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# Wind Power Development and Landscape – Social Participation, Opportunities and Challenges

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## Abstract

This chapter describes and exemplifies how different methods for landscape analysis have been applied for wind farm development and planning in Sweden and Spain. In our case studies from Sweden and Spain we discuss the possibilities, strengths and shortcomings of use of different methods of landscape assessment for wind power development in relation with the definition of landscape by the European Landscape Convention (ELC). The Swedish case study is an example of how the proposed guidelines for wind development in the master plan of Uddevalla has been contested and how dialogue-based landscape analysis has redirected wind energy planning. This has been possible through disentangling and illuminating social values in the description of landscape characters as a basis for new planning guidelines. The Spanish case of the Valle de Lecrín and Alpujara demonstrates limitation of a study based only on expert analysis of visual impact of wind farms. By complementing these expert methods with dialogue, local stakeholder's perspective was revealed and the role of wind turbines in the construction of a local landscape was understood. We show that the role of the landscape planner should be understood as an interpreter and mediator, rather than that of an expert and prescriber.

**Keywords:** Energy landscapes, ELC, landscape assessment methods, public participation, wind power planning

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## 1. Introduction

The European Landscape Convention (ELC) [1] definition of landscape as “an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors” highlights the importance of developing landscape policies dedicated to the management and creation of landscapes. This includes planning procedures that allows the general public and other stakeholders to participate in policy creation and implementation. Identification and assessment of landscapes thus constitute a central element of the ELC.

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According to some recent approaches to landscape [2, 3], landscape can be considered a material, social, institutional and political process that is constantly changing and dynamic. As such, a *deliberative* landscape analysis performed as a mutual learning process between concerned actors may help us to understand interlinks between physical, social, economic and cultural processes. This is most evident when we consider the transition from a conventional energy system to a renewable energy system, demanding more space in areas holding high natural and cultural values. This has proven to cause infected conflicts between stakeholders, making this landscape transition very difficult. A deliberative landscape analysis highlight conflicts but can also show how the assessment of landscapes can promote the intersubjectivity necessary for any dialogue concerning incorporation of new energy infrastructure in to a sustainable ecosystem.

This chapter aims to explore how we can assess landscapes and prepare grounds for decision making, planning and evaluation of impact from change through different methods of landscape assessment and how public participation can become its integrated part. In our case studies from Sweden and Spain, we discuss the possibilities, strengths and shortcomings of these assessment methods in relation to the definition of landscape by the ELC. Our case studies are drawn from both practice and research on wind power planning and landscape analysis in Sweden and Spain.

The landscape analysis exemplified by the Swedish case study is an integration of the above-mentioned methods; however, these have been revised in relation to the needs of the specific project and deriving data from and in dialogue with people affected by wind developments. The Spanish case study is based on critical review of landscape analysis made in the municipality of Lecrín Valley in 2004–2006 contrasted with new data obtained through field observations and in-depth interviews with different stakeholders.

## 2. Landscape and environmental impact assessment

Landscape is a salient issue in the development of wind power. It is commonly accepted that the most frequent public concern when weighing up the costs and benefits of wind power concern landscape values [4]. Normative planning processes, often with a markedly hierarchical structure and reliant on existing landscape norms/values or classifications, have been shown to direct wind power deployment towards non-protected, allegedly ‘less sensitive’ areas and to increase social or environmental injustice [5]. Cowell [6] and Nadaï and Labussiere [7] have highlighted that in wind power planning processes the ways in which landscape qualities entered in a selective way the planning rationales, favoring qualities that were formally mapable or even measurable ‘at a distance’.

Conversely, cases of planning approaches based on participation or responsive to specific local situations have been shown to contribute to the emergence of new landscape representations and norms described by the authors as energy landscapes—or landscapes of which renewable energy infrastructures are perceived and treated as part, even if these developments face

opposition [8, 5]. The practices and values associated with landscape by different stakeholders play a role that requires further analysis in different contexts.

Depending on what tradition and method of landscape analysis is chosen, the landscape might be viewed differently: either as a visual surface that is possible to evaluate in an objective manner through character assessment or as an ongoing interaction between physical and social forces. The physical and social aspects of landscape analysis should be equally important to present a qualified description of landscape impact and valid mitigation measures. Descriptions (representations) of landscape characters, qualities and functions need to be communicated in a stringent process open to public participation resulting in a deliberated and well-informed evaluation of impacts.

