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The Acceptability of Wind Farms: The Impact of Public Participation

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Abstract

The planning process for wind farm projects appears to be a complicated matter in many cases. Despite the positive attitude towards wind power in general, local wind farm projects often face strong opposition. The aim of this study is to shed more light on residents' perceptions of participation in the planning process of wind farms.

This study is based on interview data (N = 22) and survey data (N = 291) collected from residents living near two Finnish large-scale onshore wind farms built about 1.5 years before the data was collected. The results indicate that residents' participation in the planning process was rather passive and the vast majority of the respondents perceived that they did not have an opportunity to participate. Quite interestingly, perceived participation in the planning process resulted in a decrease in acceptability in terms of perceived well-being. Furthermore, the results indicate that the need for participation does not expire after the planning process for a wind farm has concluded. Thus, project developers should be prepared to continue communication with residents after the planning phase.

1. Introduction

The Fifth Assessment Report of the Intergovernmental Panel on Climate Change asserted that the largest contributor to global greenhouse gas emissions is the energy supply sector (Bruckner et al., 2014). The relation between wind power and mitigation of climate change is obvious. Wind power as an alternative energy source can reduce greenhouse gas emissions. Thus, it is no wonder that, during the last few years, wind has been an increasing source of renewable energy in the European Union (EU). In 2015, wind accounted for 44.2% of all power capacity installations; hence, it is the leading form of all power installations (World Wind Energy Association, 2014).

The concepts of acceptance and acceptability are used when discussing wind power development wherein planning proposals are presented from the top – meaning from companies and authorities – down to people and communities.[1] However, focusing on social acceptance maintains a top-down perspective on the wind power planning process which easily simplifies the expected reactions to wind energy proposals into two categories: objection and support. This obviously means there is a risk of losing sight of other important individual or community responses like uncertainty, resistance or apathy (Batel, Devine-Wright, & Tangeland, 2013).

The general acceptability of wind power is very high, according to many surveys and public polls. For example, the Special Eurobarometer 2014 showed that European citizens would prefer national targets to increase renewable energy consumption by 2030 (European Commission, Directorate-General for Climate Action, 2014). In Finland, 74% of citizens perceive that the use of wind power in electricity production should be increased (Energiateollisuus ry, 2015). However, in addition to general acceptability, wind power projects are also influenced by local acceptability. According to Wolsink (2013), attitude objects that gain general acceptability and local acceptability are completely different and evaluated with different attributes. For example, when the attitude object is wind power (in general), one of the most obvious perceived attributes for this object is when wind power is perceived to mitigate climate change. When the attitude object is a particular wind farm, many of the attributes being evaluated are related to personally perceived effects, such as visual impact on the landscape (Wolsink, 2013). Thus, when local project plans are published, different kinds of fears and worries may emerge amongst members of the public. People may be concerned because of perceived local or personal impacts. The concept of a *social gap* is used in conflict situations where opinion polls show the high general acceptability of wind power but local developments meet resistance (Bell, Gray, & Haggett, 2005; Bell, Gray, Haggett, & Swaffield, 2013). According to Bell et al. (2005), this attitude–behavioural gap has been explained by a demographic deficit if most locals accept the project but minority opposition leads to cancellation or delay of the project. The other explanation is that the proponents are qualified supporters. Nimbyism (the word is derived from the acronym NIMBY [not in my backyard]) is the third reason for a social gap, and here it means support for wind power in general but not when in people's own backyards (Bell et al., 2005). Bell et al. (2013) later expanded the framework with findings about heterogeneous types of attitudes that influence the social gap. One explanation for the social gap is that it is a consequence of the power of local people: opponents may be in the minority, but they can block the planning process for a wind power project (Bell et al., 2013).

[1] In this paper, we follow Huijts, Molin, and Steg (2012) and define *acceptability of wind power* as public attitudes towards wind power and *acceptance* as behavioural intention.

In this paper, we define *participation* as the contribution by groups or individuals to the decision-making process (see also Jami & Walsh, 2014). The concept of participation is seen as representing a hierarchy of ways in which citizen power might be manifested following Arnstein's (1969) ubiquitous ladder of public participation (see also Aitken, Haggett, & Rudolph, 2016) where the bottom rungs represent non-participation. The middle rungs mean *tokenism* where the public is informed and consulted. The upper rungs are called *empowerment*, indicating power redistribution from power holders to the public (Arnstein, 1969; Aitken et al., 2016; Jami & Walsh, 2014).

The growing body of participatory research in the context of wind power has covered practices related to community engagement (Toke, Breukers, & Wolsink, 2008), planning processes (Cowell, 2010; Wolsink, 2010), information and participation (Jobert, Laborgne, & Mimler, 2007; McLaren Loring, 2007), questions of ownership (Warren & McFadyen, 2010) and fairness (Gross, 2007; Möller, 2010; Van der Horst & Toke, 2010). Many studies have observed the power of communities; for example, members of the public may block or delay developments with their actions (Aitken, 2010, Bell et al., 2013; Eltham, Harrison, & Allen, 2008; Jones & Eiser, 2009; Waldo, 2012). However, the point when passivity turns to activity regarding wind power project differs between people (Waldo, 2012).

This study aims to examine the perceptions of the level of participation in the local wind farm planning process. Additionally, we will analyse the factors affecting the acceptability of the operating wind farm to answer the question: Does perceived participation also predict local wind farm acceptability? The study period occurred about six years after the decision-making, when the wind turbines had been in the operational phase about 1.5 years.

The present study uses data from semi-structured interviews (N = 22) as the main method and a survey (N = 291) as an additional method to study the perceptions of participation and their effects on acceptability. During the interviews, we were especially interested in the perceived level of participation of community members in the participation process. The qualitative interview material was analysed using the International Association of Public Participation's "IAP2 spectrum of public participation", which was developed based on Arnstein's (1969) ladder of participation. The local acceptability of operating wind farms was measured quantitatively as the perceived impacts of wind turbines on the landscape and well-being.

