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The Marine Environment – An Acceptable Alternative to Land for Locating Renewable Energy Generation?

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Abstract of a dissertation submitted in partial fulfilment of the requirements for the degree of M.Appl.Sc.

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ABSTRACT

In the context of the New Zealand Energy Strategy-target of 90% electricity generation from renewable energy by the year 2025, this dissertation analyses if the generally accepted statement that socio-economic factors and in particular planning procedures and public acceptance of individual schemes are a major limitation for the development of renewable energy projects, also applies in New Zealand. Moreover, it is analysed if a relocation of renewable power generation to the coastal and marine environment, in particular in form of offshore wind farms, could circumvent this obstacle.

Therefore New Zealand's spatial planning framework on land and in the marine environment is analysed using parts of the comparative policy analysis. Furthermore, the consent processes and the public perceptions via submissions of three different case studies, two wind farms on land and a tidal power generation scheme in the marine environment are examined with a framework which is partly based on Devine-Wright (2005) and Graham et al. (2009).

It is ascertained that the resource consent process on land can be an obstacle in the realisation of new wind farms, mainly due to time and cost consuming procedures and strong public opposition. The relocation of projects into the marine environment does not circumvent of facilitate the consenting process, but potentially reduces public opposition if appropriate locations are chosen and their allocation is strategically provided for in the spatial planning framework. This however requires changes to the existing planning system of New Zealand's marine environment.

Keywords: Planning, Marine spatial planning, Renewable Energy, Wind Energy, Public Perception, Marine Energy

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LIST OF ACRONYMS AND ABBREVIATIONS

AMA	= Aquaculture Management Area
BOI	= Board of Inquiry
CMA	= Coastal and Marine Area
EPA	= Environmental Protection Authority
GW	= Gigawatt
GW/h	= Gigawatt per hour
HMR wind farm	= Hauauru Ma Raki wind farm
KW/h	= Kilowatt per hour
MSP	= Marine Spatial Planning
MW	= Megawatt
MHWS	= Mean High Water Springs
NIMBY	= Not in my Backyard
NPS	= National Policy Statement
NZES	= New Zealand Energy Strategy
NZCPS	= New Zealand Coastal Policy Statement
OECD	= Organisation for Economic Co-operation and Development
RCA	= Restricted Coastal Activities
RCP	= Regional Coastal Plan
RMA	= Resource Management Act
RPS	= Regional Policy Statements

1. INTRODUCTION

> "[…] New Zealand, by virtue of its topography and location, is an island well endowed with wind energy resources […]. There are many potential wind energy farm sites which could be integrated into the grid. Despite this it seems anomalous that no attempts have been made to demonstrate either a pilot farm or a well-sited single medium sized wind power generator in New Zealand" (Edwards, 1990).

This quote is taken out of a publication by P. J. Edwards, who assessed wind energy resources in New Zealand. There were no plans to establish wind farms in New Zealand at that time, now the situation has changed significantly. Most developed countries are increasingly aware of the need to undertake a significant transition in their energy system and with international agreements like the Kyoto Protocol, there is a global trend towards renewable energy generation.

Due to its plentiful geothermal and hydrologic resources, New Zealand always had a high share of its energy from renewable electricity generation and in the last 15 years wind energy has been utilised as an additional source of electricity production. This trend of establishing further sources of renewable energy generation goes along with the energy policies of the New Zealand government as outlined in the New Zealand Energy Strategy (NZES) 2007 and in the recently published Draft New Zealand Energy Strategy 2010. The strategies introduce the ambitious target to achieve 90 percent electricity being generated from renewable sources by the year 2025 (Ministry of Economic Development, 2007; ibid. 2010a). Wind energy is expected to play a major role in achieving this aim. However, recent years have shown that new wind farm developments are significantly delayed or even declined in the resource consent process.

It is generally accepted that some of the major obstacles in the growth of wind power capacity are not of a technological or economic nature, but socio-political factors like planning processes and the public acceptance of individual wind farm proposals (Ellis et al., 2007). A relatively recent development that potentially circumvents this major obstacle is the establishment of energy generation schemes offshore. In countries like Denmark, the United Kingdom, and Germany large offshore wind farms are already operating and prove to be technically and economically viable (Jay, 2008; Markard & Petersen, 2009; Portman et al., 2009).

Although New Zealand has a great resource potential in the offshore environment, there are no plans to establish such schemes yet. However, such a statement is very similar to Edward's

quote from the year 1990 stated at the beginning and in hindsight, it took only a few years till wind farms became reality in New Zealand. Taking current international trends into account it is interesting to examine if developments of renewable energy in the offshore environment will be a viable alternative in New Zealand in the near future.

1.1 RESEARCH AIMS AND OBJECTIVES

This dissertation contributes to the context of spatial planning of renewable energy projects on land, and looking into the future, also in the marine environment. It focuses on the basic questions: First, does the generally accepted statement that socio-economic factors such as public acceptance and planning procedures are a major limitation for the development of renewable energy projects, apply in New Zealand? Second, would a relocation of renewable power generation to the coastal and marine environment, in particular as offshore wind farms, circumvent this obstacle?

The research aim can consequently be divided into two parts:

1. To gain new insights into planning and the public perception of wind farms in New Zealand, and therefore to add value to the spatial planning process of renewable energy schemes.
2. To assess options and limitations of establishing renewable electricity generation in the coastal and marine environment of New Zealand, especially offshore wind farms, from a spatial planning perspective.

In order to achieve those aims, the following research objectives are set for this dissertation

- Assessment of the main characteristics and differences in statutory spatial planning frameworks on land and in the coastal environment.
- Assessment of the main sources, characteristics and types of public opposition on renewable energy schemes, especially wind farms and analysis whether the public opposition against wind farms would also apply for renewable energy-generation schemes in the offshore environment.
- Assessment of the opposition against tidal power projects in New Zealand and assessment if the opposition would also apply for offshore-wind farms.

1.2 THESIS STRUCTURE

In order to achieve the aims and objectives, this dissertation-presentation is structured in seven chapters. Chapter Two presents a literature review to outline the background and research context in which the dissertation topic is embedded. Therefore, the international trend towards energy generation via renewable sources will be summarized at the beginning of the Chapter before a brief overview of energy generation in New Zealand is presented. This is followed by an outline of the development of wind energy in particular and the trend to move this form of energy generation into the marine environment. The second part of the literature review then identifies the scientific context and the conceptual framework by presenting the current state of research in the field of spatial planning and its function in the development of renewable energy schemes on land and in the offshore environment. One particular focus hereby is on the role of public perception of wind energy in spatial planning processes and its influence on the realisation of renewable energy projects.

The third Chapter introduces the methodology which is used to analyse spatial planning processes and the public perception of renewable energy in New Zealand in order to assess the options and limitations of such developments in the coastal environment. Three different case studies are examined: Two wind farm proposals named Mill Creek and Hauauru Ma Raki and the only large scale renewable energy project in the offshore environment in Kaipara Harbour. The methodology is applied in the analysis which is set out in Chapter Five. In chapter six the findings of the literature review are combined with the analysis and the results will be assessed in a discussion. The final conclusions are presented in the last section, Chapter Seven.

1.3 LIMITATIONS OF THIS DISSERTATION

This dissertation focuses on the spatial planning procedures of renewable energy projects and their socio-ecological acceptance on land compared to the marine environment. It is therefore not gone into detail regarding the technical or economical feasibility of those projects. Furthermore, the area in the marine environment which is focused on in this dissertation is limited to the coastal marine area (CMA) which is defined as the area between mean high water springs (MHWS) and twelve nautical miles out to the sea. It is considered unlikely that applications for renewable energy schemes outside of the CMA will be made in the near future.

2. BACKGROUND AND RESEARCH CONTEXT

The following sections outline the thematic background and the research context in which the content of this dissertation is embedded.

2.1 A GLOBAL TREND TOWARDS RENEWABLE ENERGY

Today's strong emphasis on electricity generation from renewable sources developed mainly for two reasons. First, renewable energy is an important instrument for reducing greenhouse gas emissions deriving from energy generation via conventional, fossil-fuel dependent sources. It is therefore a key component of meeting international requirements in tackling climate change (e.g. Alexander & Boyle, 2004; Elliot, 2007a). Furthermore, this aim fits well with a nation's desire to reduce fossil fuel dependency, especially when imported from other countries and the desire to secure and diversify long-term energy supply (Barry & Chapman, 2009). However, reality shows that in most countries electricity supply is still largely dependent on fossil fuel and due to economic growth, rising population and technical progress, electricity demand is continuously rising (International Energy Agency, 2009).

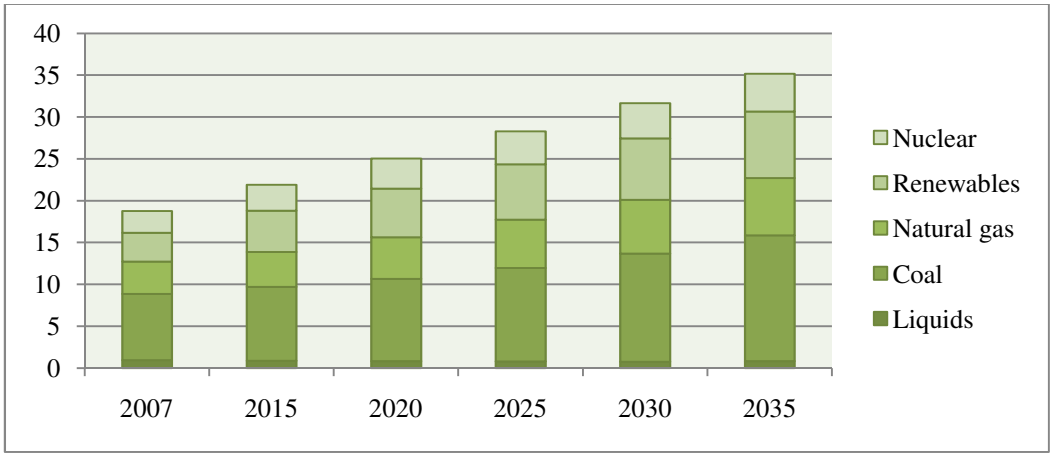

Figure 1: Forecast of the World Net Electricity Generation by Fuel till 2035 (in trillion KW/h) (U.S. Energy Information Administration, 2010)

The total global electricity generation is expected to almost double from 2007 till 2035 and it is expected that renewable energy will play a more important role in electricity generation. It is apparent that it is the second largest source for electricity generation behind coal from 2015 onward (Figure 1). Moreover, with fossil fuels becoming scarcer and nuclear power having a questionable reputation due to radiation security and waste management issues, renewable en-

ergy will, given the current knowledge, very likely become the major source of energy generation in the long-term (Elliott, 2007b).