In many countries protected areas and preservation policies and plans are used as point of departure when describing impacts of change [9]. Landscape is often treated as scenery and impacts on this scenery are described as mainly visual. The rest of impact analysis is devoted to environmental aspects, i.e. flora, fauna and cultural history. Environmental impact assessments (EIAs) disconnect the real-time landscape and most change is consequently deemed as a threat to protected areas or species. To conserve something in constant change such as a landscape is of course a contradiction in terms and the disconnection of nature from culture leads to fragmented ecosystems that are not viable, yet that is how we assess impacts in accordance with the law. A dynamic and holistic view promoted by the term landscape as defined by the ELC, gives an update on presents day conditions for animals, plants and people illuminating the interconnections necessary in order to reach a multifunctional and sustainable development of environment and human society in interaction constituting the landscape [2,10].

## **2.1. Rethinking landscape analysis**

Landscape analysis performed in relation to wind development has unfortunately been greatly influenced by a misinterpretation of the work of Kevin Lynch [11]. This has permeated landscape analysis and manifested an expert paradigm where the visual values and physical structures of the landscape have been evaluated by the trained expert in a spatially static way fitting nicely in to the established methods for EIAs. It is however possible to “walk in the foot paths” of Kevin Lynch and discover that his attempts to elaborate information from and in conversations with people living in and experiencing a landscape can be refined in order to develop a landscape analysis appropriate for communicative and collaborative planning. Lynch’s work was concerned with the orientation, perception and activity of people in an urban landscape. By rethinking Lynch and emphasizing the potential of his notation of structural features in relation to important landscape functions and landscape characters defined through LCA and/or HLC, the Swedish case study shows how a landscape analysis becomes a powerful tool for participation in planning. In this context it is important to note that both LCA and HLC are often applied as expert analysis with no dialogue. The Swedish case study integrates the different methods and complements them with dialogue o illuminate the social construction of landscapes. This way the landscape analysis as a process will act as

a link between abstract ideas about landscape characters in different scales and the human perceptual experience of the qualities and functions of these landscapes.

The Spanish tradition of landscape analysis for wind power development is very recent and was also marked by urban perspective. Before 2006 landscape impacting evaluation of energy development was not explicitly required by the Spanish laws on Environmental Impact Assessment, although it normally was part of the process. Only in 2006 the National Law 9/2006 on Strategic Environmental Assessment (based on Directive 2001/42/CE) established that Reports on Environmental Sustainability should evaluate landscape impacts of any project and plan.

The most common types of landscape analysis for wind power development in Spain have been based until quite recently on visual impact assessment through landscape elements inventory, photo-visualizations or/and GIS viewshed studies. Only during last decade landscape characters defined through LCA has been introduced in some methodological proposals for landscape analyses, although it did not become a commonly used method [12, 13].

In Spain landscape analysis is not generally hold in dialogue with people affected by wind development, although landscape analysis through dialogue with local residents as presented by the Spanish examples of Valle de Lecrín and Alpujarra (Andalusia) demonstrate that the expert needs to take into consideration different stakeholders' relations to wind turbines and how these as artifacts inscribe into their use of the territory and landscape.

## 2.2. National and regional landscape policies

In both countries landscape conservation policies seem to be connected to the meaning of the concept of landscape in respective languages.

The concept of landscape (*landskap* in Swedish) has in germanic languages historically a double meaning as either a smaller territory defined through common culture and history, or merely as the visual surface of things [14]. Sweden is divided into 25 'landskap' (in the sense of territory), based on common culture and history as well as a shared geography. These 'landskap' play an important role in people's self-identity, but they do no longer serve any political or administrative purposes. In Spanish the concept of landscape is generally defined as visual surface of things, but the word for landscape in Spanish as in the other Roman languages is *paisaje*, in which 'pais' means 'land' in the sense of the bounded area of a region or country. 'Land' does not mean soil, but refers rather to a historically constituted place [2]. The meaning of landscape has roots going deep into the identities of the historical regions from which the Mediterranean Landscape Charter and the Landscape Convention emerged (*Idem.*). Spain is divided into 17 autonomous regions (Comunidades Autónomas); many of them are historical regions based on common cultural, historical and/or language identity. This is the case of Andalusia.

