Part 2.
Landscape architecture from the perspective of sustainable energy transition

Part Two develops reflections about landscape architecture in the light of sustainable energy transition.Through landscape planning and design, landscape architecture deals with sustainable energy transition and contributes to shaping the physical environment by using those renewable energy resources which are locally available. Yet, it does not compromise the social, ecological and aesthetic characteristics of the landscapes involved.
This part aims at pinpointing the approach that landscape architects have, whenever they deal with sustainable energy transition. The main objective is to reflect on the disciplinary knowledge of landscape architecture and on the skills used by landscape architects in designing renewable energy landscapes, in Italy and elsewhere.

Chapter 3 explores the controversial nature of design in landscape architecture and the consequent implications for sustainable energy transitions, especially in Italy. To this end, I analyzed two special issues dedicated to renewable energies on the journal *Architettura del Paesaggio*. In addition, an overview of the debate concerning this topic is given for the Italian context. The data were collected through an online questionnaire sent to a significant sample of Italian landscape architects. In the light of the elaboration of these data, I then discussed the shared culture on the topic with regard to the Italian context (Williams, 2004).

Chapter 4 aims at reporting how Italian and Dutch landscape architects are dealing with renewable energy-related projects, and at considering how they approach landscape planning and designing for renewable energy. For the analysis, I chose a total of eight Italian and Dutch landscape architecture companies and I used a series of interviews as empirical base for the chapter (Miles & Huberman,1994). The analysis shows that Italian landscape architects mainly deal with site specific projects and finally suggest one design solution, whereas Dutch landscape architects chiefly develop long term scenarios.

Micro hydro power plant, Paullo, MIlano, Italy .
(S. Minichino)

Chapter 3. Italian landscape architecture approach to renewable energy

3.1 Introduction

Italian landscape architecture is quite a young discipline. The Italian Landscape Architecture Association (AIAPP) was founded in 1950 and official academic landscape architecture classes only began in 2000. The definition of landscape architecture given by AIAPP is in line with the internationally recognized definition.

Landscape architecture is widely considered as a design-based discipline (Olmested, 1870 in Larice & Macdonald, 2007; Nijhuiset al, 2011; Van Damme, 2012; Zagari, 2006). Design sees the world as a project and acts upon the world through projects (Meyer, 1996; Swaffield, 2006; Koh, 2013). Designing landscape occurs on different scales, global (policy making for landscape), regional (landscape planning) and site (site design) (Steinitz, 1996; 2004).

All these scales could support sustainable energy transition, particularly landscape planning and site design (see e.g. Stremke & van Dobbelsteen, 2012). The question is how.

Sustainable energy transition is aimed at achieving environmentally sustainable energy systems through increasing energy efficiency, promoting renewable energy sources and sustainable transport (Strong, 1992; Solomon & Khrisna; 2011). Sustainable energy transition is also envisioned as a socio-technical processes, involving both technological innovations, complex systems

management and multilevel governance (Loorbach, 2001; Rotmans & Loorbach, 2010; Paredis, 2013). Renewable energy projects could be included both in top down initiatives, for instance, international companies promoting photovoltaic plants, and bottom up initiatives, such as community owned wind farms (Hielscher et al, 2011; Perelman, 1980).These initiatives have a spatial and a territorial nature because they refer to new configurations of space as well as specific territorial strategies (Wächte et al, 2010).

The spatial and territorial dimensions of sustainable energy transition are related to conscious environmental spatial planning and design, thus involving landscape architecture.

On a worldwide scale, discussions regarding sustainable energy transition first began after the oil crises in the 1970s. The political and energy crisis introduced the need to reflect on the production and living models based on security and energy independence (Illich,1974; Rifkin, 2011). Approaching sustainable energy transition in terms of planning and design landscape emphasizes four environmentally designed steps: a) reduce consumption using intelligent and bio-climate design; b) reuse waste energy streams; c) use renewable energy sources, and d) ensure that waste is reused as food (Van den Dobbelsteen, 2009). Although the use of renewable energy technologies is one of the principal strategies in achieving sustainable energy transition, the real sustainability of these technologies is controversial issue, and the concept of sustainability itself is unclear in terms of landscapes transformations (e.g. Antrop, 2005, 2006; Farina, 2013).

In order to explore the implication for landscape architecture in sustainable energy transition in Italy, this chapter is structured according to the following questions:

- What are the main characteristics of the Italian landscape architecture and how is landscape design envisioned by landscape architects?
- What is the most common landscape architecture approach to renewable energy and sustainable energy transition in Italy?

First, an overview of the material collected and methods used in data processing is provided. Secondly, the debate on the role of design for landscape architecture is addressed in order to clarify how it could be tackled in terms of the sustainable energy transition. Lastly, this notion is examined in the context of Italian landscape architecture and discussed in the light of the opinions of a sample of Italian landscape architects.

3.2 Shared values in Italian landscape architecture

In Italy, landscape architects are increasingly becoming interested in renewable energy. *Architettura del Paesaggio,* which is the professional journal edited by PAYSAGE*,* has dedicated two issues to the topic. The aim of these special issues, entitled *Paesaggio energia e risorse,*18/2008 and *Energia dalla natura e nuovi paesaggi,* 24/2012, was to explore approaches and examples within the professional practice. I analyzed these approaches and examples by searching

for types of renewable technologies, location, spatial scale of the project and main topics addressed.

In addition, an on line questionnaire (Dillman & Bowker, 2001) was sent to AIAPP members and affiliates (October 2013 - November 2013), in order to obtain a stronger common base to examine the Italian context (Williams, 2004). Questions about the following were included:

- Italian landscape architecture as a discipline and its designing tools;
- how landscape architect professionals are involved in planning, designing and dealing with renewable energy;
- what landscape architects think about their possible role for sustainable energy transition[8]

The common server provider used for the survey automatically analyzed the data referring to multiple-choice questions. The open questions were examined by searching for words used frequently by respondents. Data were studied by searching for unity of meanings (Miles & Huberman, 1994) in order to outline features of a possibly shared culture among Italian landscape architects (Firewether & Rinne, 2012).

3.3 The controversial nature of design in landscape architecture

The European Landscape Convention envisions landscape as the whole territory of states including both ordinary and special urban and peri-urban spaces, towns, villages and rural areas (Olwig, 2006a; Selman, 2011). Thus it seems that landscape cannot be actually designed without considering the various forces that shape places, such as policies, private initiatives and individual actions (Behzadfar & Razzaghi, 2011; Ogrin, 1994; Paolinelli, 2011). The landscape is therefore envisioned as an entity which cannot first be planned and then designed. Indeed, the concept of landscape is strictly connected to changes, which may be sudden and unpredictable. The uncertainty in how landscapes are being transformed is a recognized topic to be addressed by landscape architecture via landscape planning and design principles (Prominsky, 2005; Roggema, 2014).

Landscape is thus considered as the product of three different forces: sectoral policies (Pedroli, 2006), people (Ferrario, 2011), namely collective and individual actions, and cognition (Farina, 2006). Thus the concept of landscape acquires a double meaning of medium and arena both in policies, collective and individual activities, and in the general public's perception.

Indeed, Pedroli, while considering the landscape as a product of sectoral policies, refers to the geographical concept of landscape, but shifts the emphasis to policy as a tool for steering transformations. Therefore landscape is, first of all, a future spatial vision. Ferrario also starts from the geographical concept of landscape, by considering the relationship between human activities and the land (Antrop, 2000; Cosgrove,1994; Farinelli,1991; Sereni,1972). Her perspective, considering the problem from a spatial planning point of view, approaches landscape as the tool to introduce individual and collective choices into spatial planning. Farina explicitly states that landscape is not a manageable subject, but a

8 See the overall questions of the questionnaire sent to Italian landscape architects p. 209.

perceptible object (Farina & Belgramo, 2006). Therefore, if landscape is perceived as a tool for steering and interpreting spatial transformations, landscape becomes the means for designing new spatial configuration on different scales.

In conclusion, design in landscape architecture refers to both imagining future scenarios, as well as the creative and inclusive process of giving form to physical phenomena at every scale. Indeed, landscape architecture is traditionally envisioned as being capable of reconciling past and present landscape characteristics with future transformations through the forward-looking visions created by designing (Koh, 2013; Sijimons, 2010; Van Damme et al, 2013).

3.4 Landscape design and landscape planning

The dialectic of planning and design affirms that although design could be seen as part of planning or independent activities, planning and design share a common ground in shaping and governing spaces (Rossi, 1982; Steinitz, 1998; Steiner, 2011; Van Assche et al, 2013). Within the boundary of landscape architecture, the dialectic of planning and design has also been discussed (Banerjee, 2011; De Jonge, 2009; Ogrin, 1994, Stiles, 1994; Zoh, 2000). This controversial relationship derives partially from the fact that landscape is not a field exclusive to landscape architecture. Therefore, the way in which the disciplines use the concept of landscape is relevant for distinctions.

Landscape architecture refers to both planning and design, envisioning spatial transformations. The first deals with questions like what, where and how much, resulting in generalized plan categories, such as zones or areas designated for land use. This level of planning does not involve new spatial configurations and / or the implementation of land use structure. On the other hand, design deals with concrete and descriptive elements. In this respect, design deals with the how-questions.

Essentially, landscape planning tackles the comprehensive knowledge of landscapes, in order to integrate it into all kinds of regional general spatial planning, while landscape design tackles the transformation, in order both to integrate this knowledge into spatial planning and implementation. However, the European Landscape Convention positions landscape planning and landscape design within the landscape governance, as they are envisioned as more democratic tools for spatial and decision making (Beunen & Opdam, 2011; Janssen et al, 2012; Opdam et al, 2013; Primidhal et al, 2013). In this situation the distinction between planning and design fades and they become a merged option for envisioning future landscapes.

3.5 Landscape and design as common ground in decision making

For the last decade, environmental and spatial sciences have changed approach in dealing with complex problems. Indeed they have passed from the plot scale

analysis to problem solving at the place scale, involving increasing subjectivity and uncertainty (Musacchio 2010a; Wu, 2006; Scott, 2012).

Landscape design should therefore be investigated from the perspective of bridging those two different fields. Landscape architecture deals with solving different problems through design practices. Thus the landscape is considered as a medium and a method for synthesis especially for sustainable design processes. Landscapes integrate different processes such as environmental, economic and social and in addition, they are visible. These features are proposed to be used to effect sustainability and invite creative invention and people involvement (Nassauer, 2012).

Landscape architecture, in terms of both landscape design and landscape planning, has strategic and operational disciplinary backgrounds (Firebrother, 1974; Ogrin,1994). The first is connected to the kinds of notions and skills derived from generalization processes, the second derives from the knowledge and skills used in tackling specific problems connected to individual cases.

To sum up, design processes as well as the landscape are common platforms for academics, professionals, stakeholders and citizens because they are both conceptual and operational paradigms in achieving goals for spatial transformations. Both landscape and design are common grounds for project development in policy making and implementation. Designing and planning from the perspective of landscape becomes a useful way to solve complex or multi-framed problems (see e.g. Biancini, 2012; Nijhuis & Bobbink, 2012)

3.6 An outline of the dialectic planning-design within Italian landscape architecture

Landscape architecture started to deal with the role of design when landscape was included in the discussion – initially about conservation and transformation (see e.g. Caravaggi, 2002), and then urban planning and design (see e.g. Cinà, 2012). The rationale underlying the design nature of landscape architecture has recently been further developed after the law in Italy on Heritage and Landscape Planning (Codice dei Beni culturali e del Paesaggio, Dlgs n. 42, 2004) incorporated European Landscape Convention principles. The idea of integrating spatial plans and landscape plans is at the core of the debate (e.g. Abis, 2009; Paolinelli, 2011; Ferrara & Campioni, 2012). The interactions between decision making on a regional scale, local decision making and site design are discussed within strategy formulation and implementation. The key issue is to deal simultaneously with the plot scale and the site scale, and this is also critical for sustainable energy transition.