2.1.1 Energy Generation in New Zealand

New Zealand always had a high share of renewable energy generation and among all OECD countries, it has the third highest percentage, only topped by Norway and Iceland. In other words, over 30 percent of the country's primary energy supply is generated from renewable sources. This high level of renewable energy is mainly generated from geothermal resources in the central North Island and large hydropower resources on both islands (Krumdieck, 2009; Ministry of Economic Development, 2009).

All renewable energy transformation in New Zealand is for the generation of electricity which increased from about 38000 GW/h in 1999 to 42000 GW/h in 2009 (Ministry of Economic Development, 2010b).

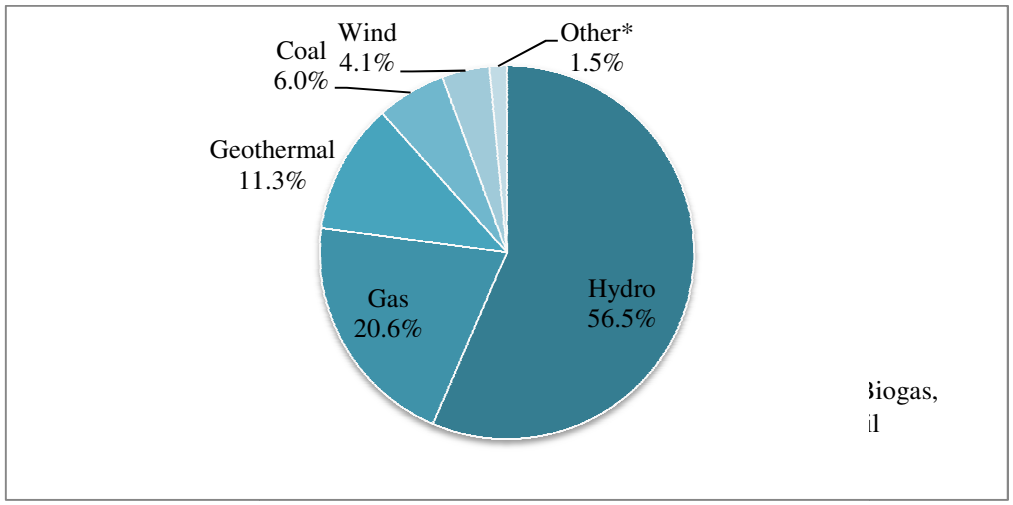

Figure 2: Electricity Generation in New Zealand March Quarter 2010 (Ministry of Economic Development, 2010a)

The main source of renewable electricity generation in New Zealand is hydropower, followed by geothermal energy. The most important thermal generation fuel types are gas and coal. To date, wind energy only plays a minor role in the renewable energy mix (Figure 2). In total, the share of renewable sources within the total electricity generation in the first quarter 2010 was about 73%. Although this indicates a reasonably high share, it is variable when looking at it over time. In other words, New Zealand's electricity generation from renewable sources has dropped significantly from 1974 to 2009 (Figure 3).

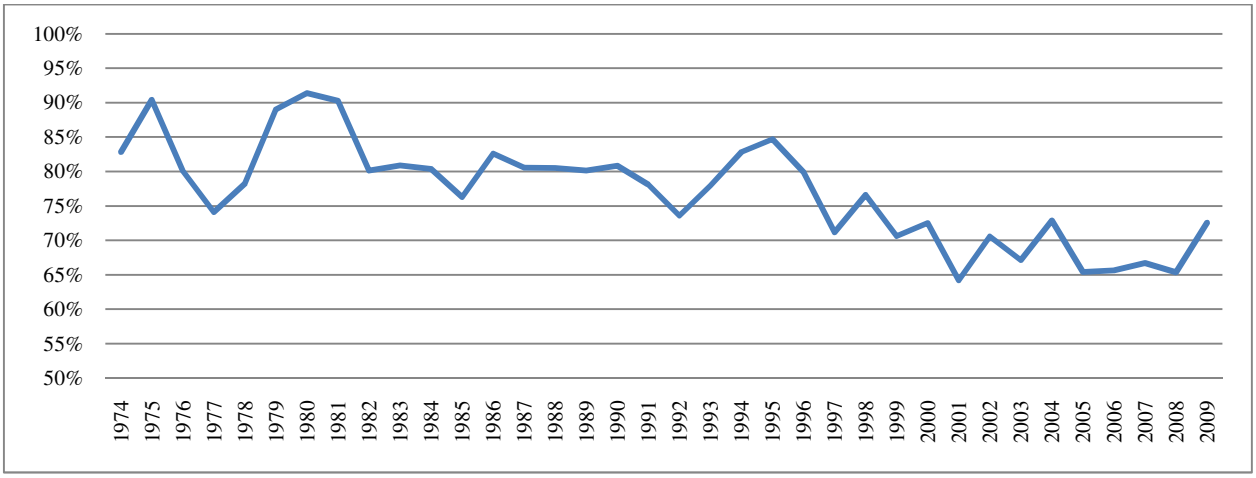

Figure 3: Share of Renewable Sources from of New Zealand Electricity Generation 1974-2009 (Ministry of Economic Development, 2010b)

The decreasing share of renewable electricity generation occurred due to several reasons. First of all a high reliance on hydropower combined with relatively drought conditions led to reduced renewable electricity generation. Moreover, increasing demand in the last years has mainly been met by a stronger reliance on thermal generation, (i.e., by gas and coal). As a result, this has inevitably led to increased CO_2 emissions in the electricity generation sector (Krumdieck, 2009; Ministry of Economic Development, 2009). The New Zealand Government has tried to counteract this development. The target of 90% electricity generation from renewable sources till the year 2025 was introduced with the publication of the NZES in 2007 (Ministry of Economic Development, 2007) and maintained in the updated version in 2010 (Ministry of Economic Development, 2010a).

2.1.2 Wind Energy – A Global Overview

One important source of renewable electricity generation is wind energy. In the last 30 years the sector has grown to a significant source of electricity production in over 70 countries (Global World Energy Council, 2010). It is one of the fastest growing energy sources worldwide (DeCarolis & Keith, 2004) and among all 'new' renewable energy sources wind power has the potential to make the most significant contribution (Roddler & Weinstein, 2010). New renewable energies are technologies like photovoltaic, bioenergy, and wave or tidal energy. 'Old' renewable energy sources are hydropower and geothermal energy (Alexander & Boyle, 2004). At the end of 2009, the globally installed wind power capacity was about 158.5 GW (Global Wind Energy Council, 2010). The countries with the largest capacity are the United

States with 35,064 MW, followed by China with 25,805 MW, and Germany with 25,777 MW. The markets are highly dynamic with substantial growth rates (ibid., 2010). Other countries, like Spain and Denmark, do not have such a high absolute wind power capacity, but relatively seen, wind energy is a major source of electricity generation there (see Table 1).

Table 1: Wind Energy in Chosen Countries

	Installed wind power capacity 2009 (MW)	Share of wind power on domestic electricity demand 2009	Growth rate of wind power capacity 2008-2009
United States	35,064	2%	39.5%
China	25,805	n/a	114%
Germany	25,777	7%	8%
Spain	19,149	14.5%	14.7%
Denmark	3,465	20%	10.6%

(Global Wind Energy Council, 2010; World Wind Energy Association, 2010)

Key drivers for the success of the wind energy sector are mainly various policy schemes in those countries that promote and partly subsidise technology development and diffusion. Almost all developed countries have wind energy as a high priority on the political agenda (Markard & Petersen, 2010).

2.1.3 Potential and Obstacles for Wind Energy in New Zealand

In comparison to other countries, the history of wind energy in New Zealand is relatively young (Dawber, 1994). The first single large scale wind turbine was constructed in 1993 and, in 1997, the first commercial wind farm was established.

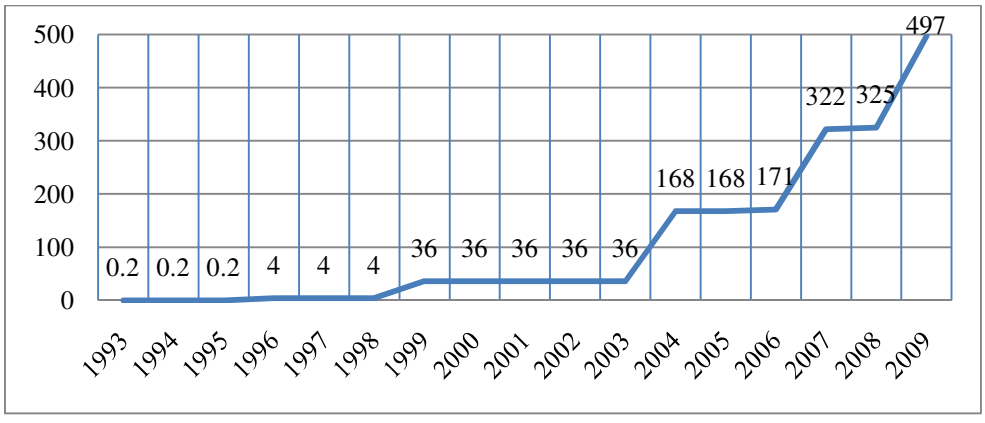

Figure 4: New Zealand's installed Wind Energy Capacity 1993-2009 in MW (Global Wind Energy Council, 2010; New Zealand Wind Energy Association, 2010a)

However, until the year 2003, the development of wind turbines had been limited to a few dispersed projects that contributed just 36 MW to the domestic electricity grid. Only from 2004 on, wind energy experienced a significant growth (Figure 4, also Appleyard, 2004). At present, there are eleven wind farms operating in New Zealand ranging from capacities of less than one MW to over 150 MW. The total installed capacity of all eleven sites is 496.3 MW (Table 2).