In Sweden there are many tools for conservation; however, they are focused on conservation of areas, species of plants and animals (the Environmental Code) or the conservation of ancient remains, churches, other buildings, and place names (the Heritage Conservation Act). The term 'landscape' is only rarely mentioned in regulations and in a legal sense referred to as either

environment or the image of the landscape in an aesthetic sense (*landskapsbild*). In the environmental code landscape has lost its old meaning of landscape as territory and identity.

The everyday landscape is to a certain extent protected by general rules of consideration in the environmental code; however, many decisions and policies that have an effect on landscapes are not regulated by Swedish law [15]. There is a general lack in EIAs regarding adequate public participation, comprehensive overview of landscape impact, and stakeholder coordination [16]. There is no mention of the significance of the landscape to people and conflicts of interest often arise because of unclear or overlapping laws [9]. The Swedish Energy Agency has pointed out areas of national interest for wind energy developments. The assessment of these areas suitability was made primarily with regard to factors such as average wind speed and safety distance to housing areas with no concern to landscape character or public interests. These areas are now being revised and the criteria for areas of national interest for wind are heavily debated.

Unlike Sweden, in Spain, energy planning is the responsibility of the Central Government, although the regions play a very important role in the decision-making process. Local governments (municipalities) on the other hand play only a secondary role in the authorization procedure, which at times has resulted in a lack of awareness of project development and the absence of strong opposition to renewable power projects [17–19].

As for landscape regulation in Spain, the situation is similar to the Swedish one. Although there are many national and regional tools which directly or indirectly concern landscape conservation and the term “landscape” is used in many of the recent laws approved after signing the ELC, energy planning systems, which are often based on engineering and economic considerations, are difficult to match with landscape management on a local level.

In spite of the new laws, landscape impacts have only secondary role in decision-making process concerning wind farms. As some recent research have demonstrated [20], local authorities in Spain do not have capacity to introduce landscape impacts of wind farms as an substantial factor into decision-making process, since they have limited power in this process and because in practice there are only three requirements for giving wind farm license by these authorities: wind turbines should be situated out of any protected natural area, they should be close to electric evacuation line and should correspond to a territory officially defined as ‘wind resource area’. The process of planning and authorization in Spain does not give enough power to landowners and the general public in the EIA process. Information about projects and procedures lack transparency and clarity. Whereas, the EIA in Sweden by some is understood as giving too much concessions to those opposing to wind power projects [19].

Although public participation in the decision-making process on wind power development has become a common procedure in Spain, due to the adoption of the Aarhus Convention and the ELC, public engagement is generally seen as a one-way communication with an end result determined in advance. The tendency towards a top-down, technocratic, hierarchical way of thinking about how the planning system has to be shaped, inherited from the period of centralized policies before 1978, persists in Spain [21]. Public participation is understood as public approval (or validation) and consultation does not involve stakeholders in decision-

making processes. Also, public surveys does not affect the decision making process. Therefore, social participation processes are viewed as a way of conducting political control of perceptions and/or indoctrination of stakeholders who are not convinced in the suitability of wind power projects for their territory dominates in Spain [22].

The siting of wind power schemes in Spain has not been decided at a local level, which creates an important contradiction between the intentions of Spanish landscape policy and the actual mechanics of decision-making processes. In spite of essential changes due to application of the ELC, which encouraged some Spanish regions to incorporate landscape as an important issue in land use regulation, landscape policies are still out of step with the development of renewable energy policies.

### 3. Case studies

#### 3.1. Swedish case study: Uddevalla municipality

##### 3.1.1. Background

Uddevalla municipality is located on the Swedish west coast in the metropolitan area of Gothenburg (Figure 1). The municipality has a varied landscape including forested highlands, fjords, grabens and mosaic landscapes. The varied topography and the, for Swedish conditions, high population density are challenges that the guidelines for wind power development in the municipality has to handle.



Figure 1. Uddevalla municipality, Sweden.

The proposed guidelines for wind power development were at the start of the case study a result of planning guidelines excluding areas from wind power development based on legislative restrictions. Meaning that areas with planning restrictions due to high cultural or natural values were regarded as unsuitable to wind development without further investigations as to if the present day status of these values were viable and relevant. Also, the possibility that not protected areas might prove more functional habitats or hold important recreational and social values were never investigated. These guidelines led to that the coastal areas and the highlands were eliminated, leaving the mosaic landscapes in the central and eastern parts of the municipality open for possible wind development. Since the guidelines identified areas that both authorities and local citizens objected to this became the start of a discussion whether the values protected by legislative restrictions were relevant for wind power development in Uddevalla municipality. The situation became very infected and affected the trust of the public in officials and politicians. Conflicts between wind developers and the effected public also increased as wind developments were proposed in areas with no restrictions for wind development. There were also no directives or recommendations regarding how to adapt wind developments to the landscape conditions.