The remainder of the paper is organised as follows. The next section reviews previous research on public participation during the wind farm planning process and the acceptability of wind power in terms of the

landscape and human well-being. Section 3 describes the research design and the context of the study in detail. The results are presented and discussed in Section 4, and Section 5 concludes the paper.

2. Public participation in wind power projects

2.1. The spectrum of public participation

Almost all papers concerning the wind power planning process have recommended a high level of public participation (Coleby, Miller, & Aspinall, 2009; Devine-Wright, 2011; Devlin, 2005; Swofford & Slattery, 2010; Wolsink, 2007; Wright, 2012). Better public engagement can result in better decisions and greater legitimacy and trust, which may then have positive effects on a wind power project's acceptance. Perceptions of procedural fairness (e.g. being heard, receiving adequate information, being treated with respect and perceiving unbiased decision-making) may affect outcome fairness (e.g. the development of the wind farm) and vice versa (Gross, 2007). In other words, increasing participation and procedural fairness might increase the local acceptability of the outcome or a sense of outcome fairness (Aitken, 2010). Neglecting local interests may turn conditional wind farm supporters into objectors (Wolsink, 2007). Community members desire public participation (Coleby et al., 2009) but also the continuity of involvement for there to be policy responsiveness and accountability (Hindmarsh & Matthews, 2008).

However, despite the many reported advantages of public participation, there may be disadvantages. Participation processes are time-consuming and hence expensive. If the process is conducted negligently, the result could be a loss of credibility or low-quality decisions that contribute to increased costs during the implementation phase (Jami & Walsh, 2014). Also, participation as a negative experience may influence attitudes about wind power or future participation negatively (Jami & Walsh, 2014). It also seems that non-participation is a risk for future wind energy developments. If residents perceive opportunities to express their opinions during the participation process and the developer responds to their requests, then the acceptability rate is likely to be high. Negative perceptions of those two points of participation result in a decrease in acceptability and an increased likelihood of a negative attitude towards the new project (Motosu & Maruyama, 2016). Despite the attempt to adopt the current best practices, a conflict may develop in the community (Colvin, Witt, & Lacey, 2016). The drivers of the conflict are diverse, such as unsuccessful early-stage engagement, the lack of a neutral facilitator, or absence of space for local opposition in the formal process. In addition, a vote of support for a wind farm proposal may polarize the community (Colvin et al., 2016). An unsuccessful participation process causes long-lasting harm and prevents the wind power operator from achieving a social licence to operate

(Langbroek & Vanclay, 2012). While diverse interests should be taken seriously, it takes time and energy to consider them, giving rise to the possibility of political conflicts. Participants' limited capacities to fulfill the requirements for participation process may cause problems (Alberts, 2007; MacArthur, 2015). This leads to the conclusion that meaningful discourse can reasonably occur only among technical experts and there is no value in building consensus amongst all stakeholders (Alberts, 2007).

One of the most commonly used typologies to examine or further develop the process of community participation is Arnstein's (1969) ladder of participation (Hurlbert & Gupta, 2015; Shier, 2001; Tritter & McCallum, 2006). Arnstein arranged her model in a ladder pattern where each rung represents progressive levels of citizen participation. Based on Arnstein's ladder of participation, the IAP2 developed a spectrum which demonstrates the hierarchical process in which social power is redistributed from project developers to the public (see Figure 1). Next, the results from studies concerning public participation in wind power are discussed following the IAP2 spectrum of public participation.

****Insert Figure 1 about here****

2.2. Lower rungs, tokenism

Informing citizens about their rights, responsibilities and options is the most important step towards conducting participation legitimately (Arnstein, 1969). In the context of wind power, researchers have highlighted the role of knowledge as an important factor for improving social acceptability: information, dialogue and the opportunity to participate are essential (Krohn & Damborg, 1999; Swofford & Slattery, 2010). Increasing the environmental literacy of a population near wind turbines influences supportive and opposing attitudes towards planned or constructed wind farms (Swofford & Slattery, 2010). Researchers have highlighted the need for educational programmes near areas of planned projects (Dimitropoulos & Kontoleon, 2009; Wolsink, 2000). The aim of these programmes is to inform residents about a planned or proposed project and about renewable technologies, climate change and energy policy (Swofford & Slattery, 2010). As Swofford and Slattery (2010, p. 2517) put it:

"Without it [education], the full advantages and disadvantages of a renewable technology (in this case wind energy) are not communicated entirely. Wind energy must be shown to be more than a financial investment; it is

at the forefront of environmentally benign sources of electricity production and a new form of carbon mitigation."

A successful consultation process includes a promise by the company to abide by all laws, the use of multiple information sessions, and the use of public meetings and online forums for feedback collection (Corscadden, Wile, & Yiridoe, 2012). A high level of consultation and early communication with communities will secure the possibility of social acceptability and reduce conflicts (Corscadden et al., 2012). It should also be borne in mind that the complex nature of participatory engagement starts from the renewable energy policy-making level where practices have been closed and historically dominated by industrial interests (Agterbosch, Mertens, & Vermeulen, 2009; MacArthur, 2015). However, this level of participation is a passive approach that has been criticised as inadequate (Colvin et al., 2016). Just being informed gives citizens no guarantee they will be included in decisions (Colvin et al., 2016; Hindmarsh, 2010).

2.3. Higher rungs, empowerment

In Arnstein's ladder of participation, the assumption is that higher rungs should be preferred over lower rungs. At the highest level, the public is empowered to make choices. In decision-making, collaborative approaches with the public are more effective in developing public acceptability towards wind power projects than top-down approaches (Agterbosh et al., 2009; Jami & Walsh, 2014; Wolsink, 2007). For procedural justice, it is essential that the local stakeholder's voice is heard and information is disseminated in a network.