Table 2: New Zealand Wind Farms Operating or under Construction – Key Facts

Name	Region	Wind farm capacity in MW	No. of turbines	Operator	In operation since
Brooklyn	Wellington	0.225	1	Meridian	1993
Hau Nui	Wairarapa	Stage 1: 3.9 Stage 2: 4.8 Total: 8.7	Stage 1: 7 Stage 2: 8 Total: 15	Genesis	Stage 1: 1996 Stage 2: 2004
Tararua	Manawatu	Stage 1: 31.7 Stage 2: 36.3 Stage 3: 93 Total: 161	Stage 1: 48 Stage 2: 55 Stage 3: 31 Total: 134	Trustpower	Stage 1: 1999 Stage 2: 2004 Stage 3: 2007
Gebbies Pass	Canterbury	0.5	1	Windflow	2003
Te Apiti	Manawatu	90.8	55	Meridian	2004
Southbridge	Canterbury	0.1	1	Energy3	2005
Te Rere Hau	Manawatu	32.5 (operating) 16 (under construction)	65 (operating) 32 (under construction)	NZ Windfarms	2006 (operating) 2010 (under construction)
White Hill	Southland	58	29	Meridian	2007
West Wind	Wellington	142.6	62	Meridian	2009
Horseshoe Bend	Central Otago	2.25	3	Pioneer Generation	2009
Weld Cone	Marlborough	0.75	3	Energy3	2010
Te Uku	Waikato	64.4 (under construction)	28 (under construction)	Meridian	2011 (under construction)
Mahinerangi	Clutha	36 (under construction)	12 (under construction)	TrustPower	2011 (under construction)
Total operating **Total**		**497.3** **614**	**369** **441**		

(New Zealand Wind Energy Association, 2010a)

Although the industry made a dynamic progress in the last decade, wind power still only plays a minor role New Zealand's electricity market (Figure 2). This is partly due to a lack of consistent supporting policy (Barry & Chapman, 2009). There are currently still no incentives for investment in renewable energy generation. Yet, whereas early wind farms were supported un-

der the Ministry for the Environment's Projects to Reduce Emissions scheme, introduced in 2003, new wind farms have proceeded without support, showing that well-planned and executed projects can compete economically with other forms of electricity generation (Global Wind Energy Council, 2010).

Table 3: Proposed Wind Farms in New Zealand

Site	Region	Capacity (MW)	Developer	RMA application status	Application notification
Awhitu	Franklin	18	Genesis	Consented after appeal/on hold	04/2004
Titiokura	Hastings	Up to 48	Unison/Roaring 40s	Consented after appeal	04/2005
Hawkes Bay	Hastings	Up to 225	Hawkes Bay Wind Farm	Consented after appeal	05/2005
Taharoa	Kawhia	up to 54	Taharoa C & PowerCoast	Consented after appeal	12/2005
Taumatatotara	Waikato	Up to 54	Ventus	Consented but on hold	N/A
Project Hayes	Central Otago	Up to 630	Meridian	Environment Court decision appealed to High Court	11/2006
Kaiwera Downs	Gore	Up to 240	TrustPower	Consented after appeal	11/ 2007
Mill Creek	Wellington	Up to 71	Meridian	Consented but appealed to Environment Court	04/2008
Mt Cass	Hurunui	Up to 69	MainPower	Application declined, decision appealed to Environment Court	06/2008
Project Central Wind	Ruapehu & Rangitikei	Up to 130	Meridian	Consented after appeal	07/2008
Waitahora	Southern Hawkes Bay	Up to 177	Contact Energy	Application declined, decision appealed to Environment Court	09/2008
Hauauru ma raki	Waikato	Up to 540	Contact Energy	Called in to a Board of Inquiry, application publicly notified	09/2008
Mt Stuart	Clutha	Up to 6	Pioneer Generation	Consented after appeal	12/2008
Turitea	Manawatu	Up to 360	Mighty River Power	Called in to a Board of Inquiry, application publicly notified	01/2009
Long Gully	Wellington	Up to 12.5	Windflow / Mighty River Power	Consent appealed to the Environment Court	05/2009
Lulworth	Marlborough	Up to 1	Energy 3	Consented after appeal	12/2009
Slopedown	Southland	n/a	Wind Prospect CWP	Not yet applied	-
Puketiro	Wellington	n/a	RES	Not yet applied	-
Hurunui	Hurunui	n/a	Meridian Energy	Not yet applied	-
Windy Peak	Wairapa	n/a	Meridian Energy	Not yet applied	-
Castle Hill	Wairarapa	n/a	Genesis Energy	Not yet applied	-
TOTAL		**Up to 2635**			

(New Zealand Wind Energy Association, 2010b)

Moreover, the wind energy industry in New Zealand has ambitious plans and there are various proposals for future wind farms located all over New Zealand. As at September 2010, 16 new applications for wind farms with a capacity of up to about 2600 MW had been lodged and a further five sites were under investigation (Table 3, Figure 5). The number of proposed wind energy schemes indicates that wind energy resources in New Zealand are much under-utilised. This is surprising when considering the fact that the country is considered to have one of the best wind resources in the world (Ashby, 2004). The country sits in one of the major atmospheric circulatory zones with a prevailing mid-latitude westerly air flow, also known as the 'Roaring Forties'.

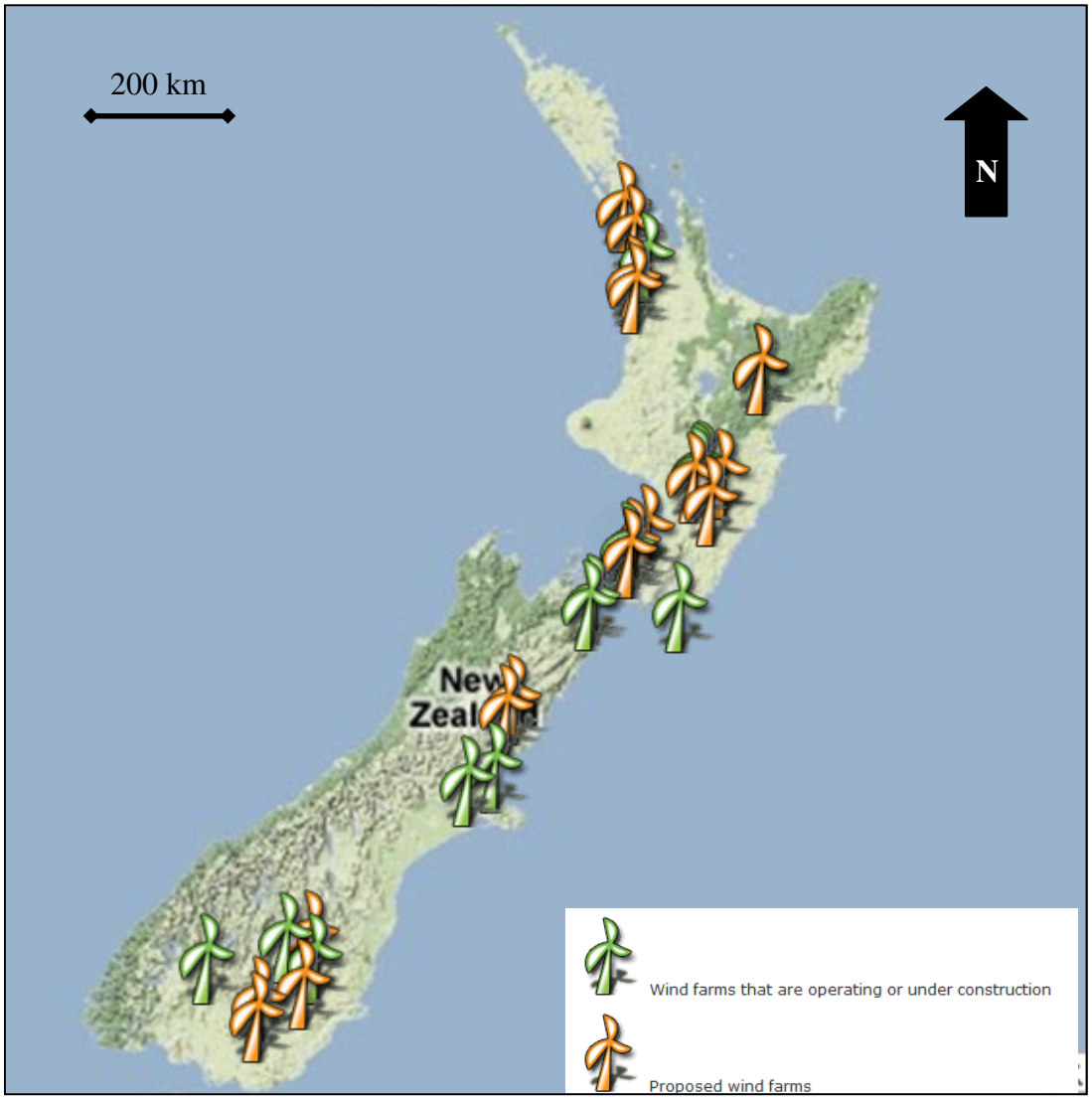

Figure 5: Location of Operating and Proposed Wind Farms in New Zealand (New Zealand Wind Energy Association, 2010a).

