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An analysis of the key environmental and social issues surrounding wind energy generation in New Zealand

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1. INTRODUCTION

In New Zealand, the use of wind energy has been identified as one of the ways to assist in transitioning away from the need for fossil fuel-based energy. This source of energy has several benefits including, inter alia: minimal air and water pollution, green and renewable energy source, and reduced dependence on fossil fuels. Despite the benefits of wind energy, environmental and social issues continue to surface in response to an increase in wind energy generation in New Zealand. These environmental and social issues are analysed in this paper with consideration given to current legislative and policy instruments.

The generation of energy from renewable sources such as the wind can immensely assist a country in improving energy security, reducing greenhouse gas emissions, combating the adverse effect of climate change and responding to the global energy challenge (MfE, 2011). The exploration of wind energy has been highlighted as one of the renewable energy sources to be utilised to diversify New Zealand's energy mix to deliver efficient and affordable energy across the country, while also achieving renewable energy targets and meeting international obligations surrounding greenhouse emissions and climate change mitigation (MBIE, 2011). Furthermore, renewable energy sources such as the wind have been identified as one of the mitigation strategies to combat climate change and make countries less susceptible to the volatility of fossil fuel prices (Saidur, Islam, Rahim, & Solangi, 2010).

2. BACKGROUND

New Zealand has a history of renewable energy generations in areas such as hydro, wind and geothermal energy. To build on this platform, the National-led government signalled its intentions to generate 90 percent of its energy from natural renewable sources by the year 2025, and by the year 2050 to reduce greenhouse gas emissions by 50 percent from the 1990 levels (MBIE, 2011). The wind has been identified as one of the renewable sources of energy that can contribute to achieving these targets.

For the first quarter of 2016 renewable energy generation contributed 82.2 percent of New Zealand's electricity with a 12.9 percent increase in wind energy generation from March 2015 to March 2016 (MBIE, 2016). This upward trend in wind energy generation is expected to continue in the future and play a significant role in diversifying the energy mix in New Zealand to meet the projected energy demand. To date, there are 19 wind farms either operating or under construction in New Zealand (EECA, n.d.). This demonstrates that New Zealand is well endowed with wind potential primarily due to its location and topography (Kelly, 2011).

Notwithstanding the wealth of the wind resource in New Zealand, there are environmental and social issues that arise from wind energy development. The environmental issues include earthworks, landscape effects,

loss of ecology, loss of wildlife, the displacement of other animals, erections of structures and dust. The social issues consider the noise generated from the wind turbines, the aesthetics as it relates to landscape, the visibility of wind turbines and proximity dwellings. In this regard, it is important to ascertain whether these environmental and social issues are adequately addressed under the existing legislative and policy environment.

3. LEGISLATIVE AND POLICY ENVIRONMENT

The Resource Management Act 1991 (RMA) is New Zealand's overarching legislation on the management of the environment. It aims to promote the sustainable use and management of the natural and physical resources fostering environmental protection while enabling the social, economic and cultural well-being of the people of New Zealand. The RMA facilitates a hierarchical approach to environmental management starting with central government outlining national objectives through the implementation of the National Policy Statements (NPS), National Environmental Standards (NES), and the New Zealand Coastal Policy Statement (NZCPS). From these national policy statements and standards, regional councils develop their own Regional Policy Statements (RPS) and Regional Plans (RP) and local councils develop their district plans from the RPS and RP. The hierarchical nature of the RMA ensures that District Plans are consonant with those developed at national and regional levels. In essence, plans made at the district or regional level or decisions taken must be in consensus with the provision under the RMA (Johnston, 2016).

Hence, the RMA is the overarching legislation governing wind energy projects but there is uncertainty that arises from its implementation during the wind energy process (Sagemüller, 2006). This uncertainty arises from the sometimes-varying interpretation of certain elements of the RMA and can trickle into the resource consent process as well as the assessment of environmental effects (AEE) requirements. Resource consent is required for wind energy projects under the RMA and aims to address the environmental and social issues such as landscape, adverse visual effects, noise and loss of ecology (Palmer & Grinlinton, 2014).

Moreover, the uncertainty with the RMA also often results in wind energy projects being heard in the Environment Court, resulting in a long, expensive and highly contested process for wind energy projects (Kelly, 2011). This long and contested process may sometimes arise due to limited and discretionary public participation during the initial process as the public consultation process varies based on the developer and the proposed wind energy project (NZWEA, 2013). In addition, it is important to consider the cultural perspectives during the AEE as well as during public consultations due to the indigenous, cultural and historical value of proposed sites and the ancestral relationship between Māori and the environment (Sagemüller, 2006).