Aitken et al. (2016) suggested that community engagement should involve multiple methods: raising awareness amongst community members, consulting them and empowering them. These methods should be complementary rather than alternatives to one another. Empowerment should ensure that consultation responses are meaningful and add value for participants and the community (Aitken et al., 2016). The question regarding large-sized wind power projects is the form of a realistic outcome. For private developers or officials, the delegated power is presumably not really an opportunity (Bidwell, 2016). Instead, smaller community-led wind power projects would meet these criteria for more active power redistribution. The approaches of community empowerment are still few and different in each case. Empowerment may include variation in project outcomes and dependency relations. It seems that empowerment is easier for those individuals who have better material (income) and knowledge (education) resources (Schreuer, 2016; Slee, 2015).

3. Materials and Methods

The empirical study was carried out in Finland near two onshore wind farms located close to residential areas during the winter and spring of 2014–2015. The wind farms were Tuulimuukko in Lappeenranta and Ristiveto in Merijärvi. Both wind farms became operational in mid-2013. The Tuulimuukko wind farm has seven 3 MW turbines, and the Merijärvi wind farm has six 2.3 MW wind turbines. Thus, the size of the installations was quite small in relation to many commercial wind energy facilities.

In Finland, the law ensures that the public has the opportunity to participate in environmental decision-making (Kuusiniemi, Ekroos, Kumpula, & Vihervuori, 2013). The Constitution of Finland guarantees the public rights to participate and appeal during decision-making processes involving their environment. Public participation is also an essential requirement for planning processes which include an environmental impact assessment (EIA). For example, wind farms with at least ten wind turbines or 30 MW mandate an EIA. In practice,[2] wind farm siting includes the official hearing process involving the display of planning documents for public inspection, public comment periods and public meetings to ensure informed, legitimate decision-making. The official public hearing process was held in Lappeenranta in 2009 and in Merijärvi in 2008.

Data was collected via semi-structured interviews and a large survey that were both part of the larger wind power study. Next, both the data collection methods are presented.

3.1. Interview data

The aim of the interviews was to explore the residents' perceptions of participation in the local wind farm planning process. The interviewees were selected because they permanently lived close to the wind turbines and could make observations about the turbines (their average distance to the nearest wind turbine was 1400 m). Almost all the contacted persons were willing to participate in the study, and the final number of interviewed persons was 22. The interviewees were regular residents in the local community. Principally, they did not have any other specific role in relation to the local wind power development process except for one interviewee, who was a landowner and hence had some monetary benefit from the wind power company through tenancy. Four of the interviewees were retired, and the others were of working age (the age ranged from 22 to 67 years old).

[2] In both the Lappeenranta and Merijärvi wind farms, the number of wind turbines was under 10, and the total power amounted to less than 30 MW in each case. This means that the EIA was not required. In these cases, the wind turbine siting process included zoning and planning permissions with participatory and appeal rights.

Fourteen of the interviewees were from Merijärvi and eight from Lappeenranta. The interviews were semi-structured, meaning that certain themes and questions were included but the interviewees could share their experiences and views freely inside the given frame. The interview questions included topics like opportunities to participate in the wind farm planning process, general attitudes towards wind power, intentions to support or oppose wind power developments and perceived changes in their perceptions of wind power after the local wind farm construction. Interviews were held during the spring and winter of 2015 in the respondents' homes, except for one interview which was held by phone. The interviews lasted an average of 45 minutes. The interviews were recorded and transcribed verbatim.

The interviews were coded with Atlas.ti software, version 7.5.13. Data was categorised in terms of the International Association of Public Participation's "IAP2 spectrum of public participation" regarding tokenism and empowerment. The coding process included reading and interpretation, resulting in categorizing the findings. During the analysis, the interviewees' descriptions about information distributions, consultations, attempts to hear residents' concerns and meetings were categorized as *tokenism*. The interview data was coded as *empowerment* when interviewees described negotiations between residents and power holders (project developers or authorities), sharing decision-making responsibilities or dominant decision-making authority and control. During the classification, the limitations of the typology were considered. It was noted that individual perceptions could be placed in more than one location in the spectrum of citizen participation. For example, one of the participation methods was meeting with project developers and environmental officials, which is consulting with a degree of tokenism, but the interviewees also described it as an expression of residents' power. However, power redistribution is of the essence when moving from tokenism to empowerment, and this example would be coded as tokenism.

3.2. Survey data

The survey questionnaire was loosely based on Pawlaczyk-Łuszczyńska, Zaborowski, Zamojska-Daniszewska and Waszkowska's (2014) study, with additional questions concerning participation during the wind farm planning process. The aim of the survey was to study the perceived opportunities for participation in the local wind farm planning process to further analyse the factors affecting the acceptability of the operating wind farm. So far, few studies (e.g. Firestone, Kempton, Lilley, & Samoteskul, 2012; Johansson & Laike, 2007) have

examined the relationship between perceived past participation and local project acceptability during the operation phase.

Wind power acceptability was examined through two measures: the impact of the wind farm on the landscape and on well-being (see Table 1). The perceived impacts on the landscape and human well-being guide evaluative judgements of wind power and hence shape acceptability (Huijts et al., 2012). The landscape effects of wind power are often reported to be the most significant factor for perceptions of wind power implementation (Krohn & Damborg, 1999; Toke et al., 2008; Warren, Lumsden, O'Dowd, & Birnie, 2005; Wolsink, 2007). More precisely, the landscape impacts of wind power or scenic questions regarding wind power are found to be important for the formation of both general and local wind power acceptability (Bell et al., 2005; Kontogianni, Tourkolias, Skourtos, & Damigos, 2014).

When it comes to well-being, wind turbines represent a change in the environment related to perceived health effects and may cause annoyance for some residents. Furthermore, annoyance has associations to visual cues and attitudes (Knopper & Ollson, 2011). Botterill and Cockfield (2016) recently found that health impacts, rather than changes in the landscape, are the focus of the Australian wind power debate. Hence, it seems that the impacts of wind power on well-being are part of the complicated attitudinal structures regarding wind farms.

