth, L. (2018). Large-scale photovoltaics? Yes please, but not like this! Insights on different perspectives underlying the trade-off between land use and renewable electricity development. <i>Energy Policy</i> , 122, 429–437.
79	Stremke, S., & Koh, J. (2010). Ecological Concepts and Strategies with Relevance to Energy-Conscious Spatial Planning and Design. <i>Environment and Planning B: Planning and Design</i> , 37(3), 518–532.
80	Stremke, S., & Koh, J. (2011). Integration of ecological and thermodynamic concepts in the design of sustainable energy landscapes. <i>Landscape Journal</i> , 30(2), 194–213.
81	Talandier, M. (2018). Are there urban contexts that are favourable to decentralised energy management? <i>Cities</i> . 82, 45-57
82	Tena, D. L. de, & Pregger, T. (2018). Impact of electric vehicles on a future renewable energy-based power system in Europe with a focus on Germany. <i>International Journal of Energy Research</i> , 42(8), 2670–2685.
83	Tronchin, L., Manfren, M., & Nastasi, B. (2018). Energy efficiency, demand side management and energy storage technologies – A critical analysis of possible paths of integration in the built environment. <i>Renewable and Sustainable Energy Reviews</i> , 95, 341–353.
84	van der Kam, M. J., Meelen, A. A. H., van Sark, W. G. J. H. M., & Alkemade, F. (2018). Diffusion of solar photovoltaic systems and electric vehicles among Dutch consumers: Implications for the energy transition. <i>Energy Research & Social Science</i> , 46, 68–85.
85	van Zalk, J., & Behrens, P. (2018). The spatial extent of renewable and non-renewable power generation: A review and meta-analysis of power densities and their application in the U.S. <i>Energy Policy</i> , 123, 83–91.
86	Vandevyvere, H., & Stremke, S. (2012). Urban Planning for a Renewable Energy Future: Methodological Challenges and Opportunities from a Design Perspective. <i>Sustainability</i> , 4(6), 1309–1328.
87	Wächter, P., Ornetzeder, M., Rohracher, H., Schreuer, A., & Knoflacher, M. (2012). Towards a Sustainable Spatial Organization of the Energy System: Backcasting Experiences from Austria. <i>Sustainability</i> , 4(2), 193–209.
88	Yazdanpanah, M., Komendantova, N., & Ardestani, R. S. (2015). Governance of energy transition in Iran: Investigating public acceptance and willingness to use renewable energy sources through socio-psychological model. <i>Renewable and Sustainable Energy Reviews</i> , 45, 565–573.
89	Yenneti, K., Day, R., & Golubchikov, O. (2016). Spatial justice and the land politics of renewables: Dispossessing vulnerable communities through solar energy mega-projects. <i>Geoforum</i> , 76, 90–99.
90	Zhao, P., & Pendlebury, J. (2014). Spatial planning and transport energy transition towards a low carbon system. <i>DisP - The Planning Review</i> , 50(3), 20–30.

Annex 2

Search strings for the first and second layer of inquiry

The following search strings were used in SCOPUS:

First level of inquiry: concepts

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((TITLE((energ* AND ({planning} OR {design}) AND (space OR spatial OR urban OR rural OR territorial OR territory OR infrastructur* OR landscap* OR cit*)) ) OR KEY((energ* AND ({planning} OR {design}) AND (space OR spatial OR urban OR territorial OR territory OR infrastructur* OR landscap* OR cit*)) ) AND DOCTYPE(ar OR re) AND SUBJAREA(MULT OR AGRI OR BIOC OR IMMU OR NEUR OR PHAR OR MULT OR CENG OR CHEM OR COMP OR EART OR ENER OR ENGI OR ENVI OR MATE OR MATH OR PHYS OR MULT OR ARTS OR BUSI OR DECI OR ECON OR PSYC OR SOCI) AND ( LIMIT-TO(LANGUAGE, "English") OR LIMIT-TO(LANGUAGE, "French") ) AND ( EXCLUDE(SUBJAREA, "COMP") OR EXCLUDE(SUBJAREA, "PHYS") OR EXCLUDE(SUBJAREA, "MEDI") OR EXCLUDE(SUBJAREA, "EART") OR EXCLUDE(SUBJAREA, "CHEM") OR EXCLUDE(SUBJAREA, "CENG") OR EXCLUDE(SUBJAREA,"BIOC") OR EXCLUDE(SUBJAREA, "MATH") OR EXCLUDE(SUBJAREA,"BUSI") OR EXCLUDE(SUBJAREA, "ECON") OR EXCLUDE(SUBJAREA, "HEAL") OR EXCLUDE(SUBJAREA, "IMMU") OR EXCLUDE(SUBJAREA, "PSYC") OR EXCLUDE(SUBJAREA, "NEUR") OR EXCLUDE(SUBJAREA, "NURS") ) ) )
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Second level of inquiry:

- a) "Urban metabolism" AND (energ*) AND ("plann*" OR "design*" OR architect* OR space OR spatial OR urban OR rural OR territorial OR territory OR infrastructur* OR landscap* OR cit*)
- b) "Circular economy" AND (energ*) AND ("plann*" OR "design*" OR architect* OR space OR spatial OR urban OR rural OR territorial OR territory OR infrastructur* OR landscap* OR cit*)
- c) "cradle to cradle" AND (energ*) AND ("plann*" OR "design*" OR architect* OR space OR spatial OR urban OR rural OR territorial OR territory OR infrastructur* OR landscap* OR cit*)

An asterisk following words (wildcards) indicate that the search engine will allow variations of these words to be accepted (e.g. "function*" to indicate a search for "function" but also "functioning", etc.). Quotation marks signify that only the exact phrase will be allowed in the search results.

Excluded articles at full text for the First layer of inquiry.

Ref ID	Reference	Reason to discard
N1	Aranda Usón, A., Ferreira, G., Zambrana Vásquez, D., Zabalza Bribián, I., & Llera Sastresa, E. (2013). Environmental-benefit analysis of two urban waste collection systems. <i>Science of The Total Environment</i> , 463–464, 72–77.	Major focus about waste not energy and absence of a well-defined concept
N2	Benjamin, M. F. D., Ubando, A. T., Razon, L. F., & Tan, R. R. (2015). Analyzing the disruption resilience of bioenergy parks using dynamic inoperability input–output modeling. <i>Environment Systems and Decisions</i> , 35(3), 351–362.	Prevailing of technical aspect
N3	Botsaris, P. N. (2015). An approach of the spatial planning of a photovoltaic park using the Constructal Theory. <i>Sustainable Energy Technologies and Assessments</i> , 11, 11–16.	Prevailing of technical aspect
N4	Byrd, H., & Matthewman, S. (2014). Exergy and the City: The Technology and Sociology of Power (Failure). <i>Journal of Urban Technology</i> , 21(3), 85–102.	Prevailing of technical and quantitative aspect
N5	Dong, Y., Xia, B., & Chen, W. (2014). Carbon footprint of urban areas: An analysis based on emission sources account model. <i>Environmental Science & Policy</i> , 44, 181–189.	Accounting/quantification methods
N6	Gobattoni, F., Pelorosso, R., Lauro, G., Leone, A., & Monaco, R. (2011). A procedure for mathematical analysis of landscape evolution and equilibrium scenarios assessment. <i>Landscape and Urban Planning</i> , 103(3), 289–302.	Absence of energy focus and prevailing of technical/mathematical aspect
N7	Hooimeijer, F. L., Puts, H., & Geerdink, T. (2016). Successful Development of Decentralised District Heating: Application of a Theoretical Framework. <i>Journal of Settlements and Spatial Planning</i> , 19–30	Absence of a well-defined concept for energy management
N8	Mehmood, A. (2010). On the History and Potentials of Evolutionary Metaphors in Urban Planning. <i>Planning Theory</i> , 9(1), 63–87	Absence of energy focus
N9	Páez, A. (2010). Energy-urban transition: The Mexican case. <i>Energy Policy</i> , 38(11), 7226–7234.	Absence of a well-defined concept for energy management
N10	Pelorosso, R., Gobattoni, F., Geri, F., Monaco, R., & Leone, A. (2016). Evaluation of Ecosystem Services related to Bio-Energy Landscape Connectivity (BELC) for land use decision making across different planning scales. <i>Ecological Indicators</i> , 61, 114–129.	Prevailing of technical and quantitative aspect
N11	Soutullo, S., Sanchez, M. N., Olmedo, R., & Heras, M. R. (2011). Theoretical model to estimate the thermal performance of an evaporative wind tower placed in an open space. <i>Renewable Energy</i> , 36(11), 3023–3030.	Prevailing of technical aspect
N12	Strømman-Andersen, J., & Sattrup, P. A. (2011). The urban canyon and building energy use: Urban density versus daylight and passive solar gains. <i>Energy and Buildings</i> , 43(8), 2011–2020.	Prevailing of technical aspect

N13	Wang, S.-H., Huang, S.-L., & Budd, W. W. (2012). Integrated ecosystem model for simulating land use allocation. <i>Ecological Modelling</i> , 227, 46–55.	Prevailing accounting model
N14	Yanık, S., Sürer, Ö., & Öztayşi, B. (2016). Designing sustainable energy regions using genetic algorithms and location-allocation approach. <i>Energy</i> , 97, 161–172.	Absence of a well-defined concept for energy management
N15	Zhang, Y., Li, S., Fath, B. D., Yang, Z., & Yang, N. (2011). Analysis of an urban energy metabolic system: Comparison of simple and complex model results. <i>Ecological Modelling</i> , 223(1), 14–19.	Prevailing accounting model

Excluded articles as full text “urban metabolism”

Ref ID	Reference Urban metabolism	Reason to discard
N1	Athanassiadis, A., Bouillard, P., Crawford, R. H., & Khan, A. Z. (2017). Towards a Dynamic Approach to Urban Metabolism: Tracing the Temporal Evolution of Brussels’ Urban Metabolism from 1970 to 2010. <i>Journal of Industrial Ecology</i> , 21(2), 307–319.	Absence of energy planning and design principles
N2	Bai, X. (2016). Eight energy and material flow characteristics of urban ecosystems. <i>Ambio</i> , 45(7), 819–830.	Absence of energy planning and design principles
N3	Barles, S. (2010). Society, energy and materials: the contribution of urban metabolism studies to sustainable urban development issues. <i>Journal of Environmental Planning and Management</i> , 53(4), 439–455.	Absence of energy planning and design principles
N4	Conke, L. S., & Ferreira, T. L. (2015). Urban metabolism: Measuring the city’s contribution to sustainable development. <i>Environmental Pollution</i> , 202, 146–152.	Accounting/quantification methods, absence of energy planning and design principles
N5	Giordano, P., Caputo, P., & Vancheri, A. (2014). Fuzzy evaluation of heterogeneous quantities: Measuring urban ecological efficiency. <i>Ecological Modelling</i> , 288(C), 112–126.	Accounting/quantification model, absence of energy planning and design principles
N6	Golubiewski, N. (2012). Is there a metabolism of an urban ecosystem? An ecological critique. <i>Ambio</i> , 41(7), 751–764.	Absence of energy focus and energy planning and design principles
N7	Lei, K., Liu, L., & Lou, I. (2018). An evaluation of the urban metabolism of Macao from 2003 to 2013. <i>Resources, Conservation and Recycling</i> , 128, 479–488.	Absence of energy planning and design principles
N8	Voskamp, I. M., Stremke, S., Spiller, M., Perrotti, D., Hoek, J. P. van der, & Rijnaarts, H. H. M. (2017). Enhanced Performance of the Eurostat Method for Comprehensive Assessment of Urban Metabolism: A Material Flow Analysis of Amsterdam. <i>Journal of Industrial Ecology</i> , 21(4), 887–902.	Absence of energy planning and design principles and absence energy focus
N9	Zhang, Y., Yang, Z., & Yu, X. (2015). Urban Metabolism: A Review of Current Knowledge and Directions for Future Study. <i>Environmental Science & Technology</i> , 49(19), 11247–11263.	bsence energy focus and of energy planning and design principles

Excluded articles as full text “circular economy”

Ref ID	Reference Circular economy	Reason to discard
N1	Brand, U., & von Gleich, A. (2015). Transformation toward a Secure and Precaution-Oriented Energy System with the Guiding Concept of Resilience—Implementation of Low-Exergy Solutions in Northwestern Germany. <i>Energies</i> , 8(7), 6995–7019.	Circular economy it’s only quoted in the key-words and not developed in the paper
N2	Dienst, C., Schneider, C., Xia, C., Saurat, M., Fischer, T., & Vallentin, D. (2013). On Track to Become a Low Carbon Future City? First Findings of the Integrated Status Quo and Trends Assessment of the Pilot City of Wuxi in China. <i>Sustainability</i> , 5(8), 3224–3243.	Absence of energy planning and design principles
N3	Geng, Y., Fu, J., Sarkis, J., & Xue, B. (2012). Towards a national circular economy indicator system in China: an evaluation and critical analysis. <i>Journal of Cleaner Production</i> , 23(1), 216–224.	Absence energy focus and of energy planning and design principles
N4	Kalmykova, Y., Rosado, L., & Patrício, J. (2016). Resource consumption drivers and pathways to reduction: economy, policy and lifestyle impact on material flows at the national and urban scale. <i>Journal of Cleaner Production</i> , 132, 70–80.	Absence energy focus and of energy planning and design principles
N5	Kuznetsova, E., Zio, E., & Farel, R. (2016). A methodological framework for Eco-Industrial Park design and optimization. <i>Journal of Cleaner Production</i> , 126, 308–324.	Prevailing of industrial component, absence of energy planning and design principles
N6	Mathews, J. A., & Tan, H. (2016). Circular economy: Lessons from China. <i>Nature</i> , 531(7595), 440–442.	Absence energy focus
N7	Stahel, W. R. (2016). The circular economy. <i>Nature</i> , 531(7595), 435–438.	Absence of energy focus and energy planning and design principles
N8	Stephan, A., & Athanassiadis, A. (2017). Quantifying and mapping embodied environmental requirements of urban building stocks. <i>Building and Environment</i> , 114, 187–202.	Absence of energy planning and design principles
N9	Wu, H., Shi, Y., Xia, Q., & Zhu, W. (2014). Effectiveness of the policy of circular economy in China: A DEA-based analysis for the period of 11th five-year-plan. <i>Resources, Conservation and Recycling</i> , 83, 163–175.	Absence of energy planning and design principles
N10	Yu, C., Jong, M. de, & Cheng, B. (2016). Getting depleted resource-based cities back on their feet again – the example of Yichun in China. <i>Journal of Cleaner Production, Part A</i> (134), 42–50.	Absence energy focus and of energy planning and design principles

List and full references of reviewed articles for the first layer of inquire (concepts); number referring to each paper for the understanding of Figure 2 (Clusters of papers with relative importance of spatial and energy aspects); list of concepts found in each paper.

