

Part 1. Changing perspective on the dialectic landscape and renewable energy. The emerging role of landscape architecture in sustainable energy transition

Part One discusses the literature concerning the relationship between landscape and renewable energy, focusing in particular on landscape architecture as domain of inquiry. This part aims at explaining the main perspective adopted in the research work, that is, landscape architecture-sustainable energy transition link.

Literature shows that the dialectic of landscape and renewable energy, is an emerging topic in the academic debate (see e.g. Nadai & van der Horst, 2010b), in which three main discourses are developed: conflicts, transition and space. In order to explain the meaning of the emerging concept of energy landscape, I selected landscape architecture seminal papers concerning the topic.

Several authors consider this framework as a tool to reflect on the new paradigms for landscape planning and design, and landscape architecture academics focus on the complex phenomenon of transition and call for a more reflection on the role of the discipline .



**Wind farm, Santa Luce, Pisa.
(S. Minichino)**

Chapter 2.

Starting concepts and literature discussion

2.1 Landscape and renewable energy. An emerging topic in the academic debate

At the beginning of this research work, a seminal article arguing on the concept of *landscape of energies* (Nadai & Van der Horst, 2010b) had just been published in the scientific journal *Landscape Research* (2/2010). This issue was entirely dedicated to the relationship between landscape and energy and it was the outcome of the international workshop *Emerging Energies, Emerging landscapes: Revisioning the Past, Constructing the Future* held on 6th and 8th June 2007, Nogent-sur-Marne (France) which was sponsored by the European Science Foundation. This exploratory workshop aimed at reflecting on the implication and impacts of renewable energy diffusion on the European landscapes and beyond. The main reflection concerned the dialectic landscape and energy focusing on spatial and societal changes.

The editors of the special issues ended up with several questions proposing new lines of research such as a) the institutional, political and economic change connected to renewable energy deployment b) governance and planning system adaptation to the European energy transition and c) a new landscape aesthetic. The seminar also called for a new role of landscape in conceive energy spatial transformation proposing the dialectic planning and siting (Laboussiere, 2007; Nadai & Laboussiere, 2013) for reflecting on a more democratic attitude in energy strategies formulation. Several academics joined the seminar. They were researchers on social science, geography, public policies, spatial and urban

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planning and landscape architecture.

In line with this seminar, numerous initiatives were promoted for reflecting on the implication of the transition to a renewable energy system for European landscapes, for instance *Exploring new landscape of Energy* organized by Institute of Geonics, Academy of Sciences of the Czech Republic (2011); *Landscapes of Energy, An exploration of physical landscapes of energy* promoted by The Oslo School of Architecture and Design (2012) and lastly *Unraveling the logic of energy landscape* organized by The Permanent European Conference for the Study of the Rural Landscape (2014).

In addition over the past years the European Union has started a process of restructuring energy policies, choosing a path to a renewable energy transition (see for instance European Climate Change programs, The Climate and Energy Package, 2008 and the Road Map, 2050). This means that technological and economical topics, and also environmental and social elements are involved in the process.

Thus in the European context, landscape has started to be envisioned as integrative framework or agenceie (Selman 2010; 2012) for decision making and public discussions for landscape development. Thus landscape collaborates to more sustainable transformations via the social construction of places (see European Landscape Convention, Florence, 2000; Council of Europe Treaty Series n. 176)

The democratic nature of the concept of landscape as an interface between the global and regional or local scales proposed by the European Landscape Convention (Olwig, 2006a; 2007) calls for elaborating a new energy-landscape paradigm (Nadai & van der Hosrt, 2010b; Selman, 2010).

Landscape architecture as the discipline dealing with planning, design and management of landscape (ECLAS, 2009) across different scales (Belanger, 2013; Koh, 2013) is envisioned somehow contributing to this reflection.

Yet landscape architecture was involved in energy-related problems especially in suggesting spatial principles for siting energy power plants (Crowe 1958, De von Back, 2010) or electrical distribution lines (see e.g. Molburg et al, 2007). Recently landscape architecture has started to deal with renewable energy technologies proposing for instance layouts of wind farms (Moderini & Selano, 2006; Shoebel, 2012) and plantations of energy crop (Bell & McIntosh, 2001). However these approaches emphasize only the site specific knowledge of landscape architecture. A different role for landscape architecture in conceiving energy related landscape transformation is called from few professionals and academics who deal with this topic at the regional level and from the perspective of strategic spatial planning (Sijmons et al, in press; Stremke & van den Dobbelssteen, 2013).

