For Figures please see: Upham, P. and Garcia, J. (2015) A cognitive mapping approach to understanding public objection to energy infrastructure: the case of wind power in Galicia, Spain, *Renewable Energy* 83: 587-596. doi:10.1016/j.renene.2015.05.009

Word count (main text): 6,156 inc refs, excluding abstract, figures and tables

Abstract

Historically, Spain has experienced relatively little public objection to wind power proposals, but this is changing in the region of Galicia, which now hosts a relatively concentrated level of wind turbines. To document and understand this objection, we take a cognitive mapping approach, commenting on its value as a method and focussing particularly on the issue of community compensation. Cognitive mapping structures the causal logic of individuals' thinking, revealing this and facilitating group discussion. Here we compare cognitive maps that reflect different positions on the controversy. Both monetary and in-kind compensation are dismissed by local campaigners and local stakeholder representatives alike. In-kind compensation is regarded as inadequate firstly because it cannot provide the scale of the public goods perceived as necessary by the host community. Secondly, the developer is in any case considered inappropriate as provider of public goods, which the community think should be delivered by local and regional governments.

Keywords

Wind power; cognitive map; public objection; community compensation

1. Introduction

By the end of 2014, Spain had 22,986.5MW of installed wind turbine capacity, making it the second largest European host after Germany [1]. In 2012, wind energy supplied nearly 18% of total national Spanish power demand [2] and some Spanish regions are still experiencing significant growth in wind energy installed capacity. Unlike a number of other European countries, wind energy deployment in Spain, and particularly in the region of Galicia that we focus on here, has faced little opposition from the local communities – something that has facilitated the development of the sector at a national and regional level [3]. However, this pattern has recently been challenged in the Atlantic coast of the province of Pontevedra in Galicia, where new onshore projects are at the time of writing encountering strong resistance from local communities.

While the benefits of new energy infrastructure are typically accrued at regional and national levels, the direct effects are experienced by host communities and are often perceived as costs, risks and externalities [4]. Community compensation potentially redresses this imbalance by "transferring resources from the beneficiaries of the project to those badly affected by it" [5]. Such compensation measures can take a variety of forms: they may be monetary or in-kind; and they may be provided for individuals or communities, the latter being on a shared basis. Compensation measures also vary according to their main objective, be this to mitigate potential planning problems, compensate the local community for eventual accidents, or reward individuals for the risks and costs associated with these facilities. While there is a relatively large body of work on energy siting controversies [6] the literature on compensation is more modest in size [7,8,9]. There is also a related, critical strand of literature on the theme of justice in relation to sustainability and other policy appraisal across a variety of contexts [10].

Originally developed to capture the processes underlying spatial cognition, cognitive mapping has been widely used to structure multi-faceted environmental planning and management problems (e.g. [11]). Yet despite the breadth of issues already explored through cognitive mapping, the approach has been little used to help document and understand community objections to renewable energy siting. We find that cognitive mapping has the potential to provide a structured account of the factors involved in social objection, focussing particularly on the perceived conceptual and causal relationships of factors that are salient to those involved.

The paper is structured as follows. First, an initial section provides a short overview of the literature on compensation. We then describe the case study and the cognitive mapping methodology used. Finally, we interpret the cognitive maps of three contrasting groups of stakeholders, commenting on the particular contributions of the technique in terms of revealing ways of thinking. The stakeholders are grouped as: (i) local stakeholder representatives (local mayors and heads of communal land organisations); (ii) local

campaigners (members of local civil society organisations); and (iii) non-local stakeholder representatives (representatives of the Regional Government (Xunta de Galicia) and the Spanish Wind Energy Association).

2. Theory and practice of community compensation

In general, research on the effect of community compensation on perceptions of facility siting suggests that monetary compensation does not necessarily increase the support for proposed projects [9]. Indeed empirical research indicates that in-kind or public goods compensation is better received by host communities [5][12]. The literature on compensation offers two main explanations for the apparent failure of monetary compensation to reward host communities: the 'bribe effect' [13][14] and the 'crowding-out of public spirit' [15][16]. The bribe-effect arises when "people feel they are being bought off or perceive (morally) inappropriate trade-offs between risks to environment, health or safety and cash payments" [5].

This crowding-out of public spirit thesis suggests that monetary compensation may diminish the support for a project when individuals have already accepted the facility as something good for the public. Hence monetary compensation may crowd out the public spirit and reduce the willingness to accept (WTA) a facility [16]. The preference for communal, non-monetary compensation may also reflect the finding that it tends to be easier for individuals to think in terms of a 'public good' versus 'public harm' trade-off than a private versus public trade-off, as in the first case both share a 'public' dimension that is difficult to conceptualize (one might say ethically as well as cognitively) as a private gain or loss [12].