The role of design in landscape architecture and the role of landscape architecture in spatial planning remain emerging questions as well as the relationship between landscape planning and design - again for sustainable energy transition too. However, Italian and international landscape architecture have started to change their focus, turning from garden design to regional planning (Van Damme et al, 2012), working on the rational use of renewable and non-

renewable sources. Some landscape architects have started to work on landscape characteristics connected to the potential of renewable energy (Belanger, 2009; Zoido Naranjo, 1995).

In Italy, renewable energy diffusion initially had a huge impact on environmental assessments and only in a second phase was landscape included in this kind of analysis. Landscape was introduced in the power plant assessments concerning institutionally protected areas, and landscape architecture skills were required (Oles & Hammarlund, 2011). In addition, the contribution of landscape architecture in power plant evaluations and in mitigation design, followed the conception projects by for instance, engineers. Since that is considered not adequate for regulating and envisioning more sustainable energy landscapes, severals authors proposed landscape architecture as contributing to site and conceive power plants (Campus, 2013; Moderini & Selano, 2006; Zampieri, 2010, 2012). Despite this, tools proposed by landscape architecture academia and professionals, jointly with institutional bodies focused mainly on landscapes protection referring to the concept of the compatible transformation of landscapes plants (Di Bene & Scazzosi, 2007; National Renewable Energy guides line, 2010).

3.7 Renewable energy diffusion and landscape architecture in Italy

Renewable energy diffusion is the most evident and socially recognized phenomenon of sustainable energy transition in Italy. The sustainability of their deployment refers to the wider issue of sustainability. The European Landscape Convention envisions the landscape as the arena where sustainability can have a strong operational meaning (De Jan Pons, 2006; Prieur, 2006). Although the European Landscape Convention does not refer explicitly to energy and renewable energy, sustainable transformations of landscape are the focus of the document which defines renewable energy diffusion within the domain of people's well being. Thus Italian landscape architecture deals with renewable energy deployment.

Sustainable energy transition is rooted in European strategic choices regarding energy. In fact, in 1996-97, the European Energy Agency was created when a debate began about the possibility of having a shared European energy policy. A long series of Green and White Papers followed this discussion and in 2009 the target known as *package 20-20-20* was published by the European Commission aiming at ensuring that the European Union meets its ambitious climate and energy targets by 2020. As Europe aims to reduce the use of oil and gas, raw materials, land and water by 2050, the European Road Map 2050 proposes a low-carbon society with low-energy, low-emission buildings with intelligent heating and cooling systems, and more carbon friendly transportation systems focusing on renewable energy implementation.

In Italy, the issue of sustainable energy transition was addressed in reaction to the European proposals in 2009, and the Italian Renewable Energy Action Plan was introduced (2009/28/EC), and in 2013, the National Strategy for Energy was published. The main actions proposed for the renewable energy target were monetary policies based on economic incentives. Despite the delay in producing national strategic documents on energy, in 2005 the first incentives

policy for renewable energy development were set out by the Italian government (Primo Conto Energia, DM 28/07/2005). At this point, Italian national and local governments had no strategies or regulations to deal with renewable energy in the regions, and no concrete ideas on the real meaning of renewable energy transition were shared. Despite this, Italy has a long tradition of renewable energy power plants, such as water and geothermic power plants, which since the early 20th century have been built mainly in the north and center of Italy.

The spread of renewable energy resulted in the coexistence of historical and new renewable energy landscapes. For instance, new photovoltaic fields were often located in the areas of unused thermal power plants. Despite this, location and permits were the most problematic elements since international or national investors were the major actors involved in these kind of projects. They promoted initiatives unrelated to a more comprehensive strategic and spatial vision. This led to the uncontrolled deployment of these technologies, which are now very common in Italian landscapes. Thus landscape architects dealt mainly with the permission procedures.

3.8 Italian landscape architects opinions on sustainable energy transition (part I)[9]

3.8.1 Examples from 'Architettura del paesaggio'

This section outlines the main results from the journal '*Architettura del paesaggio'* and analyses the results of the online questionnaire. The role of landscape design and the implications for sustainable energy transition are highlighted in the Italian context. The journal dedicated two issues to the topic of renewable energy.The first issue was published in 2008, when renewable energy had just started to be developed in Italy, and the second, published in 2012, refers to a period when a more structured assessment of their sustainability was being developed. In the first issue, landscape is envisioned as a continuously changing living place. This approach was influenced by the perspective of the European Landscape Convention, which was adopted by the Italian Government in 2005. The diffusion of renewable energy is considered by the journal's editors as a driving force in changing the shape of the landscape.

The most common argument in approaching renewable energy was the need to counteract controversial effects such as compromising historical landscapes by new landmarks such as wind turbines (see e.g. Battistella, 2010) by developing opportunities on a local level such as combining new infrastructures and recreational activities. The introduction of renewable energy into Italy was thus envisioned as the rising driving force for a new economic and social development. The cross-cutting theme proposed by landscape architects, in terms of the diffusion of renewable energy, was the topic of infrastructures.

The challenge was to conceive a new aesthetic. Although landscape design was considered as the most suitable activity offered by the discipline, the need to conceive programs on a regional and local scale was clearly stated.The compatibility of transformation with landscape characteristics, linking the regional

9 This chapter uses questions 2, 3, 4, 9 and 10 of the online questionnaire (see p. 209).

scale and the site specific scale, was introduced into the discussion.

In the 2008 issue, renewable energy was envisioned as a new land use, mainly connected to agricultural landscapes. Landscape architects worked on deciding locations for wind farms, and on a more sustainable management of green and forestry spaces considering biomass production and recreational areas. In a few of the projects published, landscape architects proposed concepts for planning strategies and a more energy-conscious architectural design. For instance, they called for a renewed role of vegetation and open green spaces in energy saving.

In the 2012 issue, three key words were used to describe this topic: *nature, landscape and energy*. In contrast with the first issue, the concept of infrastructure was replaced by the assumption that the entire territory is the potential entity in producing energy for human activities. In addition, the lack of a geographical strategic vision for renewable energy diffusion was underpinned.

Although the role of landscape architecture in conceiving regional strategies for energy landscapes was highlighted most projects have been at a site scale and in urban landscapes.

The 2012 issue outlines several technological solutions in order to highlight the many ways in which this topic involves everyday landscapes (table 3.1).

Table 3.1 Comparison between the two issues of Architettura del Paesaggio

	***Paesaggio energia e risorse,* 18/2008**	***Energia dalla natura e nuovi paesaggi,* 24/2012**
Topics	Renewable energy and landscape transformation	Landscape architecture in designing renewable energy power plants
Critical issues	Renewable energy technologies are considered only from the perspective of landscape protection	Lack of territorial strategies for renewable energy development
Renewable energy technologies	Mainly wind and biomass	A wide range of technologies
Projects	Landscape study on location of renewable energy plants and biomass management	Site specific projects and power plant design both in rural and urban areas
Landscape architecture role	Turning critical effects to opportunities for local development	Including energy in a more general landscape-conscious design

In conclusion, although sustainable energy transition was not explicitly addressed in either of the issues, both of them stated that a more strategic vision is needed for renewable energy. Despite this, few projects dealt with this topic. The first issue was more focused on landscape transformation, whereas the second issue started to examine the role of professionals. In 2008, landscape architects were regarded as professionals who can work on spatial principles for developing

renewable energy as a means for local development, and in 2012 as professionals who include energy within their general design activities.

3.8.2 Landscape architects opinions from the online questionnaire

About 120 landscape architects returned the questionnaire. In addition, I received an unexpected number of e-mails, asking for meetings or offering a deeper opinion on the topic. These facts together with the very high percentage of responses in the first week after then survey was sent out, underline how important this topic is to Italian landscape architects.The key topics explored by the questionnaire and summarized in (table 3.2) and are briefly discussed. Respondents defined landscape both as the geographical entity and the framework for design (respectively 32 and 27%). For them, landscape is strictly related to the concept of heritage (15 %) and could be envisioned as an arena for discussion. Only a few mentioned the ecological and territorial dimension of landscape (15%).

Respondents were asked about the scope of landscape architecture by an open question in order to have a wider range of opinions. Although the answers were very different, the most frequently mentioned areas of activities were open and green spaces (68%). Some respondents also mentioned the strong relationship between garden design and regional landscape design. Few of the respondents considered landscape architecture in the wider domain of spatial or urban planning. However, a very small number of respondents reported that, in their opinion, Italian landscape architecture should be more related to urban design, going beyond the common idea that the main role of landscape architecture is to mitigate impacts.

A significant number of respondents (67%) stated that landscape architecture is related to people and they specified that the discipline could be useful in collecting people's opinions and perception. Indeed, respondents referred very frequently to landscape architects as mediators in design and planning as well as in decision making. In general, there was an overlap between the concept of landscape and landscape architecture.

The landscape architects were asked to state what they believed was the main characteristic of landscape design in terms of their own work practice. They felt that the starting point of design consists in the direct observation of places via a visual and semiology analysis and from a multi spatial-temporal perspective. Visual analysis from significant observation points and from different routes (railways, highways and footpaths) was reported as very important. In addition, developing their design concept and products from different levels and over the long term (56%) was considered to be the most relevant characteristic of landscape design. Again, there was no clear distinction between landscape design or landscape planning. Respondents had very similar opinions regarding the possible role of landscape architects in sustainable energy transition. Although some respondents do not consider the impact of landscape architects in these processes (1%), and think they should only be involved in specific situations, most respondents (80%) agreed on the significant role for landscape architecture professionals in sustainable energy

transition. They felt that this kind of professional could contribute both to site and regional design of renewable energy.

Lastly, interviewees were asked about the possibility of disciplinary knowledge, and above all landscape design, informing sectoral policies, including renewable energy policies. Most respondents (79%) agreed on this possibility, recognizing both the operational and the strategic dimensions of landscape architecture.

Table 3.2 Main results from the onine questionnaire sent to Italian landscape architects and members of the Italian Association of Landscape Architecture.[10]

Questions		Share of respondents
Landscape definitions	Geographical space	32%
	Design framework	27%
	Arena of discussion	16%
	Mentioning *heritage*	15%
	Mentioning *territory*	5%
	Mentioning *ecosystem*	7%
Scope of landscape architecture	Mentioning people or living places	67%
	Mentioning perception or aesthetics	32%
	Mentioning garden or open spaces	68%
	Mentioning also spatial planning	12%
Landscape design	Mentioning visual analysis and semiology	70%
	Mentioning sliding scale and time horizons	56%
	Mentioning ability in drawing and sketching	32%
Renewable energy and landscape architects' role	Landscape architects have a very important role	80%
	Landscape architects can only really contribute in specific situations	9%
	Landscape architects have no role	4%
Landscape architecture and sectoral policies	Landscape architecture could be very influential	79%
	Landscape architecture could be influential in some sectoral policies	20%
	Landscape architecture has no role	1%

3.9 Conclusions

In Italy, landscape and landscape architecture are often considered as synonymous (see also Ferrara, 1968, Di Carlo, 2013). Accordingly, the concepts of landscape planning and design also tend to overlap, revealing a general difficulty in viewing the discipline both from a theoretical and practical perspective.

10 The sum of share of respondents is more than 100% because respondents were allowed to give more than one answer to the questions.

This overlap was also found for sustainable energy transition. Indeed, often landscape and landscape architecture are used as synonyms when tackling renewable energy, to the detriment of the design and the more transformative character of the discipline. In addition, landscape design commonly refers to site-specific transformation, whereas landscape planning relates to the definition of homogeneous transformation areas. The two fields barely communicate with each other, the first relating to short-term and site specific transformation, and the second connected to identifying land uses.