Thus landscape changes produced by renewable energy spread are not confinable to a special places or setting because in order to be effective, renewable energy diffusion needs societal organization including more energy conscious principles in building, transport and communication (Angelucci, 2011; Ghosn, 2010; Zimmerer, 2011).

Thus a transition to renewable energy system is also a landscape transition

(Nadai & Van der Horst, 2010) involving policies formulation and implementation, renewed roles for academia, professionals and people.

In the following, literature discussion concerns firstly the main discourses on landscape and renewable energy, and secondly landscape architecture academia dealing with landscape and renewable energy.

2.2 Discourses on landscape and renewable energy: conflicts, transition and space

Energy is considered to be structuring identities, territory and landscapes. In addition renewable energy has a strong spatial impact because it is related to geographic characteristics of the whole territory and it brings to mind the fact that energy came from somewhere, which contributes on arising consciousness about impact and consequence of energy demands (Pasqualetti, 2000).

On the other hand landscape has become a key arena in the debate on energy policies challenging the integration of new dimensions such as participation and Aesthetics values in energy policies formulation, planning regimes and decision making practices (Hain, 2005; Perrotti, 2011; 2012; Wolskin, 2006). Despite of that, more frequently landscape is approached in the assessment procedure considering the visual impact of renewable energy infrastructures on the landscapes (see e.g. Chiabrando et al, 2011; 2012; Chias & Abat, 2013; McPartland, 2012; West et al, 2010). Thus the relationship between landscape and energy is envisioned by the main narrative of *conflicts*. The meta-discourses structuring the conflicts narrative are the climate change mitigation and the right to landscape (Pasqualetti, 2002; 2011a; Van der Horst, 2007; van der Horst & Vermeylen, 2011).

Indeed the long-term global conservation of the atmosphere versus the local, short-term conservation of the landscape are considered to be the prevailing issues. Landscape quality, occurring at the local level is the controversial point in transforming landscapes using renewable energy technologies (Roca et al, 2011). Thus landscape quality knowledge and assessment is considered to be a fundamental tool approaching the problem of social acceptability of renewable energy reflecting on the concept of place attachment and place-related symbolic meanings (Devine-Wright, 2011a; 2011b; 2011c; Davenport & Anderson 2005; Wolskin, 2006). The relationship between global and local (Germundsson et al, 2011; Olwig, 2011) emphasizes the role of the local dimension in developing renewable energy future rather than a technical top down approach. The exemplar case showing this fact is the internationally discussed island of Samsø in Denmark as well as the experience of other energy communities in Europe (Frantzeskaki et al, 2013; Hain et al, 2005). In this concern, the concept of the transition to a more sustainable energy system (Smil, 2001; 2010; Strong, 1992) and thus more sustainable landscape (Selman, 2010; Stremke & Van den Dobbblesteen, 2013) is envisioned by a bottom up approach. The phenomenon of transition is envisioned as a socio-technical process involving both technology innovation and societal engagement (Rotmans et al, 2001; Shove & Walker, 2010). This approach is considered a possible element for going beyond the conflict. Within the paradigm

of socio-technical transition, landscape is envisioned as an agent based place where innovation and governance are correlated issues (Verbong & Geels, 2010; Van Berkel & Verburg, 2012). Furthermore as many of the ideas around energy are abstract and difficult to grasp, the idea of landscape may be able to solidify the debate helping make the energy debate more concrete on the international and local level (Gohsn, 2010). Indeed new energies (renewable energy technologies and consequent spatial organization) reshape geographies of power (Olwig & Mitchell, 2007) and relationship between different territories.

The spatial issue is considered the most operative dimension of the relationship between landscape and energy (Bagliani et al, 2010; Sijmons et al, 2008, Van den Dobbelsteen et al, 2009). Indeed dealing with spatial strategic planning (see e.g. Weller, 2008), spatial planning (see e.g Owens, 1986; Roggema, 2014), design disciplines could contribute to the discussion about energy transition and renewable energy deployment. Two different possibilities exist for renewable energy technologies deployment. They are connected to two different scales. On one hand mega power plants producing energy for wide regions as proposed for instance in the past century by Hermann Sörgel's project entitled *Atlantropa* and recently revisited by the Road Maps 2050 by Rem Koolhaas's OMA. Such an approach envisions entire geographical regions as energy landscapes. On the other hand diffuses mini renewable energy plants producing energy for small communities without the problem of energy distribution and waste of energy flux, are considered the most practicable strategies (e.g. Droege, 2009). Concentrated renewable power plants are very similar to the logic of fossil fuel power plants. The widespread model calls for individual engagement, more sustainable habits, new infrastructural organization and new land use organization (Owens & Driffill, 2008).