Context may also play an important role in the acceptance of compensation. Cowell et al [4] argue that compensation is more likely to succeed in communities where the institutional context has some characteristics of 'property rule' (i.e. the host community holds an 'ex-ante' control of the development process), rather than in those governed by a 'liability rule'

(the host community only has the possibility to accept or reject compensation once the process is undertaken without their participation). Others have highlighted the need to identify and consider the specific values attached to facility siting locations, in relation to the proposed compensatory measures [17][18].

Research on the relationship of public participation and community ownership of wind energy projects has also increased in recent years. Empirical studies indicate that community ownership, co-ownership and local participation in combination increase public acceptance of wind energy schemes [19][20]. Community involvement may potentially bring advantages of fewer planning refusals, increased public support, more informed public debate and more distributed benefits to the host community. However, Warren and McFayden [20] identify some disadvantages of community schemes in the form of the reduced economies of scale arising from smaller projects and an administrative burden for both the community and developer (if these are not the same), concluding that community ownership may not be a realistic option for many rural communities. Notwithstanding the emergence of participatory regimes in northern European countries, particularly Denmark and Germany, wind power generation in Spain is largely controlled by large corporations and there is in fact little evidence of public attitudes towards local ownership and co-operative renewable energy schemes in Spain to date.

3. Material and methods

3.1 Wind energy planning in Spain

Although wind energy has experienced a rapid growth in Spain since the 1990s, Toke et al [21] suggest that the relatively little local opposition to this stems from Spanish rural populations being of low density and with limited access to a variety of resources, with the consequence that the Spanish countryside is perceived as a low-value living space and unproductive land (ibid). This may also partly account for the relative absence of local ownership of wind farms [3]. Besides these socioeconomic factors, though, there are also

institutional elements that may explain the scant local opposition to wind energy in Spain, such as the centralised model of spatial planning and the late development of landscape policies [22]. Local councils have little power in the wind energy decision-making process and play a secondary role, with virtually no means to reject wind farm proposals or to zone land as unsuitable for wind power developments [23]. In contrast, the Spanish regional governments (AACC) play a major role in both energy planning and facility siting in Spain. Each region sets its own energy plans and grants authorizations for wind energy siting [23]. There is also a financial incentive for local authorities to welcome wind farms: they provide tax revenues to the municipalities and can be important sources of income in an often economically depressed rural context (referred to below).

In 2008 the regional government (the Xunta de Galicia) approved a new regulatory framework, which attempted to improve both environmental regulation and public participation in wind energy schemes, including land owners [24][25]. However this legislation was modified again by the new regional government in 2009. The new regulatory framework (Decree 242/2007), which is still in force at the time of writing, removes the participatory measures established by the precedent legislation and considers public participation only in terms of an Environmental Compensation Fund (ECF) [25]. This fund is raised through the collection of an environmental levy, the 'canon eólico', which taxes the impact of wind farms on the landscape and is intended to finance environmental projects in the municipalities affected by wind farms and in other locations of Galicia.

Another important element to be taken into account is the way in which developers gain access to prospective development sites. Developers have three options to access land: purchase, rent or expropriation. Although the three options are possible for private properties, communal land cannot be purchased. As long as wind farms are considered 'public utilities', landowners may be expropriated if they do not reach any agreement with the developer to consent the development. Although the most common option is to rent the land, Simón and Copena [26] argue that the "threat of expropriation has been used, in

many cases, to force landowners to accept relatively low prices for their land". Moreover, the benefits received by landowners are an insignificant proportion of the overall revenues yielded by wind farms in Galicia. Simón [27] estimates that landowners' compensation accounts for roughly 1% of the gross revenues generated by wind farms, whereas the same developments account for nearly 57% of the overall rural GDP in Galicia.

Looking to the future, despite the success of the wind energy sector in the last couple of decades, recent regulatory changes in the national energy policy pose new threats to the future of the wind industry. The 'tariff deficit' accumulated by the Spanish utility companies since the liberalization of the sector in 1997 has recently led the Spanish government to tighten up the regulatory framework and to reduce the subsidies to renewable energy projects[1]. The new legislation will not only affect future projects, but also existing developments, bringing an end to the regulatory stability that has characterized the Spanish sector during the last decade.

3.2 The 'Pedras Negras' wind farm proposal

The Pedras Negras project is at the time of writing proposed for the Morrazo peninsula in the South-western coast of Galicia, in the province of Pontevedra (Fig. 1). The project is located within the Wind Energy Reserve of Morrazo, one of the areas designated by the regional government to host wind energy developments. There are three municipalities directly affected by the development: Moaña, Vilaboa and Marín. If constructed, the facility will have an overall installed capacity of 42 MW and will comprise 14 turbines of 3 MW and 119 metres in height, although 21 alternative positions have been further considered within the WER for possible enlargements.