Italian landscape architecture mainly focuses on site design activities, whereas design outcomes are mostly used to assess transformation rather than to suggest strategic landscape transformations. Yet such a need is expressed both in the AIAPP journal and in the online questionnaire. Regarding sustainable energy transition, Italian landscape architecture seems to be more interested in the site and design of the power plants. In fact, the territorial dimension of this problem is not really taken into account by landscape architects in their professional practices.

According to this analysis, Italian landscape architecture in terms of sustainable energy transition shows that landscape design is used mainly for specific problems in specific cases, or for generalizing design solutions on a site specific level, neglecting the role of design in envisioning structural and strategic framed energy landscapes.

Geothermal power plant, Larderello, Pisa, Italy.
(S. Minichino)

Chapter 4.
Landscape architects dealing with renewable energy: Italian and Dutch cases

4.1 Introduction

Planners and designers, namely spatial planners, environmental planners, urbanists, engineers, architects and landscape architects are more and more involved in projects where climate change and energy are addressed through the sustainable energy transition topic.

Landscape architects' role in these kinds of works has been increasingly discussed (see e.g. Steiner, 2011; Stremke & Van den Dobbelsteen 2013), showing how landscape architects' professional background is used in solving problems framed by sustainability. Thus landscape architects have expanded on their professional activities, for instance, by participating as experts in decision-making processes (Davis, 1994; Hackett 1977).

This chapter analyses some Italian and Dutch emerging landscape architects' practices on landscape design and planning for renewable energy. The main objective of the chapter is underpinning landscape architects' approaches while designing energy landscapes. Italy and The Netherlands are the scope of the chapter. This chapter was structured around answering the following questions:

- How landscape architects in their professional works are dealing with renewable energy in the Italian and Dutch contexts?
- What professional skills and knowledge do landscape architects use while designing renewable energy landscapes?
- What could be learned, by comparing Italian and Dutch practices, concerning landscape architects' background for renewable energy- related works?

In the following paragraphs, materials and methods are briefly illustrated and the analytical framework used for analyzing landscape architects' renewable energy-related projects are explained.

Different ways of knowing in landscape architecture are described (De Jong & Fergusson-Hessler, 1996) as well as different paradigm of design processes (Alexander, 2013). Italian and Dutch landscape architects from eight landscape architecture firms are interviewed and asked for reflections on possible implications for landscape architecture in sustainable energy transition. Landscape architects' approaches to renewable energy are analyzed and compared. Finally suggestions for the Italian context are proposed.

4.2 Searching for renewable energy-related precedents in landscape architecture

This chapter used traditional qualitative methods (Miles & Huberman, 1994). The collected materials consist of semi-structured interviews with landscape architects working on renewable energy and secondary materials such as written and visual reports. Indeed, recently developed works or on-going projects are considered key materials for advancing reflections on the landscape architecture approach to renewable energy topic.

Table 4.1 Data collected and techniques for analysis.

	Procedures for collecting data	Data analysis techniques
1	Semi- structured interviews with a total of eight landscape architecture companies in Italy and The Netherlands along with illustration drawn by landscape architects	Tape-recorded materials and illustration such as ideograms or conceptual framework were analyzed by an open coding
2	Thirty-one cases of energy-related works from landscape architecture offices portfolio	Documents and material from the interviews were analyzed through the framework of precedents analysis (re-worked from Van den Toorn & Guney, 2011)
3	Four cases are chosen in order to explain different approaches to the topic	Documents and material from the interviews were analyzed through the framework of precedents analysis (re-worked from Van den Toorn & Guney, 2011)

Landscape architecture firms selection

Landscape architects from eight landscape architecture companies, four in Italy and four in the Netherlands, were selected in order to be inquired about their works in energy-related planning and design (table 4.2).These landscape architecture companies were chosen because:

- founders of the firms were registered in the national or international landscape architecture associations such as AIAPP (Italian Landscape Architecture Association) and NVTL (Netherlands Association of Garden and Landscape Architects) or IFLA (International Association of Landscape Architects).

- in the landscape architecture firms' portfolio there are renewable energy - related works
- companies were involved in programs, workshops, conferences concerning renewable energy.

Table 4.2 Interviewees backgrounds

Company	Interviewees
NL1	One person interviewed: landscape architect and director of the company
NL2	One person interviewed: landscape architect and geo-morphologist
NL3	One person interviewed: senior architect and urbanist
NL4	One person interviewed: landscape architect and founder of the company
IT1	Six people interviewed: forester trained in landscape architecture and founder of the company and five employees: forester trained in landscape architecture and co-founder of the company and four landscape architects
IT2	One person interviewed: architect trained as a landscape architect and landscape architecture teacher
IT3	Two people interviewed: Landscape architect, director of the company, landscape architecture professor and a spatial planner
IT4	One person interviewed: architect/teacher trained as a landscape architect and urban planner

Interviews design [11]

The interviews were structured by both open and multiple choice questions and they started or finished with landscape architects illustrating their ideas and opinions with hand-drawn sketches. Interviews were structured searching for reflections on a) landscape architecture as discipline, b) landscape architects' approaches to renewable energy planning and design c) the landscape design role in policy formulation. Indeed interviewees were asked to reflect on their projects and on the general topic of designing energy landscapes. Six key words - *landscape, energy, policies, people, design and narrative* - were proposed for drawing conceptual frameworks and ideographs.[12] In general, during the interviews, landscape architects were asked to think about the possible strategic role of design in energy-related works. In order to test the consistency and saliency of this sample of landscape architects, interviewees were asked about other landscape architects involved in this topic and meeting the criteria of selection. Italian interviewees did not suggest other colleagues involved in this topic. Dutch landscape architects named the same companies previously individuated.

Data analysis

Transcribed and hand-sketched materials were analysed following an iterative and open code process by searching for commonalities and differences according to interpretative analysis (Corbin & Strauss, 2007; Miles & Huberman, 1998,). Axial

11 The interviews design was structured by me, Renée de Wall and Sven Stremke, under the label of NRGlab, *Energy Landscape and beyond*, Wageningen University (NL). The interviewes with Dutch landscape architects have occurred during the period May-June 2013 and they were conducted by me and Renée de Waal. The interviews with the Italian landscape architects have taken place in July 2013 and they were handled by me. Data elaboration and analysis were indipendenly conducted by me and Renée de Wall for different purposes.
12 See the format of the interviews, p. 203.

and horizontal interpretations of the transcribed interviews were conducted. The drawing material were read following what landscape architects said during the drawing sessions, using the same technique adopted for analyzing the spoken part of the interviews.

Energy-related cases selection

31 projects (16 in Italy and 15 in The Netherland)[13], both realized and not yet concluded, were selected after the interviews, considering reflections of landscape architects about their most representative works according to their opinions. This cross section sampled was analysed according to *precedents analysis* framework (Van den Toorn & Guney, 2011), in order to compare landscape architects approaches, methods and typology of work in Italy and the Netherlands. The 31 projects constituted the embedded cases of the research work (Stake, 2006). Four cases were further selected by me in order to explain better the general approach used by the interviewed within this chapter.

Precedent analysis and embedded cases

Precedents analysis methodology is used for studying the 31 embedded cases. This consists of the systematic analysis of plans or projects following a common analytical framework, that enables comparison between plan and project types as well as within a plan or project type. Indeed, precedent analysis is considered the base for theory development as a body of coherent, generic and explicit design knowledge[14].

Although plan analysis is the core of the precedent analysis, in this chapter design products such as master plans, visualization spatial or strategic visions, landscape assessment studies, site-specific design and guidelines are analyzed. In this research work, precedent analysis is built for a quite new topic for landscape architecture aiming at contributing in reflections both on the discipline in general and especially on the design component, learning from earlier experiences.

The analytical framework proposed by Van den Toorn & Guney (2011) was re-worked for the purpose of inquiring landscape architects works while designing renewable energy landscapes. The analytical framework is structured following four categories: context, analysis, synthesis and representation. In this way general actions conducted by landscape architects in their projects are simplified for comparison.

Context aims at studying which kind of renewable energy technologies are approached by landscape architects as well as which types of landscapes are involved in their projects such as sensitive, ordinary or degraded landscapes. Commissioners who hired landscape architects, typology of landscape architects' assignment and lastly the grade of landscape professionals involvement are analyzed. These aspects of the projects context are useful for understanding

13 For the overall list of the cases see pp. 201-202.
14 The framework used for the *precedents analysis* is showed in Chapter 1. (see table 1.2, p. 20).

landscape architects' attitudes and roles.

Analysis aims at comparing differences in analytical processes explored by landscape architects on the energy topic. More traditional and innovative analysis allowed for the purpose of searching for common or different techniques. Types of landscape elements, structures and processes are classified. The question addressed in this category was about which kind of components of landscape these professionals inquiry while working on renewable energy.

Synthesis aims at pinpointing design concepts and topics used by landscape architects to produce final elaborations. Questions, actions and spatial-temporal scales are described.

Restitution and communication aims at comparing different techniques and products of the design process. Indeed, the way that landscape architects use to communicate their works is considered relevant for reflecting on the use of landscape architecture's more traditional and innovative skills.

4.3 Doing designing knowledge explicit

Doing design knowledge and design process explicitly is considered one of the most important elements in advancing both practice and theory for design disciplines (Cross et al, 1981; Cross, 1982; Cross; 2007; Dorst & Cross, 2001). Design discipline refers to design as a way to generate new knowledge useful in solving problems by the elaboration of design processes and design products. Thus landscape architecture is envisioned as a design discipline (see e.g. Murphy, 2005; Nijhius, 2011). Designers tackle ill-defined problems, focusing on solutions. They use codes that translate abstract requirements into concrete elements (Cross, 2004; Lawson, 2012).

Moreover reflections on the designing process and products could be done both from professionals. Meanwhile, they are working on their projects with professional researchers or alongside several actors involved in the whole process, in order to improve the process and achieve better solutions (Conole, 2010; Shön,1984). From this perspective, design is, on one hand, the imaginative creation of possible forms for certain purposes completed with instructions for making them, (Lynch & Hack,1980) and on the other hand, the imaginative process where purposes are evaluated and re- worked. The design process is envisioned as a cyclical and open process because results are used to improve the solutions proposition. Lastly it is an open process because it opens to various solutions and several actors.

Reflecting on the design processes and design products means considering a) what kind of knowledge the design process refers to; b) what kind of knowledge it produces; d) for what aims design products and knowledge produced by the design process are used.

For understanding the aforementioned points within landscape design of energy landscapes, different kinds of knowledge used in landscape design are described in the following.

Over time, the design process has been envisioned as a technical activity based on a rationalized approach to sectoral problems or as a creative

individual process (Hiller et al, 1972). Recently a third approach has emerged considering design as a cognitive process (Cross & Clayburn Cross, 1995; Dorst & Dijkhuis,1995) and eventually a social process. Different kinds of knowledge derived from cognition-oriented theory in problem solving (de Jong & Fergusson-Hessler, 1996; Leeuwen & Vermoolen, 2012) are briefly described and related to landscape architects practices on renewable energy. Four kinds of knowledge could be described:

1. situational or operational knowledge
2. conceptual knowledge
3. procedural knowledge
4. strategic knowledge

1.Situational or operational knowledge

Situational or operational knowledge refers to notions and information about a particular situation and domain. This is useful for framing a problem and giving a case specific solution. Considering the landscape architecture domain, an example of situational knowledge refers to the notions coming from visual analysis for a specific areas used to propose a site-specific design for solving a site-specific problem. Thus operational knowledge refers to a specific problem in a specific place and is used to produce site- specific solutions in the feasible and present domains (figure 4.1) .

