



Perceptions of wind energy projects in two coastal Massachusetts communities



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ARTICLE INFO

Keywords:

Wind energy
Project development
Public perception
Semi-structured interviews

ABSTRACT

Using 15 semi-structured interviews of residents in two neighboring coastal Massachusetts communities, one of which recently installed an onshore wind project, a study sought to identify the specific characteristics that drive perceptions about the existing project as well as hypothetical new onshore or offshore projects. It found that economic benefits and visual aspects of the project were most important to participants, followed by noise, environmental benefits, hazard to wildlife, and safety concerns.

1. Introduction

Wind energy will contribute to decarbonizing the United States electricity system. Many states have already set ambitious goals in the form of renewable portfolio standards (RPS) that require minimum levels of electricity demand be met from renewable resources like wind (DSIRE, 2017). The Environmental Protection Agency's Clean Power Plan and other federal climate change policies may further encourage the adoption of renewable energy (EPA, 2016). Overall, there is strong general public approval of wind projects across the U.S., with 70% of Americans agreeing that more emphasis should be placed on producing domestic energy from wind resources (Gallop, 2016). However, support from communities where projects are located may be different. Past work has shown a disconnect between general support for wind power and opposition in some communities where projects are located (Devine-Wright, 2005a; Van der Horst, 2007; Wolsink, 2000). This phenomenon is often referred to as not-in-my-backyard, or NIMBY. However, as many studies (Wolsink, 2000) have pointed out, NIMBY may be too superficial an explanation, since opposition often focuses on more specific project characteristics such as visual changes to the landscape, noise from the project, wildlife impacts, or perceived inefficiencies of the technology.

This challenge is of particular concern in Massachusetts, which has committed to building 2000 megawatts (MW) of wind capacity by 2020 (Massachusetts State Website for Wind Energy, 2015) relative to only 100 MW installed today (Geological Survey, 2017). Thus, the state will face substantial growth in the number of wind projects in the near term, including both onshore and offshore locations, a characteristic that has been shown to affect public perception (Ek and Persson, 2014;

Ladenburg, 2008). Offshore projects in Massachusetts have already provoked significant controversy. Cape Wind, a 130-turbine offshore wind project proposed in Nantucket Sound, recently failed to gain public approval due, in part, to local opposition (McNamara, 2015).

In this article, we used 15 semi-structured interviews to identify positive and negative perceptions of wind projects within two neighboring coastal communities in Massachusetts, for existing wind projects, as well as for potential new onshore and offshore locations. We selected our sample from the coastal city of Gloucester, which recently built three onshore wind turbines, and the neighboring town of Rockport, which is five miles away. These communities share demographics that are similar to other coastal regions of Massachusetts (Essex, Plymouth, and Barnstable counties – see Appendix A) that will soon be faced with new development of onshore and offshore wind farms. A sample of 15 is sufficient to identify the most commonly held beliefs in a population (BruinedeBruin and Bostrom, 2013). Our goal was to identify *what* people believe, so as to inform future follow-up surveys with larger samples, which can then be used to assess *how many* hold each of the identified beliefs.

2. Methods

2.1. Sample

We conducted 15 semi-structured interviews with residents of the city of Gloucester and town of Rockport, aiming to reflect the communities' diversity of experiences with wind projects. We used door-to-door recruitment to reach participants living near the existing turbines, during the month of September 2015. The rest of the participants were

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recruited using posted advertisements at local stores and restaurants the following month. Table 1 shows that our sample's demographics were diverse in location, age, income, gender, and education. However, all participants identified with non-conservative political views (either Independent or Democrat), which is representative of political views within coastal Massachusetts communities (see Appendix A for more information).

2.2. Procedure

Each interview lasted 30–60 min and was audio-recorded. Each participant was provided the incentive of a \$25 Amazon gift card. Each interview consisted of open-ended questions, a ranking exercise, and a discrete-choice task, as explained below. The full interview protocol is presented in Appendix B.

2.2.1. Open-ended interview questions

We conducted semi-structured interviews that were based on the mental models interview approach developed by Morgan et al. (Morgan et al., 2001), where a “mental model” is the set of beliefs relevant to people's decisions about a specific topic. The interviewer began with open-ended questions (i.e. “Tell me about the existing wind project in your community”), and then followed up with clarifying questions (i.e., “Can you explain further?”, “Anything else?”, “What other important aspects can you think of?”).