[1]The 'tariff deficit' in Spain has been raised due to the increasing shortfall between costs borne by the utility companies and the revenues raised from end-users. The Spanish government has resolved to eliminate the tariff deficit by curtailing incentives to renewable energy, among other measures.

<Figure 1The Morrazo peninsula>
(Source: Wikipedia, reproduced under GNU Free Documentation and Creative Commons licences)

The wind farm is intended to be built in the highest area of the O Morrazo peninsula, also known as 'Montes do Morrazo' (Morrazo mountains), which is located between 400-600 metres above sea level. The wind farm will be visible throughout the South-western coast of Galicia, which is one of the most populated areas of the region, including from the Estuaries of Vigo and Pontevedra, which are known as 'Ría de Vigo' and 'Ría de Pontevedra' respectively. These are heavily urbanized spaces with a high concentration of industries. The Ría de Vigo hosts a population of nearly half a million inhabitants (the city of Vigo alone has more than 300,000 inhabitants). In short the Pedras Negras proposal is located in a politically sensitive natural enclave.

Strong opposition has emerged in the Morrazo area and the three municipalities affected by the development, since the project draft was submitted to the local councils in 2011. This opposition has been primarily led by the Platform in Defense of O Morrazo Mountains (PDMM)[2], alongside the communal land organisations (Comunidades Veciñais de Montes - CVMs), whose land will host the majority of the wind turbines. An ensuing anti-wind farm campaign has successfully engaged local communities and local councils against the project (Moaña and Vilaboa voted against the wind farm, while Marín cast a blank ballot). The rest of the local political parties have supported the campaign. The Pedras Negras wind farm conflict has also reached the regional parliament of Galicia, where two political parties (BNG and

[2] The Platform consists of a wide range of environmental, social and cultural organisations. Its main objective is to enhance the protection status of the natural areas and the cultural heritage of the Morrazo Mountains.

PSdeG)[3] have requested the cessation of the ongoing wind farm procedures. Additionally, more than 500 legal objections had been submitted to the regional government during the first half of 2013, by a wide range of opponents including social and environmental organisations, political parties, local councils and a large number of citizens from the local communities[4]. Community compensation is not being formally considered as part of the Pedras Negras project, but a number of community-owned schemes do manage to operate in Galicia.

3.3 Method

The method is case study-based, using semi-structured interviews to inform the development of cognitive maps. Cognitive mapping derives from the field of cognitive psychology, particularly Personal Construct Theory [28], which seeks to understand how humans make sense of their world by structuring concepts by contrast and similarity, organizing them in a hierarchical structure [29]. Cognitive maps are graphical representations of knowledge that organize hierarchically the concepts and relationships between them [30]. As Kearney and Kaplan [31] note, cognitive maps are "hypothesized knowledge structures embodying people's assumptions, beliefs, facts and misconceptions about the world". These internal representations of the external environment are considered essential for the interpretation of new information and to carry out key cognitive processes such as prediction and decision-making [32].

[3]BNG (Bloque Nacionalista Galego) is a regional nationalist party. PSdeG (Partido Socialista de Galicia) is the regional socialist party.

[4] This is virtually the only avenue of public participation allowed in the wind energy development process. The regional government allows a period in which individuals and organisations may present objections to the regional government.

Although cognitive mapping was originally intended to capture the processes underlying spatial cognition, it has been widely used to structure and assist the resolution of complex social problems, including participative environmental management problems in a variety of domains (e.g. [32]). Yet despite the wide range of issues already explored through cognitive mapping, the technique appears not to have been used to help document and understand the social acceptance and rejection of renewable energy siting proposals.

Here, cognitive maps are used to make explicit the reasoning that underpins stakeholders' attitudes towards the Pedras Negras wind farm proposal, including to what extent those attitudes vary when compensation and related participatory options are considered. To this end, ten stakeholder interviews were undertaken, plus a small, deliberative workshop with campaigners from three distinct local civil society organisations[5]. The developer declined to be interviewed.

Both synchronous (real-time) and post-hoc methods were used to develop participants' cognitive maps. The approach used in the workshop was synchronous and followed the method of structured conceptual content cognitive mapping (also known as 3CM) [31]. The method consists of the following steps:

1. Pre-workshop identification of potential concerns and issues through an in-depth analysis of objection documents relating to the wind energy project[6]. The aim of this

[5]Luita Verde (environmental organisation), Parapente Morrazo (sport organisation) and Colectivonacionalista do Marín (social organization). The three organisations are integrated in the PDMM.