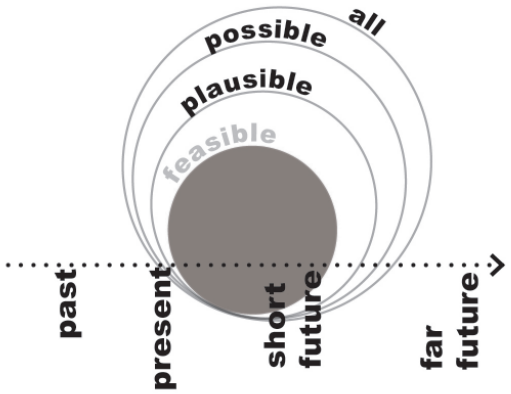


Figure 4.1 The scheme, re-worked by Steinitz (2001) show where operational knowledge could be envisioned in landscape planning and design activities.

2.Conceptual knowledge

Conceptual knowledge is consolidated knowledge about facts and principles applicable in a certain domain. It refers to a static but implementable knowledge

used in performing solutions following shared methods. Problem solvers add this kind of knowledge after they acquired situational notion in order to find suitable solutions. This is related for instance to the disciplinary background and education.

3. Procedural knowledge.

Procedural knowledge refers to the possibility and capacity to refer one problem state to another. In landscape architecture, procedural knowledge, for instance, needs to decide a localization of a land use according to ecological principles.

4.Strategic knowledge

Strategic knowledge refers to capacity to generalize about solutions. Indeed, the previous kind of knowledge refers to specific problems and weak situations, meanwhile strategic knowledge refers to wider categories of problems make a general plan, giving more than one solution. Notions and observations coming from a site-specific problem can be used in a wider process, which could be open to various solutions. For landscape architects this means, for instance, starting with design on the site specific levels in order to imagine a set of strategies on the regional level, going from the project scale to the planning one (figure 4.2).

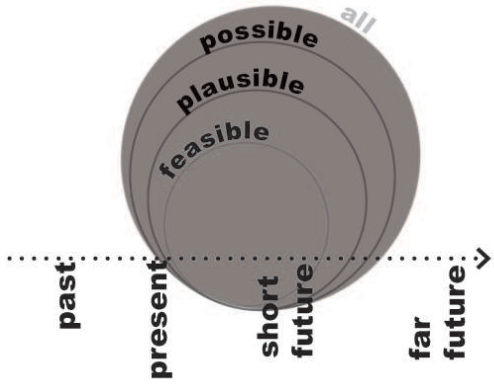


Figure 4.2 The scheme re-worked by Steinitz (2001) show how strategic knowledge could be envisioned in landscape planning and design activities.

Both in Italian and in Dutch landscape architecture, these kinds of knowledge coexist. They are deeply rooted in disciplinary traditions. This work, focuses on dialectic operational and strategic knowledge being considered strictly related and weaker inquired concernng renewable energy deployment phenomena.

Different landscape architecture traditions share opinions about the main character of design: a) it is an open-ended process proposing various design

solutions, b) it goes across different scale levels and time horizons c) it considers long term processes d) it should refer to specific and widely shared design program (see e.g. Donadieu, 2011; Koh, 2013; Prominsky, 2005).

These characteristics are connected to the use of a different kind of knowledge within different contexts. Indeed, in Italy, the situational or operative knowledge has a strong role in conceiving landscape transformation and strategic knowledge is less considered within the landscape architecture practices for strategic planning contributing rarely to territorial strategies formulation (Ferrara & Campioni, 2012). In the Dutch context the strategic knowledge in landscape architecture has acquired a stronger role in conceiving spatial transformation since the beginning of 1990s, when landscape architecture started to be involved in spatial and strategic planning, and site-specific projects were seen as occasions for reflecting on regional strategies formulation (Sijmons, 1990; Salewsky, 2012; Vroom, 1990).

4.4 Design process and landscape architecture

As explained in the preceding paragraph, design is regarded as a particular process or activity, which aims to address problems that can have design solutions. An alternative definition, however, sees design as a part of all decision-making or problem-solving processes which means referring to the social paradigm of design. From this perspective, design processes in landscape architecture do not only produce final products for the implementation phase of programs or projects, but rather generate possible alternatives that are the objects of public evaluation and choice. General design theory identifies different design processes (see Alexander, 2013):

- *Logic and analytical* consisting in finding solutions in a systematic way (Simon, 1996)
- *Intuitive and creative* referring to a non-rational process. Design process is described as a explanation of the reality and solutions are achieved by association and not universal code (Hiller et al, 1972)
- *Reflection in action*. This model of designing is a reiterative process aiming at fitting the final solution (Shön, 1984).

Essentially landscape architecture refers to all of these models. However, different design approaches are used and discussed in different landscape architecture traditions and in different historical periods. Design processes and role-planning and eventually decision-making processes refer to the role of discipline in society (Van Ashhe et al, 2013).These kinds of design processes produce different results in terms of scales and themes because they are used also for different purposes. This is true also for renewable energy design.

4.5 Landscape architecture firms dealing with renewable energy

In the following, landscape architects opinions from the interviews are discussed identifying the dominant discourses on the renewable energy topic for these landscape architecture practitioners.

The landscape architecture companies deal with various renewable energy technologies, frequently working on a mix of technologies, mainly wind turbines and photovoltaic panels. Two of the selected companies have a specific section for energy in their professional portfolio. The others envision this topic in different areas of their work (figure 4.3 and table 4.2).The online portfolios of the firms were analysed for elaborate the data showed in the picture. Energy is considered a quite inter-sectoral topic in landscape architecture firms' works in both counties. Energy is approaching different scale levels and for some companies it is a quite central issue to be addressed. A more evident regional approach emerged for the Dutch landscape architects.

All of the selected firms talked about renewable energy as an emergent field of their professional work. Thus reflections are quite difficult to clearly be delineated. For that reason landscape architects were asked to draw while thinking about their activities in order to point out hidden logic or unusual reflections (figure 4.4 and 4.5). Although landscape architects work on different topics, all of them felt the need to have more notions on energy. They believe that energy is the most suitable theme to imagine landscape transformation for a more sustainable future.

They claim that landscape architecture is now at a cross roads for defining roles and skills because new design topics and new scientific paradigms have arisen in environmental science (see e.g. Wu, 2006). Thus energy is one of the topics for reflecting about landscape architecture, since energy is an inclusive concept representing a framework of integration for scientists, policy makers, professionals and people as well as the landscape itself.

Thus, interviewees agreed on landscape architecture and landscape architects relevant role in sustainable energy transitions, although they declared that this opinion is not common among institutions and society in general, especially in the Italian context.

Although renewable energy is a quite new topic for landscape architecture, the interviewed argued that, since it addresses spatial transformations, it is anyhow a specific task for landscape architecture (interviewees IT2, IT4,NL1, NL2, NL3,). Indeed they argued that when top down or button up decisions cause modifications of landscape structures or processes, landscape architects should intervene. This is not about certain topics or scale levels. Thus traditional techniques of the disciplines such as sliding spatial scales, long term thinking and notions about both artificial and natural systems, are often used. They talked about the analytical skills for visual analysis (IT1, IT2, IT4, NL1, NL2, NL4) and criteria of composition to define their ability while designing renewable energy landscapes (IT3, NL2).

Dutch landscape architects especially revealed that more reflections are needed on energy-conscious landscape planning and design. They claim for the implementation of knowledge regarding energy systems such as maps about existent electrical greed (NL1), energy flux and energy balance (NL2), consumption of energy geographically described (IT3) and technological innovations (IT1).

Both Italian and Dutch landscape architects referred to local dimensions as the most suitable scale for designing energy landscapes. (IT1, IT2, IT3, NL1, NL2, NL2,). In spite of that, regional scale is an emergent topic in their works (IT3,NL1,NL2).Essentially Italian and Dutch landscape architects felt that their

consolidated way of operating is also effective for renewable energy, although more practices and more internationally shared projects are needed for exploring energy implications for landscapes (NL2).

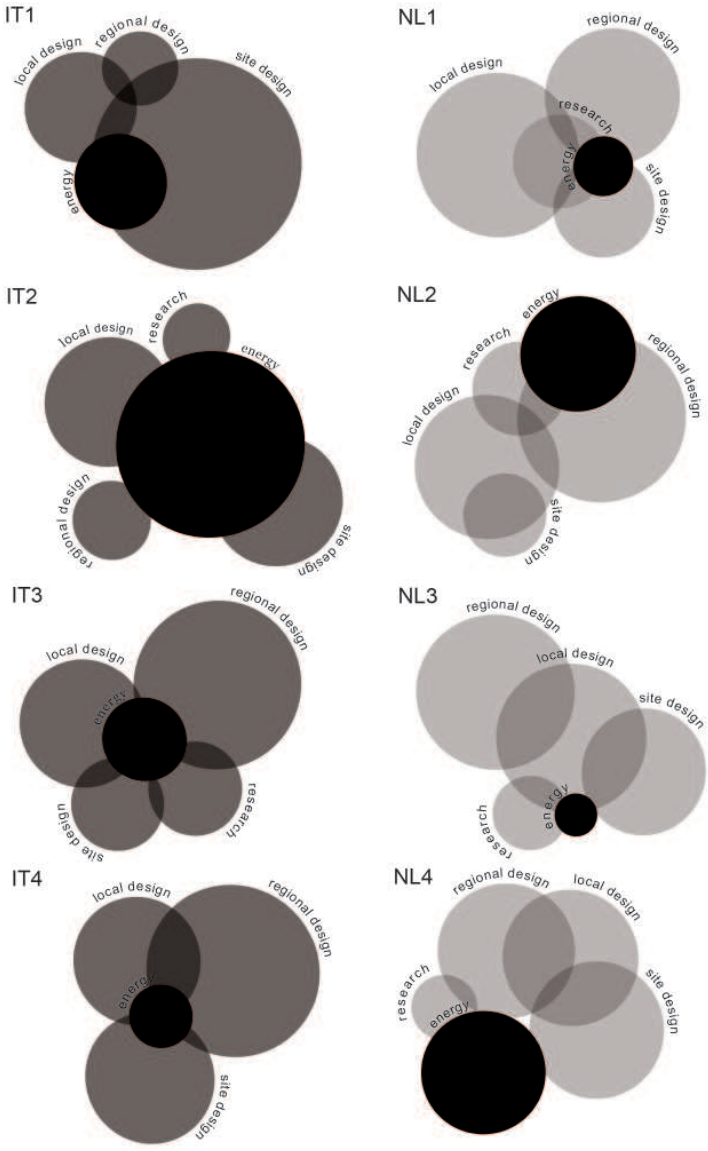


Figure 4.3 Picture shows how energy is positioned in landscape architecture firms and how it is related with the other professional activities. Landscape architects fields of works were grouped in four categories: research, site design, local design, regional design and planning which are explined in the table in the follow page.

Table 4.2. Cathegories of works.

Activities	Definitions
Research	Works and project developed in an exploratory way. We can consider research: exploratory study collaborating with research centre as well design experiment in a particular area
Site design	Activities referring to a particular place, or building
Local design	Activities referring to a particular area corresponding for instance to a municipality or provinces.
Regional design	Activities developed for a region, (not only administrative bounded) but with an certain homogeneity in characters. In this part of this research regional is considered a synonyms of grouping of different local entities.

During the interview, landscape architects were explicitly asked about the role of landscape architecture for energy policies and more generally about landscape architecture's possible contribution in sectoral policies. Most of the interviewed envisioned their profession as planning and designing activity. Thus they felt good in doing plans and design being involved, for instance, in work as consultants (IT1,IT4;NL1,NL3). Landscape architecture's contribution in sectoral policies construction is somehow advocated as a pre-feasibility study development (IT2) or verification of spatial transformation of a set of policies (IT3). Nonetheless they considered these processes as not concretely practicable (IT1,IT3,IT4,NL2,NL3). In the following, specific topics are discussed which emerged from the hand-sketching part of the interviews.

Energy as natural flux, and people and place vitality

All of the landscape architects approached energy as both a spatial issue concerning energy extraction, production, distribution and consumption, and affecting people and places' vitality. Indeed energy is envisioned as a flux and electricity. However, energy is also envisioned as an immaterial and symbolic concept, alluding to people and place's capacity to manage them.

