Energy Policy 43 (2012) 80–91

Contents lists available at SciVerse ScienceDirect

Energy Policy

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

The suitability of a feed-in tariff for wind energy in New Zealand—A study based on stakeholders' perspectives

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ARTICLE INFO

Article history:
Received 28 October 2010
Accepted 14 December 2011
Available online 28 January 2012

Keywords:
Feed-in tariff
Wind energy
New Zealand

ABSTRACT

New Zealand (NZ) aims to expand the deployment of wind energy as one means to achieve 90% of electricity generation from renewables by 2025 and in addition to reduce green house gas (GHG) emissions. Due to electricity market regulations that inhibit market entry for independent developers, New Zealand's wind energy development has been limited to primarily large wind farms developed by a handful of electricity utilities. In contrast to many other countries, NZ lacks policy support for entry of smaller investors into the wind generation sector.

In order to gage the acceptability of a feed in tariff (FIT) for wind energy in New Zealand, a survey questionnaire (366 respondents) with land owning farmers and semi structured interviews with wind energy stakeholders was conducted. Although international literature suggests that a FIT would be the most suitable policy support scheme to accelerate wind energy deployment, this conclusion was not reached by many influential stakeholders in NZ. However, a majority of the surveyed farmers supported the introduction of a FIT for wind energy. The study also revealed that farmers' acceptance of wind energy in their local area increases with their awareness about climate change issues.

1. Introduction

With an annual growth rate of around 30%, the world wind energy capacity increased from 6.1 GW in 1996 to 159.2 GW in 2009 (WWEA, 2010). Increasing fossil fuel and uranium prices and the awareness of the threats of climate change are some of the reasons why policy makers around the world have supported wind energy market growth. In addition, some of the world's leading climate scientists have suggested that in order to avoid the worst scenarios of climate change, CO_2 atmospheric concentrations will need to be reduced to 350 ppm (Hansen et al., 2008). However, at present the atmosphere has 392 ppm CO_2 and due to the continued increase in world energy demand this number is rising by around 2 ppm every year, an increase which unless reversed will make it extremely difficult to achieve the proposed target. Because the electric power sector is the largest single source of GHG emissions, the Intergovernmental Panel on Climate Change (IPCC) has stated that renewable energy (RE) will be the best tool to mitigate climate change until 2100 (IPCC, 2007). As wind energy has proven to be an effective renewable and emissions-free power generation technology, this technology should be at the forefront of any transition to renewables (Strachan et al., 2009). In most countries the transition to RE has often involved considerable government support (REN21, 2010). In NZ, however the various national governments since around 1980 have been very pro-free market and aligned with the neo-liberal economic paradigm (Bertram, 2006) and thus against instituting any Government funded subsidies.

Due to the free market policy framework favoured by New Zealand, wind energy development has been dominated by large-scale projects, which are owned by the larger electricity utilities, while independent wind energy projects, which are owned by farmers or communities, as common in Europe, are nonexistent. In 2009, the energy manager of NZ's first proposed small community wind energy project pointed out the following: "*There is no policy that would enable independent individuals, communities or businesses to invest in wind energy. The policy vacuum favours large scale corporate investment. It is a disaster. So we actually need policy change and we need a guaranteed preferential feed-in tariff, so that we can have a higher price than we buy from the grid. What we need is guaranteed prices to get bank loans to do these wind energy projects*" (pers. comm. Willis, 2009).

Widespread support for economic neo-liberalism in NZ has made it difficult for more recent governments to consider policies such as feed-in tariffs for wind energy. In addition, NZ has had a very ambivalent response to climate change mitigation.

1.1. New Zealand's climate change policy

New Zealand has long had a reputation of being "clean and green" and in this regard, the former center left NZ Labor Government

Abbreviations: FIT, feed-in tariff; RE, renewable energy

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doi:10.1016/j.enpol.2011.12.032

(1999–2008) made two major policy decisions towards the end of its term in office. First, it set a target of 90 per cent of electricity to be generated from renewable sources by 2025, a target, which included a ban on new coal and gas generation. The aim of the policy was that new electricity generation should be renewable, except to the extent necessary to maintain security of supply (NZES, 2007). The second major policy initiative was the introduction of a national emission trading scheme (ETS). In 2008, however, a new center right National Party gained Government and among the first policy actions were to remove the ban on new fossil fuel base-load electricity generation and to amend the ETS. The ETS amendments diminished the price signal for RE investors such that electricity generators will now receive a 50% free allocations of emission units, with a NZ$ 25 price cap on the cost per emission unit for the remaining 50% (CCI, 2010). Bertram and Terry (2010) have produced a comprehensive analysis of the NZ ETS and not only pronounced it ineffective but also suggested that the future exposure of NZ to international markets could be costly for future generations.