Furthermore, New Zealand has a long coastline in relation to its small land area and can consequently benefit from the sea breezes as well, providing the country with a twin advantage regarding wind resources (Energy Link and MHW NZ, 2005, Parliamentary Commissioner for the Environment, 2006). Taking the capacity factor of wind turbines into account, turbines operated in New Zealand have almost twice the global average productivity (Barry & Chapman, 2009). With this significant wind resource potential, it is estimated that, based on technical and operational issues only, wind energy from locations on land is able to supply about 20 to 25 percent of the national electricity demand (ibid., 2009) and therefore could replace coal and gas in the energy mix.

Consequently, being technically and commercially viable, wind energy would be optimal to support the targets of the Government regarding independence of foreign fossil fuels and minimisation of greenhouse gas emmissions. It also supports the diversification of renewable energy sources and thus helps to reduce the heavy reliance on hydropower in New Zealand. It is therefore assumed to play a major role in reaching the '90 percent' target of the New Zealand Energy Strategy (Graham et al., 2009). It would also help to promote New Zealands 'Clean and Green' image as the life-cycle CO_2-emissions of wind turbines are much lower than of any other form of energy generation except nuclear power generation (Elliot, 2007b). Moreover, a survey that examined the public perception of renewable energy, conducted in cooperation with the Energy Efficiency and Conservation Authority in 2008 showed that wind power in general has a very high public approval rating (generally supported by 88% of New Zealanders) compared to other sources of electricity generation. (Nielsen Research, 2008).

In reality however, and despite this strong potential, New Zealand is well behind other nations in using its wind resources. Besides the inconsistency of Government investment-incentives, one major reason for the lack of wind energy-utilisation potentially could be seen in the resource consent process and local opposition. All 16 projects, for which resource consent-applications have been lodged since 2005, had to face delays throughout the consent procedure. Five of these projects have to be re-heard in front of the Environment Court, after the initial consent decision did not satisfy either the applicant or the appellants and currently one decision is processed in front of the High Court, a superior court of the Environment Court. In two cases the Minister for the Environment used the call-in option (Table 3). A further two projects will not proceed after unsuccessful consent applications. In summary, wind energy

developers in New Zealand are facing increasingly long consent procedures, leading to significant additional costs.

New Zealand is not the only country that faces major obstacles in the establishment of renewable energy schemes and wind farms in particular. It is of general international acceptance that some of the most limiting factors in the growth of wind power are socio-political factors, such as public acceptance of individual schemes, the planning framework and other dimensions of the local politics of planning (Ellis et al. 2007).

2.1.4 Energy Generation in the Offshore Environment

A relatively recent development in other countries that potentially circumvents public opposition and exhausting planning procedures is the construction of renewable energy schemes, and wind farms in particular, in the offshore environment (Figure 6). Large-scale offshore wind power schemes are already established in countries like Denmark, the United Kingdom, and Germany (International Energy Agency, 2005).

Figure 6: Horns Rev II, North Sea wind farm, Denmark (Global Wind Energy Council, 2010)

The extension of wind energy schemes into the marine environment is a considerable turn of events in the renewables revolution (Jay, 2010). Although the establishment of wind farms offshore requires more capital compared to onshore-sites (Markard & Petersen, 2009), several advantages can be drawn out of the offshore location.

- **The resource potential:** Compared to locations onshore, winds are stronger and more consistently offshore. In other words, offshore turbines usually produce more electricity per installed generation capacity than onshore wind power plants. Furthermore, large turbines with an output of several megawatts each can be better utilised which improves the economic viability through economy of scale-effects. Combined with decreasing costs in construction as more experience in the offshore environment is gained it represents a new, high potential source of electricity generation (Taylor, 2004; Markard & Petersen 2009).
- **Availability of space**: It is a shared perception that there will ultimately be practical limits to onshore wind energy (International Energy Agency, 2005). One limiting factor on land is often the availability of appropriate locations due to land-use conflicts. In general, moving into the offshore environment means that vast, continuous areas are available for large scale wind farms with a high number of turbines without having the physical constraints from locations on land. This again leads to increasing economies of scale (Jay, 2008).
- **The general public nature of the seabed:** Whereas on-land wind farm developments usually take place on private properties which potentially can lead to additional time and cost delays (e.g. due to negotiations with land-owners in order to purchase or lease sections, or opaque property rights) the offshore environment is of public nature in many countries which can facilitate the siting process (Portman et al., 2009).
- **Public opposition and planning procedures:** In many countries the planning system has gained the reputation of being a source of delay and obstruction when developing wind farms as it generally triggers and incorporates public opposition (Jay, 2010). It is the general expectation that wind energy projects will provoke less public opposition if out at sea rather than on land, because it is beyond people's immediate surroundings. Furthermore, in many countries, spatial planning controls are absent and uses in the offshore environment follow a different procedure of obtaining permission. Therefore, they potentially can avoid 'planning difficulties' and it is generally expected that it is more likely to gain planning permission (Twidell & Weir, 2006; Jay, 2008). However the reality shows varying results depending on the individual country, site and planning system (Firestone & Kempton, 2007; Synder & Kai-

ser, 2009). If this advantage is given in New Zealand is a question which is dealt with in the following sections of this dissertation.

Besides the advantages that come along with the relocation of wind farms to the offshore environment, there also disadvantages in the marine environment. Due to the high costs for installation, maintenance, insurance, and grid connection, the electricity generated by offshore wind farms is more expensive than generated from onshore wind or conventional sources of electricity generation (Snyder & Kaiser, 2009). However, Markard & Petersen (2009) state that the advantages of offshore wind power, such as e.g. larger turbines, bigger scales and therefore increased efficiency seem to justify the extra costs for construction, grid connection and maintenance.

2.1.5 International Development of Offshore Wind Farms

Recent years have shown that offshore wind farms can play a significant role in the market for renewable electricity generation especially in Denmark and the United Kingdom. Furthermore, other countries like Germany and Spain are entering this field of energy generation and have ambitious goals for the next years (European Wind Energy Association, 2010a). In the last ten years, the industry had considerable growth rates (Figure 7). Consequently, as of the End of June 2010, the operating European offshore wind farms had a total capacity of 2396 MW. Furthermore, 16 offshore wind farms are under construction with a total capacity of 3972 MW (European Wind Energy Association, 2010b).

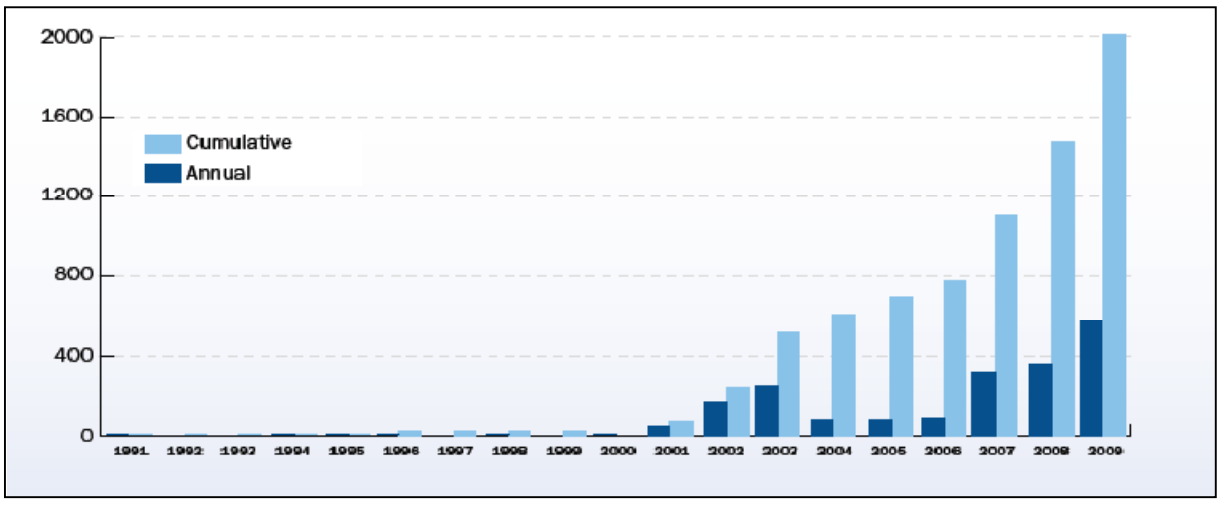

Figure 7: Installed Capacity of Offshore Wind Farms in Europe from 1991-2009 (in MW) (European Wind Energy Association, 2010a)

2.1.6 RENEWABLE ENERGY IN NEW ZEALAND'S OFFSHORE ENVIRONMENT

As of September 2010, there are no plans to establish offshore wind energy facilities in New Zealand. Based on several facts, however, it is argued in this dissertation that it is likely that plans for such a development will be made in the near future:

- **Technology** of renewable energy generation offshore is rapidly improving. Tidal power, wave power generation and especially offshore wind generation are becoming economically viable as their operation in other countries prove.
- New Zealand's **geographical location** and structure offers a huge potential for energy generation in its coastal and marine environment. Besides the potential for generating electricity through tidal and wave power (Power Projects ltd., 2008), the potential for offshore wind farms is the same that makes it desirable for sites, (i.e. having one of the best wind resources in the world). Yet, there appears to be no specific siting study for offshore wind farming in New Zealand and this would exceed the scope of this dissertation. However, it can be stated that, although the waters around New Zealand tend to descend steeply to significant depths compared to Europe, there are a few places where water depths are suitable for development at a distance offshore, (e.g. offshore of the Catlins or in the South Taranaki Bight). With deepwater technologies becoming more mature, various other locations around New Zealand could be utilised (Chazan, 2007, Roddler & Weinstein, 2010).
- Key drivers for the development of renewable energy are **policy schemes** and strategies designed by governments to promote climate change protection, technical progress and sustainable development. New Zealand introduced several policy approaches to promote renewable energy. The NZES 2007 and the recently released Draft NZES 2010 both contain the target of 90 percent electricity generation of renewable energy sources by 2025.
- Renewable energy, mainly wind energy and hydropower schemes are experiencing increasing **resistance on land** and face significant delays in the resource consent process.