[6] The main concepts were captured via the legal objections presented by opponents to the regional government, from local news media articles and from the campaigners' platform blog. Additional concepts were drawn from the literature on wind energy conflicts and compensation on facility siting.

64 stage is to generate a concept list that is likely to include concepts within participants'
65 knowledge structures [31].

66 2. Participants were then presented with the pre-defined concept list based on stage 1
67 above. They were asked to dismiss those concepts that they did not understand or
68 did not consider important and to add those that they considered were missing but
69 relevant.

70 3. The researcher-facilitator grouped the concepts into several categories on a large
71 sheet of paper, asking participants to label each group with a descriptive word or short
72 phrase [31]. This identified concept categories and priority concepts.

73 4. Finally, participants were asked to graphically link the different categories and
74 concepts with arrows to establish the causal relationships among concepts. The
75 workshop was audio-recorded in order to capture additional comments for further
76 analysis.

77

78 In the case of the interviews of key stakeholders[7], for reasons of time, semi-structured
79 interviews were conducted, supported by pre-defined questions <Appendix 1>, whilst leaving
80 flexibility for discussion. Hence the cognitive maps in this case were developed subsequently
81 on a post-hoc basis. Although the process of constructing maps from interviews post-hoc is
82 rather different from the 3CM method, it likewise aims to represent the reasoning of
83 interviewees about the topic in hand. The procedure by which such cognitive maps are
84 constructed is detailed elsewhere [33], but briefly, the process requires the identification of

[7]Representatives of the Energy department of the regional government of Galicia (Xunta de Galicia); Spanish Wind Energy Association; Moaña Local Council; Vilaboa Local Council; Association in Defense of the Ría de Vigo (APDRV); Domaio Communal land organization (Asociación de Montes Vecinais de Domaio); San Adrián Communal Land organization (Asociación de Montes Vecináis de San Adrián).

concepts, their classification in terms of causes and outcomes, the establishment of causal relationships between concepts and the construction of a hierarchical order that structures the whole map.

An in-depth analysis of all of the cognitive maps was ultimately undertaken with the aid of the Decision Explorer software. This enables the construction of group maps by merging individual maps. It provides a means of comparing different stakeholders' views, whilst highlighting both commonalities and differences. Ultimately, though, it should be noted that is impossible to completely eliminate the subjectivity of the researcher during these processes and the quality of the interviewer as listener and interpreter is key [34].

4. Results

Individual cognitive maps were developed through the workshop and from the interviews conducted with relevant stakeholders, to give 14 maps in total. The information in the individual maps was then condensed and transferred to collective maps that reflect the standpoint of three distinct groups of stakeholders: local campaigners (members of local civil society organisations), local stakeholder representatives (mayors and heads of communal land organisations) and non-local stakeholder representatives (i.e. representatives of AEE and Xunta de Galicia). The information transfer was undertaken with the aid of the software Decision Explorer [35], which is essentially a form of graphical support that also allows centrality and connectivity analysis. The three clusters were based on a categorisation relating to known affiliation. The process of combining maps was undertaken on the basis of conceptual overlap: where concepts and linkages are shared across maps, they are represented only once. Where there are unique concepts and linkages, these are included in

the combined map. Hence the combined maps condense and aggregate information across groups of individuals, but do not exclude it. It should be noted that a variety of methods are available for combining maps (see e.g. [36]. Here the purpose was not to produce maps that might be claimed to represent some form of average, but rather to ensure inclusion. This is more in the manner of Nakamura et al [37], who have advocated cognitive mapping as an approach to encoding knowledge of social relationships in computer databases. In such cases, the aim is to capture the sum of knowledge about a topic rather than use a form of averaging (in the general rather than mathematical sense).

In cognitive maps, concepts are structured in cause-effect relationships. Arrows connect concepts that influence or have a causal relationship with others. A minus sign (-) indicates that the first concept influences negatively or counterbalances the second one. In this way, the elements of individuals' reasoning is codified and made transparent as a complement to the qualitative understanding gained through semi-structured interviews. The full cognitive maps of each of the three stakeholder groups include too many concepts to reproduce with sufficient resolution in the main body of the paper and are appended as Figures A1, A2 and A3. Here in the main text we reproduce the simpler representations of the non-local stakeholders' view on the role of compensation (Figure 2) and local campaigners' view of regional wind energy planning (Figure 3). In addition, abstracting from the cognitive map of local and non-local stakeholders, appended as Figures A1 and A3, Tables 1 and 2 show the chain of consequences or causality evident in the individuals' thinking, as output by Decision Explorer software. The more connected ('central') concepts include the 'supra-municipal' nature of the project, meaning that it is outside the jurisdiction of the municipalities and wouldn't pay local taxes; and that local participation is perceived as insufficient and late, leading to concerns.