Both these models are used in developing renewable energy around the world. Enormous wind farms or solar thermal collectors are planned to be built both in Europe than in the other continents. For instance the European project POWERED (*Project of Offshore wind Energy: Research, Experimentation, development*) develops strategies for off-shore wind in the Adriatic sea; the Club of Rome proposes Sahara desert megaprojects by the *Desertec Initiative* (e.g. Erdle, 2010) following the sample of Andasol I and II in Spain's Sierra Nevada. On the other hand local self energy production community are starting to be experimented as for instance the initiative *EnergyCities* promoted by the European Parliament or the international initiative *Covenant of Majors* aiming at promoting the use of sustainable energy at the municipal scale.

2.3 Renewable energy and sustainable energy transition in landscape planning and design

European landscape architecture academia has dealt with renewable energy topic since renewable energy became an imperative for European Union (Kalicki & Goldwyn, 2013). The need for reflection about influencing positively and consciously the formation of the European energy landscape has become an autonomous research issue (see for instance the international research practices collected in Srtemke & Van den Dobbelsteen, 2013). In addition recently different

education platforms working on the concept of energy landscapes are developed by landscape architecture schools. For instance, since 2007 *LAREG Renewable Energy Landscapes* (Munich University; Germany) has dealt with the different aspect of the diffusion of renewable energy technologies⁵. In 2011 *ENGELA, Energy landscapes* was founded by the University of Brno (Czech Republic) aiming at developing an international networks for researching on the topic of energy landscapes⁶. In 2012 the *NRGLab Energy Landscapes and Beyond* platform was opened at the University of Wageningen (The Netherlands) in order to share research projects and ideas about sustainable energy landscapes⁷.

Studies and research are aimed at two main scopes: on one hand contributing to sustainable energy landscape planning and design by proposing design strategies and design principles, and on the other hand reflecting on the theoretical bases of landscape architecture for contributing to renewable energy deployment. The role and the effective contribution of this discipline to renewable energy deployment is a debated issue. In addition, since the European Landscape Convention, proposes landscapes as everyday landscapes (Pedroli, et al, 2006; 2013), as well as integrative framework in design and planning (Selman, 2012), landscape architects have started to reflect on the role of landscape architecture in sustainable development and democratizing of the decisions for landscapes transformation, including energy topic.

Six seminal articles (table 2.1) reflected on landscape architecture role for renewable energy deployment. Articles are summarized in the following and analyzed chronologically in order to understand changing approaches and topics.

What it is possible to be observed is the progressive shift from the topic of renewable energy envisioned as power plants deployment to a wider perspective involving the concept of sustainable energy transition. All of the authors reflected on frameworks or methods for designing more sustainable energy landscapes claiming for new paradigms of planning and design. I noted that all the articles considered the topic from a strong collaborative forward-looking perspective searching for the integration of strategic thinking and operational solutions.

Alain Nadai and Dan van der Horst consider the energy topic from the perspective of spatial planning and social science. This article is the introduction of special issue of *Land Use Policies* (27/2010), also collecting articles for the aforementioned seminar organized in 2007 by the European Science Foundation.

They frame the landscape and renewable energy issue at the international level, focusing on the difficulties occurring when European targets and strategies are adopted by national or local governments. The process from energy targets formulation to projects implementation is generally considered weak in terms of *subsidiarity* of energy policies (Michalena & Hillis, 2012) and *territorialization* of energy policies (Dansero et al, 2010) within the European context.

Indeed the authors state that the impacts on the physical landscape are not

⁵ see <http://www.lareg.wzw.tum.de>

⁶ see <http://www.engela.eu/en/>

⁷ see <http://www.nrglab.net/>

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taken into account in the framework of supra-national legislation because they are considered barriers to the economic development rather than opportunities to have a more strategic vision for development. Thus the risk to exclude local stakeholders and citizens from the process of decision making and action development is very probable. They thus underline how the opposition at the local level is not really connected to the concept of *NIMBY - Not In My Back Yard-* (Bell et al, 2005; Wolskin, 2007) or to a ideologically opposition to renewable energy, rather to the lack of inclusion in decision making process of local stakeholders and population. In addition, opposition is often explained by people through the narrative of *impact on the landscape*.

This kind of approach calls for landscape architects and other landscape professionals to reflect on what landscape impact means. They highlight that the questions is mainly about what kind of landscape do we want, and what do we want our landscape to remind us of. Therefore because physical transformation of landscapes, occur at the local level, a more participative and inclusive planning process should be pursued producing more strategic knowledge for decision making. Indeed, the main oppositions to renewable energy diffusion are related to traditional spatial planning projects.