Although there are no plans to develop offshore-wind farms in New Zealand to date, three resource consent applications for renewable energy schemes in the marine area have been lodged in recent years. Two of them were for small-scale projects in Cook Strait and offshore of Taranaki. Both applications were not notified and resource consent was granted. In case of the third project, the Environment Court is to decide about a large scale project that uses tidal currents to produce electricity via underwater turbines in Kaipara Harbour.

2.2 THE ROLE OF PLANNING IN THE DEVELOPMENT OF RENEWABLE ENERGY

Land-use or spatial planning can be generally defined as a decision-making process for influencing or determining the way in which physical space is used. Different countries use different approaches to land use-planning, but several characteristics are universal among all different forms of planning. Planning is future-oriented and makes use of strategies that aim to achieve certain targets. Furthermore, planning is mostly a public-sector activity and administered by different levels of government. Thirdly, it has the function to both shape and protect the natural environment as well as the built environment (after Jay, 2010). Usually, land-use or spatial planning is constituted in legislation and statutory rules of an individual country. The planning system of a country is essential as it seeks to ensure that activities are properly considered within the context of competing land uses and interests, environmental concerns, and that affected communities can participate in the decisions that are made (ibid., 2010).

Besides policy instruments (e.g. strategies with renewable energy targets, and also governmental incentives such as subsidies, tax instruments, feed-in tariffs etc.), the spatial planning framework of a nation can have a significant influence on the development of renewable energy schemes. Taking this further, the tendency for spatial planning decisions to become a focus of opposition has also led to planning often being represented as 'a problem' in establishing wind farms and therefore in meeting renewable energy targets (Cowell, 2007).

Several publications state research conducted on the interrelation between wind power implementation and the policy and planning framework of individual countries. Very comprehensive approaches are provided by Toke (2005) and Breukers & Wolsinck (2007), who come to the conclusion that policymakers and developers do not sufficiently recognise the nature of tensions at a local planning level that obstruct the development of wind farming. They recommend the facilitation of local ownership and a better approach to participation in project planning. Portman et al. (2009) use comparative policy analysis to assess the role of nations' domestic legal and policy frameworks in the siting of offshore renewable energy facilities in the United States and Germany. Although primarily conducting research about the development offshore, they also provide valuable information about the planning procedures on land in those countries. Both publications, and that of Markard & Petersen (2009), highlight that Germany's comparative success in establishing wind power for example, is due to different policy schemes, such as the introduction of the feed-in tariff. Moreover, their spatial planning process

privileged wind power by means of federal law that urged municipalities to designate local areas for wind parks.

For New Zealand, research is still quite scarce. Publications by Sagemuller (2006) and Palmer (2007) give comprehensive overviews over the policy regime and planning legislation governing wind farm development in New Zealand, but the content is not entirely up to date. They furthermore do not go into detail regarding the actual process to obtain a resource consent and the difficulties occuring in that process which are key points in the realisation of wind farm developments. Moreover, Barry & Chapman (2009) exermine the pattern of recent wind industry developments in New Zealand. They argue that one of the major characteristics limiting the potential development of the industry is the trend towards large scale devlopment, leading to strong public resistance in the planning process and they conclude that small-scale wind farms have much better chances to be developed in New Zealand. One of the major barriers equally to small scale and large scale wind farming is the resource consent process in New Zealand. Whereas large scale wind farms are more likely to face strong local opposition, the resource consent costs for small scale farms are disproportionately high, which drives developers to build larger wind farms. Recommendations in their publication are to streamline the consenting process or to make small-scale wind energy schemes a permitted activity. They also criticise that the New Zealand government does not provide consistent supporting policy, or other forms of subsidies.

2.2.1 Planning of Renewable Energy Schemes in the Offshore Environment

In many countries, the spatial planning system does not extend below the shoreline and the offshore environment often is not governed by such a framework. However, the designation of exclusive economic zones under the United Nations Convention on the Law of the Sea has opened a huge new area for potential exploitation (Jay, 2010).

As the planning framework on land has gained the reputation of being a source of delay and obstruction when it comes to the realisation of renewable energy schemes, the development of such schemes offshore can at times be seen as the easier alternative. Furthermore, in contrast to private property rights on land, the marine space of most countries is public property. This makes it relatively cheap with the main costs being those in obtaining consent to occupy and use the space in the marine environment rather than purchasing or leasing the property

(Makgill & Rennie, 2010). However, the lack of a comprehensive planning framework does not mean that developers can establish activities in the marine environment without going through a regulative process. In recent years in many countries the allocation of marine space often has been regulated by individual authorities that were responsible for one certain industry or sector, (e.g. fishing, navigation, mineral extraction, etc). As there was plenty of space and conflicts of different uses were an exception there was no much need for a management of their relationship (Cicin-Sain & Knecht, 1998). The result was that a number of authorities and departments exercised different regulatory powers over users of the sea, often with little reference to each other (Jay, 2010).

In the UK for example, a country that can be considered as a one of the pioneers in offshore wind farming, the consequence was that early developers who wanted to establish renewable energy projects in the offshore environment had to negotiate a complex series of authorisations involving more than one government body (Jay, 2008). However, a bureaucratic and practically difficult consents system under the control of the central government still seemed much more favourable than the spatial planning structures administered by local authorities on land.

Yet, especially in areas like the North Sea in Northern Europe, the uses of the marine environment have drastically increased and activities like offshore energy, aquaculture, maritime transport, and tourism are expected to increase significantly in the upcoming years. This calls for a more comprehensive and integrated approach for the management of the marine environment (Douvere, 2008; Rennie, 2010).

Consequently, in the last two decades, efforts to a more integrative and strategic approach to coastal and marine planning were undertaken and the concept of 'Integrated Coastal Management' or 'Integrated Coastal Zone Management' evolved, which is a process that ensures sectoral integration and governmental harmonisation of decisions in regard to the coastal and marine environment (Cicin-Sain & Knecht, 1998; Makgill & Rennie, 2010).

One form of integrated management of the offshore environment that has come to much attention and is emerging in several countries in particular surrounding the North See in northern Europe is the concept of Marine Spatial Planning (MSP). MSP was originally developed in order to develop marine protected areas, e.g. the Great Barrier Reef, but now also is used to manage the multiple use of marine space (Douvere, 2008). It is defined as 'a public process of analysing and allocating the spatial and temporal distribution of human activities in marine

areas to achieve ecological, economic, and social objectives that are usually specified through a political process' (Ehler & Douvere, 2009, p. 18). In other words, it is an ecosystem-based sea use management approach that allows the integrated and adaptive planning of the marine area (Douvere, 2008).

The development of offshore wind energy and spatial planning in the marine environment was primarily dealt with in the publications by Jay (2008; 2010) and also Portman et al. (2009), which highlight that MSP allows a proactive and participative determination of which marine areas are most suitable for wind farm development by considering environmental constraints, and other conflicting planned or existing uses. One other main advantage of MSP is that it provides certainty for developers and investors (Portman et al., 2009).

Planning and the development of renewable energy schemes in the coastal environment in New Zealand is a field where publications are still scarce. Loomb & Robertson (2009) offer a brief overview of planning for marine energy in New Zealand, but this article focuses only on wave and tidal energy. Ashby (2004) briefly describes potential problems of establishing off-shore wind parks in New Zealand in his publication, which is, however, not up to date in terms of planning regulations. A comprehensive publication regarding the coastal management system in New Zealand is provided by Makgill & Rennie (2010), who analyse the planning system that is in place against its value in terms of integrated coastal management principles and come to a positive result. However, they do not go into detail regarding the applicability of New Zealand's coastal management system for certain types of activities.

2.3 PUBLIC PERCEPTION OF WIND ENERGY PROJECTS

The spatial planning process in New Zealand allows every person to lodge submissions on notified resource consent applications. Furthermore, every submitter is allowed to appeal the decision that was made to the Environment Court. Public participation is a fundamental feature in leading policy and planning systems. It ensures that all stakeholders and interest group have the opportunity to be heard and are represented within the decisions that are made. This has several advantages. For once, the costs and benefits of identifying and addressing all potential issues of a decision are more likely to be evenly distributed if all stakeholders are able to participate. Second, public participation enables more information to be taken into account in the decision-making process if all relevant points of view are heard. Moreover, it is important regarding the establishment and maintenance of public confidence in policies and plans that are adopted (Makgill & Rennie, 2010).

However, wind energy faces a significant level of public resistance in New Zealand and it is not the only country experiencing these kinds of problems. Public acceptance and opposition to renewable energy projects and in particular wind farms is generally considered to be one of the most limiting factors for the growth of the industry (e.g. Devine-Wright, 2005; Firestone & Kempton, 2006; van der Horst, 2007). Pasqualetti (2001) calls it the 'irony of wind power' that the objections to an environmentally friendly energy scheme often have environmental origins. In other words, it is generally the aesthetic factor of destroyed views of the landscape and noise disturbing the environment that leads to local opposition.