Num. Ref	Reference	Concept(s) highlighted in the paper
1	Ala-Juusela, M., Sepponen, M., & Crosbie, T. (2016). Defining and Operationalising the Concept of an Energy Positive Neighbourhood. <i>Energy Conversion and Management</i> , 125, 133–140.	Energy positive neighborhood
2	Becchio, C., Corgnati, S. P., Delmastro, C., Fabi, V., & Lombardi, P. (2016). The role of nearly-zero energy buildings in the transition towards Post-Carbon Cities. <i>Sustainable Cities and Society</i> , 27, 324–337	Post carbon city
3	Dong, L., Fujita, T., Dai, M., Geng, Y., Ren, J., Fujii, M., ... Ohnishi, S. (2016). Towards preventative eco-industrial development: an industrial and urban symbiosis case in one typical industrial city in China. <i>Journal of Cleaner Production</i> , 114, 387–400.	Industrial urban symbiosis, circular economy
4	Khan, F., & Pinter, L. (2016). Scaling indicator and planning plane: An indicator and a visual tool for exploring the relationship between urban form, energy efficiency and carbon emissions. <i>Ecological Indicators</i> , 67, 183–192.	Natural/urban ecosystems, hierarchical organization, allometry
5	Lugaric, L., & Krajcar, S. (2016). Transforming cities towards sustainable low-carbon energy systems using energy synthesis for support in decision making. <i>Energy Policy</i> , 98, 471–482.	Smart energy city/smart city, energy
6	Sharifi, A., & Yamagata, Y. (2016). Principles and criteria for assessing urban energy resilience: A literature review. <i>Renewable and Sustainable Energy Reviews</i> , 60, 1654–1677.	Resilience
7	Zuazua-Ros, A., Martín-Gómez, C., Bermejo-Busto, J., Vidaurre-Arbizu, M., Baquero, E., & Miranda, R. (2016). Thermal energy performance in working-spaces from biomorphic models: The tuna case in an office building. <i>Building Simulation</i> , 9(3), 347–357.	Biomimicry
8	Chen, S., & Chen, B. (2015). Urban energy consumption: Different insights from energy flow analysis, input–output analysis and ecological network analysis. <i>Applied Energy</i> , 138, 99–107.	Urban metabolism
9	Douglas, I. (2014). The political filter in the local implementation of initiatives relating to urban ecology. <i>Landscape and Urban Planning</i> , 125, 312–319.	Urban ecology, eco city, eco town

10	Han, Y., Taylor, J. E., & Pisello, A. L. (2015). Toward mitigating urban heat island effects: Investigating the thermal-energy impact of bio-inspired retro-reflective building envelopes in dense urban settings. <i>Energy and Buildings</i> , 102, 380–389.	Bimimicry
11	Sun, L., Dong, H., Geng, Y., Li, Z., Liu, Z., Fujita, T., ... Fujii, M. (2016). Uncovering driving forces on urban metabolism—A case of Shenyang. <i>Journal of Cleaner Production</i> , 114, 171–179.	Urban metabolism, circular economy, industrial and urban symbiosis, emergy, natural/urban ecosystem
12	Dong, L., Gu, F., Fujita, T., Hayashi, Y., & Gao, J. (2014). Uncovering opportunity of low-carbon city promotion with industrial system innovation: Case study on industrial symbiosis projects in China. <i>Energy Policy</i> , 65, 388–397.	Low carbon cities, industrial and urban symbiosis
13	Moscovici, D., Dilworth, R., Mead, J., & Zhao, S. (2015). Can sustainability plans make sustainable cities? The ecological footprint implications of renewable energy within Philadelphia's Greenworks Plan. <i>Sustainability: Science, Practice and Policy</i> , 11(1), 32–43.	Ecological footprint, urban metabolism
14	Villaruel Walker, R., Beck, M. B., Hall, J. W., Dawson, R. J., & Heidrich, O. (2014). The energy-water-food nexus: Strategic analysis of technologies for transforming the urban metabolism. <i>Journal of Environmental Management</i> , 141, 104–115	Urban metabolism
15	Chrysoulakis, N., Lopes, M., San José, R., Grimmond, C. S. B., Jones, M. B., Magliulo, V., ... Cartalis, C. (2013). Sustainable urban metabolism as a link between bio-physical sciences and urban planning: The BRIDGE project. <i>Landscape and Urban Planning</i> , 112, 100–117.	Urban metabolism, Natural/Urban ecosystems
16	Newton, P., & Newman, P. (2013). The Geography of Solar Photovoltaics (PV) and a New Low Carbon Urban Transition Theory. <i>Sustainability</i> , 5(6), 2537–2556.	New Low Carbon Urban Transition Theory
17	Premalatha, M., Tauseef, S. M., Abbasi, T., & Abbasi, S. A. (2013). The promise and the performance of the world's first two zero carbon eco-cities. <i>Renewable and Sustainable Energy Reviews</i> , 25, 660–669.	Eco-city, zero-waste, first and Second laws of thermodynamics
18	Romano, S., Cozzi, M., Viccaro, M., & Napoli, F. di. (2013). The green economy for sustainable development: a spatial multi-criteria analysis - ordered weighted averaging approach in the siting process for short rotation forestry in the Basilicata Region, Italy. <i>Italian Journal of Agronomy</i> , e21–e21.	Green economy
19	Su, B., Heshmati, A., Geng, Y., & Yu, X. (2013). A review of the circular economy in China: moving from rhetoric to implementation. <i>Journal of Cleaner Production</i> , 42, 215–227.	Circular economy, industrial ecology, industrial/urban symbiosis, eco-design

20	Agudelo-Vera, C. M., Mels, A. R., Keesman, K. J., & Rijnaarts, H. H. M. (2011). Resource management as a key factor for sustainable urban planning. <i>Journal of Environmental Management</i> , 92(10), 2295–2303.	Urban metabolism, industrial ecology
21	Castán-Broto, V., Allen, A., & Rapoport, E. (2012). Interdisciplinary Perspectives on Urban Metabolism. <i>Journal of Industrial Ecology</i> , 16(6), 851–861.	Urban metabolism, cradle to cradle, urban ecology, ecological economic, natural/urban ecosystems
22	Kuzyk, L. W. (2012). The ecological footprint housing component: A geographic information system analysis. <i>Ecological Indicators</i> , 16, 31–39.	Ecological footprint
23	Li, Z., Chang, S., Ma, L., Liu, P., Zhao, L., & Yao, Q. (2012). The development of low-carbon towns in China: Concepts and practices. <i>Energy</i> , 47(1), 590–599.	Low carbon towns, circular economy
24	Van Timmeren, A., Zwetsloot, J., Brezet, H., & Silvester, S. (2012). Sustainable urban regeneration based on energy balance. <i>Sustainability</i> , 4(7).	Urban metabolism, cradle to cradle urban ecology, natural/urban ecosystems, exergy
25	Vandevyvere, H., & Stremke, S. (2012). Urban Planning for a Renewable Energy Future: Methodological Challenges and Opportunities from a Design Perspective. <i>Sustainability</i> , 4(6), 1309–1328.	Exergy
26	Zari, M. P. (2012). Ecosystem services analysis for the design of regenerative built environments. <i>Building Research & Information</i> , 40(1), 54–64.	Regenerative, cradle to cradle, biomimicry, natural/urban ecosystems, ecological footprint
27	Lehmann, S. (2011). Optimizing Urban Material Flows and Waste Streams in Urban Development through Principles of Zero Waste and Sustainable Consumption. <i>Sustainability</i> , 3(1), 155–183.	Urban metabolism, zero waste, urban ecology, cradle to cradle
28	Steiner, F. (2011). Landscape ecological urbanism: Origins and trajectories. <i>Landscape and Urban Planning</i> , 100(4), 333–337.	Urban ecology
29	Stremke, S., Van Den Dobbelen, A., & Koh, J. (2011). Exergy landscapes: exploration of second-law thinking towards sustainable landscape design. <i>International Journal of Exergy</i> , 8(2), 148–174.	First and second laws of thermodynamics, exergy, entropy, industrial ecology, engineering thermodynamics
30	Stremke, S., & Koh, J. (2011). Integration of ecological and thermodynamic concepts in the design of sustainable energy landscapes. <i>Landscape Journal</i> , 30(2), 194–213.	First and second laws of thermodynamics, exergy, Ecological concepts: energy flows, primary production, material cycling, system size, source and sink, ecological succession, differentiations of niches, biorhythm and periodicity, mutual relationship.
31	Wang, L., Xu, L., & Song, H. (2011). Environmental performance evaluation of Beijing's energy use planning. <i>Energy Policy</i> , 39(6), 3483–3495.	Ecological footprint, energy, exergy

32	Barles, S. (2010). Society, energy and materials: the contribution of urban metabolism studies to sustainable urban development issues. <i>Journal of Environmental Planning and Management</i> , 53(4), 439–455.	Urban metabolism, urban ecology, industrial ecology, territorial ecology
33	Kennedy, C., Pincetl, S., & Bunje, P. (2011). The study of urban metabolism and its applications to urban planning and design. <i>Environmental Pollution (Barking, Essex: 1987)</i> , 159(8–9),	Urban metabolism, industrial ecology
34	Marull, J., Pino, J., Tello, E., & Cordobilla, M. J. (2010). Social metabolism, landscape change and land-use planning in the Barcelona Metropolitan Region. <i>Land Use Policy</i> , 27(2), 497–510.	Social metabolism, natural/urban ecosystems
35	Nissing, C., & von Blottnitz, H. (2010). Renewable energy for sustainable urban development: Redefining the concept of energisation. <i>Energy Policy</i> , 38(5), 2179–2187.	Energetisation
36	Pulselli, R. M. (2010). Integrating emergy evaluation and geographic information systems for monitoring resource use in the Abruzzo region (Italy). <i>Journal of Environmental Management</i> , 91(11), 2349–2357.	Emergy,
37	Stremke, S., & Koh, J. (2010). Ecological Concepts and Strategies with Relevance to Energy-Conscious Spatial Planning and Design. <i>Environment and Planning B: Planning and Design</i> , 37(3), 518–532.	Ecological concepts: energy flows, primary production, material cycling, system size, source and sink, ecological succession, differentiations of niches, biorhythm and periodicity, mutual relationship, first and second laws of thermodynamics
38	Barnes, B., Cao, H., Drab, T., & Pearson, J. (2009). Design of Sustainable Relief Housing in Ethiopia: An Implementation of Cradle to Cradle Design in Earthbag Construction. <i>American Journal of Environmental Sciences</i> , 5(2), 137–144.	Cradle to cradle
39	Andrews, C. J. (2008). Energy Conversion Goes Local: Implications for Planners. <i>Journal of the American Planning Association</i> , 74(2), 231–254.	Industrial ecology, urban metabolism, ecological economics
40	Codoban, N., & Kennedy, C. (2008). Metabolism of Neighborhoods. <i>Journal of Urban Planning and Development</i> , 134(1), 21–31.	Urban metabolism
41	Moles, R., Foley, W., Morrissey, J., & O'Regan, B. (2008). Practical appraisal of sustainable development—Methodologies for sustainability measurement at settlement level. <i>Environmental Impact Assessment Review</i> , 28(2), 144–165.	Urban metabolism, ecological footprint
42	Huang, S.-L., Kao, W.-C., & Lee, C.-L. (2007). Energetic mechanisms and development of an urban landscape system. <i>Ecological Modelling</i> , 201(3), 495–506.	Urban energetics theory, natural/urban ecosystems, emergy, urban metabolism, hierarchical organization
43	Kennedy, C., Cuddihy, J., & Engel-Yan, J. (2007). The Changing Metabolism of Cities. <i>Journal of Industrial Ecology</i> , 11(2), 43–59.	Urban metabolism, industrial ecology

44	Oliver-Solà, J., Núñez, M., Gabarrell, X., Boada, M., & Rieradevall, J. (2007). Service Sector Metabolism: Accounting for Energy Impacts of the Montjuic Urban Park in Barcelona. <i>Journal of Industrial Ecology</i> , 11(2), 83–98.	Industrial ecology, urban ecology, urban metabolism
45	Huang, S.-L., & Chen, C.-W. (2005). Theory of urban energetics and mechanisms of urban development. <i>Ecological Modelling</i> , 189(1–2), 49–71.	Urban energetic theory, hierarchical organization, natural/urban ecosystems, emergy
46	Huang, S.-L., Lai, H.-Y., & Lee, C.-L. (2001). Energy hierarchy and urban landscape system. <i>Landscape and Urban Planning</i> , 53(1–4), 145–161.	Ecological energetics, natural/urban ecosystems, emergy, hierarchical organization, first and second laws of thermodynamics
47	Balocco, C., & Grazzini, G. (2000). Thermodynamic parameters for energy sustainability of urban areas. <i>Solar Energy</i> , 69(4), 351–356.	First and second laws of thermodynamics
48	Huang, S.-L. (1998). Urban ecosystems, energetic hierarchies, and ecological economics of Taipei metropolis. <i>Journal of Environmental Management</i> , 52(1), 39–51.	Ecological energetics, ecological economics, natural/urban ecosystem, emergy, hierarchical organization
49	Rees, W. E., & Wackernagel, M. (1996). Urban Ecological Footprints: Why Cities Cannot be Sustainable and Why They are a Key to Sustainability. <i>Environmental Impact Asses Review</i> , 16(4), 223–248.	Ecological footprint, natural/urban ecosystems, entropy, first and second laws of thermodynamics
50	Newcombe, K. J. (1978). The metabolism of a city: the case of Hong Kong. <i>AMBIO A Journal of the Human Environment</i> , 7(1), 3–15.	Urban metabolism, first and second laws of thermodynamics, natural/urban ecosystems

Definition of the found concepts (alphabetical order):

Allometry: the growth of body parts at different rates, resulting in a change of body proportions (Khan and Pinter 2016)

Biomimicry (inspiration from natural forms): “Biomimicry takes inspiration from natural forms, functions and technologies developed by plants and animals [...].This field, which offers enormous potential for inspiring new innovative solutions, has already been the source for many of human achievements leading to effective materials, tools, mechanisms, algorithms or processes” (Zuazua-Ros et al. 2016, 348).

Circular economy: it's a sustainable development concepts that is developing different strategy aiming to improve the efficiency of materials and energy use (Su et al. 2013).

Cradle to Cradle: It's a design approach based on the pillars: waste equal food, use current solar income and celebrate diversity (Barnes et al. 2009; McDonough and Braungart 2010).

Eco-City: It's considered as synonymous of “sustainable city” (Premalatha et al. 2013). “A sustainable city should be able to feed itself with minimal reliance on the surrounding countryside, and power itself with fully renewable sources of energy, thereby creating little or no ecological footprint. A sustainable city would use land with maximum possible efficiency and cleanliness, generate minimum possible waste and then fully recycle and reuse what it does generate. It would offer more space for people in a scenic, safe, quiet, rejuvenating and healthy environment” (Premalatha et al. 2013, 661)

Eco-design: “refers to a systematic incorporation of environmental aspects into the design of production process and the final product” (Su et al. 2013, 217).

Ecological economics: It studies energetic flows that interconnect economic and ecological/natural systems, because urban systems cannot be fully understood in isolation from the ecological system in which they exist (Huang 1998). With regards to space the energy flows from the view point of ecological economic could reveal a spatial hierarchical order of the urban system (Huang, Lai, and Lee 2001).

Ecological energetics: The study of the flows of energy within an ecological system (oxford dictionary, 2010). With reference to spatial aspects an analogy is made between a city and a natural system, from an energy perspective (Huang 1998).

Ecological footprint: “is the total area of productive land and water required continuously to produce all the resources consumed and to assimilate all the wastes produced, by a defined population, wherever on Earth that land is located” (Rees and Wackernagel 1996, 228–29)

Eco-town (UK): developed by the UK Government that in 2010 announced four eco-towns due to be built in England. “Eco-towns will help to relieve the shortage of affordable homes to rent and buy and minimize the effect of climate change on a major scale. They will provide modern homes with lower energy bills, energy efficient offices and brand new schools, community centers and services” (Douglas 2014, 317)

Emergy: “is the quantity of solar energy equivalent used, directly or indirectly, to obtain a product by a process or to renew a resource that has been consumed, it’s used as an accounting method base on thermodynamics law” (Pulselli 2010, 2350)

Energetization: “Sustainable Energetization is the transitional process of progressively meeting primary and early secondary energy service needs of a poor economic subgroup (second economy) through the delivery of an enhanced quantity, quality and/or variety of accessible and affordable energy services, enabling the sustainable development of the considered subgroup based on poverty alleviation and economic development, as well as the optimisation of the energy service supply network from a lifecycle perspective “(Nissing and von Blottnitz 2010, 2186).

