Energy Policy 121 (2018) 314–324

Contents lists available at ScienceDirect

Energy Policy

journal homepage: www.elsevier.com/locate/enpol

Wind energy and local communities: A manufacturer's efforts to gain acceptance

Beñat Landeta-Manzano[a,*], Germán Arana-Landín[b], Pilar M. Calvo[b], Iñaki Heras-Saizarbitoria[c]

[a] Faculty of Engineering, Bilbao, University of the Basque Country (UPV/EHU), Plaza Ingeniero Torres Quevedo, 1 48013, Bilbao, Spain
[b] Faculty of Engineering, Gipuzkoa, University of the Basque Country (UPV/EHU), Plaza Europa 1 20018, San Sebastian, Spain
[c] Faculty of Economics and Business, Gipuzkoa, University of the Basque Country (UPV/EHU), Plaza Oñati 1 20018, San Sebastian, Spain

ARTICLE INFO

Keywords:
Wind energy
Renewable energy
Social acceptance
Community acceptance
Original Equipment Manufacturer
Case study

ABSTRACT

Community opposition is one of the key obstacles to the expansion of wind turbine developments. The scholarly literature has focused on public opinion on wind farms (WFs) and the level of community acceptance. The efforts of Original Equipment Manufacturers (OEMs), to gain community acceptance has been under-researched. To fill this gap, the present study analyzes the evolution of interventions by a leading OEM to secure the acceptance of local communities for wind energy projects and the outcomes of those efforts. The fieldwork consisted of a longitudinal case study carried out from 2014 to 2017 by a leading international OEM. In depth personal interviews were also conducted with six experts in the field. The main efforts of the OEM focused on the visual impact of the developments, health and safety issues, community involvement and social investment in the community. In selecting the location for developing a WF, economic criteria usually prevail over social criteria. Although the company makes social investments in the community, different groups point out that those local communities should be taken more seriously, as they can serve as facilitators in the development of projects. Implications for stakeholders such as developers and policy makers are discussed.

1. Introduction

Over the last decade, wind energy has spread more rapidly and become more competitive than other energy sources (IEA, 2016). Table 1 shows that the installed wind power capacity worldwide has grown steadily, and at the end of 2015 it was more than 337 GW (GWEC, 2016). National policies to promote renewable energy have influenced the dissemination of wind power (Schaffer and Bernauer, 2014). As shown in Table 1, the use of wind energy has increased sharply in Spain in the last decade. This success was built on public funding incentives; the end of this financial support in 2011 had a negative impact on new wind energy projects in Spain (Ruiz-Arias et al., 2012; Alonso et al., 2016).

Since each Renewable Energy Sources (RES) is different, the social and environmental impact of each technology also varies (Batel et al., 2013; Heras–Saizarbitoria, 2013). The location of the project depends, to a great extent, on the perceived impact of the RES health and safety, the environment, the economy, the well-being of the community and the sense of place (Zoellner et al., 2008; Stigka et al., 2014; Cohen et al., 2014; Friedl and Reichl, 2016). It has been shown that the level of social acceptance can depend on factors associated with the decision-making process (Petrova, 2016).

Social acceptance is increasingly important in the development of new wind projects (Kardooni et al., 2016). The concept of social acceptance is defined along three dimensions: socio-political acceptance, market acceptance, and community acceptance. Socio-political acceptance refers to social acceptance in the broadest sense of the term. Market acceptance is related to the adoption of an innovation by the market, and is defined by consumers, investors and intra-firms (Delicado et al., 2014). For these groups, economic aspects are the most important factors (Kardooni et al., 2016). Community acceptance refers to the acceptance of renewable energy projects, and their locations, by local stakeholders, including local residents and local authorities (Wüstenhagen et al., 2007).

Several studies have noted the importance social barriers in determining the potential of wind projects (Gass et al., 2013; McKenna et al., 2014). However, these studies focused mainly on socio-political acceptance, and have ignored the opinions and preferences of decision makers and key stakeholders from the community (Holtinger et al., 2016). Community opposition to infrastructure development has frequently been characterized as Not-In-My-Back-Yard (NIMBY) (Lenoir-Improta et al., 2017; Petrova, 2016). Even if residents agree with wind

* Corresponding author.
E-mail addresses: benat.landeta@ehu.eus (B. Landeta-Manzano), g.arana@ehu.eus (G. Arana-Landín), pilarmaria.calvo@ehu.eus (P.M. Calvo), inaki.heras@ehu.eus (I. Heras-Saizarbitoria).

https://doi.org/10.1016/j.enpol.2018.05.034

Table 1
Installed wind energy capacity in MW by countries in the period 2006–2016.
Source: Compiled by the authors based on data obtained from GWEC (2017).

	2016		2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	
PR China	168,732	34.7%	145,104	114,604	91,412	75,324	62,384	44,733	25,805	12,210	5906	2604	3.5%
USA	82,184	16.9%	74,471	65,877	61,110	60,007	46,929	40,180	35,086	25,170	16,818	11,603	15.6%
Germany	50,018	10.3%	44,947	39,128	34,250	31,270	29,071	27,214	25,777	23,903	22,247	20,622	27.8%
India	28,700	5.9%	25,088	22,465	20,150	18,421	16,084	13,065	10,925	9645	7845	6270	8.4%
Spain	23,074	4.7%	23,025	23,025	22,959	22,784	21,674	20,676	19,160	16,754	15,145	11,615	15.6%
UK	14,543	3.0%	13,603	12,633	10,711	8649	6556	5204	4245	3241	2389	1963	2.6%
Rest World	119,539	24.6%	11,200	9694	7823	6204	5265	4009	3319	29,875	23,544	19,546	26.3%
Total	**486,790**	**100%**	**337,438**	**287,426**	**248,415**	**222,659**	**187,963**	**155,081**	**124,317**	**120,798**	**93,894**	**74,223**	**100%**