Landscape as place and integrative framework for designing

Both Italian and Dutch landscape architects considered landscape as both a place and an integrative framework for designing. According to them, the role of landscape is instrumental for spatial transformation related to renewable energy, since it could be used both in analysis and synthesis phases of design processes. Some of the interviewed claimed for the role of the landscape architect as designer, in bridging policy makers, stakeholders and people's wishes (NL1,NL2). Relations among these actors via the landscape concept are more obvious in the Netherlands, meanwhile for the Italian interviewed this relationship is very controversial (IT4).

People as society

The topic of people was immediately linked by the interviewed to the principles of the European Landscape Convention. Despite of this, Italian landscape architects were more familiar with this document than their colleagues, focusing on social perception. Landscape architects felt that people are very important while working with the concept of landscape and on landscapes. The interviewees agreed on interpreting people as society in referring to energy issues, in this case, as a worldwide topic. Some of them envisioned people as a local community that can be very influential for the creation of future energy landscapes (NL1;IT2,IT3).

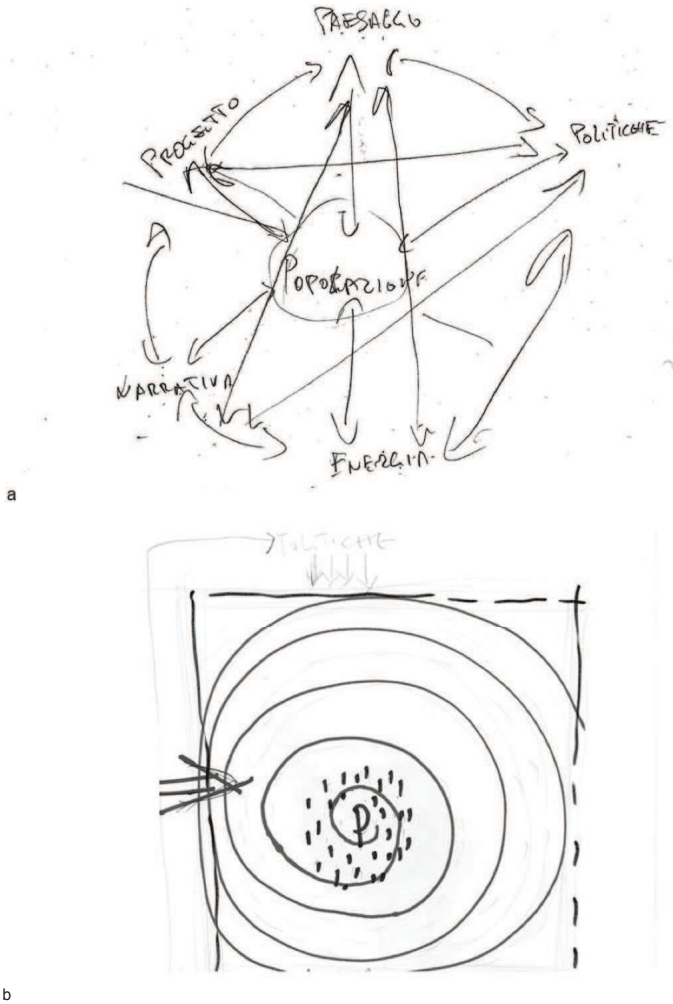


Figure 4.4 Hand drawn sketches elaborated during the interviews by Italian landscape architects asked about landscape, energy, people , policies, design and narrative.Picture a IT1, picture b IT3.

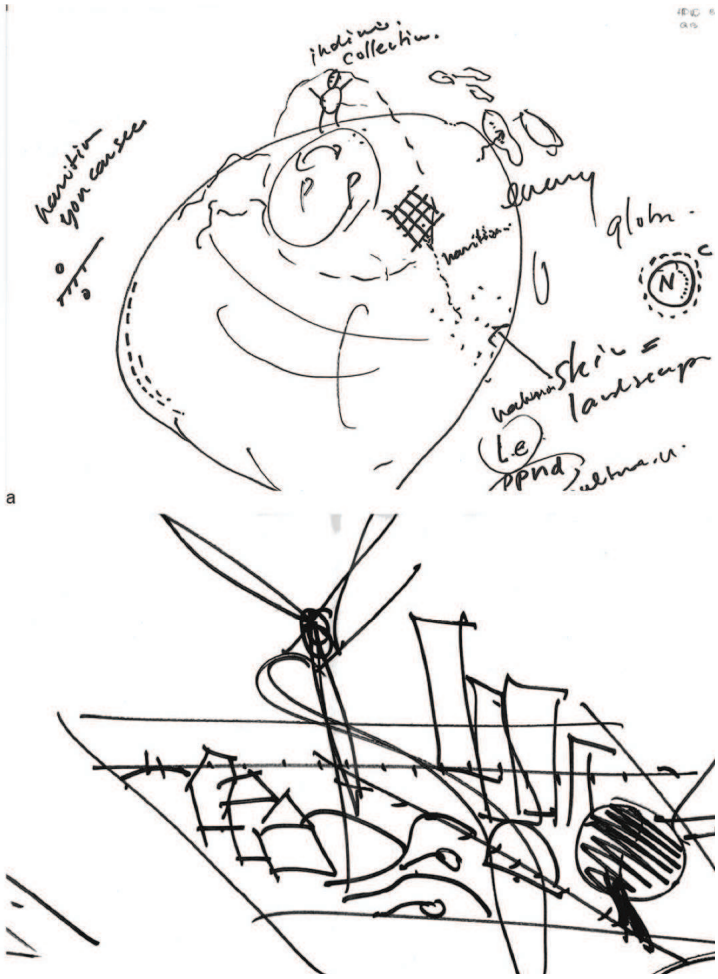


Figure 4.5 Hand drawn sketches elaborated during the interviews by Dutch landscape architects asked about landscape, energy, people , policies, design and narrative Picture a NL3, picute b NL4.

Design as narrative coming from landscape

Design is indicated as the most common activity in professional practices. Landscape architects referred to design as the capacity to interpret places, people and therefore they envisioned design as the ability of conceiving spatial transformation on different scale levels. Thus designing is also about telling stories and envisioning narratives for helping the decision-making process (NL1) or

support political decisions (IT4, NL4). In addition, landscape architects felt that they are good in finding unconventional and innovative design topics for different kinds of assignments. Thus, according to them, energy is a potentially new narrative emerging also within landscape architecture (IT3;NL2).

Energy landscape as new layer

All of the interviewed landscape architects were aware of the term and concept of *energy landscapes* (see e.g. Pasqualetti & Gipe, 2002). Although this concept was considered very useful in suggesting a new way to approach and design landscapes in the light of more sustainable energy systems, landscape architects criticized the term because, in their opinion, it seemed to indicate a mono-functional use for the landscape (IT1, IT2,NL1, NL2).

Missing the economic topic

According to the interviewed landscape architects, economic processes connected to renewable energy spread should be taken more into account in the spatial transformation processes. Landscape architects should be more aware of the influence of the market in their works (NL 1).

The undergoing concept of sustainability

The concept of sustainability was not clearly stated by the interviews format. However this concept was often mentioned by landscape architects being, according to them, strictly related to landscape quality (IT1,IT2,IT3,IT4) and spatial quality (NL1, NL2, NL3, NL4).

Italian landscape architects referred to landscape qualities such as scenic, historical and ecological, or simply to landscape in order to explain what they meant by the concept of sustainability. Dutch landscape architects referred to the quality of the experience in every day landscapes.

Landscape planning and design for sustainable energy transition

According to the interviewed, landscape planning and design are strictly related, being part of the same process (IT2, IT3,NL1, NL2, NL4). Energy topics underline the relation between these two activities. Landscape planning is very connected to searching for valuable elements and relations for creating maps and knowing landscape, meanwhile design is actually dealing with site-specific transformation (IT4).

Communicating a complex amount of data

Communication capacity is recognized as a very important skill for landscape architects. Interviewees interpret this ability as having a central role in

communicating complex amount of data about energy conscious processes (IT1,IT2,IT3,NL2,NL4). Both of the perspectives underline that the communication capacity of landscape architects derived from the way in which they approach problems and solutions as being strictly related to drawing activities. Also in energy conscious-planning and design it occurs.

4.6 Italian and Dutch approaches to designing renewable energy

In this paragraph, the overall results of the *precedent analysis* of 31 cases are discussed.

The overall results of the precedent analysis are reported, following the four macro categories of the conceptual framework namely, *context, analysis, synthesis, communication and restitution* (table 4.3 and 4.4). After this explanation, four projects show exemplarily Italian and Dutch landscape architects approaches while designing renewable energy landscapes. In Italy the projects described are: *Chieuti, Apulia (IT2_6)* and *Requalificarion of Sacco Valley, Lazio (IT3_1).* For the Netherlands the selected projects are*: Kleinee Energy Atlas (NL2_1) and Sketchbook Wind turbines and Spatial Quality (NL4_2)*.

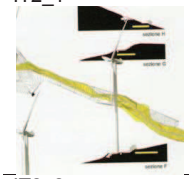
Context

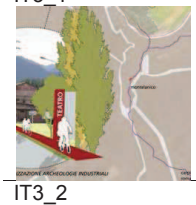
Both Italian and Dutch professionals are significantly involved in wind energy because this is one of the most common and firsly developed technologies in both countries, and also because it is obvious in the landscape. Indeed both in Italy and in The Netherland wind power started to be developed at the end of 90s. However, Dutch landscape architects simultaneously work with various technologies, meanwhile Italian professionals focus on one or, at most, two technologies at time. This depends on the commissioners who are manly energy utilities companies working on one technology in Italy and public administration for Dutch landscape architects.

Some differences appear also in the kind of works commissioned to landscape architects: in Italy they are asked mainly to suggest design proposals to mitigate the transformation due to the power plants' construction, often being involved in the executive design of power plants, meanwhile in the Netherlands they are asked for advice on spatial strategy to build power plants. Both in the Italian and Dutch contexts, landscape architects work in teams and it is very rare that they are the team leader professionals for the project, except for visual landscape assessments. Indeed both Italian and Dutch landscape architects develop formal criteria and digital tools to evaluate the visual impact of wind turbines on the landscape.

Finally, although both Italian and Dutch landscape architects are involved in projects regarding institutionally protected landscapes, ordinary landscapes are mostly approached by Dutch landscape architects, meanwhile Italian professionals intervene almost exclusively in protected landscapes where their intervention is required by the law (DL n. 42/2004).

Table.4.3 Outline of the Italian embedded cases description according to the analytical framework for the precedent analysis.