Traditional planning instruments, which are used also for imagining new energy landscapes, refer to the operational dimension of landscape by defining qualities designed and formally mapped at distance. The common attitude to use zoning in order to steer renewable energy deployment is not adequate if it is not coordinated with more inclusive energy policies formulation.

In addition, authors underline that renewable energy facilities are new objects to be related with consolidate landscapes representing a challenge for spatial planning academic and professionals which should reflect on the category of *conflict*.

Paul Selman also approaches the conflicts regarding renewable energy facilities in the landscape. He proposes an approach in order to overlap the problem of conflict including the changing concept of cultural landscape. He focuses on the inevitable change of landscape and on the fact that energy will be the most important driver of landscape changes for the next decades as well as it was in the past centuries. Energy use literally shapes our landscapes. According to the author the problem is that landscapes are very connected to acquired aesthetics which emerged by landscapes narratives or undergoing stories.

In 21th Century the emergent narrative is *sustainability* or *carbon neutrality*. Thus energy and renewable energy will became part of the new narrative underlies new landscapes. The problem to be examined concerns the attitude to learn to love these new carbon neutrality landscapes. Landscape architecture historically focused on the study of narratives both existing narratives and making new narrative by designing, thus it could enhance the discussion about the new narrative of renewable energy.

Narratives are based on understanding of processes, familiarity with scenery and care (Nassauer, 1995). Thus Selman distinguishes the energy drivers in *energy production, energy consumption and embedded energy*. According to

the author if the three stories of energy are used in describing our landscapes as well as landscape planning and design processes, we can recognize stories and purposes also in new carbon neutrality landscapes. In that sense Selman proposes that energy will be the most driving force of future cultural landscapes.

Soeren Shoebel and Andreas Ditrach focus directly on the possible role of landscape architecture and especially landscape architects in the renewable energy deployment. Indeed renewable energy installation can overlap the existing landscapes creating new synergy between for instance different land uses. According to the authors, imagining and developing these synergies is the task for landscape architecture and landscape architects. They have this role both for the concentrated model referring to mega power plants and for the distributed model connected to mini-power plants. These two models are also connected to two different kinds of landscapes; urban and rural. Also these authors consider several drive forces change the current landscapes such as climate change, growth of the population, style of life and economies. Energy production is also a big driver of landscape changes.

The authors reflect on the fact that renewable energy could have the capacity to make the coexistence of different activities in the same place using the framework of sustainability and social inclusion. They consider the different approaches to the energy topic in developed and developing countries proposing landscape as the concept for reconciling also these two different visions in a more sustainable global energy system. This could happen only if landscape of energy are designed with a democratic and public attitude, being multifunctional, referring to local and regional economies, contributing to biodiversity and maintain the possibility to experience 'beautiful' landscapes. Landscape of renewable energy are suggested to become landscape of reconciliation for people, place and decision making processes.

Sven Stremke and other colleagues envision spatial planning and landscape architecture composing long term visions for landscape transformations. The main domain explored in the two connected articles, considered seminal for this research work, is the strategic regional planning. Climate change and renewable energy are envisioned by the perspective of long-term thinking and strategic planning. Thus renewable energy is considered as one of the strategies of sustainable energy transition. The point highlighted by the authors is the need to include changes connected to sustainable energy transition into landscape design process. Three different modes of change are conceived as possible elements to integrate in the design process: current trends, critical uncertainties and intended change.

Landscape architecture is envisioned as essential including the regional and long thinking. Authors reflect on the definition of landscape architecture given by the European Association of Landscape Architecture Schools (ECLAS), stating that landscape architecture deals with the conscious shaping of the landscapes via management, planning and design. This field ranges from site design to regional planning; and the time-scale from medium-term to long-term.

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Also in this case the contribution of landscape architecture to more sustainable energy future is inquired. According to the authors landscape architecture can contribute strategically to renewable energy deployment process: 1) being *flexible* to be adjusted to the locality and resources (Jones & Gross, 1996); 2) facilitating development of *context and area specific solutions* (Healey, 2009); 3) enabling *active participation* of stakeholders in envisioning process (Healey, 1997); 4) integrating change due to *critical uncertainties* (Dammers et al, 2005); 5) helping composing *alternative proposals* rather than a single masterplan and 6) avoiding closing off *future options* (Friedmann, 2004). Composing integrated visions for certain areas via energy topics is considered a method for conceiving more sustainable energy landscapes. Authors propose a *five steps framework* shaped by: 1) analysing present conditions, 2) mapping near-future developments, 3) illustrating possible far-futures, 4) composing integrated visions and identifying spatial interventions) which enables to integrate landscape issue in strategic planning.