power, they may still oppose installations close to them (Guo et al., 2015). However, Fokaides et al. (2014) found this is not always the case and this issue is more complex than it is usually depicted. Critical aspects influencing the level of community acceptance are the visual impact, health and safety, social investment in the community, and community participation (Taylor et al., 2015; Enevoldsen and Sovacool, 2016). These aspects have to be managed with procedural justice, distributional justice and trust in the contractors, so that projects are accepted by local communities (Eswarlal et al., 2014; Enevoldsen and Sovacool, 2016). Procedural justice is related with the processes by which decisions are taken in pursuit of other societal goals, including other types of justice (Manaster, 1995, p. 23). Important elements in procedural justice include rights of participation, access to information, and lack of bias on the part of the decision-maker (Gross, 2007). Distributive justice focuses on the equitable distribution of outcomes (Wüstenhagen et al., 2007). Trust is concerned with the perception of the local communities about the veracity of the information and the intentions of the investors and managers. The company must ensure honesty and transparency during its engagement activities to help build and maintain trust (Huijts et al., 2007; Wüstenhagen et al., 2007; Hall et al., 2013).

The way that developers and the original equipment manufacturers (OEMs) have addressed the issue of community acceptance in their day-to-day operations has been under-researched. There is a gap in theoretical and practical knowledge about this issue. The present study examines the actions taken by an OEM, a leading international wind energy company, in order to gain the community acceptance of its renewable energy projects. The present article draws on an in-depth case-study conducted over a period of more than three years, to examine the actions of an OEM, and to assess the outcomes of those actions.

The rest of the article is organized as follows. After this introduction, the literature review is analyzed. The research methodology is presented in Section Three, the results are described in Section Four, and the discussions and conclusions are summarized in Section Five.

2. Literature review

Wind power has many potential socioeconomic benefits and is one of the preferred renewable energy sources for planners and national governments. It helps to diversify energy supply, but also helps to reduce CO_2 emissions, increases regional and rural development opportunities, and creates domestic industrial and employment opportunities (Akella et al., 2009; Panwar et al., 2011; Dai et al., 2015). Local communities also benefit from having wind power developments in their locality through ownership, participation and economic incentives (Aitken, 2010a), which further boosts wind energy developments (Saidur et al., 2011).

Nevertheless, the literature related to public attitudes and responses to wind power developments suggests that to ensure acceptance, or at least to avoid opposition to wind power projects, a set of challenges have to be considered. Potential developers must earn public trust (Aitken, 2010a) and create a sense of fairness around the proposed development (Wolsink, 2007; Wüstenhagen et al., 2007; Toke et al., 2008; Van der Horst and Toke, 2010). People's attitudes towards wind energy do not usually have a single cause; the components of an attitude interact and influence each other to varying degrees (Waldo, 2012).

In the last ten years, some of the main factors that reduce community acceptance of wind farms (WFs) have been thoroughly researched (e.g. Gross, 2007; Jobert et al., 2007; Dimitropoulos and Kontoleon, 2009; Evans et al., 2011; Firestone et al., 2012; Hall et al., 2013; Kontogianni et al., 2014; Wilson and Dyke, 2016). Ladenburg and Dubgaard (2007), Wolsink (2007), Toke et al. (2008), and Pasqualetti (2011) suggest that the main reason why WFs are opposed is the growing concern about landscape intrusion. 'NIMBYism' does not sufficiently explain the oppositional attitudes of local communities (Swofford and Slattery, 2010), and measuring the so-called 'NIMBY effect' has been shown to be very problematic (Warren et al., 2010; Cohen et al., 2014). Devine-Wright (2009, 2014) is one of the few authors who has proposed an alternative, describing NIMBY responses as 'place-protective actions'. Kontogianni et al. (2014) state that NIMBY does not appear to be directly related to the negative aesthetic impact of WFs. Moreover, they believe that noise may be a more decisive factor. They also propose using the term 'NIMBY syndrome' to describe people who approve of constructing new WFs away from their residences but within their area, so that they can take part in public deliberations and establish effective location planning procedures. Emotional dependence on places is essential, and any alteration can affect an individual's attitude and behavior. This seems to be particularly relevant for wind energy landscapes, which involve an especially visible energy source. For these reasons, Cohen et al. (2014) explain that the site is the most important issue to be faced by developers who are trying to mitigate local opposition to a WF.

Some of the main negative consequences of WFs noticed by communities are related to the location, especially, the visual impact on landscapes, and health and safety (Van der Horst, 2007). With regard to health and safety, the effects of noise and non-ionising radiation are highlighted (Hübner and Pohl, 2017).

The visual impact of WFs is an obvious negative effect of wind turbines (WTs) because of their obtrusive nature. Ladenburg and Dubgaard (2007) found that residents would even pay to diminish their view of WFs. Strazzera et al. (2012) concluded that visual impact had a stronger effect on local perception than other concerns.

Perceived health risk has been linked to the level of community support for WTs, even when controlling other variables such as visual aesthetic concerns (Cohen et al., 2014). The impact on health risk may follow several causal pathways (Baxter et al., 2013). Firstly, there are usually complaints about the noise generated by WFs. In fact, wherever there are WTs, there have been protests against noise (Haggett, 2012). While other issues, such as visual impact, often have subjective and interpretive quality, noise can be objectively measured, and it can be calculated whether it reaches a certain level or not (Pedersen and Waye, 2007). Knopper et al. (2014) studied changes in the environment that are associated with reported health effects, and not only turbine-