Energy-related projects	context	analysis	synthesis	means and restitution
IT1_1 	An electricity utilities company asked landscape architects to work the solar field design	Visual analysis	Following the structure of the rural landscape	Executive design and visualization
IT1_2 	An electricity utilities company asked landscape architects to work solar field design	Visual and ecological analysis	Solar field and public space	Master plan, visualizations
IT2_1 	International competition	Morphology and semiotics analysis, sounds landscapes	Site specific traces and long distance visual connections	Master plan, photomontages
IT2_2 	National and local governments	Morphological and semiotics analysis	Geographical landscape characters as guidelines for wind energy development	Ideograms
IT2_3 	Local electricity utilities company	Visual analysis, Anemometric and principles of spatial composition were used simultaneously	Scenic and symbolic means: Such as vegetation and soil	Plans, photomontages
IT2_4 	Landscape architects collaborated with an electricity utilities company, exploring the possibility for biomass and wind farms in a municipality	Landscape morphology, and visual relation between landmarks	New productive landscapes	Maps, plans, ideograms and photomontages

IT2_5 	Restyling project for a geothermic power plant including public open spaces	Visual analysis as method to discover new meanings	Geothermal power plant as landmark and occasion to explore local landscape	Maps, architectonic representation, photomontages
IT2_6 	Landscape architects were asked by engineering society for re-design the layout of a wind farm	Visual analysis, individuation of landmarks, Anemometric studies and spatial principles were used simultaneously	Iconography	Sea maps, Photomontages renders
IT3_1 	Strategic development projects for a Provinces collaborating with a private Foundation	Multilayer analysis explains territorial structure and economic processes	Energy is a tool to work on the requalification of the area	Maps, plan , info-graphics visualizations
IT3_2 	Site design of expositive space of exemplar power plants for a private company	Visual and ecological analysis	Energy - recreational park	Plans, visualization
IT3_3 	Project for re-thinking the mitigation actions for a new highway. The work was commissioned by a local Committee	Landscape signs analysis	Residual space used for biomass	Plans, visualization
IT3_4 	Landscape architects are co- promoter of initiatives for elaborate territorial development strategies	Multilayer analysis explains territorial structure and economic processes	Green landscape economy as a knowledge base for developing local projects	Maps, plans, infographics, visualization
IT3_5 	Requalification of pit excavation area used as plantations for biomass	Vegetation and soil analysis	Requalification via biomass	Ideograms, visualization

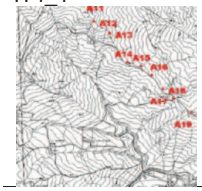
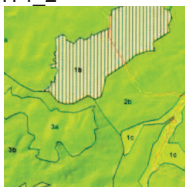
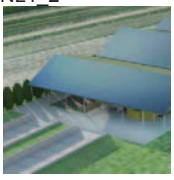
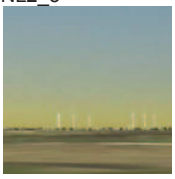
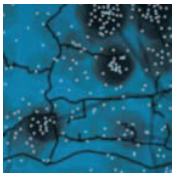
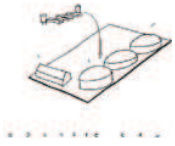
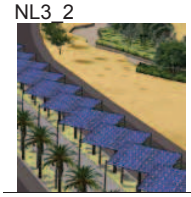
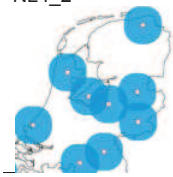
IT3_6 	Landscape architects collaborated with the provincial and municipal governments	Visual and historical analysis	Scenarios elaboration	Maps, visualization, photomontage
IT4_1 	Assessment commissioned by electicity utilities company	Visual analysis and individuation of valuable elements in the landscape	Valorization strategy according to historical landscape characters	Maps
IT4_2 	Local environmentalist association asked landscape architect to assess a previously proposed geothermal power plants	Visual, ecological and economic analysis	Alternative landscape development strategies	Maps, photomontage

Table.4.3 Outline of the Dutch embedded cases description according to the analytical framework for the precedent analysis.

Energy-related projects	**context**	**analysis**	**synthesis**	**means and restitution**
NL1_1 	landscape study for wind farms development	landscape characteristic and visual analysis	orientation in the landscape	plan and visualizations
NL1_2 	Integrating sustainable stable and husbandry systems in the landscape project developed by a group of partners working on sustainability in chicken breeding	Dutch agricultural landscape elements joined farming needs in conceiving analysis	Energy-conscious principles and landscaping techniques	Architectural design and visualizations

NL1_3 	Integral Sustainable Stable and Husbandry systems in the landscape Project developed by a group of partners working on sustainability in cow breeding	Dutch agricultural landscape elements joined farming needs in conceiving analysis	Energy-conscious principles and landscaping techniques	Architectural design and visualizations
NL1_4 	Landscape plan for bio-based economy development Project for a rural landscape in a protected area	Landscape analysis focused on vegetation and agricultural production	Rural landscape management and self economic support is engaged with bio - based economy	Land use plan and example of possible intervention, visualization
NL2_1 	Dutch Ministry of spatial planning asked landscape architects to imagine a post-carbon landscape	Landscape analysis, energy fluxes and space connected to energy technologies	Shaping energy in the landscape	Atlas, info-graphics, photomontages
NL2_2 	Provincial authorities asked landscape architects to study how new wind turbines could be sited in protected areas	Visual analysis based on elements and structures	Landscape signs as base for locating wind farms	Maps and visualization
NL2_3 	Provincial authorities asked landscape architects to study how new wind turbines could be sited in protected areas	Visual analysis	Landscape signs as base for locating wind farms	Plans and visualization
NL2_4 	Landscape architects were the promoter of a project aimed at implementing planner and designer knowledge on sustainable energy landscape	Energy flux analysis and other more traditional analysis such as visual analysis	Sustainability of energy conscious planning and design	Atlas, infographics, plans, visualization
NL2_5 	Local committee asked for spatial concepts for siting renewable energy power plants	Energy structure and processes in the island are analysed with landscape characteristics	Key concepts for future visions	Maps, plans, ideograms and photomontages

NL3_1 	Implementation phase of national and European project on building a new photovoltaic neighborhood	Historical analysis	Architectural integration of photovoltaic panels in new buildings	Sketches and architectural design
NL3_2 	Governmental authorities commissioned a new neighborhood	No specific analysis connected to landscape	Solar ribbon as integration concept	Sketches and architectural design, visualization
NL4_1 	National and local governments and international associations asked for reflection on energy transition and landscape	Visual and landscape type analysis	Overlapping energy and landscape	Maps, plans and ideograms
NL4_2 	National government asked for a plan for wind energy diffusion	landscape structures, characters and the national energy system is considered in the analysis	Aesthetic perception of new power plants	Maps, plans ideograms and rendering
NL4_3 	Province government ask for suitable areas for wind turbines	Landscape types	Creation of a landscape and wind maps	Simulations and maps and visualizations
NL4_4 	Local government asked landscape architects to organize a participative process, and to assess proposed power plants	Visual analysis	Working on size and distance from observers	Maps, photomontages

Analysis

Generally the analyzed projects are declared to be site specific. They are connected to site characters and problems even when they deal with the regional scale. Landscape architects investigate both landscape patterns, for instance, by visual analysis, and describing landscape structure, for instance, through the diachronic analysis of processes and landscape transformations. The layering approach, for instance, describing land morphology, hydrology and land uses, is used to simplify landscape systems and processes by both Italian and Dutch landscape architects.

Aesthetic perception and people orientation in the landscape are the main topics in conducting this visual analysis by both Italian and Dutch landscape architects, and it is considered both the starting point and the means for verifying the design process. In the Italian context, visual analysis, dealing with visual relations between landmarks and renewable energy plants as well as the individuation of historical elements are used. Landscape semiotic analysis (Romani, 1988; Moderini & Selano, 2006) is one of the main activities of landscape architects. For instance, they studied traces of natural and human systems starting by elements aiming at understanding structures.

Otherwise, some of the Dutch projects developed a method in order to study energy processes related to landscape patterns (Sijmons, 2008; Sijmons et al, *in press*). Energy budget and potential analysis were conducted by both energy experts and landscape architects by elaborating diagrams for representing the flux of energy. This aimed to overlap landscape characters and energy systems.

Sound analysis was conducted by several Italian landscape architects searching for elements for structuring the design process, especially dealing with wind turbines.In Italian works we can find that new renewable energy landscapes are connected to give new meanings to historical landscapes. Otherwise Dutch landscape architects often associated the concept of renewable energy to new landscape as new reclaimed lands.

Technological aspects of components of power plants were mostly considered by Italian landscape architects, meanwhile, Dutch professionals dealt mainly with general landscape characters.

Synthesis

Both in Italy and in the Netherland, specific topics are connected to renewable energy and landscape characteristics. For instance, in the Italian cases, landscape architects reflected on agricultural and historical landscapes envisioned as recreational or protected landscapes, meanwhile in the Dutch cases landscape architects reflected on the borderline of the coast, or reclaimed land and in term also of productive landscapes.Italian and Dutch landscape architects also used different topics in approaching the synthesis phase of the design processes. Although energy for innovation in agriculture is in both the Counties, Italian landscape architects used landscape regeneration, new infrastructures and local

development via energy as umbrella topics. Thus Italian landscape architects, while designing power plants, they are looking for landscape valorization strategies on local or regional scales (IT3_1).

On the other hand, Dutch landscape architects elaborated on climate adaptive or energy conscious planning and design and wind energy and spatial quality. Dutch landscape architects specifically refer to energy and energy-conscious spatial planning and design (NL1_1_2_3, NL2_4).

Landscape architects worked using different temporal horizons. The Italian professionals used near future vision meanwhile Dutch landscape architects worked on long future images.

Italian landscape architects often worked on preferred solutions both at site specific scale (IT1_1,IT2_3,IT3_2_3), and a regional level (IT3_6). On the contrary, Dutch landscape architects proposed various options, and very rarely they proposed preferred. Indeed the most used techniques by Dutch landscape architects were the scenarios (e.g. Weller, 2008; Swaffield et al, 2013) (NL1_4, NL2_3,NL4_1_3).In some cases, both in Italian and Dutch contexts, landscape architects' design were used as tools for energy planning (NL1_4,IT3_6).

Restitution and communication

Italian and Dutch landscape architects use different techniques for representing their projects: that depends mainly on the difference in scale and purpose of their works. Indeed Italian landscape architects represent mainly how specific power plants could look like in the landscape (*figure 4.6*), meanwhile Dutch landscape architects try to represent several possibilities aimed at communicating them not to experts on this issues such as policy makers and citizens (*figure 4.7*).

Thus Italian landscape architects use quite traditional communication skills such as visualization and photomontages, meanwhile Dutch landscape architects use hand-drawn sketches, infographics, ideograms as well as maps and visualization by rendering.

Essentially Italian landscape architects focused more on the elements of the geographical landscapes, meanwhile, Dutch professionals experimented with ways to communicate energy and landscape processes (see also figure 4.10) as well as spatial strategies.

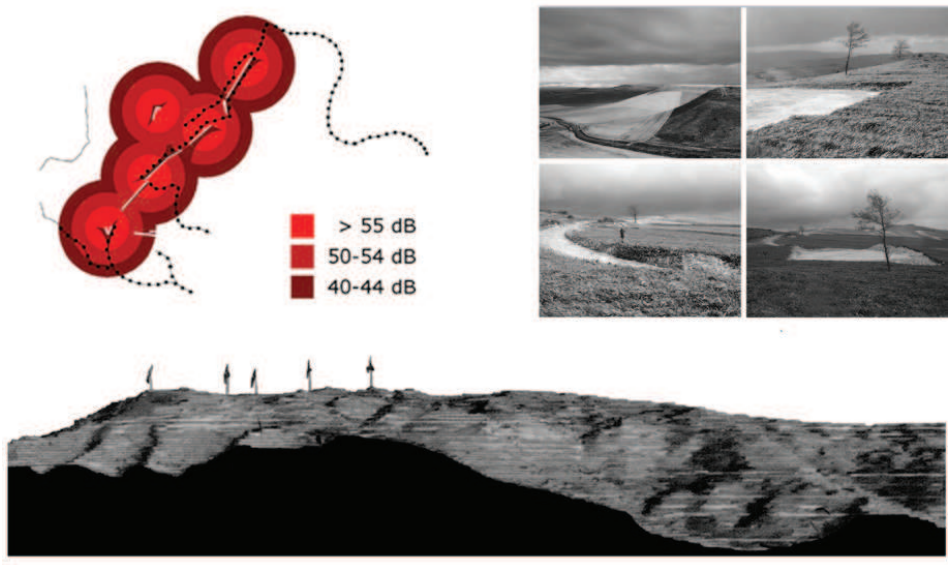


Figure 4.6 Elements studied for designing the layout of a wind farm such as wind maps, sound landscapes, semiology and morphology (IT2_3). Source: Daniela Moderini

Figure 4.7 Simulation of possible distribution of wind farms. (NL2_5);Source: VISTA Landscape Architecture.