Because of these conflicts there was a general need to evaluate the social aspects of landscape in connection to demarcation of areas as suitable for wind developments. Some officials suggested to politicians that a landscape analysis based on public dialogue and participation might redeem the confidence of the public and reveal an alternate strategy for wind development. The landscape analysis undertaken was in line with the ELC, focusing on illuminating the values resting with the everyday landscape as well as disclosing if the present day conditions of restricted areas were relevant in relation to wind power development. The objective of the landscape analysis was hence to create a present day description of landscape functions and values in order to better socially anchor the wind power planning.

### *3.1.2. A description of the landscape as perceived by people*

Expert methods for landscape analysis such as Landscape Character Assessment (LCA) [23], Historical Landscape Characterization (HLC) and Structural analysis in accordance with Kevin were used to collect and present information on geophysical conditions, historical time depth, ecological functions, and to provide a basis for dialogue. These methods were combined and revised to fit the purpose of the landscape analysis.

After an identification of geophysical generic landscape types, walk through evaluations with the public were made in order to confirm the relevance of the description of landscape types and elaborate these in to landscape character areas describing the social functions as well as naming these areas in accordance with how they are referred to in an everyday context. An additional objective of the walk through evaluations was to discuss the ongoing force and pace of change as well as the landscapes sensitivity to this change.

The character areas that were extracted from the public input on landscape types as collected during walk through evaluations and were then elaborated in workshops were the public, officials and politicians collaborated (Figure 2). This procedure created a collective learning

process regarding the possibilities as well as difficulties with implementing wind energy in a specific landscape type and character with its specific social context.



**Figure 2.** A walk through landscape evaluation in Uddevalla.

### *3.1.3. Revised guidelines for wind power development*

The landscape analysis did not state expert evaluations regarding suitable and non-suitable areas for wind power development, but described possibilities and difficulties resting with the landscape type and character in relation to wind power developments. These possibilities and difficulties created a basis for revision of guidelines for wind power development as perceived by people based on a positive planning approach stating that wind power developments correctly located in relation to important landscape functions, both ecological and social, can even restore a fragmented and exploited landscape.

The character areas with least difficulties and most possibilities were studied further through desktop analysis and field surveys. At this stage legislative restrictions were reintroduced a part of the assessment and added as one layer of information regarding identification of suitable and non-suitable areas for wind development.

The revised planning guidelines are hence the result of a socially anchored description of landscape values and functions as well as an expert assessment/evaluation of suitability in relation to legislative regulations and as well an elaboration of methods for landscape analysis acknowledged by the ELC. The expert is transformed into a process leader with the objective to reconnect disconnected landscape values and support different perspectives in evaluations of possibilities and restrictions connected to a wind development. The landscape as an arena

for dialogue and deliberation on changes repowers an understanding of important aspects of a shared social life in relation to specific processes of change, a rite of passage that equip us to redress the conflicts we must overcome in places where we live.

The Swedish case study is an example of how the proposed guidelines for wind development in the master plan of Uddevalla has been contested and how landscape analysis as basis for wind energy planning and development has disentangled the landscape values and illuminated social values in the description of landscape characters as a basis for new socially anchored wind power planning.

## 3.2. Spanish case study: Valle de Lecrín and Alpujarra

### 3.2.1. Background

The Spanish case study is located in the neighbouring *Comarcas* (or small regions) of Valle de Lecrín and Alpujarra of Granada in the Autonomous Region of Andalusia in the South-East Spain. The study area belongs to the mountain system of Sierra Nevada and the adjoining valleys. The *Comarcas* of Valle de Lecrín and Alpujarra consist of 38 municipalities with a population of 52 thousand inhabitants. These *Comarcas* have a traditional agrarian character and its agriculture is based mostly on olive and citric production in the lower parts and on vine, olive and almond production in the upper parts (Figure 3).



Figure 3. Valley of Lecrín. General view. M.Frolova.