We used the Ordinary Least Squares regression (OLS) model to explore the predictors of local wind farm acceptability. The predictors were those which were found to be significant within the previous literature. We included site-specific variables, like perceived participation in the planning process and the study area as predictors (Coleby et al., 2009; Motosu & Maruyama, 2016). Also included were demographics like age, gender and education, together with the distance between respondents' homes and the nearest wind turbine and general attitude towards wind power (Johansson & Laike, 2007; Swofford & Slattery, 2010). In one of the earliest studies of wind farm acceptability, Thayer and Freeman's study (1987) found females, older and less educated respondents had more positive attitudes towards the studied wind farm. Also, people living closer to a wind turbine and those more familiar with the area were less positive than people living farther away (Thayer & Freeman, 1987; Swofford & Slattery, 2010). The "proximity hypothesis" of wind farm attitudes supposes that the closer the resident is to the wind farm, the greater the opposition or negative attitude towards the wind farm (Swofford & Slattery, 2010, p. 2510). However, some results have revealed signs of a reverse proximity hypothesis, where those people living near the wind farm show the highest acceptability (Warren et al., 2005).

The literature has also indicated that general attitudes towards wind power have a substantial positive influence on project-specific attitudes (Bidwell, 2016; Johansson & Laike, 2007; Jones & Eiser, 2009; Wolsink, 2000).

The population register was used to obtain postal information on the targeted sample: all residents aged over 18 in Merijärvi (N = 812) and approximately the same number of residents (N = 810) aged over 18 living in postcode areas near the Lappeenranta wind turbines. Survey questionnaires with cover letters were posted to the residents for the first time during December 2014 and for a second time in January 2015. The total number of responses was 582. Thus, the response rate achieved was 35.5% (see Table 1).

****Insert Table 1 about here****

The length of residence was controlled with the following question: "How long have you lived in this residential area?" In the following, only the answers from residents who had lived in the area for more than seven years (the participation processes had been implemented about seven years before the survey was conducted) are used for the analyses.

Because of the differences in the sampling processes between the study areas, we analysed the perceptions of residents living near wind turbines (≤ 3 km). This supports our aim to study the authentic experience of participation as, in practice, hearing processes reach residents living near the planned wind farm. The number of valid respondents was 291. The selection of this subset leads to a different distribution of cases, since the final data includes 250 cases from Lappeenranta and 41 cases from Merijärvi. The reason for the difference is that the population density is much higher in Lappeenranta than in Merijärvi.

Comparing the characteristics of survey respondents to the corresponding populations shows how the survey respondents in Lappeenranta corresponded quite well with the whole population. However, in Merijärvi, men outnumbered women, and the education level was a bit lower compared to the corresponding population. The mean age of survey respondents was 60 years old, which is almost twenty years more than the mean age of corresponding populations. The demographics of the respondents and characteristics of the corresponding populations are presented in Appendix 1.

The method of studying past events has been successfully used in wind power research (e.g. Walker & Baxter, 2017; Warren & McFadyen, 2010), but this study includes risks of associated recall error. Both for the survey

and for the interviews, participants were asked to recall events that had occurred several years before. This means that the data is likely to contain some error due to recall error. In addition, although the response rate (35.5%) is acceptable, two-thirds of potential respondents chose not to participate in the study. Thus, the data may also contain some error due to non-response bias.

4. Results

The results emerging from the interview data and the survey research are analysed and discussed in the following subsections.

4.1. Interviews

The interviewees answered two general questions (What is your general attitude towards wind power? In general, would you support or oppose wind power development?) and two questions related to the local wind farm (Did you have an opportunity to participate in the wind power planning process, e.g. during the hearing process? Have your own attitudes changed after the wind farm was constructed in your area?)

For the interviewed residents, it was obvious that wind power information was available. However, it seems that interviewed persons were not that interested in seeking information. During the planning process, the project developer and authorities provided information to the residents via e.g. websites and local newspapers. However, the distribution of information did not seem to have been a very effective method of raising community awareness as the interviewed residents did not remember this first stage of tokenism well. As an interviewed couple stated:

> *I don't even remember. I was working when they [wind turbines] were planned. You* [Indicating Interview 3, person 2] *checked the post.* [Interview 3, person 1] *I suppose some [information] came. I don't remember at all.* [Interview 3, person 2]

Another resident stated:

> *I suppose there was some kind of announcement on the municipal noticeboard, which is on the wall of the municipal office. You don't necessarily visit there.* […] *We heard just a rumour: "Hey, by the way; there are wind turbines coming somewhere."* [Interview 7, person 1]

The interview data indicated that the official consultation sessions did not contribute much to the participation process. Conversely, the interviewed residents stated how they had been quite passive and had not participated in consultation meetings:

> *Yes, there were events, but we did not participate or our opinion was not asked. However, you could have participated. It was a public event. We did not consider it necessary because we do not own land, and hence, it does not affect us.* [Interview 10, person 2]

Thus, quite interestingly, it seems that non-participation was a conscious choice. However, those who had participated felt that residents' opinions had not been considered. Two examples of the unsuccessful interaction between the residents and the project developers follow:

> Interviewee: *Well, those presenters that visited* [the public information session] *gave themselves an image of being kings and knowing everything, and then the next* [presenters] *told a different story and didn't take a stand on* [residents' opinions]. *They considered us unimportant.* […] *Yes, there were two or three public hearings* […] *That's the point where the negativeness comes in; they don't tell the truth.* [Interview 2]
>
> Interviewer: *Did you feel that you had an opportunity to participate in planning during the hearing anyway?*
>
> Interviewee: *No, there was nothing like that.* [Interview 2]

Hence, it seems that the opportunity for participation does not necessarily mean that people's concerns and interests are taken into account. The second stage of tokenism (*consultation*) seems to have had two problems: it was developer-controlled and unable to provide two-way communication. Also, the impact of the consultation suffered from the lack of interest by residents, although the meetings were public and participation had not been limited. One reason for inactivity may have been the small size and number of wind turbines (total capacity of 21 MW and 13.8 MW), leading to less concern about visual impacts, impacts on personal well-being, concerns about or motivation to engage in participation, etc. For example, one interviewee described his indifference to the project:

