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Public perceptions of wind energy developments: Case studies from New Zealand

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ABSTRACT

Although the public generally hold positive attitudes towards wind energy, proposals for the construction of new wind farms are often met with strong resistance. In New Zealand, where the government has recently introduced ambitious policy targets for renewable energy generation, negative perceptions of wind farms are increasingly evident and have the potential to prevent the achievement of these targets. This research sets out to examine what influences social resistance to wind farms in New Zealand. Drawing from public submissions on three wind farm proposals, a framework developed by Devine-Wright [Devine-Wright, P., 2005a. Beyond NIMBYism: towards an integrated Framework for Understanding Public Perceptions of Wind Energy. Wind Energy 8, 125–139.] was used as the basis for identification of factors affecting public perceptions of wind farms. The research found firstly that there was no apparent relationship between the proximity of submitters to a proposed wind farm and their likelihood of having a negative perception of the proposal. A wide range of factors written in submissions appeared to have affected the submitter's decision to support or oppose the wind farm proposal. Some of these were consistent with Devine-Wright's findings, but ten further factors were added to the framework to adequately cover the aspects raised in submissions. The findings have implications for the achievement of New Zealand's energy policy aspirations.

1. Introduction

The New Zealand government has recently adopted a raft of policy initiatives to promote sustainable energy, including targets to significantly increase the proportion of electricity generated from renewable energy sources such as hydro, geothermal and wind.

Despite their 'sustainable' tag, all renewable energy options have their own set of negative impacts that can potentially lead to difficulties in establishing new generation capacity. Wind is no exception. Internationally, social resistance to new wind farms is recognised as a significant barrier to their establishment (Eltham et al., 2008; Moller, 2006; Wolsink, 2005), and research into social perceptions of wind energy developments has become an active, if still evolving, area (Devine-Wright, 2005a; Ellis et al., 2007; van der Horst, 2007; Warren et al., 2005).

Within New Zealand, wind energy generation is rapidly ramping up from a small base, and, perhaps unsurprisingly given international experience, so is controversy. A recent proposal, for example, attracted 519 submissions in objection—49% of all submissions.[1] To date, apart from surveys of levels of general public support or opposition to wind energy and wind farms (e.g. Nielsen Research, 2008) little research has been carried out in New Zealand on the nature of public perceptions of wind farms, and whether these perceptions follow similar patterns to what has been reported internationally. This paper reports on research undertaken on three wind farm proposals in New Zealand, which sought to identify the range of perceptions of submitters, and to compare these to international research findings.

2. Wind energy and public perceptions

Of the 151.40 PJ of net electricity generated in New Zealand in 2006, 65.8% was generated using renewable energy sources (hydro, geothermal, biogas, wood and wind). The proportion of renewable-sourced electricity has dropped significantly from 79.4% in 1996, and an even more impressive 82.6% in 1986 (calculated using data from Ministry of Economic Development, 2007). To counter this trend, recent government policy announced in the New Zealand Energy Strategy (NZES) aims to increase renewable energy generation, with a national target of 90% of

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[1] Project Hayes, one of the case studies.

electricity being generated from renewable sources by 2025 (NZ Government, 2007a). Related initiatives include the identification of new market arrangements to enable additional wind generation to be integrated into the electricity system, and an expanded renewable energy regional assessment programme. A National Policy Statement on renewable electricity generation is also to be produced later in 2008, which will provide high-level guidance on the consent process for renewable energy projects under the Resource Management Act 1991 (RMA) (NZ Government, 2007a, b).

Wind energy, while still representing a minor fraction of New Zealand's electricity generation, is beginning to expand rapidly and has the potential to make a significant contribution towards the government's 90% renewables target. In 2006, net electricity generation by wind in New Zealand was 2.22 PJ, or 1.47% of total net electricity generation, having risen from just 0.03 PJ or 0.02% in 1996 (calculated using data from Ministry of Economic Development, 2007). A study undertaken for the Ministry of Economic Development (MED) and the Energy Efficiency and Conservation Authority (EECA), 2005 concluded that based on technical and operational issues only, wind could potentially penetrate about 35% and supply about 20% of New Zealand's electricity (Energy Link and MWH NZ, 2005).

The current total installed capacity of wind turbines (as at February 2008) is 321.8 MW with an additional 164.6 MW under construction. Proposals totalling a further 1914 MW have been consented under the Resource Management Act; or are consented but appealed, on hold, or in the process of gaining resource consent. Many other potential wind developments are also being considered throughout the country (New Zealand Wind Energy Association, 2008). It is estimated that by 2015 up to 2450 MW of wind generation could be installed with high confidence and up to 4585 MW with high or medium confidence (Ministry of Economic Development, 2006, p. 96).