Energy positive neighborhood: as areas “in which the annual energy demand is lower than annual energy supply from local renewable energy sources. . . . The aim is to support the integration of distributed renewable energy generation into wider energy networks and provide a functional, healthy, user friendly environment with as low energy demand and little environmental impact as possible.” (Ala-Juusela, Sepponen, and Crosbie 2015, 133)

Engineering Thermodynamics: Engineering Thermodynamics (ET) aims to minimise thermodynamic losses during energy conversion and during the construction and operation of energy systems (Stremke, Van Den Dobbelsteen, and Koh 2011)

Entropy: “it is a measure of the state of disorder of a system. The SLT states that spontaneous processes will always occur in the direction of increasing disorder or entropy and decreasing energy quality” (Stremke, Van Den Dobbelsteen, and Koh 2011, 152).

Exergy: “stands for the ability of a given quantity of energy to produce work. This quantity of work is not only dependent on the energy source, but as well on the surrounding environment. Therefore exergy (or work capacity) of a particular energy carrier must always be expressed with reference to the given environment” (Vandevyvere and Stremke 2012, 1312).

First and second law of Thermodynamics: “The First Law states that energy is always conserved, the Second Law (SLT) states that during any process, exergy (work capacity) is destroyed and entropy (disorder) is produced” (Stremke, Van Den Dobbelsteen, and Koh 2011, 149)

(Nine following ecological concepts): Concepts describing relationship between organisms and their

environment, some of which reveal how energy flow is optimized in nature:

Energy flows: “refers to the transfer of energy between systems or system parts” (Stremke and Koh 2010, 521)

Primary production: “The process of fixating solar energy in biomass is described as ‘primary production’, or Photosynthesis” (Stremke and Koh 2010, 521).

Material cycling: The cyclic process of plant growth (material composition), consumption (material conversion), and decomposition (dispersion)[...] Every process on Earth thus not only depends on energy influx but also on the materials within that system (Stremke and Koh 2010, 523)

System size: “Communities of organisms and their physical environment are referred to as an ecosystem. ‘System size’ refers to the spatial extent of a system” (Stremke and Koh 2010, 523)

Source and sink: concept of ‘sources and sinks’ relates to the flow of energy, material, and information between system components. In a source area the rate of ‘production’ exceeds local ‘consumption’. Sinks consume more energy and resources than is provided locally; they depend on either storage or the import of resources” (Stremke and Koh 2010, 524).

Ecological succession: “describes the gradual change in plant and animal communities in an area following a disturbance. Disturbances are understood as being relatively discrete events in time that disrupt ecosystem development and change the availability of resources or the physical environment. Following a disturbance, plants and animals reinvade the area and a new ecosystem emerges” (Stremke and Koh 2010, 525)

Differentiations of niches: “Niche’ describes how an organism or population responds to the distribution of energy and competitors; in other words how it makes its living. Differentiation of niches is another strategy in natural ecosystems for optimizing energy utilization (Stremke and Koh 2010, 526)

Biorhythm and periodicity: “Biorhythm’ is the pattern of physiological and behavioral responses to periodic changes in the physical environment (periodicity). Biorhythm allows organisms to survive through less favorable periods. [...]One of the challenges in designing sustainable environments is to synchronize energy supply and demand in time. Energy demand can be reduced by technological innovation, the adaptive behavior of consumers, and, as we advocate, advanced spatial planning. Increasing energy assimilation and storage capacity in the physical environment can help to synchronize the system from a supply perspective (Stremke and Koh 2010, 528).

Mutual relationships: “are interactions between species which are beneficial to all participants. Organisms cooperate in mutual relationships because each one has a limited capacity for resource utilization. The combined result of their cooperative behavior exceeds the energy invested in the relationship” (Stremke and Koh 2010, 529)

Green economy: “The United Nations Environment Programme (UNEP) defines a green economy as one that results in improved human well-being and social equity, while significantly reducing environmental risks and eco- logical scarcities” (Romano et al. 2013, 158)

Hierarchical organization: “The hierarchical organization that lends ecosystems their stability expresses itself structurally in the form of very specific scaling [...] it’s means that similar design elements repeat themselves at different scales and also on the same scale. Natural complexity emerges out of a repetition of design algorithms with slight variations or anomalies or mutations for each repetition and at each varying scale.”(Khan and Pinter 2016, 183)

Industrial ecology: “The goal of IE is to go beyond ‘end-of-pipe treat and release approaches’ in industrial processing. One objective of IE is to design industrial ecosystems with high exergetic efficiency“ (Stremke, Van Den Dobbels, and Koh 2011, 161)

Industrial and urban symbiosis: It provides a system innovation. “IS is defined as a relationship that two or more unrelated industries exchange materials, energy and/or by-products in a mutually beneficial way. With the philosophy of IS, the linkage between industries and between industry and urban communities could enhance their eco efficiency” (Dong et al. 2016, 389) thus the concept of eco-industrial development which emphasize the environmental cleanness in economy development has received more and more attentions recently. Different from the traditional development mode which merely relocating industries outside of the cities for pursuing sustainable development, eco-industrial development makes significant innovation by treating or utilizing wastes (i.e. solid wastes and waste energy).

Low carbon towns/cities: “the new concept of “low carbon towns” emerged in China Tianjin was the first LCT pilot project in China. Defined as ‘A low-carbon town (LCT) in China is a town with clear targets and concrete actions planned to realize both a considerable reduction of CO₂ emissions intensity in the short term and a smooth transition to a low-carbon economy and society in the long term.’”(Li et al. 2012, 593)

Nearly Zero Energy Building: “it is characterized by very low energy consumption; nZEB design features should be defined at individual building level in order to capture the specific characteristic of each contest and guarantee really high energy performances. Realizing new nZEB and mainly transforming part of the existing building into nZEB represents the first step towards the realization of Post-carbon cities” (Becchio et al. 2016, 325).

New Low Carbon Urban Transition Theory: “model for the low carbon urban transition involving combinations of simple technological changes and harder structural changes, depending upon which parts of the urban fabric are in focus” (Newton and Newman 2013, 2538)

Post Carbon City: “In a low-carbon society we will live and work in low-energy, low-emission buildings with intelligent heating and cooling systems. We will drive electric and hybrid cars and live in cleaner cities with less air pollution and better public transport” as defined by the European Commission, 2011 (quoted in Becchio et al., 2016, p. 325)

Regenerative design: “It’s taken form ecology and natural ecosystem behaviors, implies that the built environment would need to contribute more than it consumes while simultaneously remediating past and current environmental damage” (Zari 2012, 54).

Resilience: There is no consensus on how to define it. Originated and developed in physics and psychology, resilience has been traditionally used as a measure of stability that indicates the ability of an object to survive a shock or trauma and return to the equilibrium state in a timely manner. The concept have been borrowed by other disciplines as ecology and engineers. (Sharifi and Yamagata 2016, 1657) Developed also the concept of “Urban energy resilience”: A sustainable urban energy system needs to develop effective strategies to ensure availability, accessibility, affordability, and acceptability of energy over time and under varying conditions of uncertainty (Sharifi and Yamagata 2016, 1661)

Social metabolism: “the total energy or material throughput of the economy” (Marull et al. 2010, 497)

Smart city/smart energy city: “a smart energy city in this paper is of a city which optimizes utilization of locally available energy resources and makes use of the competitive advantages of a locality to stimulate productivity in resource value chains while promoting sustainable development, in order to reduce its impact on ecosystems in surrounding area” (Lugaric and Krajcar 2016, 472).

Territorial ecology: originated from industrial ecology, but differently from the latter, territorial ecology fosters an approach through the territory instead of a product or the industry sector (Barles 2010)

Urban ecology: It studies cities as ecosystems or organisms (Newman, 1999; Wolman, 1965), creating

a metaphorical framework to analyze the interaction between urban systems and their hinterlands (Castán Broto, Allen, & Rapoport, 2012)

Urban energetics theory: It wants to state/study the relationships between energy flows and urban development (Huang and Chen 2005). It has developed from the work of Patrick Geddes, that according to Huang et al (2005) who was one of the first authors to correlate periods of human history with energy use.

Urban/natural ecosystem: These concept referred to the fact that natural ecosystems are energy self-sufficient and not pollutants. An analogy is made with urban areas that on the contrary are energy and materials consumers and waste and green gas emission due to human activity (Chrysoulakis et al. 2013; Kennedy, Pincetl, and Bunje 2011)

Urban metabolism: “urban metabolism might be defined as the sum total of the technical and socioeconomic processes that occur in cities, resulting in growth, production of energy, and elimination of waste” (Kennedy, Cuddihy, and Engel-Yan 2007, 44)

Zero waste: It’s assume that waste creation has to be avoided in first place and that waste is a “misallocated resource” that has to be recovered (Lehmann 2011)

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Annex 3

Global Table 2.1: energy conscious principles with relevance for the analyzed concepts (urban metabolism, circular economy, cradle-to-cradle) (chapter 2)

	Principles (this column)	Cradle-to-Cradle	Circular Economy	Urban Metabolism
Reduce demand/consumption				
Reducing energy demand through spatial organization (city, region)				
1	Avoiding low-density development in order to decrease transportation of people, good and electricity and creating economies of scale in infrastructures.			- Metzger A., McHale M. R., Hess G. R., Steelman T. A. (2016), - Roy M., Curry R., Ellis G. (2015) - Kennedy C., Cuddihy J, Engel Yan J. (2007)
2	Considering the urban form as an important elements for energy efficiency			- Roy M., Curry R., Ellis G. (2015), - Moore J., Kissinger M., Rees W. E. (2013), - Kennedy C., Cuddihy J, Engel Yan J. (2007), - Andrew C. J. (2008)
3	Designing to optimize energy efficiency of settlements			- Chrysoulakis N., Lopes M., San José R. and al. (2013)
4	Developing a law exergy planning			- Leduc W.R.W.A., Van Kann F. M. G. (2013),
5	Increasing urbanization to not only developing new energy efficiency self-sufficient areas, but also improving the existing urban areas			- van Timmeren A., Zwetsloot J., Brezet H., Silvester S. (2012)
6	Promoting a compact urban form			- Huang S.L., Yeh C.T., Chang L. F. (2010), - Andrew C. J. (2008), - Moles R. Foley W., Morrissey J., O'Regan B. (2008)
7	Providing multi-functional neighborhoods in compact settlement to improve energy efficiency for transport facilities and resources infrastructures (electricity, waste...)			- Moles R. Foley W., Morrissey J., O'Regan B. (2008)
8	Inquiring about regional scale rather than targeted solely at individual settlements to improve energy management			- Moles R. Foley W., Morrissey J., O'Regan B. (2008)
9	Building sustainable neighborhood reducing the energy use for building and for transports			- Codoban N., Kennedy C. A. (2008)
10	Developing agro-energetic district in more rural areas		- Zambon I., Monarca D. et al. (2016)	
11	Implementing holistic approaches and looking beyond the boundaries of a particular system, to open up opportunities for efficiencies and innovation		- Hara K., Yabar H., Uwasu M., Zhang H. (2011), - Ness D. (2008)	
12	Developing urban design strategies that can shape both energy production and consumption			- Ramaswami A., Weible C., Main D. et al. (2012)
13	Mixing uses (residential, commercial etc.) to reduce transport energy use			- Andrew C. J. (2008)

14	Thinking about land use of urban areas/activity in order to improve energy consumption (e.g. intense use of air conditioning units and dark paving materials trigger the heat island effect in urban areas)			- Mostafavi N., Farzinmoghdam M., Hoque S. (2014) - Mostafavi N., Farzinmoghdam M., Hoque S., Weil B. (2014)
15	Re-using of soil for energy purposes, other than photovoltaic power plants, which increases the degree of soil sealing		- Zambon I., Monarca D. et al. (2016),	
16	Considering as much as possible disaggregated spatial data embedded in larger descriptive characteristics (e.g. building age and size, demographics of the building user, and building energy use over time), to devise the appropriate and targeted intervention to reduce energy use effectively			- Pincet S., Graham R., Murphy S., Sivaraman (2016)
Reducing energy demand and consumption in designing building				
17	Designing building to improve energy standards: reduce energy consumption (old buildings are more energy demanders)			- Metzger A., McHale M. R., Hess G. R., Steelman T. A. (2016), - Mitraka Z., Diamantakis E., Chrysoulakis N. et al. (2014), - Roy M., Curry R., Ellis G. (2015)
18	Designing green building to improve energy production and consumption		- Geng Y., Zhu Q., Doberstein B., Fujita T. (2009), - Yong R. (2007)	- Ramaswami A., Weible C., Main D. et al. (2012)
19	Improving the energy efficiency of buildings, through an high quality of building materials and technological advances		- Zhou W., Zhu B. et al. (2012),	
20	Structural design of building to maximized natural energy use for heating, cooling and lighting: choice of the better form for the climate area, materials, surface color, facilitate natural ventilation etc.	- Barnes B., Cao H., Drab T., Pearson J. (2009),		
21	Using energy saving technologies and equipment in designing new building			- Zhang Y., Zheng H., Yang Z. et al. (2015)
22	Designing building envelopes and sun collectors to reduce energy external consumption and resilience of the building system.			- Bristow D. N., Kennedy C. A. (2013),
23	Retrofitting the existing building stock to reduce energy consumption			- Codoban N., Kennedy C. A. (2008)
24	Construction of energy-efficient apartments and houses to reduce energy consumption.			- Codoban N., Kennedy C. A. (2008)
25	Developing energy saving in governmental offices and households, green communities, green hotels and restaurants		- Yong R. (2007)	

26	Identifying accessible locations, optimizing building orientation and landscaping; choosing emerging technologies that are also cost effective; correcting the frequent oversizing of heating and cooling equipment to accommodate the peak day's loads; and seizing the emerging opportunity for smart buildings to manage demand in response to energy price signals for energy-efficient building			- Andrew C. J. (2008)
27	Understanding the energy use by different types of buildings, and their building shell, to develop better energy conservation programs			- Pincetl S., Chester M., Circella G. et al. (2014)
Improving materials management				
28	Reducing energy embodied in construction materials is an important strategy for mitigating our fossil-fuel dependency.			- Lehmann S. (2011),
29	Reducing the embodied energy of materials reusing them or returning them to nature (organic)	- Bjørn A., Hauschild M.Z. (2012),	- Haas W., Krausmann F., Wiedenhofer D., Heinz M. (2015), - Huang Q., Zheng X., Hu Y. (2015) - Dong L., Zhang H., Fujita T. et al. (2013),	
30	Closing materials loops: recycle materials to reduce embodied energy. Attention: sometimes Energy requirements for recycling can be high.		- Haas W., Krausmann F., Wiedenhofer D., Heinz M. (2015), - Huang Q., Zheng X., Hu Y. (2015) - Dong L., Zhang H., Fujita T. et al. (2013),	
31	Close as much as possible technical and biological loop		- Moreno M., De los Rios C., Rowe Z., Charnley F. (2016)	
32	“Design for disassembly” (reuse entire building components that help the reduction of energy demanded to waste disposal			- Lehmann S. (2011),
33	Considering and reduce the embodied energy of the life cycle of artifacts (building, infrastructure etc.), considering materials, implementation energy, operational energy and demolition energy	- Slavković K., Radivojević A. (2013),		
34	Reusing used products, parts of used products, and materials		- Huang Q., Zheng X., Hu Y. (2015), - Yong R. (2007),	- Huang Q., Zheng X., Hu Y. (2015), - Huang S., Hsu W. (2003),
35	Recycling as a connection between production and consumption		- Huang Q., Zheng X., Hu Y. (2015), - Yong R. (2007),	- Huang Q., Zheng X., Hu Y. (2015), - Huang S., Hsu W. (2003),
Reducing energy and fossil fuels in transport management				
36	Sharing transports to achieve a greater energy efficiency (transferring more goods to the rail system).		- Lee S.E., Quinn A. D., Rogers C.D.F. (2016)	- Lee S. E., Quinn A. D., Rogers C. D.F., (2016)
37	Changing infrastructure to elicit different behavior (such as bicycle riding or transit ridership, rather than driving)			- Pincetl S., Chester M., Circella G. et al. (2014)
38	Improving energy consumption by developing new public transit routes, to encourage public transport rather than private one.			- Mitraka Z., Diamantakis E., Chrysoulakis N. et al. (2014), - Codoban N., Kennedy C. A. (2008)