Since the farming sector is currently in deep crisis, this area has recently been developing rural tourism owing to its exceptional landscapes and natural, ethnological and cultural resources, and the neighboring Natural and National Parks of Sierra Nevada. The important landscape values of Sierra Nevada have led to the emergence of conservationist policies and to the granting of protected heritage status to many of the landscapes in the study area, via various different declarations protecting natural and cultural heritage [24].

### 3.2.2. *First landscape assessment for conflictive wind farms development*

Wind-farms installed in some of the municipalities of our study area since 2004, have had a considerable impact on the landscape of the mid and low-mountains, raising new issues regarding landscape practices and values. While the installation of wind power is difficult in the Alpujarra due to the Sierra Nevada National Park protection measures, and only two wind farms were constructed, the neighbouring Valle de Lecrín has developed five wind farms with installed capacity of about 34 MW, 20 wind turbines and about 1,69 MW installed per turbine [13]. The beginning of wind power implementation in this area dates back to the early 2000s raising issues regarding landscape practices and different tensions and conflicts. An important anti-wind power initiative was launched by the British company Mirador Andalusian Development S.L. that wanted to build a rural hotel complex in the Lecrín Valley, with some local stakeholders involved [24]. A detailed study on landscape and environmental impacts had been carried out in order to demonstrate an important value of the Lecrín Valley landscapes. The results of this study, called "Landscape and environmental viability criteria for wind farms localization", were published in 2006 when some of the wind farms were already constructed [25]. This study referred to the ELC as an important basis for landscape conservation in Spain. The study was based on analysis of visual impact, effects on visual landmarks and on view shed analysis using Geographical Information Systems (GIS). At the same time landscapes with high quality were defined through inventory of different cultural and natural elements, and landscape fragility of the Lecrín Valley was mapped. Finally, the map of viability of wind power project was produced which demonstrated that the most part of the Lecrín Valley corresponded to exclusion areas or apt areas with environmental, landscape, etc. constraints (Figure 4) (*Idem.*). All this study was made by experts, without taking into consideration the local residents' landscape perception.

As a consequence of this study the number of wind power projects for which permission was granted was reduced by local administrations.

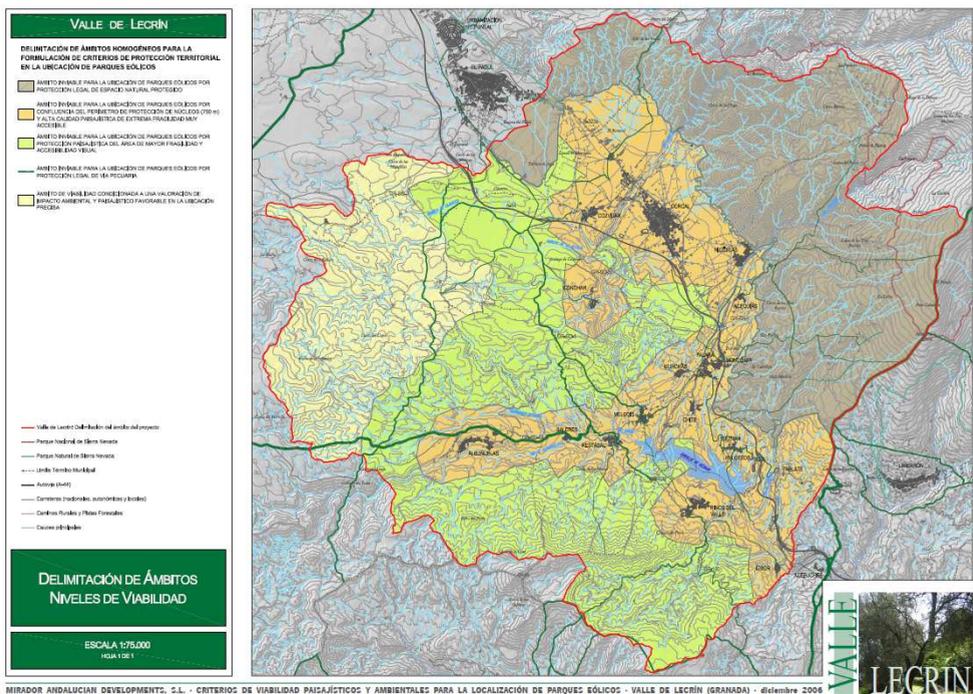
### 3.2.3. *A study of wind power project perception by stakeholders*

In order to complete landscape assessment developed in 2006 twenty in-depth interviews were made between 2011, 2012 and 2013 with different local stakeholders involved in the development of wind power projects, whether opposing or supporting it.