<Figure 2 Non-local stakeholders' view on the role of compensation>

<Figure 3.Local campaigners' view of regional wind energy planning>

Table 1 Consequences (causality) map for local stakeholders

Note: This is output from Decision Explorer cognitive mapping software; the numbers indicate the extremity of the concept in terms of position in the causal chain. A lower value indicates a more central concept, from which other concepts follow. A higher number indicates that a concept is less central and is rather an increasingly indirect consequence of previous concepts. Each chain of conceptual causality is listed separately in relation to the wind farm proposal, each one beginning with the *wind farm proposal* in bold, with +1 indicating that this is the conceptual start point. The consequences are listed in two columns to condense the information. The connectivity is highest at the top left, proceeds in ranked order down the first column and then down the second column.

+1 Wind farm proposal		**+1 Wind farm proposal**
may lead to		may lead to
+47 Supra-municipal project		+10 Impact on feedstock farming
which can lead to		which can lead to
+49 Doesn't pay local taxes		+7 Environmental impact
which can lead to		
+11 Private benefits from public land		**+1 Wind farm proposal**
which can lead to		may lead to
+16 Deficient wind energy planning		+9 New accesses and roads
		which can lead to
+1 Wind farm proposal		+7 Environmental impact

may lead to		
+36 Insufficient and late public participation		**+1 Wind farm proposal**
which can lead to		may lead to
+42 Public concerns		+6 Visual impact
		which can lead to
+1 Wind farm proposal		+7 Environmental impact
may lead to		
+25 Impact on habitat and flora		**+1 Wind farm proposal**
which can lead to		may lead to
+7 Environmental impact		+2 Noise
		which can lead to
+1 Wind farm proposal		+8 Health impact on neighbours
may lead to		which can lead to
+23 Impact on archaeological sites		+18 Rejection of wind farm
which can lead to		
-20 ... [not] Sustainable communal management of the O Morrazo mountains		**+1 Wind farm proposal**
		may lead to
+1 Wind farm proposal		+3 Electromagnetic radiations
may lead to		which can lead to

+22 Impact on recreational activities		+8 Health impact on neighbours
which can lead to		which can lead to
-20 ... [not] Sustainable communal management of the O Morrazo mountains		+18 Rejection of wind farm
+1 Wind farm proposal		**+1 Wind farm proposal**
may lead to		may lead to
+21 This is not the adequate location		+4 Pollution on water sources and land
+1 Wind farm proposal		**+1 Wind farm proposal**
may lead to		may lead to
+11 Private benefits from public land		+5 Land movements
which can lead to		which can lead to
+16 Deficient wind energy planning		+7 Environmental impact

145

146

147

148 **Table 2 Consequences (causality) map for non-local stakeholders**

+1 Wind farm proposal		**+1 Wind farm proposal**
may lead to		may lead to
+43 Pedras Negras adds to a large number of existing wind farms		+37 Public participation
which can lead to		which can lead to
+44 Repowering existing wind farms		+38 Decentralised decision-making process
which can lead to		
+53 A regulatory framework is needed		+1 Wind farm proposal
which can lead to		may lead to
+51 Difficult to put into practice		+13 Benefits
which can lead to		
+52 Not viable in many cases		+1 Wind farm proposal
		may lead to
+1 Wind farm proposal		+9 Neutral impacts
may lead to		
+37 Public participation		**+1 Wind farm proposal**
which can lead to		may lead to

+38 Decentralised decision-making process		+2 Negative impacts	

Note: As Table 1, this is output from Decision Explorer cognitive mapping software; the numbers indicate the extremity of the concept in terms of position in the causal chain. A lower value indicates a more central concept, from which other concepts follow. A higher number indicates that a concept is less central and is rather an increasingly indirect consequence of previous concepts. Each chain of conceptual causality is listed separately in relation to the wind farm proposal, each one beginning with the *wind farm proposal* in bold, with +1 indicating that this is the conceptual start point. The consequences are listed in two columns to condense the information. The connectivity is highest at the top left, proceeds in ranked order down the first column and then down the second column.

Differences in the level of knowledge, expertise and engagement in the wind farm controversy play a determining role in the complexity of the maps. While some stakeholders, such as the representative of Luita Verde (one of the most active campaigners) and the representatives of the regional government and the EEA provided more than 40 concepts each, the maps of other actors, such as the local mayors, hardly exceeded 20 concepts.