International research consistently shows that wind energy has high public approval ratings (Ek, 2005; Wolsink, 2000), and New Zealand is no exception. Public opinion research in 2004 showed that wind power had the highest approval rating of any method of electricity generation, with an 82% approval rate overall, and over 40% of respondents preferring that future electricity needs be met by wind power than from other energy sources (EECA, 2005). But despite the strong potential of wind energy to contribute to national policy aspirations, many wind farm developments in New Zealand are generating negative as well as positive responses from individuals and organisations as the proposals go through the resource consent (planning consent) process. Bell et al. (2005) propose that this disjunction between public support for wind energy and successfully building wind energy capacity can be distinguished as a 'social gap' – the gap between high public support and low success rate in planning applications, as well as an 'individual gap' – where a person has a positive attitude to wind power in general but actively opposes a particular development.

Examining the policy implications of these 'gaps', Bell et al. suggest that these could be bridged using various planks—the 'silent majority' of supporters should be drawn into the planning process through collaboration and participation; improved communication by energy developers and policy makers; better engagement with communities to discuss their concerns and understandings; better accommodation of community concerns from an early stage, particularly in relation to siting decisions; and ensuring that energy policy does not drive energy developments in a direction that is likely to inflame conflict. In a similar vein, Devine-Wright (2005b) suggests government policy targets for renewable energy developments in the UK are more likely to be met via a 'locally embedded' approach whereby communities are more involved in the development process and are able to benefit through local supply, partnerships and profit-share. Ellis et al. (2007), however, warn that opposition is more complex than simply a lack of knowledge, or a lack of participation, and call for theoretically based social research that seeks to understand why members of the public accept or resist wind farm proposals.

But even before policy issues are considered, it is crucial to understand the reasons for negative attitudes towards wind farms. Internationally, much research has been undertaken relating to technical aspects of wind energy, and how to address its physical, measurable effects such as noise generation and the visibility, shape and colour of turbines. Pasqualetti (2001) suggests that the technical problems of wind farms have largely been addressed, but there are still outstanding issues, particularly how to accommodate people's concerns about landscape values. Other influences on perception may include aesthetic integration (Sibille et al., 2009), people's beliefs relating to sustainable energy (Ek, 2005), people's knowledge levels (Ottinger and Williams, 2002), and "NIMBY" ("Not in My Back Yard") (Krohn and Damborg, 1999; noting, however, that Wolsink (2000), Devine-Wright (2005a) and others argue that the assumed prevalence of NIMBYism is not borne out by empirical studies).

Until recently, however, these various influences on perceptions have not been brought together into an integrated framework until the work of Patrick Devine-Wright (2005a). Reviewing international research on wind farms, Devine-Wright concluded that perceptions of wind farms can be based on a wide variety of characteristics of the wind farm itself (including its visual impacts, size, noise, and effects on wildlife), as well as influenced by non-site characteristics. Working from different research strands, he grouped the factors affecting public perceptions of wind farms into eight categories: physical, contextual, political and institutional, socio-economic, social and ideological, symbolic and ideological, local, and personal. Most of these categories are further divided into 'aspects'. Devine-Wright's resulting framework is shown in Table 1.

In New Zealand, significant developments such as wind farm proposals are generally notified for public submissions, and these submissions must be considered in the resource consent decision-making process. Strong opposition may implicate the success of new developments if the decision-making authorities (usually local councils) judge the impacts identified in submissions to be significant, and some contentious wind farm proposals have been either refused consent or significantly reduced in size. Many of the factors identified by Devine-Wright have been canvassed in the

Table 1
Devine-Wright's (2005a) (p. 135) 'summary of factors identified in past research as affecting public perceptions of wind farms and renewable energy'.

Category	Aspect
Physical	Turbine colour
	Turbine size
	Turbine acoustics
	Farm size and shape
Contextual	Proximity to turbines
	Landscape context
Political and institutional	Energy policy support
	Political self-efficacy
	Institutional capacity
	Pubic participation and consultation
Socio-economic	Shareholding
Social and communicative	Social influence processes
Symbolic and ideological	Representations of wind turbines
Local	Place and identity processes
	Local or community benefit and control
	NIMBYism
Personal	Previous experience and knowledge