At each stage of the wind development process, there are certain activities and requirements necessary to successfully undertake a wind energy project. A review of the existing literature, policy, legislation and case studies revealed some key areas where environmental and social issues are addressed under existing legislation and policy in New Zealand. These issues are discussed below in relation to existing wind farms in New Zealand.

4. DISCUSSION

A wind farm is a system in which wind can be harnessed to generate electricity and can vary in terms of size, design, turbines and generating capacity (NZWEA, 2013). The location and design of wind farms will be based on inter alia, grid connectivity and the availability and direction of the wind resource. From the project proposal to decommission or upgrading a wind energy project goes through a very detailed development process which includes site selection, project feasibility, detailed assessment, consenting, project confirmation, construction, operations and maintenance and finally upgrading or decommissioning (NZWEA, 2013).

The first stage of the wind energy development project is site selection. At this stage preliminary work is undertaken to ascertain the extent of the wind resource, possible hurdles are identified and

consultation with landowner commenced. The next stage of the process is the project feasibility which explores the business case in terms of project design, development costs, and benefits as well as an initial assessment of the potential effects on the environment. This leads to the detailed assessment where a more detailed site assessment is undertaken to further investigate site design and environmental effects and is followed by the formal application for resource consent and consultation with regional and district councils. The consent process is location sensitive and in most cases, approval must be sought from both the regional and district councils.

If approval is granted the wind farm design and business case are finalised with supporting contracts and the signing of the purchasing power agreement. The project then moves into the construction stage with the erection and installation of towers and turbines. Upon completion, the wind farm is commissioned, and operation commences. The final stage of the wind development process is upgrading or decommissioning. If the wind farm is upgraded, all activities from the project feasibility stage need to be redone, whereas if the project is decommissioned the infrastructure must be removed and the land rehabilitated.

The following uses specific wind energy examples in New Zealand to illustrate the way in which environmental and social issues are addressed through the legislative and policy environment.

4.1 Resource Consent

The implementation and successful development of a wind energy project are dependent on the resource consent process which aims to address the environmental and social issues that may arise during development (Sagemüller, 2006). The consents required for the development of a wind farm include land use, subdivision, water permit, discharge permit and coastal permit (NZWEA, 2013). During the resource consent process, the council will determine whether the effects are minor and approval granted or further action is required (MfE, 2015).

4.2 Assessment of Environmental Effects (AEE)

To supplement the resource consent process, there is also a requirement for an AEE to be undertaken for proposed wind energy projects. An AEE provides an objective assessment of the potential impact of a project on the environment as well as possible ways that any adverse effects will be mitigated (MfE, 2006). The RMA provides general definitions and guidance on what are effects and what the environment encompasses. However, the AEE has been criticised for providing limited specific information for wind energy developers resulting in a lack of consistency in AEE applications and acts as a source of uncertainty for both developer and policymakers (Sagemüller, 2006).

4.3 RMA as a source of uncertainty

The uncertainty with the RMA arises due to a lack of clarity around certain aspects of the Act and its interpretation as well as a lack of specific requirements for wind energy projects (Sagemüller, 2006). For example, in the Waitahora wind project, Contact Energy proposed the development of a 58 wind turbines farm with the potential of generating a maximum of 156 megawatts of electricity. The initial resource consent in 2009 was not approved as the adverse effects were deemed major by the district council. The council argued that the project could have adverse effects on the water supply to the nearby rural community, adversely affect the landscape as well as a local horse stud. However, the Environment Court concluded that wind farm would not adversely affect the water supply and that the landscape effect and the effect on the horse stud were not substantial to warrant a rejection of the consent (Palmer & Grinlinton, 2014). In this case, the interpretation of minor effects was inferred differently by the Environment Court compared to the District Council, thus creating some uncertainty surrounding the RMA and how certain terms are defined and interpreted.

4.4 Environment Court

The Environment court provides an avenue for both developers and the public to appeal

consent decisions surrounding wind farms. For example, the West Wind - Wind Farm located in Makara, owned and operated by Meridian Energy has 62 wind turbines generating up to 142.6 megawatts of electricity. After initial consent was granted to the company to proceed with the project in 2007, residents and other private interest appealed the matter to the Environment Court. The argument against the proposed wind farm was that there were adverse effects in relation to the reflections from turbines blades, bird mortality, noise and sleep disturbance. However, the Environment Court ruled that the benefits to be derived from wind were great and the effects on the environment were minor and upheld the consent granted to Meridian Energy for the construction of the wind farm (Palmer & Grinlinton, 2014). The provision for appeal to the Environment Court is made under the RMA. However, as explained earlier, the RMA is a source of uncertainty and this uncertainty is most times the cause for appeal of wind energy projects (Sagemüller, 2006).