39	Using of electric vehicles (EVs)			- van Timmeren A., Zwetsloot J., Brezet H., Silvester S. (2012)
40	Developing effective, energy-efficient public transportation system (e.g. potential in road to urban rail substitution)		- Zhou W., Zhu B. et al. (2012),	
41	Purchasing energy efficient vehicles, improving road conditions, strengthening transportation system management.		- Zhou W., Zhu B. et al. (2012),	
42	Developing users oriented service e.g. car sharing, development of public transport		- Ness D. (2008)	
43	Using energy saving raw materials in designing new building			- Zhang Y., Zheng H., Yang Z. et al. (2015)
44	Promoting the plug-in hybrid diffusion ensuring parking places with electrical outlets			- Andrew C. J. (2008)
Using vegetation for heating and cooling benefits				
45	Using landscape vegetation to reduce energy consumption			- Metzger A., McHale M. R., Hess G. R., Steelman T. A. (2016),
46	Promoting the evapotranspiration in the urban areas to reduce the heat island effect, through the implementation of green surface, and avoid paved pattern.			- Bleic I., Cecchini A., Falk M. et al. (2014) - Kennedy C., Cuddihy J, Engel Yan J. (2007),
47	Increasing urban green spaces and water to reduce heat island effect (and the related energy consumption needed for cooling) helping cooling the city			- Bleic I., Cecchini A., Falk M. et al. (2014) - Mitraka Z., Diamantakis E., Chrysoulakis N. et al. (2014) - Chrysoulakis N., Lopes M., San José R. and al. (2013) -Gonzales A., Donnelly A., Jones M., Chrysoulakis N., Lopes M. (2013), - Huang S.L., Yeh C.T., Chang I. F. (2010),
48	Developing urban forests to provide homes with heating and cooling benefits(reduction of energy consumption)			- Codoban N., Kennedy C. A. (2008)
49	Designing the surrounding space of building to maximized natural energy (e.g. structure is allotted for the planting of dense foliage in cooler areas and lighter foliage in warmer areas)	Barnes B., Cao H., Drab T., Pearson J. (2009),		
Raising public awareness and improving behavior				
50	Developing Capacity-building efforts, in order to improve the public environmental awareness. (green schools, green workshops, green newsletter etc.)			- Sun L., Dong H., Geng Y. et al. (2016)
51	Providing citizens with contextually appropriate, actionable data that enriches their life and facilitates better decisions to reduce energy consumption			- Shahrokni H., Arman L., Lazarevic D. et al. (2015),
52	Encouraging to change human behavior, household practices in a more responsible way, to reduce energy demand and consumption (choices of technologies etc.)	- Moller B., Sperling K., Nielsen S., Smink C., Kerndrup S. (2012)		- Moore J., Kissinger M., Rees W. E. (2013) - Lehmann S. (2011), - Agudelo-Vera C. M., Mels A., Keesman K., Rijnaarts H. (2012)

53	Increasing public awareness and encouraging good behaviors through newsletter and TV shows		- Guo B., Geng Y., Sterr T., Zhu Q., Liu Y. (2017), - Geng Y., Zhu Q., Doberstein B., Fujita T. (2009),	
54	Achieving sustainable consumption through various types of environmental and social marketing campaigns aimed at households and neighborhood.			- Ramaswami A., Weible C., Main D. et al. (2012)
55	Improving of behavior, either by creating awareness or by the use of management systems that reduces unnecessary use of electricity			- van Timmeren A., Zwetsloot J., Brezet H., Silvester S. (2012)
56	Changing of appliances on a user level in order to enhance more energy efficiency and thus reductions in the energy consumption.			- van Timmeren A., Zwetsloot J., Brezet H., Silvester
Industrial system				
57	To develop energy saving measures in industries (e.g. eco-design energy cascading, the application of energy efficiency technologies and equipment, energy saving education, and collaboration with local communities)		- Lu Y., Geng Y., Qian Y et al. (2016), - Yu C., de Jong M., Cheng B. (2015)	
58	Developing Eco-industrial parks		- Lu Y., Geng Y., Qian Y et al. (2016) - Su B., Heshmati A., Geng Y., Yu X. (2013) - Yong R. (2007)	- Sun L., Dong H., Geng Y. et al. (2016)
59	Restructuring existing industrial parks		- Yong R. (2007)	
60	Developing eco-farming		- Yong R. (2007)	
61	Improving and researching of best energy efficient technologies		- Hara K., Yabar H., Uwasu M., Zhang H. (2011)	
62	Use advanced technologies with low energy consumption		- Geng Y., Zhu Q., Doberstein B., Fujita T. (2009),	
63	Attracting and supporting industries with low energy consumption		- Geng Y., Zhu Q., Doberstein B., Fujita T. (2009),	
64	Closing high energy consumption industries		- Geng Y., Zhu Q., Doberstein B., Fujita T. (2009),	
65	Developing in agricultural system the pattern of energy comprehensive utilization (e.g. the use of biogas).		- Li X., Deng B., Ye H. (2011)	
Energy streams optimization				
Creating synergies among resources				
66	Creating synergies among energy and water to reduce energy use			- Kenway S. J., Turner G.M., Cook S., Baynes T. (2014) - Kenway S., McMahon J., Elmer V., Conrad S., Rosenblum J. (2013), - Kenway S. J., Lant P., Priestley T. (2011),
67	Using waste water nutrients to produce energy (e.g. biogas)		- Van der Hoek J.P., Struiker A., de Danschutter J.E.M. (2017)	- Bristow D. N., Kennedy C. A. (2013),

68	Reutilizing of wastes to produce energy (e.g. sludge)	- McDonough W. Braungart M., Anastas P. T., Zimmerman J. B. (2003),	- Islam K.M. N., Jashimuddin M. (2017), - Van der Hoek J.P., Struiker A., de Danschutter J.E.M. (2017) - Lee S.E., Quinn A. D., Rogers C.D.F. (2016) - Dong L., Zhang H., Fujita T. et al. (2013), - Hara K., Yabar H., Uwasu M., Zhang H. (2011)	- Bristow D. N., Kennedy C. A. (2013), - Pincetl S., Bunje P., T. Holmes (2012), - van Timmeren A., Zwetsloot J., Brezet H., Silvester S. (2012)
69	Harvesting local non potable water demand (toilet flushing, garden irrigation) to save energy for water provision (e.g. pumping)		- Lee S.E., Quinn A. D., Rogers C.D.F. (2016)	- Lee S.E., Quinn A. D., Rogers C.D.F. (2016)
70	Studying energy and resources flows in order to create synergies among resources to produce energy and reduce waste and different field			- Pincetl S., Bunje P., T. Holmes (2012), - Kennedy C., Pincetl S., Bunje P. (2010)
71	Studying energy and resources flows in order to close loops as much as possible			- Pincetl S., Bunje P., T. Holmes (2012), - Kennedy C., Pincetl S., Bunje P. (2010)
72	Looking at energy and resources flows organization to enchain fundamental transformation of existing production and consumption patterns in cities			- Castan-Broto V., Allen A., Rapoport E. (2012)
73	Looking beyond physical boundaries but across various scale levels for solutions of interrelated networks (energy, water, waste/nutrients)			- van Timmeren A., Zwetsloot J., Brezet H., Silvester S. (2012)
74	Using waste-wood-to energy			- Lehmann S. (2011),
Improving the management of energy streams				
75	Upgrading the electrical system to reduce energy consumption and its negative impacts.			- Metzger A., McHale M. R., Hess G. R., Steelman T. A. (2016),
76	Reducing the construction energy consumption amounts focusing on the indirect consumption (e.g. material transports)			- Zhang Y., Zheng H., Yang Z. et al. (2015)
77	Exploiting of local resources for energy production (e.g. wood)	- Bjørn A., Hauschild M.Z. (2012)		
78	Developing local sourcing to reduce energy and associated heat losses in transfer and energy needed for the transports of others resources.		- Lu Y., Geng Y., Qian Y et al. (2016), - Ness D. (2008)	- Lee S. E., Quinn A. D., Rogers C. D.F., (2016)
79	Finding and to improve symbiotic relationship between industrial parks and urban areas (urban symbiosis), on the base of geographical proximity, thought infrastructures.		- Lu Y., Geng Y., Qian Y et al. (2016) - Yu C., de Jong M., Cheng B. (2015) - Su B., Heshmati A., Geng Y., Yu X. (2013) - Hara K., Yabar H., Uwasu M., Zhang H. (2011),	- Sun L., Dong H., Geng Y. et al. (2016), - Agudelo-Vera C. M., Leduc W. R.W.A., Mels A., Rijnaarts H. (2012), - Ramaswami A., Weible C., Main D. et al. (2012)
80	Improving symbiotic relationship between agriculture and urban areas (Waste from agriculture and forest could generate energy/heating)		- Zambon I., Monarca D. et al. (2016), - Jun H., Xiang H. (2011)	- Agudelo-Vera C. M., Leduc W. R.W.A., Mels A., Rijnaarts H. (2012)
81	Developing of smart grids to improve sharing and synergy of energy among functions			- Shahrokni H., Arman L., Lazarevic D. et al. (2015), - van Timmeren A., Zwetsloot J., Brezet H., Silvester S. (2012)
82	Using innovative technologies for energy utilization			- Song T., Cai J.M., Chahine T. et al. (2014)

83	Developing energy cascading, from high grade function (e.g. industries) to lower grade functions (e.g. building)		- Zhou W, Zhu B. et al. (2012),	- Leduc W.R.W.A., Van Kann F. M. G. (2013), - Agudelo-Vera C. M., Leduc W. R.W.A., Mels A., Rijnaarts H. (2012), - Agudelo-Vera C. M., Mels A., Keesman K., Rijnaarts H. (2012)
84	Developing energetic linkage based on the multifunctionality in order to create synergies and avoid energy waste		- Zhou W, Zhu B. et al. (2012),	- Leduc W.R.W.A., Van Kann F. M. G. (2013), - Agudelo-Vera C. M., Leduc W. R.W.A., Mels A., Rijnaarts H. (2012), - Agudelo-Vera C. M., Mels A., Keesman K., Rijnaarts H. (2012)
85	Quality upgrading and recycling: on site treatment for further reuse (e.g. heat pump to increase temperature)			- Agudelo-Vera C. M., Leduc W. R.W.A., Mels A., Rijnaarts H. (2012), - Agudelo-Vera C. M., Mels A., Keesman K., Rijnaarts H. (2012)
86	Quality upgrading and closing loops: on site treatment of a system which does not have inputs or outputs (energy need inputs that have to be powered from renewable resources)			- Agudelo-Vera C. M., Leduc W. R.W.A., Mels A., Rijnaarts H. (2012),
87	Developing as much as possible an energy multi-sourcing both primary (renewable energy) and secondary (heat cascading)			- Agudelo-Vera C. M., Leduc W. R.W.A., Mels A., Rijnaarts H. (2012), - Agudelo-Vera C. M., Mels A., Keesman K., Rijnaarts H. (2012)
88	Reducing outputs by recovery (e.g. recovery nutrients or heat from biodigester)			- Agudelo-Vera C. M., Mels A., Keesman K., Rijnaarts H. (2012)
89	Minimizing the required inputs of energy e.g. mitigation system cooling			- Huang S.L., Yeh C.T., Chang L. F. (2010),
90	Increasing energy storage through the local resources uses (e.g. biomass, waste etc.)			- Bristow D. N., Kennedy C. A. (2013),
91	Designing and siting conversion nodes (transition point from energy input to output)			- Andrew C. J. (2008)
92	Optimizing networks to reduce energy consumption			- Mostafavi N., Farzinmoghdam M., Hoque S. (2014)
93	Reducing energy in production and consumption		- Huang Q, Zheng X., Hu Y. (2015) - Yong R. (2007),	- Huang Q, Zheng X., Hu Y. (2015)
94	Optimizing local energy structure		- Lu Y, Geng Y, Qian Y et al. (2016),	
Improving the management of energy streams in the industrial system				
95	Developing regional eco-industrial network		- Su B., Heshmati A., Geng Y, Yu X. (2013)	
96	Encouraging industrial symbiosis		- Hara K., Yabar H., Uwasu M., Zhang H. (2011), - Geng Y, Zhu Q, Doberstein B, Fujita T. (2009) - Yong R. (2007)	- Sun L., Dong H., Geng Y. et al. (2016)
97	Improving cleaner production		- Dong L., Zhang H., Fujita T. et al. (2013) - Yong R. (2007)	- Sun L., Dong H., Geng Y. et al. (2016)
Use renewable energy sources				
Promoting renewable energies and low carbon solutions				
98	Increasing the use of renewable sources such as solar energy during the building construction. (This is also useful to reduce greenhouse emission)			Zhang Y, Zheng H., Yang Z. et al. (2015)

99	Developing local renewable energy supply (e.g. solar panels, wind turbines, ground source heat pump)		<ul style="list-style-type: none"> - Lee S.E, Quinn A. D., Rogers C.D.F. (2016) - Haas W, Krausmann F, Wiedenhofer D, Heinz M. (2015), - Zhou W, Zhu B. et al. (2012) - Jun H, Xiang H. (2011) - Li X., Deng B, Ye H. (2011) - Ness D. (2008) 	<ul style="list-style-type: none"> - Lee S. E., Quinn A. D, Rogers C. D.F., (2016) - Agudelo-Vera C. M., Leduc W. R.W.A., Mels A., Rijnaarts H. (2012), - Agudelo-Vera C. M., Mels A., Keesman K., Rijnaarts H. (2012) - van Timmeren A., Zwetsloot J., Brezet H., Silvester S. (2012) - Codoban N., Kennedy C. A. (2008)
100	Using renewable energy resources to produce energy (e.g. photovoltaic, geothermal, wind, hydro, and biomass)	<ul style="list-style-type: none"> -Bjorn A., Hauschild M.Z. (2012), - Moller B, Sperling K, Nielsen S., Smink C., Kerndrup S. (2012), - McDonough W. Braungart M., Anastas P. T., Zimmerman J. B. (2003), 	<ul style="list-style-type: none"> - Lu Y., Geng Y., Qian Y et al. (2016) 	<ul style="list-style-type: none"> - Metzger A., McHale M. R., Hess G. R., Steelman T. A. (2016), - Sun L., Dong H., Geng Y. et al. (2016), - Song T., Cai J.M., Chahine T. et al. (2014) - Bristow D. N., Kennedy C. A. (2013), - Chrysoulakis N., Lopes M., San José R. and al. (2013) - Leduc W.R.W.A., Van Kann F. M. G. (2013) - Ramaswami A., Weible C., Main D. et al. (2012) - Huang S., Chen C.W. (2005)
101	Using a mix renewable energy sources to produce energy	<ul style="list-style-type: none"> - McDonough W. Braungart M., Anastas P. T., Zimmerman J. B. (2003) 	<ul style="list-style-type: none"> - Haas W, Krausmann F, Wiedenhofer D, Heinz M. (2015), 	
102	For wind turbine: Identifying and considering the relevant scale, the compatibility with land use, the implication of betting on an evolving technology, the intermittence of the source, the weather information			<ul style="list-style-type: none"> - Andrew C. J. (2008)
103	Using of the various renewable energy sources such as wind, solar, biomass or ocean energy adapted to local conditions.	<ul style="list-style-type: none"> - Moller B, Sperling K, Nielsen S., Smink C., Kerndrup S. (2012) 		
104	Identifying and considering the relevant scale, the compatibility with land use, the implication of betting on an evolving technology, the intermittence of the source, the weather information for wind turbine			<ul style="list-style-type: none"> - Andrew C. J. (2008)
105	Designing in order to preserve the solar access for roof top solar panels			<ul style="list-style-type: none"> - Andrew C. J. (2008)

Annex 4

Questionnaire for the survey in TEPOS territories in France.

Transition énergétique et Paysage

Enquête auprès des acteurs des TEPOS

Roberta Pistoni

Doctorante LAREP – ENSP Versailles et LAR - Wageningen University

1. Précisez le nom du TEPOS pour lequel vous travaillez

.....