> *Well, perhaps I'm that lazy and I do not actually care. I would just say that when they started planning and formed contacts and … so then there were my own evaluations, including the fact that they* [wind turbines] *don't cause terrible harm.* [Interview 1]

Instead of passiveness, some residents discussed personal contact rather than institutional procedures. Personal contact was an easy way for them to engage and get information. For some of the interviewed residents, personal contact on behalf of the project developers was highly valued:

> *It was just after the energy production began that* [they] *came and asked about our impressions;* […] *they asked how it appeared to us and if there is now anything* [on the agenda] *and if something interests us.* [Interview 4, person 1]

> *Always, when you come personally, it makes an impression. You should always remember to take other people into account.* [Interview 4, person 2]

> *Then whatever we wanted to ask, he gave us the information. For instance, I wanted to know how long this* [wind turbine] *was going to flicker. He answered immediately that, according to the data, it will be 18 minutes per year. They were well prepared.* [Interview 4, person 1]

Some residents became activated, gathered information and asked community members to meetings to discuss the issue. This happened near the Merijärvi wind farm after the official planning process and final decision made by public officials:

> *We had a meeting just because people were somewhat pessimistic towards the noise and visual impacts….* [Interview 7, person 1]

> *In that phase, all the permissions for construction of the wind farm were ready.* [Interview 7, person 2]

The aim was to get some compensation for using the village for wind energy production. As a result, these community members managed to consult with the company and get some money for the development of the village. The money is paid yearly to the community association, and the company wants a plan for the use of the money.

> *We were very satisfied with the amount of money of course* […] *but we have been laughing that we were bought. "Shut up! You get three thousand euros and shut your face!"* [Interview 7, person 1].

An interesting issue in these cases was a late increase in awareness about the impacts of wind turbines. Some residents felt the installation process had been very tough and had caused much harm because of practical difficulties, such as closed roads during working days or interference with television reception:

> *And besides, during the installation, if you live along the same road, you need an even temper. They stretch your tolerance to the limit. Meaning that the neighbours would need helicopters during that time. You have no road, no life of your own, and unfortunately it takes a long time.* […] *And one simple act to reduce these frictions would be to name a person in charge who could be contacted. And then to inform us about details like when the road will be closed. After blasting, it was totally closed.* […] *No information was given about the closed road.* [Interview 8]

Thus, it seems that the communication between residents and the developer was insufficient. Some of the residents contacted the project developers to take care of their everyday issues, such being able to use the road when necessary. One of the interviewed residents described how they managed:

> *Finally, through the struggle,* [the things were resolved]. *Nothing was done as a favour or by asking. Then I just called a bigger boss.* [Interview 7, person 1]

After the wind turbine had been installed, the residents felt annoyed by some issues, such as the visual and acoustic impacts. One resident stated:

> *And obviously, this view* [of the turbines] *strengthens the impacts. There they are, under our eyes and that rotation and sound – that is the irritation* [Interview 15, person 1].

Another resident stated:

> *Yes, and probably you connect to that* [visual effect] *because your eye takes that high-speed rotation to indicate sound, even though you really don't hear it.* [Interview 15, person 2]

To sum up, it is not realistic to expect a fully public decision-making process for a wind power development when the project owners are private companies (see also Bidwell, 2016). The results of this study indicate only limited participation in the lower degrees of the IAP2 spectrum which are closer to tokenism than empowerment. In addition, it seems that the residents were aware of participation opportunities, but many of them chose not to participate. Additionally, those who participated did not feel the participation process was satisfactory. If activation after decision-making is seen as participation, our results reveal the continuous

characteristics of participation in local projects, indicating that local participation does not always end with the siting decision and may continue as two-way communication between the residents and the wind power company during operation of a wind farm.

4.2 The survey

Table 1 summarises the descriptive statistics of the dependent and independent variables, and Appendix 2 presents their distributions. Firstly, we asked the survey respondents whether they thought they had had opportunities to participate in the planning process for the wind farm. As Table 1 shows, most respondents living near wind turbines did not perceive that they had opportunities for participation in the planning processes. In fact, 82% of the respondents perceived no opportunities, and only around 8% perceived opportunities for participation.

The percentage of perceived non-participation is surprisingly high when considering that these respondents lived quite near the proposed site. However, one must bear in mind that the survey considers non-participation resulting from lack of opportunities to participate, whereas the interviews showed that residents were aware of participation opportunities but non-participation was rather a choice (see also section 4.1). Thus, it may be that the high percentage of those who did not perceive that they had opportunities for participation arose from the survey wording[3] or recall error.

Local acceptability in this context is measured as the perceived impact of wind turbines on the landscape and well-being. As shown in Table 1 and Appendix 2, the measures of acceptability are strongly centred on the middle of the scale, indicating that residents do not perceive strong effects on the landscape (mean: 2.88) or well-being (mean: 2.94). Especially, the vast majority of the respondents perceived the impact of local wind farms on personal well-being as neutral (not positive or negative). It is also possible that they were uncertain about impacts on personal well-being. The lack of variation in the well-being variable may result in lack of explanatory power of the OLS regression analysis. The general attitude towards wind power was quite positive (mean: 3.82).

[3] The question was: "Did you have an opportunity to participate in the planning and siting process of the wind farm?" The question did not include any examples of opportunities for participation.

We used OLS regression to analyse the impact of perceived participation on current local wind farm acceptability, measured by perceived landscape and well-being. The results of the regression analysis are shown in Table 2. As shown, the perceived participation or study area had no significant effect on the perceived landscape impacts. From controlled demographics (age, gender and education), only the coefficient of age was statistically significant ($p = 0.018$) and positive, showing that older people had more positive attitudes towards the local wind farms in terms of landscape impacts. The highest value of the standardized coefficients was that of the general attitude towards wind power (0.525, $p < 0.001$), indicating that it was the single most significant predictor of local wind farm acceptability measured as perceived impacts on landscape. This model explained 35.7% of the variance in landscape impacts.