4.5 Long, costly, highly contested wind energy process

The long, costly, highly contested process is seen as one of the main obstacles to the development of wind energy in New Zealand (Kelly, 2011). This may be because of the involvement of the Environment Court when wind energy projects are appealed by residents or developers. The contesting of wind farms by residents can be attributed to negative public perception about wind farms. Graham, Stephenson, and Smith (2009) provide many reasons for negative public perception about wind farms such as farm size and shape, turbines, noise, landscape, adverse construction impact and NIMBYism commonly referred to as 'not in my backyard.'

For example, Kelly (2011) explained that it took a particular wind project two years to get through the consenting process costing the company an addition NZ$120M. Another example was the Project Hayes wind energy development project earmarked for Central Otago. After spending millions of dollars and over five years going through consenting, the Environment and High Court, the company decided to abandon the project. While some have highlighted that the high consenting cost is necessary to ensure environmental sustainability (Sagemüller, 2006), it is important to ensure that these costs don't serve as a barrier or disincentive to realising the full potential of wind energy in New Zealand.

4.6 Discretionary public participation

It can be argued that the wind energy development process is highly contested because of the discretionary nature of public participation. During the wind energy development process, public participation is not compulsory and is undertaken by the developer who determines who the key stakeholders are that should be consulted during the process (NZWEA, 2013). As a result, not consulting with local communities on proposed wind farm may further illuminate the negative perception of wind farms and contribute to the long and expensive wind energy development process.

4.7 Cultural considerations

The RMA makes provisions to consider Māori views and cultural history stemming from the principles of the Treaty of Waitangi. For example, an application by Unison Networks Limited in 2007 for the establishment of a wind farm in Hawkes Bay was appealed to the Environment Court on cultural grounds based on the cultural relationship between Māori and the environment. The Environment Court undertook an analysis of the benefits of renewable energy versus the social well-being of residents and ruled that there were adverse visual and landscape effect associated with the proposed wind farm which was more than minor and could not be ignored (Palmer & Grinlinton, 2014). The court declined consent citing that the wind farm also adversely affects the cultural and ancestral relationship between Māori and the environment due to the major adverse effects on the landscape.

Therefore, it is important for developers and consenting authorities to consult with Māori during this process. This can be done through active consultation and using Iwi Management Plans for guidance. An Iwi

Management Plan is a resource management plan developed by an iwi or hapu and identifies and outline certain pertinent issues surrounding the use of natural and physical resources in their area (MfE, 2004). It can be used to complement the provisions in the RMA when making decisions on wind energy projects and inform developers on key cultural and historical issues that need to be considered during the process.

5. RECOMMENDATIONS

Based on the discussion above, the following recommendations may assist in improving the wind energy development process while also adequately addressing the potential environmental and social issues.

- Mapping and identification of sites specifically designated for wind energy generation based on areas deemed as having the greatest potential for wind, while also considering possible environmental and social issues.
- Encouraging mandatory stakeholder participation for wind energy project rather than discretionary consultation based on the developer and project.
- Provision of clearer and more specific guidelines for the establishment of wind energy projects based on the AEE requirements under the RMA (Sagemüller, 2006). The guidelines must provide specifics on the requirements for wind energy developers.
- The New Zealand government might consider classifying wind energy project and possibility other renewable energy projects as nationally significant proposals.
- Encourage small-scale wind energy generation to assist in realising the full potential of wind energy (Kelly, 2011). The installation of single wind turbines or a few wind turbines at strategic locations by residents or businesses may assist with the visibility issues as well as the noise and the environmental issues such as environmental degradation.

6. CONCLUSION

Overall, the RMA provides a structure within which wind energy development can be undertaken. It ensures that the potential environmental and social effects of wind energy projects are managed in a sustainable way. It is also clear that the resource consent process and the undertaking of an assessment of environmental effects (AEE) under the RMA are critical to identifying and addressing environmental and social issues in relation to wind energy projects.

Although, there are benefits to be derived from wind energy development, a prudent approach needs to be taken to ensure compliance with critical components of the RMA such as provision for Māori and for the undertaking of an AEE. Greater clarity is also required under the RMA to reduce uncertainty and for consistency in the decision-making process. The development process and timeframe should not be a disincentive as this can hamper future interest in wind energy. Nonetheless, the environmental and social issues are important and should be managed in a way that realises wind energy benefits while also ensuring sustainable environmental management.

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