A comparative examination of the three maps provides a general understanding of how the different actors view and interpret the wind energy conflict (Figures 2-3 and Table 1). Local stakeholder representatives focused primarily on the negative impacts of the wind farm, i.e. health, human and environmental impacts <appended Figure A1>. Communal land organisations occupy a central role in the local stakeholders' representatives' map because the project proposal is considered to be at odds with communal land management principles and practice. Concerns about local participation and the wind energy planning in Galicia are also important factors, whilst compensation occupies a peripheral position, thus denoting a lack of consideration towards it.

Although local campaigners also attached high weight to the environmental and human related impacts, they were more concerned than local stakeholder representatives about the energy planning and the socio-economic issues, including public participation and the distributive fairness of the project <Appended FigureA2>. In the local campaigners' map, communal land management does not occupy a central position. On the contrary, communal land organisations are widely criticised for their particular vested interests.

Conversely, non-local stakeholders primarily emphasise the positive aspects of the wind farm proposal, which thus occupy the main part of the map. The negative impacts tend to be either minimised or regarded as neutral by those actors. For instance, they do not recognise the environmental impact of the development over the area (pollution, impact on flora and fauna), whereas they hold a positive view towards the landscape impact of the wind farm. Hence far from spoiling the landscape, wind turbines are perceived to enhance the visual or aesthetic value of the area. According to the representative of the Wind Energy Association, people living near previous wind farm sites in Spain had positively valued the aesthetics of the wind turbines. This may be the case in the rural and relatively impoverished areas of the interior, where wind farms have been seen as a sign of progress and development, unlike in the Morrazo area. Moreover, compensation is integrated within the cognitive map of these stakeholders and is seen as the rational way to bargain over the impacts and to reward landowners and the host community. Participatory wind energy schemes are viewed as an alternative to the project proposal, but enhanced public participation as part of that proposal was not viewed as an option. Indeed the topic of public participation was not raised by non-local stakeholders without prompting <Appended Figure A3>.

5. Discussion

There are a number of key concepts highlighted by stakeholders and reflected differently in the different composite cognitive maps. These are elaborated below.

202

203 **5.1 Distributive justice**

204 Local actors placed a high value on procedural and distributive justice, reaffirming the thesis
205 that perceptions of fairness are just as important, if not more so, than proximity per se
206 [38][39]. The developer (an Italian company) is regarded as a foreign interloper seeking to
207 exploit the public land of the Morrazo mountains for its own benefit, while local communities
208 must bear the environmental damage and the disturbance. Moreover campaigners vigorously
209 criticized the absence of public participation in the decision-making process and the wind
210 farms' status of 'public utilities'[8], considering those features as deeply unfair for the local
211 community. Indeed in the associated cognitive maps, the regional model of wind energy
212 planning is closely related to the perceived unfairness of the current proposal (Appended
213 Figures A1, A2 and A3), since this allegedly favours private corporate interests, leaving no
214 room for public participation and local involvement.

215

216 The results further suggest that the perceived unfairness of the wind energy policy reinforces
217 and builds on a firmly rooted mistrust towards the developer and the regional government,
218 confirming that trust is an essential element in the shaping of the public acceptance of wind
219 energy siting [40][41][42]. As Zografos and Martínez-Alier [42] argue, procedural and
220 distributive unfairness may be reinforced by the existence of a perceived 'centre' versus
221 'periphery' imbalance in the wind energy planning and siting. Objectors compared the role of
222 Galicia with other Spanish regions, particularly Madrid, since the first is a net exporter of
223 electricity and the latter is a large consumer of energy resources with little to no installed
224 wind capacity. One campaigner also highlighted the imbalance in the level of natural

[8] The 'public utility' status enables the expropriation of comunal lands by virtue of the regional law 8/2009.

protection in both regions (nearly 40% of Madrid's territory is protected under EU law, whilst Galicia has less than 12%)[9]. In the most extreme case, one of the activists stated that the wind energy model in Galicia "resembles that of colonial powers", thus emphasising the unequal relation of power between the parties involved and the specific role of the Morrazo as a marginalised and peripheral area subject to external rule.

Conversely, non-local actors did not question the planning and siting procedures. Both participants stressed the adequacy of the actual decision-making process to take full account of the local concerns, taking the view that it provides sufficient information to the local councils and enables individuals and organisations to submit legal objections and/or recommendations to the regional government. While they took the view that the role of the developer is critical in terms of promoting a greater understanding of wind energy and of the proposal among the host communities, this is principally conceived of as a one-way relationship.