The characters described above are explained more deeply for four projects in the following.

Offshore wind farms, Chieuti, Apulia (IT2_6)

This project has been developed by two landscape architects and an engineer who are devoted to wind power plants in their professional activity. Although these kinds of collaborations are not so common in Italy, the case shows exemplarily how renewable energy could be approached by landscape architects collaborating with other professionals. This project is a study for siting an off-shore wind farm in the Adriatic sea. The projects was firstly developed by an engineering society. This first project was refused by the commission of the national Ministry of Heritage and Cultural Activities, which is the responsible for the permit of this kind of power plants. At that point landscape architects were asked as consultants by the engineering society.

Landscape architects proposed to completely re-work the final layout of the power plant. They started to work on a wide area of the sea and the coastal landscapes, producing maps describing the use and activities of the sea area interested by the project. Using visual analysis and anemometric studies, they proposed a new layout for the power plants aiming at elaborating a more symbolic shape (figure 4.8). In addition landscape architects proposed also valorization strategies for the coastal areas near the proposed power plants. Indeed landscape architects dedicated special attention to the places where electrical cables arrive to the coast line. They became public open spaces. They felt that the very technical approach used in the first projects lacked consideration of the whole system of the area. Renders were elaborated in order to show final proposals.

In this case landscape architects used operational knowledge for mapping the sea areas for having a knowledge base for the design process and re-shaping of the wind farms. In addition they proposed the power plants as an opportunity to re-generate the coastal areas. They used design skills in order to propose economic development for the area.

Requalification of Sacco Valley, Lazio (IT3_1)

This project had been developed by landscape architects under the label of the Italian association named *Green Landscape Economy*. This association was ideated and promoted by landscape architects from *Land, Landscape Architecture* and aims at local development via promoting italian landscapes. Several environmental professionals, national trade associations and academics joined the initiative. The requalification of Sacco Valley is a joint initiative of *Green Landscape Economy*, several local authorities of *Lazio* Region, local foundations and ENEA (*National Agency for New Technologies, Energy and the Environment).*

The Sacco Valley is a very polluted and degraded area. Landscape architects worked on several strategies for the requalification of the area. Renewable energy technologies were proposed as one of these strategies. Indeed landscape architects elaborated a masterplan *(figure 4.9)* where they imagined the most

compromised areas as new energy production hubs. The *Energy Path* (*in Italian La strada dell'Energia*) is the proposed strategy for developing renewable energy production as well as pedestrian recreational paths. Various renewable technologies are used following landscape characteristics and suggesting actions for private investments.

In that case, landscape architects worked for developing a new image for these territories. They used mainly the strategic knowledge of the discipline searching for new and more inclusive solutions for the areas problems. In this project, designing has an explorative role, although real designs are not developed.

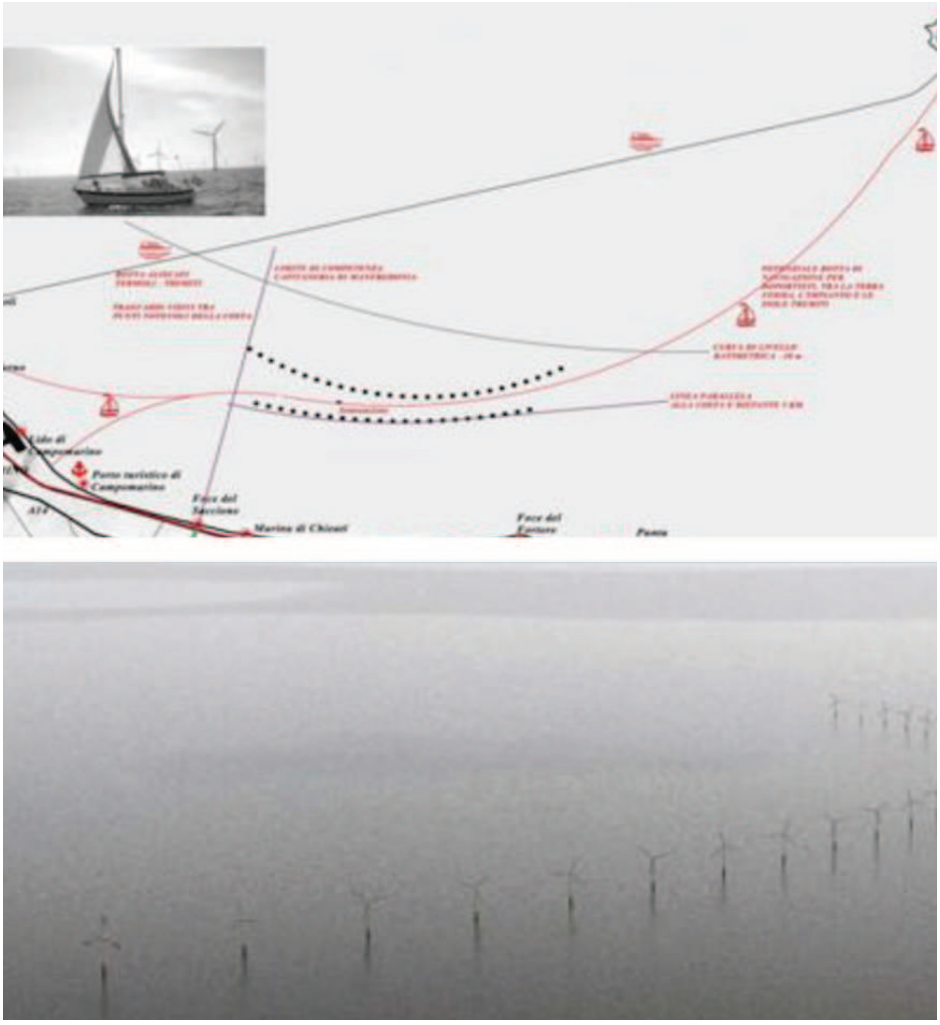


Figure 4.8 The first image shows the sea maps produced by landscape architects in order to propose a knowledge base for the design phase. The second picture shows the render simulation of the new layout of the project. Source: Daniela Moderini.

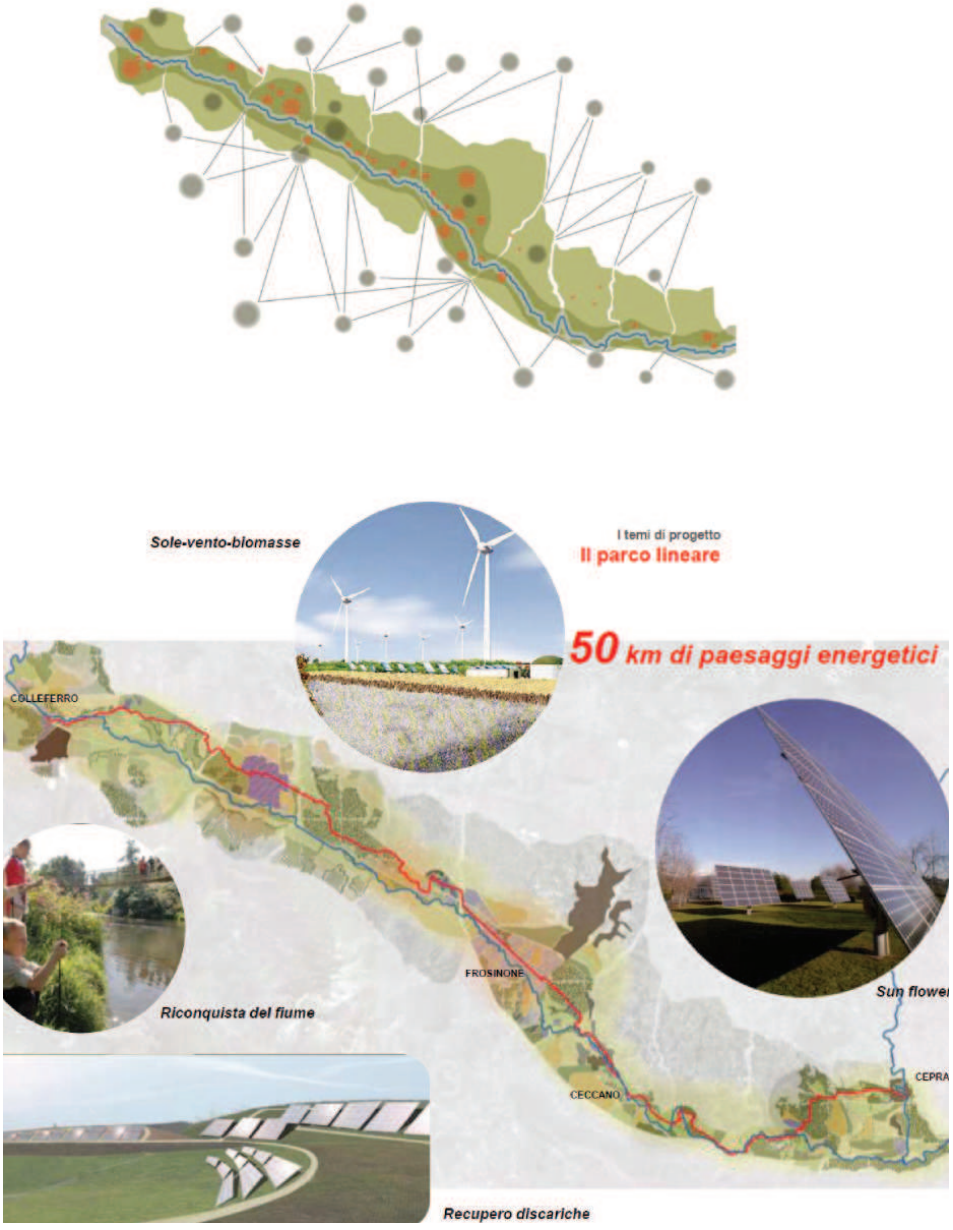


Figure 4.9 The two pictures show the master plan elaborated for the requalification of the Sacco Valley by landscape architects. The second image shows the strategy called 'The Energy Path,' p roposing renewable energy for regenerating degraded areas. Source: LAND .

Kleinee Energy Atlas (NL2_1)

This project is a forerunners' experience for landscape architects working on renewable energy in The Netherlands. Indeed this work was commissioned by the VROM, the former *Ministry of Spatial Planning, Social Housing and Environment* and the Dutch National Government advisor for Landscape.

The topic of renewable energy and energy transition has just emerged in the Dutch contexts and landscape architects were asked to study possible spatial consequences of the development of different energy technologies in the Netherlands. Landscape architects proposed an atlas of possible energy solutions where the spatial footprint of electricity production by both renewable and fossil energy sources were investigated (Sijmons et al, 2008). First of all, they elaborated with energy experts a schema for visualizing Dutch energy systems, energy balance (figure 4.10) and the carbon footprint. Then they chose an area in the *Wieringermeerpolder* in the northern part of the Netherlands, in order to work on simulations about renewable energy development.

For this area they showed the spatial footprint of energy plants needed for turning the previous fossil based energy system into a more sustainable one. Using maps, photomontages, and schemas indicating energy flux and evocative images, landscape architects explored different ways to represent energy. In addition, this project was recently implemented by Dirk Sijmons, who is professor of landscape architecture at the university of Delft as well as the director of the landscape architecture company *HNS Landschapsarchitecten*, by an educational program entitled *KwH/m2. Designing for post fossils*, where designers and students from various Dutch universities worked together on real cases across the Netherlands (Sijmons et al, *in press*).

In conclusion landscape architects used both traditional landscape architecture skills and methods such as land morphology analysis or transformation simulations as well more innovative techniques such as representing energy greed structures. In this work, although landscape architects used operational knowledge connected to a specific site, via the concept of the atlas, they offered a wider sharable knowledge for strategy formulation.