In academic literature, this is often described as the NIMBY–effect, which describes the phenomenon that certain services are in principle considered as beneficial by the majority of the population, but that proposed facilities to provide these services are in practice often strongly opposed by local residents (van der Horst, 2007). There is a variety of publications that deal with public acceptance of renewable energy schemes. Some argue that the NIMBY-effect is not the only and main theoretical concept for explaining the public objection to wind farms (Devine-Wright, 2005; van der Horst, 2007). Devine-Wright (2005) notes that the wide range of empirical studies on the public perception of renewable energy projects has generated some useful insights and has established the fact that public perception of wind farms is a complex, multi-dimensional phenomena. It depends on social, economic, cultural, political and physical factors which all have to be seen in the individual context of a proposed wind energy scheme

(see also Ellis et al. 2007; van der Horst, 2007). However, Devine-Wright states that, despite substantive criticism of the NIMBY-concept, there is no deeper theoretical framework to which research can refer. In other words, it has no conceptual foundation and thus, research is rather filled with describing the perceptions of wind farms than providing explanation for these. However, there are some exceptions to this and some authors, such as Bell et al. (2005) (using the conceptual framework of the 'social gap'), and also Wolsink & Breukers (2010) try to provide explanations for perception of wind energy. These authors find similarly that more collaborative and participative development processes with emphasis on local issues are more likely to succeed in the realisation than big-scale autocratic developments. Moreover, Devine-Wright (2005) introduces a framework which classifies the public perception of wind power (Table 4).

Table 4: Devine-Wright's Typology

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 Public Participation and Consultation
Socio-economic	Shareholding
Social and communicative	Social Influence Process
Symbolic and ideological	Representations of Wind Turbines
Local	Place and Identity Process Local or Community Benefit and Control NIMBYism
Personal	Previous Experience and Knowledge

(Devine-Wright, 2005)

Regarding, the public perception of offshore wind parks, research is still rare. Firestone & Kempton (2007) analyse the public perception of a proposed offshore wind-farm scheme in the

US. The planned area, Cape Cod, MA, is a very popular vacation spot and this project is heavily opposed by a group of local activists and still on hold. Pasqualetti (2004) concluded that offshore wind farming has not turned out to be the universal remedy in terms of mitigating complaints about aesthetic intrusion. This however, is heavily dependent on the context and location of the individual project as Portman et al. (2009) highlight by comparing projects in Germany and the United States. The same statement is made by Ellis et al., (2007) who highlights that public acceptance and opposition to any specific proposal is clearly context dependent and that participation needs to be customised around the local issues.

In New Zealand, research about the public perception of wind energy is scarce. There are, however a few valuable publications. Graham et al. (2009) investigate the public perception of wind energy in New Zealand by analysing the submissions that were lodged through the planning process for three different wind farms on the South Island of New Zealand. However, they only analyse the submissions that were lodged locally and give certain recommendations of how to reduce local opposition. One major fact, especially for New Zealand is the location of the wind farm site and its surroundings. Similarly, Barry & Chapman (2009) are using a survey to assess the public attitude towards small-scale wind farm developments in New Zealand.

There are currently no publications regarding the public perception of renewable energy projects in New Zealand's offshore environment as such schemes like the plans to built tidal current turbines in Kaipara Harbour, only became reality very recently.

In conclusion, the literature review ascertained that the offshore environment has become a viable alternative location for renewable energy generation and especially wind farms in many countries. As in other countries, New Zealand's wind farms are facing increasing resistance and delays in the planning processes on land. However, if the offshore environment in New Zealand is an alternative location for renewable energy generation, has not been ascertained yet from a planning perspective. Consequently the following analysis aims to provide new insights into this field by comparing the spatial planning procedures for both environments and examining the public perception of individual energy generation schemes on land and in the marine environment.

3. METHODOLOGY

Two analytical methodologies are applied to achieve the set research objectives. In the first element of the analysis the main characteristics of New Zealand's spatial planning framework and the differences in the processes to obtain resource consents on land and in the marine area will be analysed. The analysis is based on comparative policy analysis used by Portman et al. (2009). Their analysis looked into the regulatory framework, the public's role in siting, targeted economic mechanisms and indirect mechanisms regarding offshore wind power in Germany and the United States.

For the research of this dissertation one fragment of this analysis is used and adapted to the relevant context. In other words, in contrast to Portman et al. (2009) who compare regularity frameworks of different countries as part of their analysis, here just the statutory framework and the resource consent processes for the land environment and the coastal environment within one country are examined. The aim of this analysis is to find out if the establishment of renewable energy projects in the marine environment is an alternative in terms of a less complex resource consent process. Therefore, individual steps necessary to obtain resource consent in both environments will be presented and their characteristics and differences will be assessed by analysing different case studies. A main indicator for the efficiency of the individual consent procedures will be the timeline of the application process of the case studies.

The second element of the analysis identifies the public perception of renewable energy schemes in New Zealand. The aim is to assess whether or not the general public attitude to wind farms on land would also apply for renewable energy generation in the coastal and marine environment and offshore wind farms in particular. Key data sources for the research are public submissions on wind farm proposals under the RMA 1991. These have been proven useful in related research (Graham et al. 2009) in order to gain insights in the public perception of wind energy in New Zealand. Wind farm development proposals in New Zealand are generally publicly notified. The submissions that were received for a project must be considered in the resource consent decision. The advantage of using submissions is that they are publicly available information and they represent the explicit public opinion about a certain development proposal. A disadvantage as stated by Graham et al. (2009) is that submitters may only state the reasons for support or opposition which to their mind are the most useful information to underpin their position, because they know that the RMA has particular criteria on how de-

cisions are made. In other words, submissions most likely just state reasons within the realms of matters able to be considered under the particular legislation concerned. Consequently, submitters may have a deviating or more diversified opinion about a project than what is actually written on the submission form. However, as all submissions always indicate a certain position they are a useful source of information.

This analysis of submissions will be applied to three case studies. Two of the case studies are proposed wind farms projects on land. The third case study is the only notified renewable energy proposal in New Zealand's marine environment, the Kaipara Harbour project. Although the latter is not an offshore wind farm development, it is intended to get new insights on the process and public perception of large scale energy schemes in the offshore-environment.

The analysis will be partly based on Devine-Wright's (2005) typology (see Table 4), as well as on a further customised framework of Graham et al. (2009), but will be adapted to the research context of this dissertation.

Two major aspects needed to be taken into account for the individual design of the classification in order to make it suitable for the analysis. First of all, the classification is used to assess two different types of renewable energy generation, which are wind farms and tidal current turbines. Therefore, the categories that are used have to apply to both types. Furthermore, the frame needed to be categorised in a way that allowed analysing the attitude of individuals towards renewable energy in general, towards a specific project, and the potential attitude towards renewable energy in the coastal environment and offshore wind farms in particular. Consequently, the questions that have to be asked in order to develop the classification are:

- Does the lodged submission support or oppose the proposed scheme?
- Is the submitter local or non-local?
- What are the main rationales behind support or opposition of a renewable energy scheme?

The framework that was designed taking these issues into account is presented in Table 5. The classification divides the submissions in two main classes, which are submissions supporting the projects and submissions opposing the project. After this initial division different categories are applied to each submission.

It has to be noted that more than one category can apply for an individual submission, depending on its comprehensiveness and detail.

Table 5: Framework to categorise Public Attitudes towards Renewable Energy Projects

Framework to categorise the public attitude towards renewable energy schemes
Submissions supporting the projects
Local **General Support** **Specific Support**
Submissions opposing the projects
Locality **Environmental Issues** **Social/Community Issues** • Health / Safety • Recreation/Access to the Area • Cultural / Maori **Amenity Issues** • Visual • Noise • Construction / Traffic • Proximity to Houses • Size of the Project and Cumulative amenity effects **Socio-economic Issues** • Property Value • Business / Tourism / Fishing **Technical Issues / Viability of the renewable energy scheme** **Process Issues** **Policy Issues** **Other**

(Partly based on Devine Wright, 2005; Graham et al., 2009)

For the submissions supporting the project, the categories are:

- **Locality:** This category classifies if the submitter lives in the immediate surrounding or near the proposed development. As an admittedly arbitrary rule-of-thumb, every submitter that lives in a radius of about 20km around the location of the scheme is classified as 'local'. For the Kaipara Harbour project, the 20km radius applies for residents living around the Harbour, not just the location of the project. The need for this evolved around the discussion about the question what is 'local' in the marine environment (see Rennie, 2010). For this dissertation, 'local' in the marine environment are individuals that live close (20km) to the site and are therefore more likely to be adversely affected.
- **General Support:** This category classifies the submission that stated general support for renewable energy or wind farms without being specifically about the individual site.
- **Specific Support / Conditional Support:** Submissions that supported not just renewable energy in general, but especially the individual project at its location.

For submissions opposing the projects, the categories are:

- **Locality:** (see above)
- **Environmental Issues:** Submissions opposing the project for its environmental consequences (i.e. on flora, fauna, streams, soil and the ecosystem in general).
- **Social/Community Issues:** Submissions that oppose the project for its social consequences or its effects on the community in general. If an individual submission is more specific on social issues, this indicator contains subclasses categorising concerns regarding **Health/Safety, Recreation/Access to the Area, and Cultural or Maori issues**
- **Amenity Issues**: In this class all submissions are captured opposing a project for amenity issues in general. If an individual submission is more specific on amenity issues, this indicator contains the subclasses, categorising concerns regarding **Visual effects, Noise effects, Construction/Traffic/Roading effects, Proximity to Houses, Size and Cumulative amenity effects to other renewable energy projects.**
- **Socio-economic Issues:** Submissions opposing a project for socio-economic reasons. Subcategories are effects on **Property Value and Business/Tourism/Fishing** (fishing only applies for the Kaipara Harbour-project)
- **Technical Issues / Viability of the renewable energy scheme:** Submissions that oppose the project for technical reasons or do not believe in the viability of the individual form of renewable energy generation.
- **Process Issues:** This category contains submissions that raised doubt about the integrity of the process of the resource consent application, for example dissatisfaction with the way the developer is conducting the process or that parts of the process are not legitimate.
- **Policy Issues:** Submissions that oppose the individual project because it does not go along with national or regional policies and strategies regarding renewable energy generation.
- **Other**: Submission that stated other reasons than those listed above. In case of the Kaipara Harbour tidal current power scheme, this category contains the subclass navigation and boating risk. This only applies marginally for land wind farms as very few submissions stated the navigation risk for airplanes.