The acceptance of wind power projects by the local population was determined by several factors related not so much to their esthetic, but mostly with inscription of wind projects into local economy and its compatibility with local activities. First of all wind turbines provide

substantial income for some rural land owners and town councils. Secondly, they are compatible with traditional rural activities such as agriculture and livestock-grazing, and with most other local business activities. Moreover local ranchers perceive positively the roads and passes constructed for windfarms maintenance as facilitating access to some isolated territories. Our interviews with local residents revealed a strong connection between the public acceptance of landscape changes brought by renewables development and the economic gains this development brings. Thus, the local residents are more prepared to accept landscape changes if they participate in renewable power development in terms of the economic benefits to be reaped from it. Finally some stakeholders perceived wind turbines as an element integrated into the local landscape. Interestingly windmills have already appeared on some representations of local landscape (information panels) for tourists. In the interviews we conducted with tourists, we also discovered that some tourists had come to take pictures of wind farms, attracted by their “powerful image”. [24]

Opposition to wind farms was mainly conditioned by two factors. On one hand, many local residents felt themselves excluded from the decision-making process. On the other hand, some opposition to wind farms aroused out of disconnection between territorial development models chosen by neighboring municipalities. For example, Town Council and residents of



**Figure 4.** Delimitation of homogeneous zones for formulation of criteria of landscape protection for wind farms siting. Source: Medina Barbero, R., Sánchez del Árbol, M.A. (dir.), 2006.

Nigüelas, one of the Valle de Lecrín villages, opposed to construct wind farms on their territory in order to preserve their landscapes (*Idem.*). Now, ten years after installation of wind farm in a neighboring village many interviewees complain that landscapes of Nigüelas had been spoilt and another village had received all the economic benefits brought by the new wind farm. Therefore, if local population could have chosen now they would have accepted wind farms in their territory. In this case landscape impact acceptance is also connected with the economic benefits of renewable projects for local residents.

The Spanish case study demonstrate that landscape assessment for wind power developments based only on an expert perspective emphasizing visual impact has important limitations, since landscape reflects emotional, economical, etc. relations of local populations with their place. Our analysis of results of the interviews has shown that wind turbines may not be considered a problem in the local landscape, they might even add to the construction of local identity. In order to take into account local place aspects a dialogue with the local community is required. The relationships of the local population with wind power do not emerge through its purely visual perception, but require a multidimensional view of the wind power landscape that brings together local practices, experiences and perceptions as well as physical properties.

#### 4. Conclusion

Landscape has progressively been endowed with a new meaning in the assessment of renewable energy projects. The important shift can be spotted moving away from an expert paradigm focusing impact at a great distance for the local living context, to a more participative and deliberative planning processes. This important progress is aided by landscape assessment methods that offer new opportunities to take people's perceptions and use of landscape into consideration. Landscape Character Assessment and Historical Landscape Characterization are methods for landscape analysis that preferably include dialogue in accordance with the ELC to account for new dimensions of landscapes, counteracting the attempts to objectivize social dimensions through classification and/or quantification.

The Swedish case study is an example of how the proposed guidelines for wind development in the master plan of Uddevalla have been contested and how dialogue-based landscape analysis has redirected wind energy planning. This has been possible through disentangling and illuminating social values in the description of landscape characters as a basis for new planning guidelines. Walk-through evaluations have evaluated and complemented the descriptions of geophysical conditions (landscape types) with social functions elaborating these in to character areas with well-recognized names. The walk-through evaluations were complemented by workshops and these dialogue methods also complemented the structural analysis in accordance with Lynch original work, however, now in a rural and peri-urban context.

The Spanish case study demonstrates limitations of a study, based only on expert analysis of visual perception and accessibility of landscape, of visual landmarks and on viewshed analysis, without taking into consideration the local residents' landscape and wind power

perception. By complementing these expert methods with dialogue, local stakeholder's perspective was revealed and the role of wind turbines in the construction of a local landscape was understood.

Both case studies show that there is still a substantial lack in the ambition to take on board people's perceptions in planning and impact assessment practices in accordance with the ELC. The prevailing methods of landscape assessment rely on the trained experts definition and evaluation of landscape values. In conclusion both the Swedish and Spanish case studies show that the role of the landscape planner should be understood as an interpreter and mediator, rather than that of an expert and prescriber.

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