2. Précisez votre rôle dans la création, ou le fonctionnement ou les projets de ce TEPOS

.....

3. Depuis quand votre territoire est-il engagé dans le processus de transition énergétique?

.....

4. Pouvez-vous identifier un évènement déclencheur, ou une personnalité à l'origine du projet ?

.....

Le paysage

5. Selon vous, le paysage est-il pris en compte dans le processus de transition énergétique du territoire?

- Oui
- Non
- Ne sait pas

6. Si oui, quel(s) sont les aspect(s) du paysage sont-ils davantage pris en compte dans le processus de transition énergétique ? (Par exemple : aspects géographiques, écologiques/biodiversité, comme ressource économique -agricoles et forestiers notamment-, récréatifs, patrimoniaux à préserver, de valorisation touristique...)

.....

7. Le processus de transition énergétique s'est-il accompagné d'actions spécifiques sur le paysage ? Si oui, lesquelles ? (par exemple : volonté politique affirmée des élus, intégration dans les documents d'urbanisme, atlas des paysages, charte paysagère, plan de paysage, chargé de mission paysage, diagnostic paysager etc.)

.....

.....

8. Pensez-vous que le paysage est quelque chose d'important à prendre en compte dans le processus de transition énergétique?

- Oui
- Non
- Ne sait pas

Si oui, précisez en quoi; sinon, expliquez pourquoi :

.....

.....

9. Le cadre législatif (et réglementaire) et les instruments de planification actuels favorisent-ils ou freinent-ils la transition énergétique?

- Favorisent
- Freinent
- Ne sait pas

S'ils favorisent, précisez en quoi; s'ils freinent, expliquez pourquoi :

.....

.....

Concepteurs

10. Collaborez-vous avec des concepteurs de l'aménagement –paysagistes, urbanistes, architectes... – sur les projets de transition énergétique?

- Oui
- Non

11. Quel type de professionnel de l'aménagement travaille selon vous au développement du TEPOS? [plusieurs réponses possibles]

- Paysagiste
- Urbaniste
- Architecte
- Aucun
- Ne sait pas
- Autre(s), précisez :

12. Précisez sur quel(s) type(s) de projet(s) :

.....

13. Si un ou plusieurs paysagistes travaillent au développement du TEPOS, précisez sur quel(s) type(s) de projet(s) : [plusieurs réponses possibles]

- Ne sait pas
- Diagnostic
- Scénario énergétique
- Développement d'un plan de paysage
- Développement des instruments d'urbanisme : PCAET, SCoT, PLUi...
- Etude d'impact pour les projets d'infrastructure de production d'énergie renouvelable
- Localisation d'infrastructure de production d'énergie renouvelable
- Installation d'infrastructure de production d'énergie renouvelable
- Localisation d'infrastructure de transport d'énergie
- Installation d'infrastructure de transport d'énergie
- Localisation d'infrastructure de stockage d'énergie
- Installation d'infrastructure de stockage d'énergie
- Chauffage/réseau de chaleur
- Mobilité douce (pistes cyclables, chemins de randonnée...)
- Économie d'énergie dans les stratégies d'aménagement
- Économie d'énergie dans le chantier de construction
- Autre(s), précisez :

14. Si aucun paysagiste ne travaille au développement du TEPOS, pensez-vous que leur collaboration pourrait être utile dans le développement de la transition énergétique?

- Oui
- Non
- Ne sait pas

Si oui, précisez en quoi; sinon, expliquez pourquoi :

.....
.....

15. Qu'évoque pour vous la notion de « paysage de la transition énergétique »?

.....
.....

Concepts

16. Vous arrive-t-il d'utiliser les concepts suivants? [plusieurs réponses possibles]

- Métabolisme territorial ou urbain

- Écologie territoriale
- Économie circulaire
- Cradle to cradle
- Aucun des quatre

Si oui, préciser le(s)quel(s) et à quelle(s) occasion(s) (par exemple : appel à projets, argumentaire...)?

.....

17. Ces concepts vous paraissent-ils utiles dans la mise en œuvre de la transition énergétique?

- Oui
- Non
- Ne sait pas

Si oui, précisez en quoi; sinon, expliquez pourquoi :

.....

.....

Merci beaucoup d'avoir pris le temps de répondre à ces questions

Roberta Pistoni

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Annex 5

Basic guide of questions for semi structured interviews developed with energy transition agents in the CC Monts du Lyonnais and CC Thouarsais. Some additional specific questions according to the role of the different agents are added on case by case basis. Moreover the questions were not always made following this order but adapted to the discourse developed with the interviewed.

Processus de transition énergétique

1. Parlez-moi de votre territoire. Comment y voyez-vous le développement de la transition énergétique ?
1. Pouvez-vous m'expliquer votre rôle et compétences dans la démarche de transition énergétique ? Quel est l'objectif ? (est-il intégré dans la démarche TEPOS ?)
2. Depuis quand vous avez ce rôle ?
3. Pouvez-vous m'expliquer et détailler un peu quel type de projet vous avez développé et vous êtes in train de développer sur le territoire ? (stratégies de gestion de l'énergie etc.) Comment elles ont intégré avec la question spatiale ?
4. Dans les projets que vous menez prenez-vous en compte le l'aspect paysagère ? oui, non ? Pourquoi ?
5. Pour vous le paysage est-il quelque chose dont vous pensez qu'il soit important dans le processus de transition énergétique ? comment et pourquoi ? est-il suffisamment pris en compte ?
6. Avec qui êtes-vous en contact ? Vous collaborez avec des experts venant d'autres disciplines ou la population locale ou des acteurs locaux pour l'élaboration de ces instruments dans le cadre de transition énergétique ?
7. Comment définissez-vous votre rôle dans le processus de transition énergétique pour le Thouarsais ?
8. Vous avez- quelle formation ?
9. Avez-vous des sources d'inspiration ? Avez-vous été inspirée par d'autres projets en France ou en Europe ? pour le développement de la transition énergétique ? Ou pour autres aspect du développement de la transition énergétique ?

Les concepts

10. Avez-vous entendu parler de concept comment métabolisme urbain/territorial, économie circulaire, cradle-to -cradle ? dans quel contexte ?
11. Ils ont été une source d'inspiration pour les projets de transitions énergétique ? Ou si non qu'est-ce que vous pensez d'eux ? Ils peuvent être une source d'inspiration pour des projets de transitions énergétique ?

Le rôle du paysage dans la transition énergétique.

12. Je sais que la CC Monts du Lyonnais/CC Thouarsais ont développé un plan paysage. Existe-t-il une articulation entre votre démarche et le Plan Paysage ? Si ce n'est pas le cas, y verriez-vous des articulations possibles ? Pourquoi ?
13. Avant cette réponse à l'appel à projet pour le plan paysage, le paysage était-il un sujet de préoccupation pour le développement des projets énergétiques sur le territoire ?

Compétences et connaissances demandée (demande et offre)

14. Quels sont les difficultés majeures que vous rencontrez dans la mise en œuvre de la transition énergétique ? (dans la mise en place de vos projets ?)
15. Quels sont les nécessités en termes de connaissances et compétences à acquérir dans la transition énergétique ? Qu'est-ce qui manque maintenant ? et quel types de disciplines pourraient vous aider à répondre à ces questions ? (L'aménagement spatiale en fait partie ?)
16. De l'autre cote pensez-vous que le Monts du Lyonnais pourrait offrir/exporter quelque chose (connaissances, compétences approche, processus) en relation au processus de transition énergétique ? Qu'est-ce que on peut apprendre de ça ? Quelles sont les principaux points de force rencontrés dans la mise en place du projet ?

Professionnels d'aménagement et question énergétique

17. Dans la démarche de transition énergétique collaborez-vous avec des professionnels de l'aménagement (architectes, urbanistes, paysagistes) ? Si oui quel en dans quel contexte et à quelle étape du processus ?
18. Quel rôle les paysagistes pourraient-ils y avoir dans le cadre de la transition énergétique ? et dans quel contexte (urbain, rural etc.) ?
19. Quels compétences et connaissances des paysagistes vous pensez sont le plus utile dans le processus de transition énergétique ? Pourquoi ?

Paysage et énergie

20. Pouvez-vous me donner un exemple de projet de transition énergétique dans la CC Monts du Lyonnais/CC Thouarsais bien réussi en termes paysagers ? Pourquoi ?
21. Qu'évoque pour vous la notion de « paysage de la transition énergétique » ?
22. Pouvez-vous faire un dessin de la notion de de « paysage de la transition énergétique » ?

Annex 6

Basic guide of questions for semi structured interviews developed with energy transition agents for the Goeree-Overflakkee municipality. Some additional specific questions according to the role of the different agents are added on case by case basis. Moreover the questions were not always made following this order but adapted to the discourse developed with the interviewed.

Energy transition process

1. Talk to me about your territory. How do you see the development of energy transition in it?
2. What is your role and competences in the energy transition development? What is the goal?
3. Since when you are involved in energy transition process? And how?
4. Could you explain rapidly the developing process of energy transition /sustainability for the island? What has been done and what is in project? And regarding the landscape dimension?
5. With which partners do you collaborate experts, local population, local stakeholders?
6. Is landscape a matter of concern in the energy transition process? To what extent, how and why?
7. For you landscape is something that do you think is important to be taken into account for the energy transition process? How and why?
8. Do you have some sources of inspiration? Have you been inspired by other projects in the Netherlands or in Europe for developing energy projects?
9. How do you define your role in this energy transition process of Goeree-Overflakke?
10. Do you think that your work has repercussion with landscape and spatial concerns about energy transition? If yes, why and how? Do you take it into account in your work?
11. What background do you have?

Concepts

12. In energy transition process, do you know concepts such as urban metabolism, circular economy and cradle to cradle?

13. They have been a source of inspiration for the energy transition projects? Or if not what do you think about them? Could they be a source of inspiration for energy transition related projects?

Knowledge competencies (Demand and supply)

14. What are the main difficulties that you are facing in energy transition implementation?
15. What are the needs in terms of knowledge/competencies in energy transition? What is lacking now? And what kind of discipline do you think could answer these needs? And in spatial terms?
16. On the other hand, do you think that the territory could supply/export something (knowledge, etc.) related to energy transition? What can we learn from it?
17. I know that there is a plan made by HNS landscape architect in 2012 representing a spatial scenario for the energy transition do you know about it/Taken into account it?
If not, do you think that could be useful to have this kind of instrument? Why?
18. And now the landscape energy scenario for the 2030 developed by Marco Vermeulen? What is the objective? How/to what extent it will be taken into account? You were involved? If yes how?

Environmental designer's involvement

19. Do you work in energy transition projects with environmental designers (architects, landscape architects)? If yes in which context? At which stage? And with landscape architects?
20. What role do you think that landscape architects could have in energy transition process?
21. What landscape architects' skills do you think are the most useful in energy transition process?

Energy transition landscape

22. Could you please give me an example of an energy transition project on Goeree-Overflakkee well done/successful in landscape and spatial terms? Explain why.
23. What does the notion of "energy transition landscape" evoke for you?
24. Please could you sketch an energy transition landscape?

Annex 7

List of interviewed for the three embedded cases: CC Monts du Lyonnais, CC Thouarsais and Goeree Overflakkee municipality

List of interviewed for *communauté des communes* (CC) Monts du Lyonnais

Person	Role and institution	Date and place
Couthenx Paul-Jean	Ingénieur énergies renouvelables, responsable projets CoopaWatt, association pour l'accompagnement des projets participatif citoyen d'énergie renouvelable [responsable projets CoopaWatt, association supporting citizen participatory in renewable energy projects]	23/01/2018 – Lyon
Croize Alice	Chargée de mission TEPOS, transition énergétique et développement des énergies renouvelables de la CC des Monts du Lyonnais [TEPOS project manager and development of renewable energy in the CC Monts du Lyonnais]	23/01/2017 – Parc Eco Habitat, St Symphorien sur Coise 28/09/2018 – Montmélian, complementary interview for the drawing
Claus Isabel	Landscape architect in “Isabel Claus Paysagiste” office	16/11/ 2017- office, Lyon
Coicadan Guillaume	Conseiller Energie - Biomasse Service Régional Énergie - Biomasse – Climat (CRA AURA), Chambre d'agriculture du Rhône [Rhône agricultural chamber, energy -biomass adviser]	3/07/2018 - Regional agricultural chamber office, Lyon
Garnier Philippe	Maire de Meys, président du GIP Parc Éco Habitat, vice-président binôme à la transition énergétique de la CC des Monts du Lyonnais [mayor of Meys, GIP President of Parc Eco Habitat, duo vice-president to energy transition in the CC Monts du Lyonnais]	22/01/2018 - Lyon
Gautron Hélène	Chef de projet SCoT, Syndicat mixte du SCoT des Monts du Lyonnais [SCoT project manager of the Monts du Lyonnais]	05/12/2018 - Parc Eco Habitat, St Symphorien sur Coise
Klein Alois	Agriculteur, porteur d'un projet de méthanisation à St Denis sur Coise [farmer, biogas project initiator]	16/07/2018 - Farm in Pomeys

Lefaucheux France-Noëlle	Référente territoriale Rhône-Monts du Lyonnais, ADEME [ADEME territorial referent of Rhône-Monts du Lyonnais]	10/07/2018 - Regional ADEME offices, Lyon
Mouette Jean-Baptiste	Chargé de mission PCAET, de la CC des Monts du Lyonnais [PCAET project manager of the CC Monts du Lyonnais]	05/12/2018 - Parc Eco Habitat, St Symphorien sur Coise
Robert Thomas	Directeur du Parc Éco Habitat, Plateforme locale de Rénovation de l'Habitat, Responsable du Service Transition Energétique, de la CC des Monts du Lyonnais [Parc Eco Habitat director, responsible energy transition service]	04/12/2017 - Parc Eco Habitat, St Symphorien sur Coise
Tachon Marie Pauline	Ingénieure responsable Rhône du Centre régional de la propriété forestière Auvergne Rhône-Alpes [Technical animation regional center of forest property Auvergne Rhône-Alpes region]	22/01/2018 - CNPF Parc de Crécy - Saint Didier au Mont d'Or

List of interviewed for *communauté des communes* (CC) of Thouarsais

Interviewed	Role and institution	Date and place
Angebault Frankie	Referente territoriale ADEME pour les Deux-Sevres [ADEME territorial referent of Deux-Sevres]	04/07/2018 – ADEME offices in Nouvelle-Aquitaine, Poitiers
Chevallier Aurélie	Directrice du pôle Aménagement durable du territoire de la CC du Thouarsais [Sustainable territorial management division director for CC Thouarsais]	11/12/2017 – Centre Prométhée, Thouars 16/07/2018 – complementary interview for the drawing
Claus Isabel	Landscape architect in “Isabel Claus Paysagiste” office	05/04/2019 - office, Lyon
Des Dorides Isabelle	Chargée de mission développement local à la chambre d'agriculture Deux-Sèvres [Project manager local development of agriculture chamber of Deux-Sevres]	10/04/2018 - Chambre d'Agriculture, Thouars
Desprez Élise	Chef de projets chez wpd, développeur de projet d'énergie renouvelable. Projet TIPER Thouarsais [Wind turbine project manager in wpd, which realized wind turbines in TIPER project]	14/02/2018 –wpd, Office in Limoges
Joubert Chantal	Agricultrice ayant développé un projet de gestion des haies pour le bois énergie - chaudière [Farmer which developed a bocage/wood-energy boiler]	16/07/2018 – Farm in Mauzé-Thouarsais
L'Hévéder Maylise	Chargée de mission TEPOS Agriculture et Entreprises de la CC du Thouarsais [TEPOS agriculture and companies project manager for CC Thouarsais]	12/12/2017 – Centre Prométhée, Thouars