The analysis of the spatial planning frameworks, and the characteristics and differences in the resource consents processes on land and in the marine environment was achieved by studying relevant legislation and statutes, case law, and consent decisions. Applying the findings of the reading analysis to the individual case studies furthermore helped to identify the actual consenting-timeline of those projects and moreover, identified the main sources of delay in the resource consent process. Consequently, the applied methodology proved to deliver the anticipated outcomes. However, it would be interesting to include more case studies into the research in order to generate a more detailed examination of the planning procedures of New Zealand's wind energy projects. Unfortunately this is not possible at this stage due to time restrictions and a word limitation of this project.

The analysis of the submissions of the individual projects was achieved by reflective repeated reading of the relevant submissions itself, relevant consent decisions and submission summaries where applicable. The categorisation of the submissions was conducted by hand and their analysis was performed using MS-Excel, which was chosen as the most appropriate method given the scope of this dissertation. Although quite an extensive procedure considering the fact that over 1200 submissions were lodged for the three case studies in total, it proved to be an effective method and more practical than conducting interviews on such a high number of individuals. It is moreover more practical than conducting a survey on people participating in the planning process of the individual projects as the expected response rate is usually relatively low.

4. CASE STUDIES

The following paragraphs introduce the case studies which are examined in this dissertation. The limited scope of this dissertation only allows analysing three different examples. The first two case studies represent wind energy generation schemes on land. The Mill Creek project and the Hauauru Ma Raki Wind Farm (HMR) were chosen for this research in particular because each of them follows a different path in the resource consent procedure. Whereas Mill Creek is dealt with through the usual resource consent procedure, the HMR wind farm is dealt with as a matter of national significance. The third case study, the Kaipara Harbour project is chosen because it represents the only large scale, notified renewable electricity generation scheme in New Zealand's marine environment.

4.1 MILL CREEK

Mill Creek is a proposed wind farm scheme in the Ohariu Valley north-west of Wellington. The developer is Meridian Energy. It is planned to establish 31 turbines on a site covering about 1800ha of privately owned farm land. The 31 turbines have a total capacity of up to 71.3 MW (Table 6). According to Meridian Energy, its location close to the Cook Strait and its funnelling effect provides the site with strong and consistent winds, which means that project Mill Creek would generate electricity over 90% of the time. This is enough renewable electricity to power the equivalent of 35,000 average homes.

However, Mill Creek is located close to the highly populated area of greater Wellington. Furthermore, another large-scale wind farm, West Wind, which has been in operation since 2009 and consists of 62 turbines, is located in the close surroundings of the proposed wind farm scheme (Figure A1 in the appendix). The area is also used for recreational purposes like mountain biking and horse riding. The initiative to build the wind farm was from the landowners as a way to support the ongoing viability of their farms and they assigned Meridian for the realisation (Meridian Energy Ltd., 2010). In other words, the wind farm provides an additional income for the property owners on which the wind farm is located. The application to gain resource consent was lodged by Meridian in March 2008 (Meridian Energy Ltd. to the Wellington City Council, Porirua City Council and Wellington Regional Council 2009).

4.2 HAUAURU MA RAKI WIND FARM (HMR WIND FARM)

The Hauauru Ma Raki wind farm (HMR wind farm) is a proposed renewable energy scheme at the west coast of Waikato. It is located along 34km of coastline starting 8 kilometres north of Raglan along the shore up to 4km south of Port Waikato (Figure A2 in the appendix). With 180 planned turbines and a capacity of up to 540 MW, this project can be considered as a very large scale wind farm. It would be able to supply up to 200.000 homes with power (Contact Energy Ltd. 2010). The developers for this project are Contact Energy and the Wind Farm Group (Table 6). The existing use of the proposed location is mainly pastoral farmland. Although the site is located in reach of the major demand centres of Auckland and Hamilton, the area itself is not densely populated. The remote west coast of the North Island however, is known for its appealing scenery and serves recreational purposes. Furthermore, the turbines would be visible from Raglan, which is a seaside village 8 km south of the proposed project and a popular tourist destination. It is also a very famous surf break, protection for which is provided for in the proposed New Zealand Coastal Policy Statement 2008. Contact Energy and the Wind Farm Group lodged the resource consent application for this project in September 2008 (Contact Wind Limited & Contact Energy Limited 2008).

4.3 KAIPARA HARBOUR PROJECT

Kaipara Harbour is the proposed location to build a marine turbine power generation project which harnesses tidal currents to produce electricity. The project comprises up to 200 submerged turbines with a generation of around 200 MW (Table 6). It is planned to site it near the entrance of the Harbour (Figure A4 in the appendix). The Harbour itself is situated in Northland, the northern part of the North Island in New Zealand (Figure A3 in the appendix). Being about 50 km north-west of central Auckland it is close to New Zealand's most populated urban agglomeration and it is also only about 50 km southwest of Whangarei, the capital of the Northland-Region. There are readily available routes to sell electricity using existing transmission lines. According to Crest Energy, which is the main developer in this project, the scheme could generate power for up to 250,000 homes when fully implemented. In contrast to wind farm projects, the tidal power generation scheme is subsidised by the New Zealand Marine Energy Deployment Fund, which granted NZ$ 1.85 million that are used for the resource consent process (Crest Energy ltd., 2010).

The technical principals of tidal turbines are quite similar to wind turbines. There are however, some fundamental differences. Tidal turbines are totally submerged, and therefore usually invisible and silent to humans. Furthermore, tides can be exactly predicted and it is possible to forecast the time and level of power-generation. Kaipara Harbour is a suitable location for this scheme, because its tidal currents are very strong. The tides average about 2.10 m. On the other hand Kaipara Harbour also serves as a location for fishing, recreation, and tourism. Crest Energy lodged a resource consent application in July 2006 and amended it in July 2007 (Crest Energy Kaipara Ltd to the Northland Regional Council 2008).

The Kaipara Harbour project is only one of three marine energy projects that are currently under development in New Zealand and it has by far the largest scale. For the other two projects resource consents were granted in recent years. Neptune Power obtained permission to construct a single underwater tidal current turbine in Cook Strait in 2008 and Power Projects ltd. is allowed to construct a single wave energy converter 4.3 kilometres offshore of the Waitara River mouth in Taranaki. In contrast to the Kaipara Harbour project the effects of both small-scale schemes were considered as minor and thus, the resource consents were not notified (Neptune Power ltd. to the Greater Wellington Regional Council, 2008; Power project Ltd. to the Taranaki Regional Council 2010).

Table 6: Overview over the Case Studies

	Type	**Developer**	**Location**	**No of turbines**	**Electricity generation**	**Application date**
Mill Creek	Wind Farm	Meridian Energy ltd.	Ohariu Valley, NW of Wellington	31	71 MW	03/2008
Hauauru Ma Raki wind farm	Wind Farm	Contact Energy ltd. and Wind-Farm Group	Between Port Waikato and Raglan	180	540MW	09/2008
Kaipara Harbour project	Tidal Power Scheme	Crest Energy ltd.	Entry of Kaipara Harbour	200	200 MW	07/2006 07/2007

(Meridian Energy ltd., 2010; Contact Energy ltd. 2010; Crest Energy ltd., 2010).

5. ANALYSIS

The analysis consists of two main elements. The first element focuses on New Zealand's spatial planning framework and the processes that are necessary in order to obtain resource consent for renewable energy schemes on land compared to the offshore environment. The second element analyses the public attitude towards renewable energy schemes and its role throughout the consenting process. For both elements, the three case studies are examined.

5.1 NEW ZEALAND'S SPATIAL PLANNING FRAMEWORK

In New Zealand, the Resource Management Act (RMA) 1991 is the main planning legislation and governs the consent process for renewable energy developments. In other words, all applications for consents to construct wind farms are assessed against the purpose and provisions of the RMA 1991.

With the planning-framework of the RMA 1991, New Zealand uses a rather neoliberal approach in comparison to the planning legislation in most other countries. By managing the natural and physical resources, it focuses on the effects of activities rather than the activities themselves. Therefore it relies on the market to efficiently decide the most appropriate use of resources rather than having the government direct certain land uses in certain areas through an activities based zoning schemes (Makgill & Rennie, 2010).

The main purpose and principles are set under Part Two of the Act. In there, s5(1) states the overriding purpose of the Act as to 'promote the sustainable management of natural and physical resources'. S6 sets out 'matters of national importance' that have to be 'recognised and provided for' by decision-makers. Section 7 states 'other matters' which decision-makers must 'have particular regard to'. Since the Resource Management (Energy and Climate Change) Amendment Act in 2004, this section contains subsections 7 (i) and 7(j), that is to have particular regard to 'the effects of climate change (s 7(i)) and 'the benefits to be derived from the use and development of renewable energy' (s 7(j)). Section 8 ensures that decision-makers have to take into account the principles of the Treaty of Waitangi. Sagemuller (2006) and Palmer (2007) both assess how wind energy projects can be interpreted under part 2 of the RMA 1991. It is stated that with the insertion of ss7(i) and 7(j), first steps into the direction of promoting renewable energy schemes under part 2 of the RMA 1991 have been made (see e.g.

Genesis Power Ltd. V Franklin District Council [2005] 6 BRMB 123) and that wind energy projects now have a fair chance in the balancing act determining whether it serves the purpose and principles of the RMA 1991 (Sagemuller, 2006).

The RMA 1991 furthermore provides for several planning instruments on different levels which need to be taken into account and contribute to a more coordinated and concrete direction in terms of the development of renewable energy (see Figure 8). On a national level these are National Policy Statements (NPS) , National Standards and the New Zealand Coastal Policy Statement (NZCPS), which is the only mandatory NPS under the Act. In 2008, the Government also drafted a 'Proposed National Policy Statement for Renewable Electricity Generation'. Its purpose is to manifest the governments position on the benefits of renewable electricity generation and consequently, it helps to promote a nationally consistent approach to balancing the competing values associated with renewable energy resources and aims to provide a greater certainty to decision-makers, applicants and the public in general (Ministry for the Environment, 2008).