Concerning well-being, the model explained 32.6% of the variance. Perceived participation had a statistically significant impact on well-being (-0.250, $p < 0.001$). Surprisingly, the estimated coefficient is negative, indicating that people who felt they had been able to participate in the planning process perceived the impact on well-being more negatively. This result could be better understood if we analyse the responses about how the residents felt after their participation. Right after the question related to opportunities for participation, we asked whether their opinions were considered in the planning process. Of the respondents, 42.9% felt that their opinion was not taken into account, almost the same percentage (38.1%) were not able to say, and 19% felt that their opinion had been taken into account in the planning. Thus, the negative coefficient of people's perceived participation may result from the feeling that their opinions or worries were ignored.

****Insert Table 2 about here****

It seems that the general attitude towards wind power was the single most significant predictor for well-being as a measure of local wind farm acceptability as the estimated standardised coefficient was 0.465 ($p < 0.001$). The study area had no impact on acceptability, but the respondents' age was positive and statistically significant ($p = 0.033$). The older people had more positive attitudes towards the local wind farms in terms of well-being as well. However, the distance between respondents' homes and the nearest wind turbine did not predict acceptability in terms of well-being. One explanation may be that the mean distance from survey respondents to the nearest wind turbine was as much as 2027 m. By contrast, the interviewed residents lived much closer to

wind turbines (mean distance: 1400 m), and they perceived the distance between wind turbines and residential areas as critical:

> *And surely, when these* [wind turbines] *were installed here, they* [the project developers] *had sessions and you cannot say that we were not informed. But you just felt that it is just nice to have them* [wind turbines]. *But they* [the wind turbines] *should not have been this close.* [Interview 12]

> *I have generally got quite a positive attitude towards the installation of wind turbines. You should just keep the distance to residential areas long enough, and the placing should be planned rigorously.* [Interview 22, person 1]

> …*not closer than one and half kilometres to the closest windmill* [from someone's home]. *The one* [wind turbine] *that we have there that is one kilometre and 410 metres* [away] *is just*… [Interview 3, person 1]

> *They are possibly too close to residential areas. They should be farther away. Then the disturbance would be less. I think that at least two – or as we have this two and half kilometres – up to three kilometres* [is the distance required between wind turbines and residential areas]*: not less than two kilometres distance to residential areas* [Interview 10, person 2]

Thus, it may be that the distance plays an important role in acceptability only for those who live in relatively close proximity to wind turbines.

5. Discussion

The key objective in this paper was to examine perceptions of the level of participation in the local wind farm planning process. As an additional analysis, factors affecting the acceptability of the operating wind farm were analysed. The study was conducted in two Finnish study areas for residents who lived within the vicinity of the operating wind turbines during both the study and the planning and implementation processes. According to Finnish legislation, local authorities are responsible for decision-making in these cases, but they are also expected to consult and hear the opinions of people in the immediate surroundings of the planning area. Therefore, the residents in our study should have had an opportunity to participate in the formal decision-making process. The research questions were studied with semi-structured interviews supported by a survey.

As to level of participation, our results reveal that most of the survey respondents did not perceive that they had opportunities for participation; however, the interviews showed that non-participation was out of choice grounded in a passiveness as people were aware of participation opportunities. In other words, the residents who perceived an opportunity to participate in the planning process did so rather passively. Our results also revealed that only a small number of people showed signs of activeness when they started to negotiate for some compensation after the official decisions by local authorities. Corresponding findings about limited public participation were also identified in the wind energy decision-making processes in Ontario, Canada (Jami & Walsh, 2017). There, practices seemed heterogeneous, and public participation was at varying degrees of the IAP2 participation ladder: *inform*, *consult* and (rarely) *involve* (Jami & Walsh, 2017).

All in all, the residents had quite positive attitudes towards wind power in general, which is a very typical result (Wolsink, 2007). The local acceptability was also measured and indicated lower acceptability in terms of perceived landscape and well-being impacts. This result – a high general attitude of acceptability and lower local acceptability – is consistent with previous research findings relating to the presence of a social gap (Bell et al., 2005; Van der Horst, 2007). These results may indicate possible problems in relations between the community and developers or between the community and decision-makers. Regardless of the difference between general attitudes about wind power and attitudes about local wind power development, the general attitude was the most significant predictor for local wind farm acceptability: the more positive the general attitude towards wind power, the higher the acceptability of wind farms. This result is in line with many previous studies (Bidwell, 2016; Johansson & Laike, 2007; Jones & Eiser, 2009; Wolsink, 2000).

The results of the survey revealed that those who perceived they had opportunities for participation perceived landscape effects and especially effects on their own well-being negatively, meaning there was low acceptability for the local wind farm within this group. This seems to contradict results which emphasise the central role of perceived participation in the planning process as something contributing towards local acceptability (McLaren Loring, 2007; Swofford & Slattery, 2010). This result might indicate some misunderstandings, difficulties or other problems in the hearing protocols or in the interactions between different stakeholders. As participation may be a question of power, these results may also reflect an empty experience: an outcome after formal participation without power redistribution (Arnstein, 1969). In the studied cases, empowerment did not finally occur, and the participation remained at tokenism, which is at the lower rungs of Arnstein's ladder (1969). Both the interviews and the survey results support this finding. Only a few residents were active, and activation happened after the decision-making process.

In addition, the regression analysis of survey data did not confirm the proximity hypothesis (Swofford & Slattery, 2010) as the distance between residents and wind turbines was not a significant predictor for the acceptability of the wind farm. However, this result contradicted findings from the interviews, where the residents perceived the distance between home and wind turbines as important. One explanation may be that the mean distance from survey respondents to the nearest wind turbine was longer than the corresponding distance between the interviewed residents and wind turbines.

As with any study, this empirical research includes some limitations. As the wind turbines had been operating for 1.5 years, it was reasonable to suppose that the residents had experience of local effects concerning landscape and well-being. However, one problem is that the survey respondents and the interviewed residents did not remember the details of the past planning process very well. This recall bias is difficult to systematically evaluate, but it must be acknowledged. The results of this study indicate that interaction was seen as either an institutional procedure or as personal contact, which could both be experienced in various ways on a subjective level. In addition, there might be different interpretations of the main concepts (such as participation, landscape, physical health or personal well-being) of this study. Hence, it would be important to conduct this study for other wind farms and give respondents some guidance about the meanings of the study variables.