The present NZ National Government aims to reduce GHG emissions in a range between −10% to −20% below 1990 levels by 2020 and to maintain the target of 90% of electricity generation from renewables by 2025 set by the earlier Government (NZES, 2010). On mentioning these targets it is important to note that NZ is a significant GHG intensive economy and the fifth largest per capita GHG emitter of all OECD countries (WRI, 2010). The percentage of electricity from renewable sources in NZ decreased from just over 90% in 1974 to around 65% in 2008 while its GHG-emissions increased by 22.8% from 1990 to 2008 (MfE, 2009). In addition, the new draft energy policy documents (NZES, 2010) released by the Government support an upsurge in fossil exploration, which together with the uplifting of a ban on new fossil fuel generation plant, will in all likelihood lead to long term increased emissions for the country.

With the current NZ energy policy framework and without direct support for RE the realization of the NZ Government's purported objectives regarding GHG emissions and improvement in RE proportion should be considered somewhat dubious. A recently published report by the Institution of Professional Engineers New Zealand (IPENZ) concluded that with the current market situation carbon emissions are likely to be 11% higher in 2015 than 2009 levels and the RE percentage penetration of electricity generation are likely to reach around 71% by 2025—far less than the 90% target (IPENZ, 2010).

1.2. NZ's wind energy development

New Zealand has been recognized as having one of the best wind resources in the world (Ashby, 2004; Pretli, 2003). Compared to other OECD countries, however, the development of wind energy in New Zealand has been relatively slow and inconsistent (Barry and Chapman, 2009). At the beginning of 2010 New Zealand had 11 operating wind farms with a combined capacity of 497.3 MW. This capacity supplied 3.46% of New Zealand's annual electricity generation in 2009. At the time of writing, there were an additional 20 wind farms proposed to be deployed in NZ, with a total capacity of 2875.5 MW (NZWEA, 2010). However, it is thought unlikely that all or even most projects under investigation or with resource consent applications will actually be built. Many proposed wind farms have been delayed or curtailed because of difficulties complying with the NZ Resource Management Act (RMA) or for straight economic reasons (NZWEA, 2010).

From 1995 wind energy in NZ on a kWh basis had been increasing by over 45% per annum (pa) but after 2005 this increase had slowed to around 20% pa (MED, 2010). Arguably one of the reasons for this slowing of development has been due to the lack of specific policy initiatives to promote renewable energy in NZ, initiatives such as feed-in tariffs, tax exemptions, tradable green certificates and the promotion of local ownership of wind turbines in order to avoid local opposition.

However, the only specific support mechanism that has been given to wind energy in recent decades has been carbon dioxide credits to two wind farm projects under the "Projects to Reduce Emissions"—program in the years 2003–2004 (IEA, 2006). In contrast, countries with a high level of deployment of wind energy have implemented specific and targeted RE support schemes to promote wind energy development (IEA, 2009). In regards to RE support with FITs, it is interesting to note that more and more countries have decided to implement Premium FITs. This modified FIT model was first introduced by Spain followed by Denmark, Slovenia, the Czech Republic, Italy, Estonia, Argentina, the Netherlands and most recently Germany. With a Premium FIT, wind energy producers receive the hourly market price for electricity on the spot market, and a fixed premium on top of the market price. Therefore, RE developers receive higher payments when market prices go up and less if market prices decrease.

Table 1 shows wind energy capacities and implemented wind energy support schemes from OECD countries, which are most similar in size and population to NZ. Table 1 is not an exhaustive list of all possible energy statistics (e.g. electricity demand) to assess a countries wind industry and therefore caution must be applied when making comparisons. However, the lack of policy support is possibly a key reason why New Zealand's wind industry is failing to experience the higher capacities as seen overseas.

Clearly the relationship between wind energy deployment in NZ and policy initiatives needs to be investigated, in light of the barriers to wind energy development.

Table 1
Wind energy capacity, area, population and RE support scheme of different OECD countries.
Source: Agnolucci (2007) and REN (2010).

Country	Wind capacity (MW)	Population (millions)	Wind share (%)	FIT (incl. premium FIT)	Tradable green certificates	Tax reduction
Denmark	3479[a]	5.5	20[c]	x		
Sweden	1560[a]	9	1[b]		x	x
Ireland	1260[a]	4.2	8[c]	x		
Austria	995[a]	8.2	3[d]	x		
New Zealand	497[a]	4.2	3[e]	–	–	–

[a] *Source*: WWEA (2010).
[b] *Source*: EREC (2009).
[c] *Source*: Walsh (2010).
[d] *Source*: AWEA (2010).
[e] *Source*: NZWEA (2010).