5.2 Cumulative impacts

One of the distinctive elements of the Pedras Negras conflict is the perception that the project adds to the impacts associated with neighbouring development projects (motorway construction and enlargement, industrial sites, quarry project proposal) and previous environmental disasters (oil spill, fires in the Morrazo area). Hence local campaigners do not perceive the impacts of the future wind farm in isolation, but as one threat among others in

[9]This fact is not trivial for local campaigners, who seek to achieve a higher level of legal protection for the Morrazo mountains.

the Morrazo peninsula. This perception and fear of cumulative impacts has been highly significant in many wind farm controversies [43][44].

The cumulative impacts of the wind energy sector as a whole in Galicia are also highlighted by campaigners and representatives of communal land organisations as a major cause of opposition[10]. The perception is that Galicia bears an excessive level of wind energy production and associated environmental damage. Additionally, there are concerns as to the fate of the electricity produced - the electric power is partly exported to other Spanish regions - and about the inefficiency of the current electricity grid management, as wind power production is occasionally interrupted. These concerns are coupled to the observation of a continuing use of non-renewable energy sources, i.e. the renewable resource is supplementing rather than substituting for fossil fuel use. Accordingly, the representative of the Xunta land owners was of the view that a repowering option, rather than additional turbine installations, would the best strategy going forward.

5.3 Compensation and values

Local actors rejected the adequacy of both cash payments and the provision of public goods as compensation for the perceived environmental and social impacts. Somewhat paradoxically, money was considered to be the wrong form of compensation, whereas in-kind compensation was seen as unable to provide the level and types of investment that the community needed. Some explicitly viewed non-monetary compensation as no less an attempt at bribery than monetary compensation. The concerns raised by local actors about

[10]It should be noted here that the relatively unpopulated Galicia at the time of writing has an installed wind power capacity of 1.2 kW/capita, compared to Denmark's 0.8 kW/per capita.

monetary compensation rather support critique of the neoclassical economic assumption that environmental, social and moral values can be made comparable and commensurable by monetary means [45]. Members of the municipality of Moaña emphasised that the need to preserve the land for the next generations is directly at odds with the principle of monetary compensation. Stakeholders from Vilaboa underlined the priority of public health over any other value and the impossibility of trading off human health and money.

Although local campaigners were particularly averse to compensation for proposed wind development projects, some argued that if compensatory measures were used, they should focus on communities who already 'suffer the burdens' of existing wind farms. Hence local stakeholders opposed compensation connected to project proposals, accepting it only for existing projects. This corresponds with the observation of Cowell et al [4] regarding the co-existence of two ostensibly contradictory positions held by objectors and which can be distinguished in terms of *ex-ante* 'acceptability' and *ex-post* 'acceptance' of the project. Indeed the wind farm proposal has the characteristics of a 'liability rule', whereby the local community has no scope to control the development process and to negotiate the community benefits *ex-ante*, unlike in communities governed by a 'property rule' [4]. In the context of liability rules, argue Cowell et al [4], the promise of compensation does not increase the *ex-ante* acceptability of the project, as this is not seen as adequate to fully compensate the irreplaceable value of what is lost.

On the other hand, non-local actors expressed strong support for the current forms of host community compensation (Figure 2). The representative of the Xunta argued that monetary compensation is fully appropriate as a reward for landowners, since this is the best way to

compensate the loss of value of the land (here, the value of the land is essentially seen as property value). In-kind compensation was perceived to be more suitable for offsetting impacts experienced by the whole community. This view is to some extent shared by the representative of the AEE, for whom monetary compensation is not even considered as 'compensation' in itself, but rather as a mere commercial transaction between the developer and the landowners. For this stakeholder, the land is traded as any other commodity, so that the market value of the land is the only factor to be taken into account. Similarly, non-monetary compensation was viewed as fully adequate to compensate the host community. Again, this was not regarded as 'in-kind compensation' per se, but rather as the usual kind of investment that is carried out by local councils with the revenues accrued from local taxes. Here, non-local actors confirm the hypothesis that 'public' harms are easily compensated by 'public' investments, rather than cash payments [12]. Yet the detachment of those actors from the specific location may help explain the lack of concern towards the non-use values of the Morrazo area and the current support of monetary compensation.

In sum, local actors thought about the main issues at stake as in the realm of the political deliberation, rather in the domain of economic valuation [46]. The procedural and distributive justice issues, the intrinsic natural values attributed to the area and the health threats perceived by the community were conceptualised in terms of values that hardly permit of monetary bargaining. In contrast, non-local actors considered that monetary valuation is perfectly compatible with some of the values at stake. These conflicting views demonstrate the existence of different valuation languages, justifying the need to develop conceptual and methodological approaches that take full account of the pluralism of values present in this kind of environmental conflict [45].