Maisonneuve Delphine	Chargée de mission énergie et climat de la CC du Thouarsais [Project manager energy and climate for CC Thouarsais]	11/12/2017 – Centre Prométhée, Thouars
Martin Maxime	Chargé mission TEPOS et cit'ergie de la CC du Thouarsais [Cit'ergie and TEPOS project manager for CC Thouarsais]	17/01/2018– Centre Prométhée, Thouars
Rambault Pierre	Maire de Saint-Varent et vice-président à la transition énergétique de la CC du Thouarsais [mayor of Saint-Varent and vice-president of energy transition for CC Thouarsais]	16/11/2017 – City Hall of Saint- Varent

List of interviewed for Goeree-Overflakkee

Person	Role and institution	Date and place
Both-Verhoeven Tea	Raadslid [municipal councilor] Goeree Overflakkee (innovation and sustainability, wind energy, tidal energy etc.)	29/09/2017 - Gemeente Goeree Overflakkee, Middelharnis
Dirk Pauline	Beleidsadviseur Ruimtelijke Ontwikkeling Goeree Overflakkee [Policy adviser Spatial Development]	03/10/2018 – Gemeente Goeree Overflakkee, Middelharnis
Jasper Hugtemburg	Landscape architects in H+N+S office	17/05/2017 – H+N+S studio Amersfoort
Ras Jaap-Jan	Farmer that developed a biogas facility in Goeree-Overflakkee	3/010/2018- his farm in Den Bommel
Seriese Lennard	Until spring 2017 – Program manager for sustainability and innovation, Goeree-Overflakkee From spring 2017 Senior account manager of energy transition in Stedin (electricity a gas transport network operator)	01/09/2017- Stedin offices, Rotterdam
Somsen Isolde	Programmableider ruimtelijke kwaliteit [Program leader spatial quality], Projectleider energie en ruimte [Project leader energy and space] in Province of Zuid-Holland	25/09/2017- Offices of the Zuid-Holland province, the Hague
Sweep Monique	Director Cooperative Deltawind (project support for renewable energy project implementation)	01/09/2017 - Deltawind offices, Ounde-Tonge
van Ewijk Annelies	Manager Programma Energietransitie [program manager for energy transition], in Zuid-Holland province	28/09/2017 - Offices of the Zuid-Holland province, the Hague
van der Sleen Manel	Beleidsadviseur duurzaamheid [policy sustainability adviser] in Goeree-Overflakkee	19/07/2017 - Old Town Hall, Middelharnis

Observed key meeting:

CC Thouarsais

18/01/2018 – Internal meeting about plan de paysage and plan de paysage official launching

19/01/2018 – field visit with landscape architect in charge of the plan de paysage, PAP members, and about 15 elected representatives of the CC Thouarsais

09/04/2018 – strategic atelier for plan paysage - centre promethe Thouars

CC Monts Lyonnais

7/11/ 2018 – atelier for PCAET strategies with local stakeholders – Parc Eco Habitat, Saint Symphorien sur Coise

Annex 8

Original French version of the text translated in English by the author in the box 9.3 and 9.4 in chapter 9.

Box 9.3. Oral answer of the French sustainable territorial management division director of the CC Thouarsais about “energy transition landscape”, France.

“Ben ouais, quand tu me dis paysage de la transition énergétique, je vois un beau paysage de bocage avec des petites éoliennes dispersées, des... Pourquoi pas un champ de panneaux photovoltaïques? Et des petites maisons avec des panneaux solaires, des maisons en bois, euh... voilà. Pour moi, c’est un paysage de la transition énergétique, et puis l’agriculteur qui passe, de l’élevage aussi.”

Box 9.4. Explanatory example of the drawing process along with the oral narrative of sustainable territorial management division director of the CC Thouarsais about “energy transition landscape”, France (Figure T1).

“On a un territoire avec des grandes plaines et on a un territoire avec des vallées qui sont encaissées en fait. Donc, là, j’té fais la vallée. Et puis après, on est sur un territoire plus vallonné. Comme ça, et avec du bocage. Donc voilà, on va faire un peu, essayer de le faire un peu comme ça. Et euh... Oui, là, on va dire, mais c’est très schématisé, mais, en gros, là on est plutôt dans le maillage, dans le maillage bocager. Ouais, j’té fais des p’tites haies. Et donc là, t’as l’eau qui coule dans la vallée.

Après, y a quand même les côtés un p’tit peu plus urbains, voilà, j’pense qu’il faut... faut faire une petite ville, quoi. Voilà, avec nos grands toits en ardoise, et puis quand même quelques immeubles. Ça, on va dire que c’est la ville. Et puis après, on a... on a tout... tout notre habitat isolé. Voilà, avec des grandes fermes, qui peuvent être des longères. On va plutôt faire une exploitation agricole un peu par ici.

Euh... Ouais, voilà. Euh... pfff... puis après, il peut y avoir des panneaux photovoltaïques dessus. Tant qu’à faire. Et puis ici, on va retrouver aussi des... On va retrouver nos éoliennes, regarde comme elle est belle mon éolienne dis donc! Donc voilà. Oh la la! J’ai pas tenu compte des proportions, mais c’est pas grave... Ah oui, si, pour moi, c’est important aussi qu’y ait une petite route, avec un gars à vélo dessus. Euh... Parce que, parce que faut qu’on réfléchisse aussi à la mobilité et qu’sur notre territoire le vélo est quand même... il est quand même important, quoi. Euh... voilà. Et puis après, ya... yale... yale tracteur. On est quand même sur un milieu rural, donc le tracteur il est important. Le bocage n’est pas encore beaucoup exploité. Mais on travaille sur la filière bois ... Et d’ailleurs, j’pense qu’il faut qu’on mette un tas de bois quelque part. Parce que le bois, en fait, c’est la première énergie renouvelable qu’est utilisée sur notre territoire, et depuis des années. Il me semble important qu’il y ait le tas de bois qui soit représenté, et notamment la haie est une de ses ressources. Beaucoup de bois buches, mais voilà, enfin c’est... c’est une énergie renouvelable importante Ah

oui, puis faudrait peut-être faire un soleil aussi. Quand même. Voilà. Un paysage de la transition énergétique, ouais, voilà, c'est ça. Tu vois, enfin, moi l'idée, c'est d'être dans un beau paysage, où on vit bien, où y a pas trop de pollution, et que voilà. Et, ouais, y a quand même ce rapport à la ville qu'est...au milieu urbain quand même, qu'est important puisqu'on doit être aussi en solidarité avec ce territoire-là. Et euh, dans les paysages de la transition énergétique aussi y a un sujet qu'on n'a pas trop abordé – du coup, j'vais peut-être le symboliser comme ça – c'est les cultures. Parce que dans la transition énergétique y a aussi l'alimentation. Et pour moi, l'alimentation locale, les circuits courts contribuent aussi à la transition énergétique. Donc voilà Et dans les territoires aussi en transition, dans la transition énergétique, peut-être le symboliser comme ça, mais... y a des gens qui discutent. Les gens ils vivent ensemble, ils font des échanges, enfin... j'sais pas y a cette notion de convivialité, de réseau... De dire : moi je produis des légumes, pour produire mes légumes, euh... Ouais, j'produis mes légumes, mais ça sert dans l'école machin, enfin voilà. Et aussi... cette notion de circuit court, elle me paraît importante.

Annex 9

Questionnaire for the on-line survey FFP French landscape architect association

Questionnaire développé dans le cadre de la thèse de doctorat effectuée au sein du laboratoire de recherche LAREP de l'École de Paysage de Versailles et du Landscape Architecture Group de l'Université de Wageningen aux Pays-Bas.

Questionnaire

1. Dans votre pratique professionnelle comme paysagiste, quels types de projets développez-vous le plus?

- Maîtrise d'œuvre
- Assistance maîtrise d'ouvrage
- Autre :

2. Pouvez-vous préciser l'échelle à laquelle vous travaillez le plus ?

- jardins privés
- parcs
- espaces publics
- documents d'urbanisme
- planification de territoire
- Autre :

3a. Quel est votre statut professionnel ?

- Structure libérale (gérant ou associé)
- Structure libérale (salarié)
- Structure publique
- Autre :

3b. Préciser le nom de la structure : ...

4. Dans votre agence/structure collaborez- vous avec d'autres spécialités (architecte, ingénieur environnement etc.) ?

- Oui
- Non

4b. Si oui, lesquelles ?

.....

5. Les questions énergétiques font-elles partie du champ de votre pratique de paysagiste ? (Cocher une réponse)

- Oui, souvent
- Oui, quelquefois
- Non, mais il faudrait
- Non

6. À travers quelle entrée vous est-il arrivé de traiter des questions de gestion raisonnée de l'énergie dans vos projets ? (Cocher une ou plusieurs réponses)

- Scenarios énergétique sur le long terme
- Localisation d'infrastructure de production d'énergie renouvelable
- Projet d'installation d'infrastructure de production d'énergie renouvelable
- Localisation d'infrastructure de production d'énergie non renouvelable
- Projet d'installation d'infrastructure de production d'énergie non renouvelable
- Localisation d'infrastructure de transport d'énergie
- Projet d'installation d'infrastructure de transport d'énergie
- Localisation d'infrastructure de stockage d'énergie
- Projet d'installation d'infrastructure de stockage d'énergie
- Réseau de chaleur
- Projets de mobilité pour faire des économies d'énergie
- Économie d'énergie dans les stratégies d'aménagement
- Économie d'énergie dans le chantier
- Diagnostique lié à l'énergie
- Autre :

7. Dans quel contexte territorial ?

- Urbain dense
- Périurbain
- Rural

8a. Est ce que vous avez collaborés avec d'autres disciplines pour traiter de la gestion énergétique ?

- Oui
- Non

8b. Si oui, lesquelles ?

.....

9a. Considérez-vous d'autres aspect écologiques quand travaillez sur des projet lié à l'énergie ?

- Oui
- Non

9b. Si oui, pouvez vous préciser sur quel aspect écologique ?

- biodiversité
- eau
- trames vertes et bleues
- matériaux renouvelables
- autre :

10. Qu'évoque pour vous la notion de « paysage des énergies » ?

.....

11. Si vous en connaissez, pouvez-vous signaler des projets/opérations de gestion raisonnée de l'énergie ?

.....

12. Vous arrive-t-il d'utiliser un de ces concepts ? (Cocher une ou plusieurs réponses)

- Économie circulaire
- Métabolisme urbain
- Écologie territoriale
- Cradle to cradle
- Aucun des trois

Si oui, pouvez vous préciser lequel et dans quels cas ? (ex. appel à projets etc.)

.....

13. Que pensez vous de ces concepts et de leur mise en œuvre dans le projet de paysage ?

.....

14. Si vous en connaissez, pouvez-vous signaler des projets/opérations mobilisant un de ces concepts (économie circulaire, métabolisme urbain, écologie territoriale) ?

.....

Merci beaucoup d'avoir pris le temps de répondre à ces questions.

Annex 10

Questionnaire for the on-line survey NVTL Dutch landscape architect association

On-line survey developed in the framework of a PhD research carried out in the research laboratory LAREP of Landscape Architecture School of Versailles (France) and in the Landscape Architecture Group of Wageningen University (Netherlands).

Questionnaire

1. What is your main function in your professional practice?

- Project manager
- Project supervisor (client side)
- Other: ...

2. At which scale(s) do you work most? (one or multiple answers)

- Private garden
- Parks
- Public spaces
- Urban planning
- Regional planning
- Other: ...

3a. What is your professional status?

- Practice (owner/partner)
- Practice (employed)
- Other:.....

3b. Specify the name of the structure/studio (not mandatory):

.....

4a. Do you collaborate with other experts? (architect, urban planner, engineer, ecologist etc.)

- Yes
- No

4b. If yes, please specify which experts:

.....

5. Do you work on (a) project(s) related to energy?

- Yes, often

- Yes, sometimes
- No, but I'd like to
- No

6. What energy-related aspect(s) do you address in your work? (one or multiple answers)

- Energy long term scenarios
- Siting renewable energy production infrastructure
- Design of renewable energy production infrastructure
- Siting of non-renewable energy infrastructure
- Design of non renewable energy infrastructure
- Design of infrastructure for energy transport
- Siting of infrastructure for energy transport
- Design of technology for energy storage
- Siting of technology for energy storage
- Heat network
- Mobility energy saving projects (e.g. slow mobility)
- Energy savings as part design project
- Energy saving in design implementation
- Energy related analysis
- Others:.....

7. In which territorial context do you work on energy projects? (one or multiple answers)

- Urban
- Periurban
- Rural

8a. Do you collaborate with other discipline(s) in energy projects ? (Engineer, ecologist etc.)

- Yes
- No

8b. If yes, could you specify which discipline(s)?

.....

9a. Do you consider other ecological aspect when you work on project related to energy?

- Yes
- No

9b. If yes, which ecological aspects? (one or multiple answers)

- Biodiversity
- Water
- Green or blue infrastructures
- Recycled materials
- Others:

10. What does the notion of “energy landscape” evoke for you?

.....

11. Please list one or more of your energy-related projects (if applicable):

.....

12. Could you indicate other landscape energy projects that you are aware of? (municipality, province, neighborhood etc.)

.....

13a. Do you use one of these concepts in your practice? (one or multiple answers)

- Circular economy
- Urban metabolism
- Territorial ecology
- Cradle to cradle
- None of the four

13b. In what kind of work do you use these concepts? (analysis, design, realization etc.)

.....

14c. Still the same concepts. What do you think of these concepts and of their application in planning and design?

.....

14d. Can you name some projects where one or more of these concepts are used?

.....

Your response has been recorded

Thank you very much for the time you spent answering to this questionnaire.

Annex 11

List of the landscape architects interviewed in France and the Netherlands

List French landscape architect interviewed

Person	Details	Date and place
FR1 Aubry Pascal	Paysagiste DPLG, Paysagiste-conseil de l'État	22/06/2016 – ENSP Versailles
FR2 Brauns Alice	Paysagiste DPLG, paysagiste-conseil de l'État	14/11/2017 – ENSP Versailles
FR3 Chazelle Claude	Architecte-paysagiste DPLG, directeur de l'Atelier Régional de Paysage et d'Architecture de l'Environnement, paysagiste-conseil de l'État	27/11/2017 and 02/02/2018 office Clermont-Ferrand
FR4 Claus Isabel	Ingénieure-paysagiste, Isabel Claus paysagiste	11/12/2017 – office Lyon
FR5 Hilaire Philippe	Paysagiste DPLG, Paysagiste-Conseil de l'État	15/01/2018 – office Versailles
FR6 Laubie Claire	Paysagiste DPLG, atelier à ciel ouvert	03/05/2018 – office Fontenay sous Bois
FR7 Matras Mathilde	Ingénieure paysagiste, ETD – Énergies et Territoires Développement	05/07/2018 – office Roanne
FR8 Planchais Laure	Paysagiste DPLG, Agence Laure Planchais, paysagiste-conseil de l'État	12/01/2018 – office Paris

List Dutch landscape architect interviewed

Person	Details	Date and place
NL1 De Jong Jannemarie	Partner landscape architect, Wing, partner in ruimte en ontwikkeling [partner in sapce and development]	17/05/2017 – office, Wageningen
NL2 Hugtemburg Jasper	Landscape architects H+N+S	17/05/2017 – office, Amersfoort
NL3 Oudes Dirk	Landscape architect Wing	31/05/2017 – office Wageningen
NL4 Somsen Isolde	Landscape architect Programmaleider ruimtelijke kwaliteit [Program leader spatial quality], Projectleider energie en ruimte [Project leader energy and space] in Province of Zuid-Holland	25/09/2017- office of the Zuid-Holland province, the Hague
NL5 Stroeken Frank	Landscape architect, partener in Terra incognita	06/06/2017 – office Utrecht
NL6 Strootman Berno	Landscape architect founder of Strootman Landschapsarchitecten and “Rijksadviseur voor de fysieke leefomgeving” [Government advisor for the physical living environment]	31/05/2017 - offices Amsterdam
NL7 Veul Joppe	Landscape architects H+N+S	17/05/2017 – offices, Amersfoort
NL8 Wijnakker Rens	Landscape architect FABRICations	03/07/2017 – offices, Amsterdam

Annex 12

Basic guide of questions for semi structured interviews developed with French landscape architects. Some additional specific questions were added on case by case basis. Moreover the questions were not always made following this order but adapted to the discourse developed with the interviewed.