To identify positive and negative perceptions about wind projects, participants were also asked open-ended questions about their perceptions of the existing wind project in Gloucester. In addition, we asked about three hypothetical new projects in their community, within one mile of their home, within five miles from their home, and offshore. Throughout the interviews, we maintained a list of the project characteristics that were introduced by each participant.

2.2.2. Ranking exercise

After completing the open-ended questions, participants were asked to confirm the list of characteristics we recorded. Subsequently, participants ranked each of the listed characteristics in terms of their perceived importance.

2.2.3. Discrete choice task

In a simple discrete-choice task, we first showed maps of a new three-turbine wind project to be built in one of four locations: (1) as an expansion of the existing wind project in Gloucester; (2) a new onshore project at the Rockport transfer station (recycling center/dump); (3) an offshore project two miles from Gloucester's shore; or (4) an offshore project two miles from Rockport's shore. Projects located farther from shore have been shown to be more acceptable to coastal communities (Krueger et al., 2011; Ladenburg and Dubgaard, 2007), and are more amenable to larger-scale projects. However, we chose two miles from shore for its visual similarity to the existing onshore wind project near Gloucester, which is clearly visible in many neighborhoods. Furthermore, we selected only three turbines in our study, since this is the size of the existing project in Gloucester, and is the average size of existing onshore wind projects in Massachusetts (Geological Survey, 2017). Although future development of offshore wind will likely consist of many more turbines that are farther from shore,¹ near-term projects are likely to be small and close to shore. For example, the first offshore wind project in the U.S., built in 2016 and located off Block Island in Rhode Island, consists of only five turbines and is 3.8 miles from shore (Block Island Wind Farm, 2016).

Fig. 1 presents the maps that participants received. For each map,

¹ In the United Kingdom (which has over 5000 MW of offshore wind capacity), the average number of turbines per offshore wind project is about 60 and the average distance from shore is about 6 miles (4C Offshore, 2017).

Table 1
Diversity of participants (15 total).

Demographic	Range	# Participants
Location	Rockport	4
	Gloucester	2
	< 1 mile from project	9
Age	< 25 years	3
	24–44 years	2
	45–64 years	7
	> 65 years	3
Income	< \$35 k	3
	\$35–50 k	2
	\$50–100 k	3
	> \$100 k	4
	NA	3
Gender	F	7
	M	8
Highest Education	High school	6
	Associates	2
	Bachelors or Masters	7
Political Affiliation	Democrat	8
	Independent	6
	Republican	0
	NA	1

we asked participants to identify the proposed wind project location to confirm their understanding, and asked them to comment on the proposed project. We also showed a picture of an offshore project two miles from shore in the United Kingdom (see Appendix C) and asked them to assume that the proposed offshore project (presented in Fig. 1) would look similar. This was important since, at the time of the interviews, no offshore projects existed in the United States. Visual displays have been shown to improve the accuracy of learning a participant's perceptions about projects (Bishop, 2005). We explained that each of the new onshore projects we presented would look like the existing one in Gloucester. All participants confirmed that they saw the existing project in Gloucester every day.

Lastly, we asked participants to choose one of the four locations they liked most, and to rank locations based on their preferences. In both cases, they were asked to explain their underlying reasoning. At the end of the interview, each participant reported demographic information.

2.3. Coding

After each interview, we coded the specific characteristics discussed for the existing and hypothetical projects. We then categorized these specific characteristics into general categories. In total, we identified 16 categories (across 55 specific characteristics), including: visual impact, benefits from renewable energy, economics, personal experience with wind projects, specific site location, community identity, impact to the local environment, noise, proximity to homes, wildlife impacts, the process of how wind projects are built, size, safety, construction, concerns about impacts to the local fishing industry, and references to the Cape Wind project. For each, we identified whether they were referred to as positive or negative. Appendix D shows all specific characteristics identified, their mapping to general categories, and example quotes.²

² For example, we coded the following as a positive characteristic about ‘visual impact’: “I don't consider them an eye sore... I think they are surprisingly pretty” Similarly, we coded the following as a negative characteristic about ‘visual impact’: “There is a price to be paid for [a new wind project] in a place of great natural beauty. Is the price too steep? ... I don't know.”.

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