This research aims to increase the understanding of the continuous nature of the participation process and thus reaffirms the complex nature of local social acceptability (see e.g. Fournis & Fortin, 2016; Jami & Walsh, 2017). Firstly, it seems that the right to participate does not substantially promote socially and culturally sustainable development in Finland. If the aim is to increase the acceptability of renewable energies as a technology for mitigating climate change, then the participation process should be further developed. According to this study's results, residents perceive successful participation to be something more than contributing to processes at lower levels of tokenism. The current process seems to reach only the minority of residents while the majority stay rather passive. Special attention should be paid to an increase in awareness and advanced planning for projects that look far ahead towards installation and wind energy development while investing in continuous public participation. Secondly, this study reveals that the need for participation does not expire after wind farm siting decisions. This finding is in line with previous findings about citizens' desire for active participation and continuity of involvement (Hindmarsh & Matthews, 2008; Jami & Walsh, 2017). Project developers should be prepared to continue communication with residents after the planning phase. There is a need for future research to identify ways and practices with which to establish how and when the formal wind power participation process could give more power to residents.

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Appendix 1.

Table A1. Demographics of the respondents (N = 291) and characteristics of the corresponding whole population of Lappeenranta and Merijärvi.

Gender	Percentage of respondents	Lappeenranta	Merijärvi
Male	48.5% (141)	49.4% (35977)	54.5% (627)
Female	51.5% (150)	50.6% (36817)	45.5% (523)
Total	*100% (291)*	*100% (72794)*	*100% (1150)*
Age, years mean (S.D.*)	Respondents (N = 291)		
	60 (14.3)	43.1	40.1
Education	Percentage of respondents	Population over 15 years	
		Lappeenranta	Merijärvi
Basic education	28% (81)		
High school	3% (8)		
Vocational education	50% (146)	52% (32562)	52% (461)
University of applied sciences	9% (26)	10% (6158)	5% (46)
University degree	4% (12)	7% (4563)	1% (11)
Doctoral degree	0%	0.8% (503)	0.3% (3)
Total	*94% (273)*	*69% (62083)*	*58% (890)*
Wind farm area	Percentage of respondents		
Lappeenranta	85.9% (250)		
Merijärvi	14.1% (41)		
Total	100% (291)		

Note: Frequencies or standard deviations* are in parentheses.

Appendix 2.

Distributions of key variables.

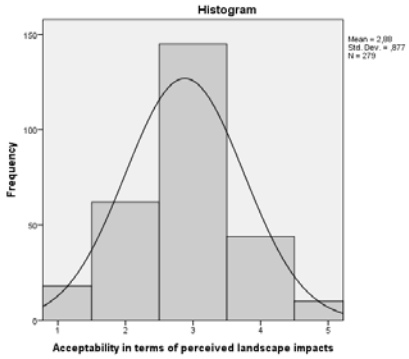

Figure A1. Acceptability of the local wind farm in terms of perceived landscape effects. (Scale: How do you perceive the impacts of wind power in your residential area? 1 = very negatively … 5 = very positively)

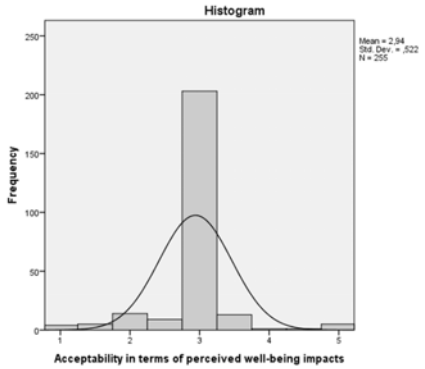

Figure A2. Acceptability of the local wind farm in terms of perceived well-being effects. (Scale: How do you perceive the impacts of wind power in your residential area? 1 = very negatively … 5 = very positively)

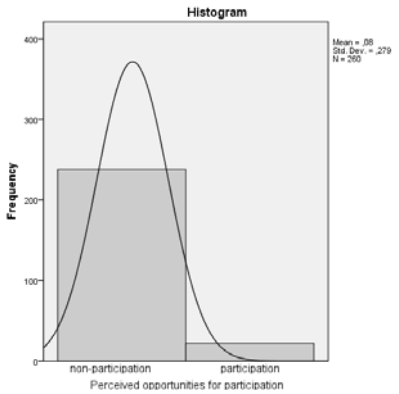

Figure A3. Perceived opportunities for participation during wind farm planning process.

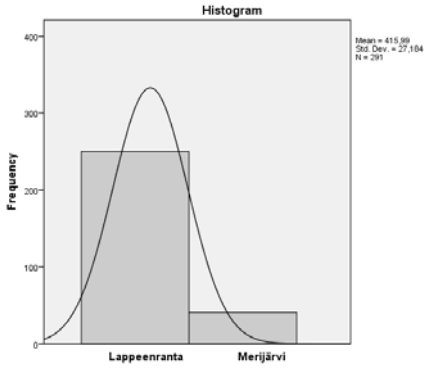

Figure A4. The frequencies of the respondents from two study areas.

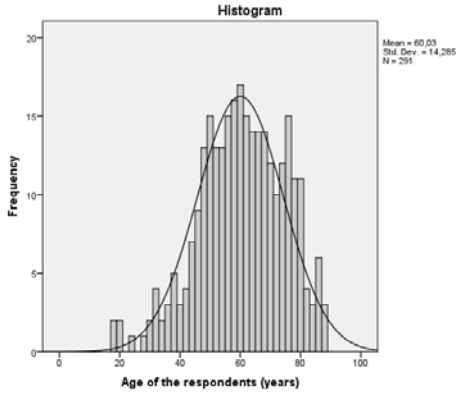

Figure A5. Age of the respondents.