The office

1. Quel est votre rôle dans le bureau ? À quelle étape du processus de projet vous intervenez plus ? (chef d'agence, commande, appelle d'offre ou développement du projet etc.)
2. Quelles disciplines sont présentes dans votre bureau ?
3. Quel type de projet vous développé le plus dans votre bureau (espace public, travail prospectif, parc etc.) ? Les projets relatifs à la gestion énergétiques y ont une place importante ? À quelle échelle vous abordées le plus les projets énergétiques ? (planification, échelle du quartier etc.)
4. Depuis quand vous vous intéressez aux questions d'énergie ? et pourquoi ? (demande des appelle à projet ou intérêt personnelle etc.)

Le rôle des paysagistes dans la transition énergétique

5. Quel rôle à, selon votre expérience, le paysagiste dans le contexte actuel de transition énergétique ? et quel rôle y pourrait y avoir ?
6. Quelles compétences peuvent mettre à disposition les paysagistes pour le développement de la transition énergétique?
7. Dans le cadre de projet concernant la transition énergétique, quelles connaissances vous utilisez ? ils peuvent être des évolutions dans la pratique en termes de connaissance à acquérir ?
8. Dans le cadre de projet concernant la transition énergétique, quelle démarche de projet vous appliquez ? ils peuvent être des évolutions dans la démarche ?
9. Quelles sont les principales difficultés que vous avez rencontrées en travaillant sur un projet concernant l'énergie (projet concernée par la question de l'énergie)?
10. Avez-vous vu une évolution dans le question lié au paysage et la gestion de l'énergie depuis que vous avez commencé à travailler ?

Démarche d'un projet (projet spécifique)

11. Quel a été votre rôle dans ce projet ?
12. Quel était le but du projet par rapport à la question énergétique ?
13. Pouvez-vous expliquer l'évolution dans le processus de projet ? (connaissances et

démarches)

14. Quel était, selon vous, la valeur ajoutée que vous aviez apportée au projet étant que paysagiste ? Quelles compétences et connaissances sont les plus utiles ?
15. Avez-vous rencontré des différences dans le processus, dans les tâches dans les résultats par rapport aux autres projets ne traitant pas de la gestion de l'énergie ?
16. Avez-vous rencontré des difficultés et des limites dans le développement et la réalisation du projet ? Si oui, lesquels ?
17. Pouvez-vous identifier des principes de gestion énergétique, que vous utilisez dans de projet de transition énergétique ?
18. Avez-vous collaboré avec d'autres disciplines en traitant de la question énergétique ? Si oui lesquels ?
19. Comment ce passé la collaboration avec les autres disciplines ? Et le dialogue avec eux ?

Les concepts

20. Est-ce que il y a des concepts que vous utilisiez pour aborder le thème de l'énergie ?
21. Est-ce que vous avez entendu parler des concepts tels que métabolisme urbain, économie circulaire, cradle to cradle ? si oui dans quel contexte ?
22. Que pensez-vous de ces concepts par rapport à la gestion énergétique et de leur mise en œuvre dans le projet d'aménagement/ paysage ?
23. Quels principes opérationnels évoquent pour vous ces concepts ?

France-Pays-Bas et international

24. Comment décrire l'approche française au regard de la prise en compte des questions énergétiques dans le projet de paysage ?
25. Pensez-vous que ces questions énergétiques en rapport au paysage sont mieux prises en compte dans d'autres pays européens ? Lesquels et pourquoi ?

Paysage et transition énergétique

26. Pouvez-vous faire un croquis dessinant la notion de « paysage de la transition énergétique » ?
27. Qu'évoque pour vous la notion de «paysage de la transition énergétique » ?
28. Pouvez-vous dessiner un croquis expliquant quel rôle peut avoir le paysagiste dans le contexte de la transition énergétique ?
29. Quel rôle peut avoir le paysage dans le contexte de transition énergétique ?

Annex 13

Basic guide of questions for semi structured interviews developed with French landscape architects. Some additional specific questions were added on case by case basis. Moreover the questions were not always made following this order but adapted to the discourse developed with the interviewed.

The office

1. What is your role in the office? At what step of the project process do you work the most (design, drawing technical elements etc.)?
2. Which disciplines are present in the office your work?
3. What kind of project do you develop the most in the office (Public space, parks, future scenarios, urban planning, regional planning etc.)? Do the energy related projects occupy an important place? At which spatial scale are your most develop energy related projects? (region, site etc.)
4. Since when do you are interested in energy aspect, and why? (call for tender, personal interests etc.)

Landscape architect role in energy transition

5. What is the actual role, according to your experience, of landscape architects in energy transition process? What role could they have?
6. What competencies do/can landscape architects provide to the implementation of energy transition?
7. Developing energy transition related project, what kind of knowledge do you use? Do you need to acquire additional knowledge on some topics?
8. Developing energy transition related project, what kind of design steps do you use? Is there the need for new design steps?
9. What are the main difficulties that you face while working on energy related projects?

Energy design process (related to a specific project of the office,)

10. What was your role in this project?
11. What was the project goal regarding energy?
12. Can you describe the evolution of the design process in this project? (design steps and knowledge needed)
13. What was, according to you, the value that you could add to the project as landscape architect? What competences and skills are most useful?
14. Are there differences compared to other project not dealing with energy (e.g. process, task, results)?
15. Did you encounter difficulties/limits during the process of this project? If yes which ones?
16. Which energy-related design principles did you use when working on the project?

17. Do you collaborate with other disciplines when you work on energy projects? If yes which one(s)?

18. How did your collaboration with other disciplines go? And the dialogue with them?

France the Netherlands and international

19. Please describe what you think is the ‘Dutch approach’ to energy-conscious landscape design (process, concepts, paradigm.)

20. Do you think that energy and landscape question are more taken into account by landscape architects in other countries? If yes, which ones and why do you think that is the case?

The concepts

21. Are there concepts that you use to plan/design for energy?

22. Are you familiar with concepts such as urban metabolism, circular economy and cradle to cradle? If yes, in which context did you learn about them?

23. What do you think of these concepts and of their application in energy landscape planning and design?

24. Which operational (design) principles do you associate with these concepts?

Landscape and energy transition

25. What does the notion of “energy transition landscape” evoke for you?

26. Could you please draw what you the notion of “energy transition landscape“ means for you?

27. Could you sketch/draw the landscape architect/landscape architecture role in energy transition context?

28. What role could have landscape in energy transition context?

Annex 14

Global Table 13.1: energy conscious design principles coming from landscape architects drawing an “energy transition landscape” (black) and principles extracted by question about LA contribution in energy transition (green), and from knowledge, design steps (blue). (chapter 13)

	Principles	LA
Reduction energy consumption		
1	Designing landscape in order to reduce energy consumption	FR2
2	Encouraging the less energy consumption behaviors of people through landscape/spatial organization design	FR6
3	Developing spatial organization in order to decrease energy consumption of built areas for transports (e.g. mix of functions).	NL3, NL8
4	Decreasing energy demand through the designing of mobility systems (e.g. slow mobility paths)	NL5, NL6
5	Encouraging compactness in urban form for saving energy in transports	NL6
6	Reducing energy consumption in buildings through insulation	NL4
7	Using trees in order to reduce the heat island effect in urban areas, I order to decrease energy consumption for cooling	FR1
8	Choosing carefully tree essence in order to have solar gain in winter and solar shade in summer in building and neighborhood	FR1
9	Using local material as much as possible in order to reduce energy for their transports	FR3, FR8
10	Avoiding the choices of materials that requires a lot of energy for their fabrication	FR8
11	Designing park, public spaces, etc. in order to reduce their maintenance and the energy needed for it (e.g. reducing essences that need often cut)	FR8
12	Combining energy quantitative data with the spatial/landscape components for reducing energy consumption in territories	NL3, NL8
Energy stream optimization		
13	Using local biomass for local energy production	FR7
14	Developing a local heat network, feed by local agricultural biomass	FR7, NL3, NL7
15	Developing a local heat network, feed by local geothermic (heat pump)	NL3, NL7
16	Developing ET strategies/projects based on local landscape resources and characteristics	FR4, FR7, NL3, NL7, NL8
17	Siting large scale RE technologies projects nearby high energy consuming urban areas in order to reduce energy loss	NL1
18	Developing efficient connection infrastructure between high energy consuming urban and high energy producing areas	NL1, NL6
19	Creating energy synergies between dense populated urban areas and their lower dense rural hinterlands	NL1

20	Optimizing energy flow through a careful spatial organization among functions	NL2
21	Creating synergies among local flows for energy production (biomass, waste...)	NL2
22	Developing energy cascading system from industries to the households	NL3, NL7
23	Thinking at the energy transport network (on the ground or underground) while siting RE technologies, to reduce energy loss	NL4
24	Developing coherent spatial plan for underground energy transport infrastructures	NL4
Renewable energy production		
25	Thinking of other landscape induced effects, beyond the visual one, when designing RE projects	FR2
26	Making perceivable the power/strength behind RE production projects	FR3
27	Choosing wind turbines parks site coherent with the territory landscape, considering a large scale	FR6
28	Siting PV panels on the roof in order to preserve agricultural land	FR6
29	Siting PV panels in residual spaces (parking shadows, dykes, alongside highways)	FR6, NL2
30	Developing a RE production mix on territory (wind, PV, biogas, etc.) based on local characteristics analysis	FR7, NL1, NL3, NL4, NL7, NL8
31	Designing RE production projects making them tell new stories becoming landmarks in the landscape	FR8, NL5
32	Paying attention to RE technologies integration in the historical urban center	NL1
33	Designing RE technologies integration at building scale	NL1
34	Developing new design concepts for RE technologies localization (e.g. wind turbine in the forest)	NL2
35	Designing carefully the edges of large scale RE technologies projects	NL3
36	Being attentive at the correct dimension/scale and proportion of RE technologies implementation in build inhabited areas, in order that they do not dominate the landscape	NL3, NL7
37	Paying attention to biodiversity topic in large scale RE technologies projects	NL4
38	Developing coherent spatial plan for underground geothermal production technologies	NL4
39	Concentrating wind turbines parks in clusters, avoiding their uncontrolled sprawl on the territory	NL6
40	Designing RE production projects in order that they do not dominate the whole landscape of the territory	NL7
41	Substituting old more sprawled wind turbines with more efficient ones to be localized in clusters	NL7
42	Analyzing a very broad area for siting RE technologies technology, beyond the implementation site	FR2
43	Developing participatory process (e.g. meeting, field workshops, etc.) for supporting in RE technologies (wind turbine PV panels) siting choice	FR7
44	Combining energy quantitative data with the spatial/landscape components for RE production potentials in territories	NL3, NL8

Transversal principles towards energy transition

Considering specificity of each territory/site

45	Defining energy transition projects coherent and thought across scale from the global territorial system to the house and site level	NL1, NL3, NL7, NL8
46	Differentiating the designing between RE energy production dominated landscapes and built inhabited ones	NL3
46	Developing urban areas as energy-self-sufficient system as much as possible, exploiting local resources	NL7
48	Elaborating a main thread among topics and territorial characteristics, stakeholders discourse, through landscape design in order to ground the ET in the territory	FR3, FR4 <i>et al.</i>
49	Bridging natural characteristics (e.g. sun, wind) and ET infrastructures, land uses layers through design	NL1
50	Making spatial/landscape explicit energy transition quantitative goals in order to understand their energy potential and feasibility for each territory	NL4, NL3, NL8
51	Considering energy reduction consumption based on local characteristics at the same level than RE production while developing vision for territory	FR4
52	Reading landscape from hydrology, topography, geology perspective in order to support ET choices grounded in the territory	FR3, NL2

Integrating multi-functional and cross-sectoral consideration

53	Analyzing other topics such water, agriculture, biodiversity, etc. while working on ET in order to create possible synergies and problem solving across them	FR4, NL7
54	Defining energy transition strategies looking as much as possible at the global territorial system in order to create synergies among parts.	NL1
55	Thinking about energy transition design solutions in urban public spaces, combining the two functions	NL4
56	Developing multi-functionality in the landscape while working on energy transition, combining energy with other functions (e.g. agriculture, recreational, etc.)	NL6, NL3, NL5, NL2, <i>et al.</i>
57	Designing spaces to adapt them to new needs in order to support people to have more energy efficient behavior (e.g. waiting spaces for electric vehicles recharges)	NL8
58	Exchanging with other experts (disciplinary fields) through the whole design process to integrate functions and sectors.	NL1, NL4, <i>et al.</i>

Supporting the elaboration of a shared projects

59	Developing new narratives in order to rise a “landscape feeling belonging” about ET landscape induced changes for local inhabitants in order to make better accept them	FR3, NL5
60	Supporting in the elaboration of a territorial shared project by local inhabitants and other stakeholders, towards energy transition strategies, using participatory process (workshop, etc.)	FR5, FR4
61	Exchanging with agents (e.g. agriculture urbanism, etc.) in territory in order to collect knowledge about different topics and issues and provide better energy design solutions	FR4
62	Supporting people to network and dialogue, treating the ET projects across geographical scales and on long terms	NL6

63	Representing future landscape possibilities in order to facilitate a dialogue among territorial stakeholders to define ET process	FR4, NL7 <i>et al.</i>
64	Accompanying local inhabitants to understand landscape as dynamic entity and so changes in the transition process to lower local opposition to the projects	FR7, FR6 <i>et al.</i>
65	Exchanging with local inhabitants in order to integrate their aspiration in the projects	FR4, <i>et al.</i>
66	Using dynamic video to better make understands to local inhabitants/ stakeholders the project for wind turbines, including their movement in representations	FR1
67	Representing RE technology projects carefully matching the physical reality as much as possible in order to better understand and make understand the reality of the project	NL5, NL6, NL7, FR3
68	Using board/ table games with local stakeholders in order to better make them understand the spatial/landscape component of energy transition and supporting in deciding strategies.	NL4
69	Developing empirical tool to better represent projects and make them understandable (e.g. balloon to represent wind turbines)	FR8
Others		
70	Thinking and designing the reconversion of the dismantled nuclear power plant area	FR6
71	Developing landscape ET vision on short terms, but also long terms (30/50 years)	FR6

Annex 15

Liste acronymes (alphabetic order)

ADEME : Agence de l'environnement et de la maîtrise de l'énergie [Agency of the environment and the energy management]

APCE: Association of Paysagiste conseil de l'État [Landscape architects State's advisers association]

APR: atelier pédagogique regional [pedagogical territorial desing studio]

CC: communauté de communes [community of municipalities]

CTE: contrat de transition écologique [Ecologic trnastion contract]

CRE: "College van Rijksadviseurs" [Government advisers board]

DOO : Document d'orientation et d'objectifs [Orientation and objectivesl document]

ELC: European Landscape Convention

ET: Energy transition

FFP: Fédération française du paysage [French landsape federation] (landsacpe architects network)

LOP : Landschapontwikkelingsplan [Landscape development plan]

LTECV : Loi transition énergétique pour la croissance verte [Law energy transition for the green growth]

NVTL : "Nederlandse vereniging voor tuin en landschapsarchitectuur" [Netherlands Association for Garden and Landscape Architecture]

OAP: Orientation d'aménagement et de programmation [planning and program orientation]

PADD : projet d'aménagement et de développement durables" [planning and sustainable development project]

PAP: Assocaition paysage de l'apres petrole [After oil landscape association]

PCAET: Plan climat air énergie territorial [Territorial climate air energy plan]

PCET: Plan climat énergie territorial [Territorial climate energy plan]

Plan MER: Milieueffectenrapportage [Environmental Impact Assessment-EIA]

PDU: Plan de déplacements urbains" [Urban movement plan]