317

318 **5.4 Community-owned wind energy schemes**

319 Unlike monetary and in-kind compensation, the prospect of more community-focused wind
320 energy projects (co-operatives and projects fully or partly owned by local councils) was widely
321 accepted by participants. These attitudes confirm to some extent the evidence drawn from
322 previous studies on the public perception of community-owned schemes [19][20]. Most of the
323 opponents considered such schemes as a potential solution to the lack of local involvement,
324 rather than a way to compensate the community for environmental damage or disturbance.
325 Nevertheless, for the local campaigners, participatory schemes are only acceptable insofar as
326 they are limited to small-scale projects aiming to cover the local consumption of electricity.

327

328 Non-local actors also had positive attitudes towards other forms of ownership in the wind
329 energy business. However they were more sceptical about the eventual success of those
330 projects. The economy of scale that is needed to develop a wind farm in a cost-effective way
331 and the difficulty of feeding the excess of electricity generated into the grid, along with the
332 inherent complexity of the power plant management, were viewed as the main barriers to the
333 success of self-consumption and community-owned schemes. The disadvantages identified
334 correspond with those outlined by Warren and McFayden [19] and the supplementary
335 difficulty of electricity grid access has been frequently identified as a barrier to the
336 development of small schemes in, for example, the UK [47].

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5.5 Methodological commentary

The literature on energy siting controversies is largely based on qualitative and quantitative case study work, framed in terms of various theories and undertaken according to the norms of differing research philosophies. It needs to be asked what additionality cognitive mapping brings to existing approaches. We see this as consisting of several, mutually reinforcing contributions. Firstly, the explicit articulation of individuals' reasoning and the presentation of this to the same people, particularly in a group context, does facilitate reflection and discussion. Group feedback can of course be undertaken without cognitive mapping, but the graphical representation of reasoning, positions and beliefs does support debate and reflection. It also enables differences to be observed and discussed in terms that are one step removed from the principles themselves. For this discursive purpose, cognitive maps as visual representations are also relatively intuitive and easy to interpret. Similarly, in the simpler analytic versions, the concepts of centrality and connectedness are relatively easy to grasp – cognitive mapping is well suited to giving the type of output shown in Tables 1 and 2 and is also capable of considerably more sophistication. Cognitive maps also enable the summary of multifaceted issues in a concise structure with relatively minimal overlay of a priori theoretical constructs. Rather the constructs come from the individuals, albeit to some extent assisted (in this case at least) by initial scoping of issues salient in the controversy. With this method, the researcher's role is to prompt, elicit and document participants' ideas, rather than to test or reveal according to a pre-existing theoretical frame or hypotheses.

Overall, the lack of an a priori theoretical frame makes cognitive mapping particularly suited to exploratory work. Cognitive mapping does also have some similarities with other methods of analysis: while not using the scales of attitudinal surveys, it does permit aggregation of individual responses and it does provide qualitative thematic detail, similar to semi-structured

interviews. Moreover, while the ability to show a pattern of ordered conceptual connections is in one sense unique, ranking of the significance of issues can and often is achieved in surveys. The difference is that such ranking is usually interpreted in relation to attitudes rather than cognition in the sense of knowledge and understanding. This said, in showing individuals' prioritisation of issues cognitive maps reflect not just knowledge and understanding, but also attitudes. Their representation is in terms that emphasise conceptual linkages, but value weightings are nonetheless involved.

6. Conclusions

Cognitive mapping is able to provide succinct, condensed and comparable representations of the structure of stakeholder thinking in an energy siting controversy, in this case the Pedras Negras wind power proposal in Galicia, Spain. While many of the objections raised by the local stakeholders in this case are typical of objections elsewhere in Europe, some are quite particular to Spain, notably a land use planning system that readily permits compulsory purchase of land in this context and others. A perception of forced land appropriation has led to further perceptions of procedural and distributive unfairness, which interact with a strong sense of regional cultural identity and place attachment. In contrast, non-local stakeholders gave little weight to the consequences that local stakeholders considered negative, whilst highlighting perceived positive outcomes anticipated at local, regional and national levels.

For most local stakeholders, neither monetary nor in-kind compensation would make the project acceptable, whereas for non-local stakeholders, compensation would be acceptable and of the same order as a market trade. The causality chains evident in the cognitive maps make the contrasting lines of reasoning clear and allow these to be presented to interviewees

389 for discussion and debate. Overall, we would suggest that even simple forms of cognitive
390 mapping can perform well not only as an exploratory method, clarifying and revealing key
391 aspects of a controversy, but also providing detailed information of value in its own right.

392 **Funding**
393 There was no external source of funding for this work.
394
395 **Acknowledgements**
396 The authors would like to thank all those who agreed to take part in developing the cognitive
397 maps. The representations and interpretations, however, are the authors' own.
398
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