In addition, landscape architects declared using a research by design approach (Deming & Swaffirld, 2011; Lenzholzer et al 2012), using design skills in order to re-frame an emergent problem.

Sketchbook Wind turbines and Spatial Quality (NL4_2)

This project was also commissioned by the VROM and aimed at developing spatial principles for siting wind farms in The Netherlands. Indeed the national energy policies focus on the technologies and spatial strategies needed in order to steer the development of wind farms.

Landscape architects were part of a wider team involving the independent research institute ALTERRA from the University of Wageningen.This project represents one of the first examples in the Netherlands where landscape architects

worked on renewable energy topics. They analyzed landscape characteristics and the spatial organization of the country, aiming at pointing out which areas needed more energy and where landscapes were more sensible for their historical or ecological characters. They proposed four spatial principles in order to position wind farms: *line, concentration, cluster, spread* (figure 4.11).

For each of these concepts, they did a visual analysis aiming at understanding how these power plants could modify the perception of the Dutch landscape. In addition they proposed possible locations for wind turbines, following the criteria of production and consumption balance, for instance, industrial areas, intensive agricultural areas. Finally they elaborated some suggestions for siting and designing power plants.

In this case landscape architects used the very traditional skills of the discipline such as visual analysis. They used mainly the operational knowledge from the discipline for solving site-specific problems on the site-specific level, elaborating guidelines for power plants design. Despite that, landscape architects also indicated different spatial concepts useful in guiding wind farms' development.

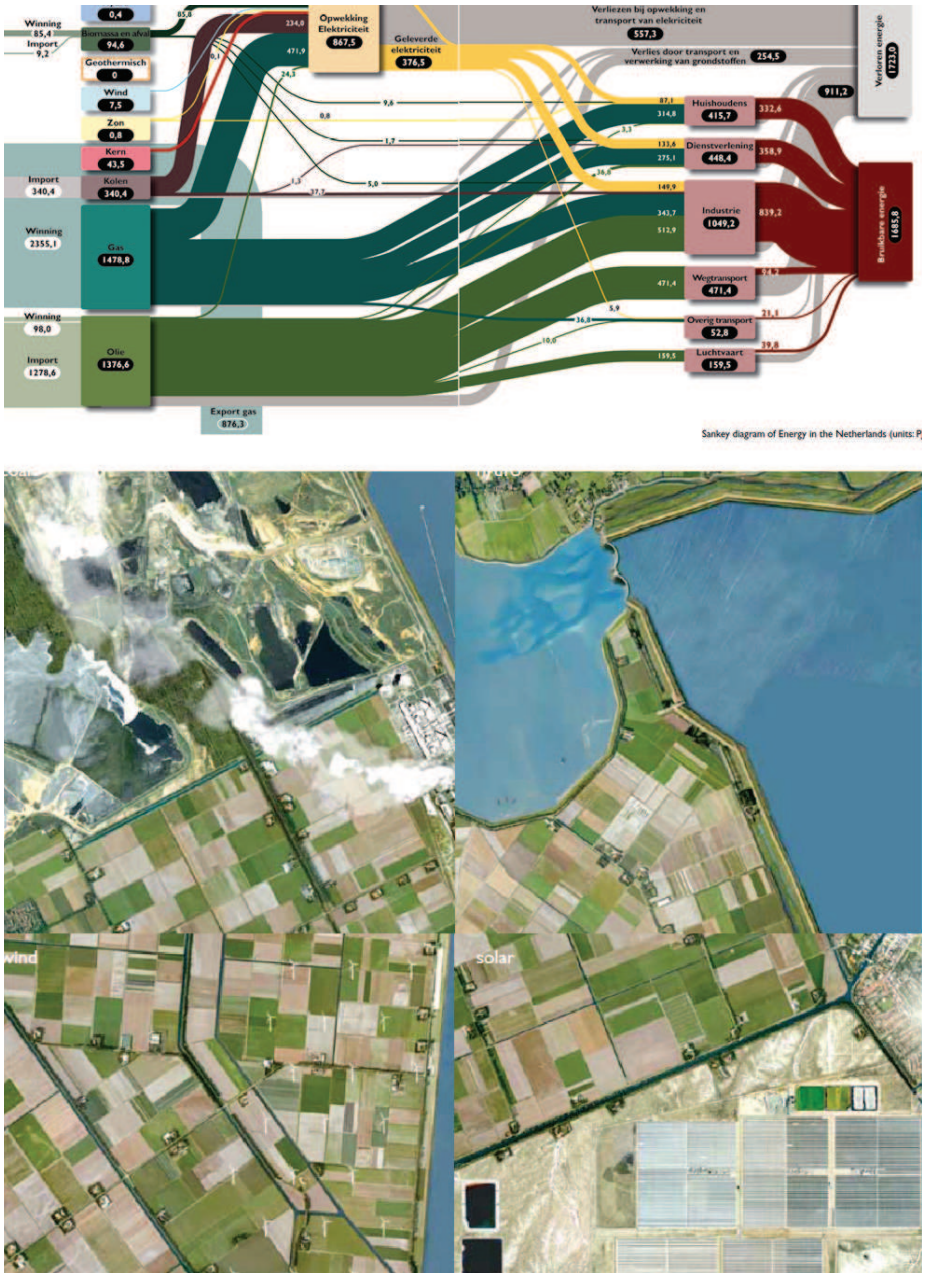


Figure 4.10 In the first image, the energy balance of the Netherlands is represented. In the image below, the simulation of the spatial footprint of renewable energy technologies (geothermal, wave, wind and solar) in the Wieringermeerpolder is shown. Source: HNS Landscape Architecture.

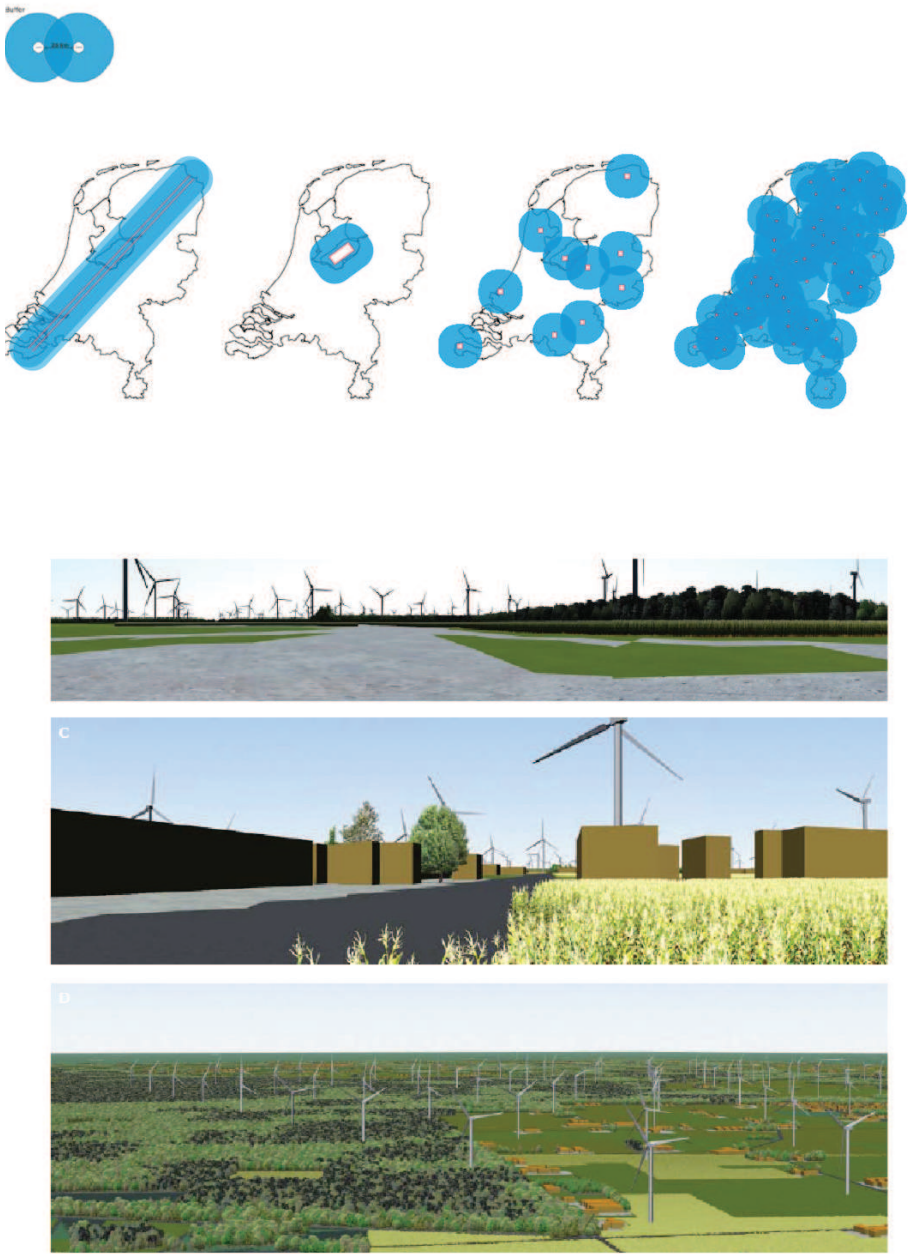


Figure 4.11 The first image shows the four spatial strategies suggested for wind turbine development: line, concentration, cluster, spread. The image below shows a computer simulation of possible locations for wind turbines on the local scale. Source: Sketchbook VROM, Wind turbines and Spatial Quality, 2006.

4.7 Conclusions

From the observation of Italian and Dutch examples, we can argue that landscape architecture traditional skills and techniques such as visual analysis and morphological landscape analysis are used in planning and design renewable energy landscapes. In addition it is possible to reflect on which kind of design products landscape architects offer and how these products are used while designing renewable-energy related projects.Landscape architects' works are all connected to ideas for future landscapes such as visualizing transformation, imagining new aesthetics, proposing spatial principles. In both countries, the traditional skills of landscape architects are employed in dealing with renewable energy deployment. On one hand, visual and morphologic analysis as well as sliding scales and searching for new meanings by designing are employed for energy landscapes. On the other hand, quite new skills are emerging such as hidden structures of landscape, namely energy fluxes, or interpreting technological characters of landscapes, such as the energy grid. Both operational and strategic knowledge is used for these activities.Landscape architects produced different design products: scenarios, spatial principles connected to renewable energy development strategies, spatial principles for siting renewable energy power plants, master plans, site design as verification of spatial strategy, mitigation and landscaping design, simulation of visual analysis. These products explain how landscape works as well as how it would appear.All these products are potentially able to give two different kinds of information: the first is a site-specific advice affecting the actual transformation of geographical landscapes. This is connected to the more traditional way of understanding landscape architectural knowledge. On the other hand, the same product could be used informing decision-making processes and eventually policy – formulation on different levels. Although more awareness by Dutch landscape architects could be found concerning the different ways to use these products, this is quite an innovative approach for landscape architecture operating in commissioned works. Thus energy topics, among others connected to sustainable transition as for instance water management, expand the landscape architecture scope, including the regional issue and uncertainty of territorial transformations.However, commonly Italian landscape architects seemed less familiar with this topics and searching for rules for the most compatible transformation with existing landscapes. Otherwise Dutch landscape architects started to deal with those topics from the perspective of spatial planning by envisioning renewable energy as a challenge for their professional practices. According to those reflections, three points for future reflection within the Italian landscape architecture discipline are proposed:

- revealing energy :energy needs to be revealed to a wider public than in the past. Indeed renewable energy affects the whole territory and an increasingly number of actors. Landscape architects should use their designing skills in order to democratize the concept of energy.
- drawing energy: drawing energy requires skills in understanding landscape functioning, including technological systems.
- imagining energy:imagining energy landscapes requires proposing various solutions according to different objectives and will.

Solar field, Navicelli, Pisa, Italy.
(S. Minichino)