The authors propose a case where this approach was applied in order to develop a vision for an energy landscape in The Netherlands. The integration of context scenarios in design process is the proposed outcome of the two articles. They propose that this renewed landscape planning and design process does not necessarily lead a conventional spatial plan but at least to a series of spatial interventions.

Daniela Perrotti and Stanislas Henrion explore the topic from the point of view of the land use conflicts in the agricultural areas. The authors claim for the integration of energy and landscape policies. The authors elaborated on the acceptability of landscape transformations criteria for managing energy projects. Indeed a wider participation of people in decision making process concerning landscape and renewable energy is advocated as well as a more strategic attitude in conceive energy projects. The article is based on two cases where a more integrated approach is acknowledged. The strategic dimension both of renewable energy issue and possible contribution of landscape architecture are discussed referring to the policy construction. The social perception of landscapes in general and energy landscapes in particular is considered the starting point for the integration process.

A *landscape sensitive approach*, defined as the synergic interaction of material and immaterial dimensions of landscape, could contribute to renewable energy projects implementation via an *energy-landscape approach* to policies. This approach proposes an energy-landscape framework taking different indicators such as ecological and social. According to the authors, the very important point is reasoning on a common platform in decision and design processes. Authors look at renewable energy as only one of the components of energy transition which is strictly related with the concept of landscape acceptability on the regional scale. In conclusion, authors propose that energy policies and landscape could be integrated in order to achieve more sustainable landscape development.

Table 2.1. Seminal articles on the relationship between landscape and renewable energy (column 1). For each text is shown how authors reflected simultaneously on landscape and energy (column 2), the concept proposed (column 3) and the possible role of landscape architecture they proposed (column 4).

| Seminal articles | Renewable energy and landscape | Concept proposed | Landscape architecture role proposed |
|---|---------------------------------|--|--|
| Nadai and Van der Horst, 2010a | Renewable energy landscapes | Landscape impact | Open the planning process to people |
| <i>Wind power planning, landscapes and public</i> | | | |
| Selman, 2010 | Landscape of carbon neutrality | Cultural landscapes | Exploring the emerging narrative of sustainability for landscape planning and design |
| <i>Learning to Love the Landscapes of Carbon –Neutrality</i> | | | |
| Shoebel & Ditrich, 2010 | Landscape of renewable energies | Local -global landscapes | Building synergies for multifunctional landscape |
| <i>Renewable Energies Landscapes of Reconciliation?</i> | | | |
| Stremke et al., 2012 | Sustainable energy landscapes | Five step approach for planning and design sustainable energy landscapes | Integrating visions for future energy regional strategies |
| <i>Integrated Visions (Part I): Methodological Framework for Long-term Regional Design</i> | | | |
| <i>Integrated Visions (Part II): Envisioning Sustainable Energy Landscapes</i> | | | |
| Perrotti & Henrion 2013 | Every day landscape of energies | Landscape - energy approach to policy | Informing policies formulation |
| <i>The Notion of Landscape Acceptability as a Potential Key Factor in a New Integrated Approach to Energy-Landscape Policy</i> | | | |

2.4 Conclusions

This chapter started with the analysis of the main dialectic used for describing the relationship between landscape and renewable energy, conflicts, transition and space. Landscape architecture articles dealt with all these topics focusing on the spatial issue because it fit the scope and purpose of landscape architecture as discipline. However the spatial issue from the perspective of landscape architecture calls for the more complex problems beyond the locating of renewable energy installations and related to the *conflicts* for instance between local and supra-national initiatives concerning renewable energy development. All the authors which dedicated articles to inquire the possible role of landscape architecture in the renewable energy deployment argued about: a) the *driving forces* shaping landscapes and more and more connected to energy issue; b) the *integration* of visions or policies.

The perspective adopted in the articles goes beyond the relationship of renewable energy and physical landscape, embracing the complex concept of sustainable energy transition including spatial planning discipline, social science and policies science.

All of the authors propose different roles for the discipline in participating to sustainable energy transition. Surely their proposals depend on their research fields and interest, anyhow they suggest to explore a more collaborative and informative dimension of landscape architecture using bottom up approach in order to produce general knowledge on landscapes. They stress on the need for landscape change and for changing approach to landscape planning and design being familiar with the principles of the European Landscape Convention. Thus literature devoted to landscape architecture role in the energy transition calls for more reflections on the role of landscape architecture for the reflection about the future configurations of landscapes, proposing differently the integration of design and planning process and policies formulation.



**Thermal electrical power station and photovoltaic fields, Cavriglia, Arezzo, Italy.
(S. Minichino)**



**Natural gas storage, Groningen, The Netherlands.
(Flickr, J. Lesneyman)**