PLU: Plan locale d'urbanisme [Local urbanism plan]

PLUi: Le Plan Local d'Urbanisme intercommunal [intermunicplities local urbanism plan]

PPE: Programmation pluriannuelle de l'énergie [Multiannual energy plan]

PREPA: "Plan national de réduction des émissions de polluants atmosphériques" [National plan for air polluting emission reduction]

RES: renewable energy source

RE: renewable energy

PV: photovoltaic

TEPCV: "Territoire à énergie positive pour la croissance verte" [Energy positive territories for the

green growth]

TEPOS : “Territoires à énergie positive” [Energy positive territories]

SER: “Energieakkoord voor duurzame groei” [Energy agreement for sustainable growth] (SER) (2013)

SNMB: La stratégie nationale de mobilisation de la biomasse [National strategy of biomass mobilisation]

SEV III: “Derde Structuurschema Elektriciteitsvoorziening” [Third structure plan electricity supply]

SCoT: Schéma de cohérence territoriale [Territorial coherence scheme]

SNBC: Stratégie Nationale Bas Carbone [national low-carbon strategy]

SNMB : “La stratégie nationale de mobilisation de la biomasse” [National strategy of biomass mobilisation]

SRCAE: Le schéma régional du climat, de l’air et de l’énergie” [Regional scheme of climate, air and energy]

SRADDET: Schémas Régionaux d’Aménagement de Développement Durable et d’Égalité des Territoires (qui englobe le SRCAE). défini par la loi portant Nouvelle Organisation Territoriale de la République (NOTRe), 2015

SRE: schéma régional de l’éolien [regional wind schema]

SVIR : “Structuurvisie Infrastructuur en Ruimte. Nederland concurrerend, bereikbaar, leefbaar en veilig” [strategy vision for infrastructure and spatial planning. Making the Netherland competitive accessible, liveable and safe]

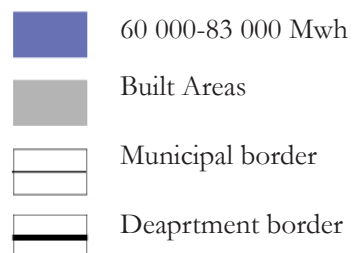
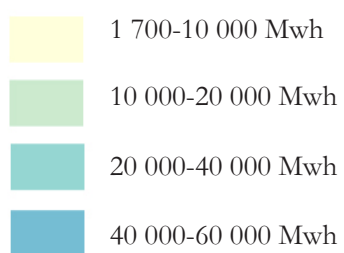
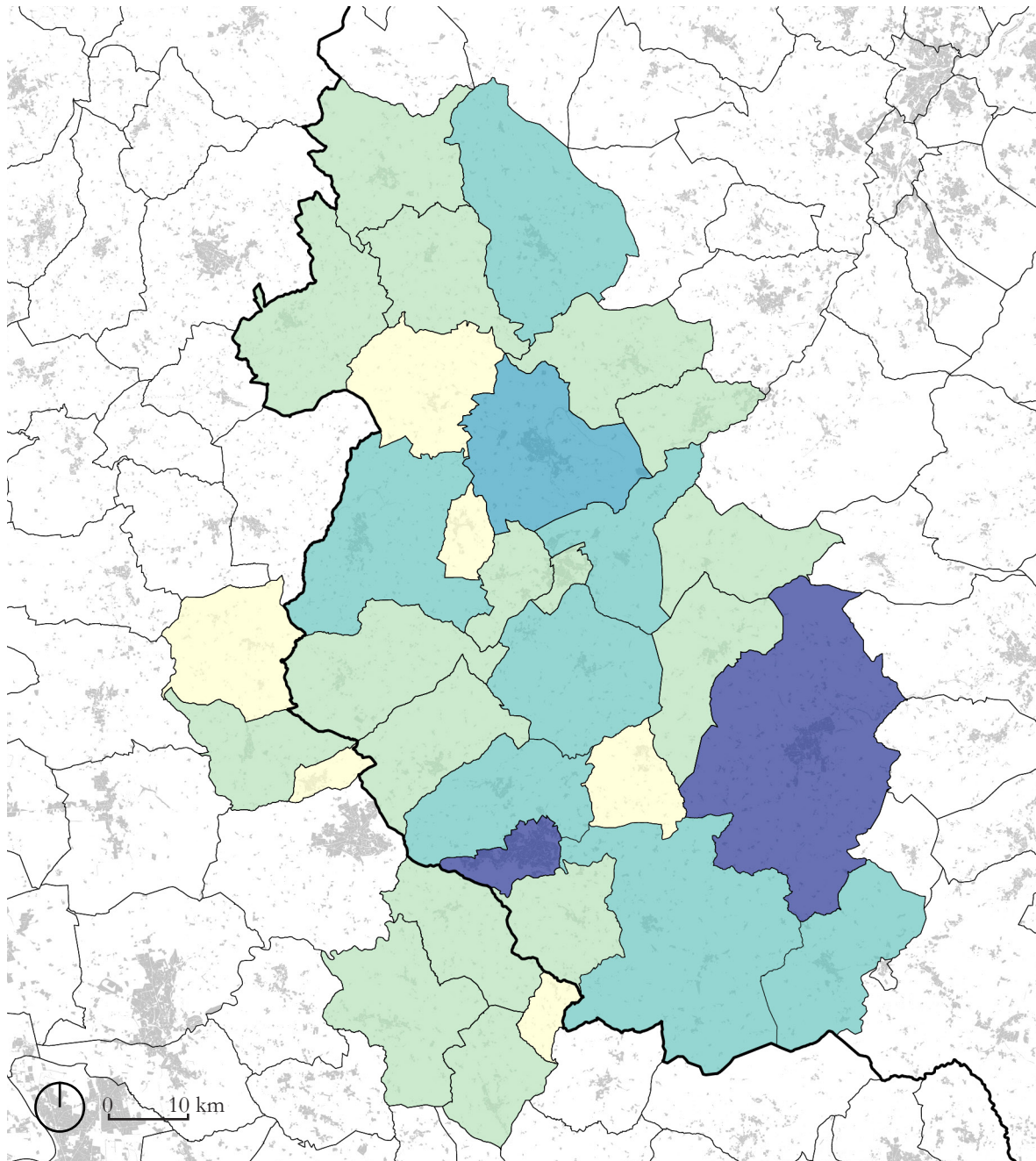
S3REnr : “Schémas Régionaux de Raccordement au Réseau des Énergies Renouvelables” [Regional scheme for renewable energy connection to the grid]

ZDE: zones de développement des éoliens [wind development area]

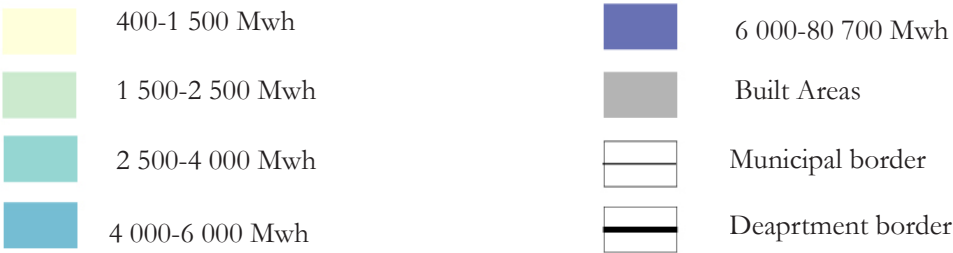
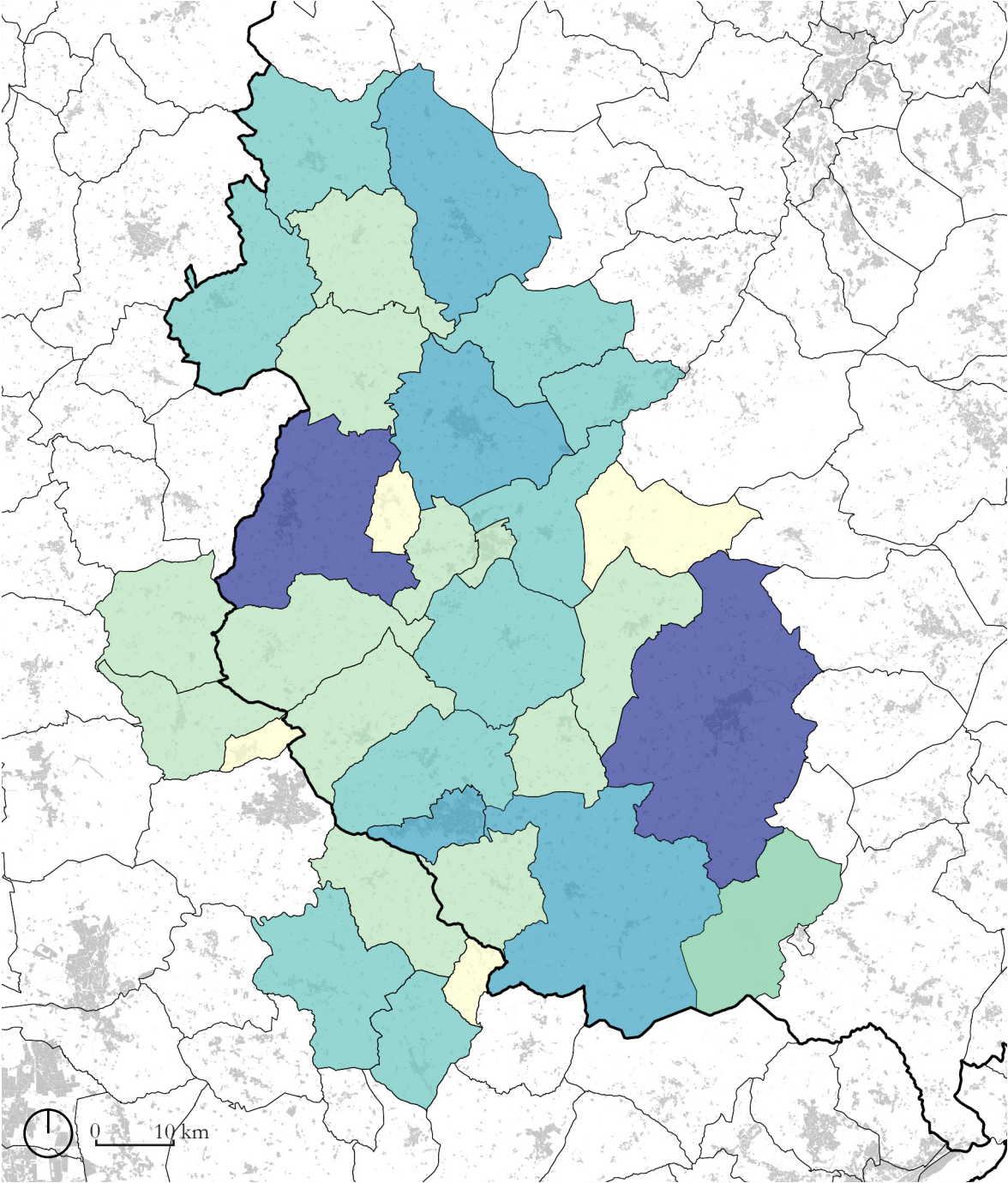
Annex 16

Map of total energy consumption (residential, tertiary, transport, industries) in MWh, 2015, in the municipalities of the CC Monts du Lyonnais.

Source: author elaboration through Qgis of OREGES data



Map of renewable energy total production (wind, PV, solar thermal power, biogas, wood-energy) in MWh, 2015 in the municipalities of the CC Monts du Lyonnais.
 Source: author elaboration through Qgis of OREGES data



Title : Landscape planning and design for energy transition in France and the Netherlands. Principles, practices, recommendations

Keywords : territory, landscape architect, planning instruments, territorial agents

Abstract :

The research relates to the ongoing discourse about energy transition, starting from the consideration that the energy transition generates a landscape transition too, thanks to the long-lasting relationship between energy development and spatial organization, the first one having inevitably an impact on the second. The period we are living, it is not an exception. The ongoing transition, which implies a gradual relocation and territorialisation of the energy system, need planning and design landscape according to reduction of energy consumption and renewable energy production goals. In this framework the main goal of this research is to establish and assess energy conscious landscape planning and design in the context of the ongoing energy transition.

The research framework is based on different concepts: *urban metabolism*, *circular economy* and *cradle-to-cradle*. Through a critical view of the linear functioning 'take-make-waste' of our society, they could inform choices and strategies aiming a better energetic sustainability, with impacts on spatial and landscape planning and design.

A comparison between France and the Netherlands, nations engaged in energy transition process and with an important and long lasting tradition in landscape architecture, but with differences, contributes to understand how landscape and spatial planning and design are taken into account and which energy development strategies and synergies are developed. The research analyses territories: two in France and one in the Netherlands, committed to a transition process. The contribution of landscape architects is also investigated. The similarities and differences of the two national context allow to put the analyses in perspective.

Results show that in French territories there is a general lack of recognition of landscape planning and design as able to contribute to energy transition, beyond the integration of renewable energy technologies. On the contrary, this role seems to be better addressed in the Dutch context. Nevertheless, territorial agents have a vision of the connection between landscape and energy transition which also includes the reduction of energy consumption and optimization of energy flows. Concerning landscape architects, energy transition does not lead to radical changes in their practice. They continue to rely on knowledge and design steps conventional for the discipline, but which have to be combined with new knowledge and steps specific to energy topic.

Titre : Le projet de paysage au service de la transition énergétique en France et aux Pays-Bas. Principes, pratiques, recommandations

Mots-clés : territoire, paysagiste, instrument de planification, acteurs du territoire

Résumé :

La recherche s'inscrit dans le débat actuel sur la transition énergétique. De tout temps, la gestion de l'énergie et l'aménagement de l'espace et du paysage ont entretenu une relation forte, la première ayant fatalement un impact sur le second. La période que nous vivons ne fait pas exception. La transition en cours, qui implique une progressive relocalisation et territorialisation du système énergétique, nécessite d'aménager le paysage en fonction d'objectifs d'économie d'énergie et de production d'énergies renouvelables.

Dans ce cadre, l'objectif central de la recherche consiste à établir et à évaluer un projet de paysage « prônant l'usage et la production raisonnée de l'énergie » dans le contexte de l'actuelle transition énergétique.

Le cadre d'étude s'appuie sur différents concepts : *métabolisme urbain, économie circulaire, cradle-to-cradle*. À travers une critique du fonctionnement linéaire « produire-consommer-jeter » de notre société, ils peuvent informer des choix et des stratégies visant à une meilleure soutenabilité énergétique, avec des retombées en matière d'aménagement et paysage. Une comparaison entre France et Pays-Bas, nations engagées dans la transition énergétique et ayant chacune une longue tradition en architecture du paysage, mais avec des différences, permet d'analyser la manière dont paysage et aménagement du territoire sont pris en compte et quelles stratégies et synergies de gestion énergétique sont développées. La recherche porte sur des terrains d'étude à l'échelle stratégique du territoire : deux en France et un aux Pays-Bas, engagés dans un processus de transition énergétique. La contribution spécifique des paysagistes concepteurs est également explorée. Les similarité et différences des deux contextes nationaux permettent de remettre l'analyse en perspective.

Les résultats montrent que, dans les territoires français, il existe un manque général de reconnaissance du projet de paysage comme outil susceptible de contribuer à la transition énergétique au-delà du développement des technologies pour la production d'énergies renouvelables. Au contraire, ce rôle semble être plus reconnu dans le contexte néerlandais. Toutefois, les acteurs des territoires ont une vision de la relation entre paysage et transition énergétique qui comprend aussi la réduction des consommations énergétiques et l'optimisation des flux d'énergie. Concernant les paysagistes, la transition énergétique n'amène pas de changement radical dans leur pratique. Ils continuent à s'appuyer sur des connaissances et des étapes de projet conventionnelles à la discipline, mais auxquelles doivent désormais être combinées des connaissances et des étapes nouvelles propres au projet concernant l'énergie.