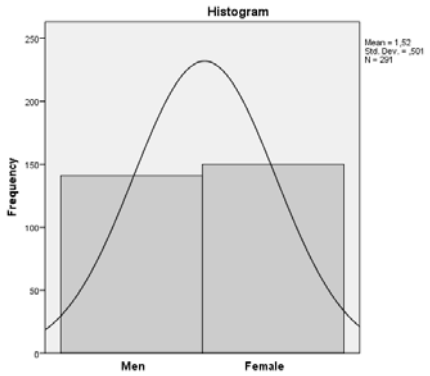

Figure A6. The frequencies of men and women.

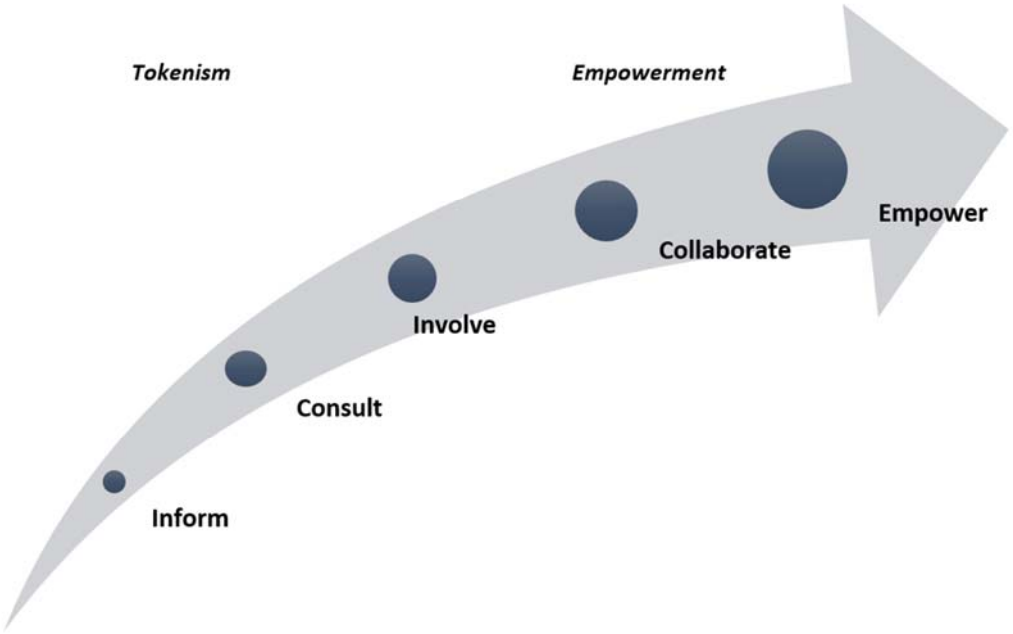

Figure 1. IAP2 spectrum of public participation (adapted from Jami & Walsh, 2014 Jami, A. A. N., & Walsh, P. R. (2014).

Table 1. Key variables used in the analysis (WP = wind power, WF = wind farm, WT = wind turbine).

Dependent variable	Description	Mean		Median	SD	Min	Max	N
Local acceptability of WP								
Landscape	Perceived landscape effects "How has wind power affected the landscape in your living area?" Scale from 1 = very negatively to 5 = very positively, 3 = not any effect	2.88		3.00	0.877	1	5	279
Well-being	Perceived effects on own well-being. Mean value of two questions: "How has wind power affected your own physical health in your residential area?" and "How has wind power affected your own well-being in your residential area?" Scale from 1 = very negatively to 5 = very positively, 3 = not any effect	2.94		3.00	0.522	1	5	255
Perceived participation	"Did you have opportunities to participate in the planning process for the wind farm?" No = 0 or yes = 1	Non-participating		Participating	Not answered	Total		
		81.8% (238)		7.6% (22)	10.7% (31)	100% (291)		
Control variables		Mean		Median	SD	Min	Max	N
Age	Age in years	60		60	14.3	18	87	291
General attitudes towards WP	"What is your attitude towards wind power in general?" Scale from 1 = very negative to 5 = very positive	3.82		4.00	0.949	1	5	282
Distance between home and the nearest WT	Measured by EUREF ETRS-TM35FIN coordinates	2027.3		2081.0	552.5	720	2986	291
Gender		Male		Female				*Total*
	Male or female	48.5% (141)		51.5% (150)				291
WF	Lappeenranta (Tuulimuukko), Merijärvi (Ristiveto)	Lappeenranta		Merijärvi				*Total*
		85.9% (250)		14.1%(41)				291
Education	Level of education (1 = basic education, 2 = high school, 3 = vocational education, 4 = university of applied sciences, 5 = university degree, 6 = doctoral degree)	Basic education	High school	Vocational education	University of applied sciences	University degree	Doctoral degree	*Total*
		27.8% (81)	2.7% (8)	50.2% (146)	8.9% (26)	4.1% (12)	0% (0)	273

Table 2. Results of regression analyses for testing effects of perceived participation on local acceptability.

	Local acceptability measured as perceived impacts on					
	Landscape			Well-being		
Independent variables	*b*	Beta	t	*b*	Beta	t
Constant	0.726		1.737	1.576		5.792***
Predictors						
Perceived participation	–0.289	-0.092	–1.625	–0.469	-0.250	–4.189***
Study area: Merijärvi	–0.181	-0.071	–1.197	0.043	0.028	0.452
Demographics						
Age	0.009	0.140	2.375*	0.005	0.132	2.150*
Male	–0.153	-0.086	–1.604	0.036	0.033	0.576
Education	–0.065	-0.081	–1.410	–0.036	-0.072	–1.204
Other predictors						
Distance between home and nearest WT[1]	2.22E-5	0.014	0.254	7.676E-5	0.078	1.348
General attitude towards WP[2]	0.492	0.525	9.290***	0.267	0.465	7.722***
F (df)	19.717 (7;236)***			16.209 (7;220)***		
R^2	0.376			0.348		
Adj. R^2	0.357			0.326		

*p<0.05; **p<0.01; ***p<0.001

[1]WT = wind turbine

[2]WP = wind power