On a regional level, each council is obliged to publish a 'Regional Policy Statement' (RPS) to manage the natural resources in this area. Furthermore, the regional council may issue Regional Plans. A Regional Coastal Plan (RCP) is mandatory for each region. Within the regional level, every territorial authority has to prepare a district or city plan. Such a plan sets out objectives, policies and rules regarding the effects of land-use in that area. It will include the details for permitted activities, and will define for which acitivities, or more precisely, its effects, resource consents have to be obtained. Categories of rules for which a resource consent has to be obtained are controlled activities, restricted discretionary activities, discretionary activities and non-complying activities. A plan can rule out certain activities or developments if it declares them as prohibited activities. Unless there is a plan change that modifies the class of activity, no resource consent application can be lodged for prohibited activities.

All plans have to have regard to part 3 of the RMA 1991, which sets out duties and restrictions for certain effects on the environment. In practice, wind farms are likely to be discretionary or non-complying activities in district plans and accordingly, a relevant resource consent is required for the development (Palmer, 2007).

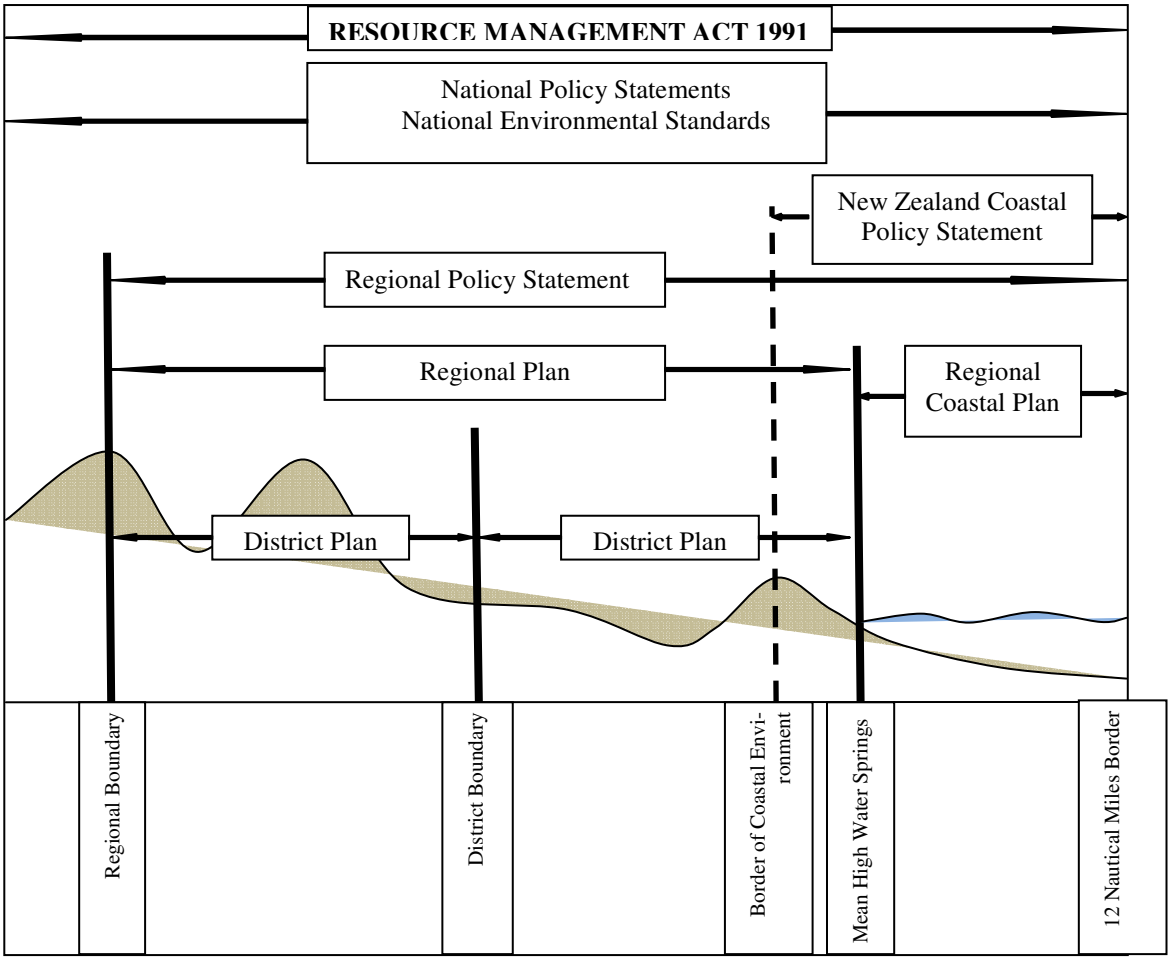

Figure 8: New Zealands Resource Management Policy and Planning Framework (Graphic by the author modified from Greater Wellington Regional Council, 2009)

5.1.1 THE RESOURCE CONSENT PROCESS ON LAND

The resource consent process under the RMA 1991 provides a framework for developers, decision-makers and the wider community to discuss individual projects and activities and to decide if they will take place or how their effects are managed respectively. The RMA 1991 defines different types of resource consents, which are land use consents, subdivision consents, coastal permits, water permits, and discharge permits. The decision-making power is divided between regional councils in respect of air and water, and city and district councils, in respect of land-use activities. Usually large scale developments consist of several resource consent applications as different kinds of work have to be executed, e.g. earthworks, discharge to land, water or air, erection of structures and buildings, piping of water bodies etc. Each resource

consent application is assessed individually in combined or joint hearings as more than one council can be involved. The aim is to achieve an integrated and informed decision.

The application process and its conditions as stated in the RMA 1991 and updated through the Resource Management (Simplifying and Streamlining) Amendment Act 2009 under Part 6 is as follows. An application for resource consent has to follow certain guidelines and includes an assessment of environmental effects, set out in Schedule 4 of the Act. The application generally contains a description of the project, an overview over the consultation procedures, its positve impacts and adverse effects, and intended mitigation measures.

Once resource consent applications are lodged and the relevant council is satisfied with the provided information, the authority decides if the application will be publicly notified, limited notified or not notified. If a proposal is notified, every person has 20 working days to make a submission either in support or opposition of the project. Once the closing date for submissions has come, the council provides the applicant with a list of all submissions and furthermore, it will prepare a report about the proposal. Then, pre-hearing meetings or mediation meetings are optionally held between the applicant and submitters. The next step in the resource consent application process is to hold a resource consent hearing which is held either by one or more commissioners of the local authority or, on request, by one or more 'independent' commissioners. If more than one resource application is lodged and/or more than one local authority is involved, joined or combined hearings can be held. At the hearing, the applicant and submitters who wish to be heard may speak to support their submission. The hearing committee will consider the application, submissions, evidence heared, and any relevant plans and policy documuents and makes a decision according to the principles and provisions of the Act. If it approves the resource consent application, the committee will usually attach certain conditions to the resource consent. The decision of the hearing committee can be appealed to the Environment Court within 15 working days by either the applicant if the consent is declined, by the submitter if the consent is approved, or by either side if their concern relates to conditions on the consent. Once an appeal has been lodged other interested parties may join the proceedings to make sure their needs are represented, if necessary, at the hearing. The Environment Court then can reassess the application. Environment Court decisions can be appealed to the High Court only on points of law. Since

the simplifying and streamlining amendments of the Act in 2009, the applicant can also request for the application to go directly to the Environment Court.

For large scale projects which may initiate a strong reaction in public and media there is also an alternative path that a resource consent application can take. The Minister for the Environment can determine that a proposal is of national significance and he can refer it to a Board of Inquiry (BOI) or the Environment Court for consideration and decision, which is called a 'call-in'. Matters of national significance can be identified in different ways:

- An application can be lodged directly to the Environmental Protection Agency (EPA), who may recommend the Minister to 'call in' the matter. The EPA was established with the 2009 amendments of the RMA 1991 and its task is to receive and process applications for projects of national significance as well as to provide support to the BOI when considering proposals.
- The applicant or local authority can ask the Minister to 'call in' and refer the matter to a BOI or the Environment Court.
- The Minister can intervene on his own initiative after an application has been lodged with a council.

A matter becomes 'called in' usually if the proposal has aroused widespread public interest, has strong effects on physical and natural resources, or is to big in scale to be handled by one local authority. The procedures used by a BOI and the Environment Court are similar to the usual resource consent process, but cross examination may be permitted during the hearing. The decision reached by a BOI or the Environment Court can be appealed to the High Court only on points of law. However, if a proposal is considered a matter of national significance the consent process might be more detailed and therefore more time and cost consuming Yet the intend of the call-in provisions is to provide a fast-track for major applications (Figure 9).

5.2 SPATIAL PLANNING IN NEW ZEALAND'S COASTAL ENVIRONMENT

The coastal environment or more precisely the Coastal Marine Area (CMA),is also governed by the RMA 1991. Therefore, New Zealand became on of the first countries that implemented statutes requiring integrated coastal management of its coastal and marine areas (Makgill & Rennie, 2010). One exception is the fisheries-sector, which is governed by the Fisheries Act 1996. Besides the fisheries-sector, New Zealand's coastal management framework is considered as a best practice example of intergrated management (ibid.,2010).

The process of managing activities in the coastal marine area is similar to the spatial planning process on land, but there are certain differences. As it is in the case for spatial planning on land, potential activities have to be assessed against Part 2 of the Act (see above) and the duties and restrictions of Part 3 of the RMA 1991 apply. Section 12 , s 12A, and s 12B deal with activities in the CMA. However, as the CMA is generally public property, the enabling principle of the RMA 1991 does not apply in those sections and a more precautionary, restrictive approach is chosen. Thus, activities in the CMA are prohibited unless they are of de minibuis scale, a rule in a plan allows it or a resource consent is obtained (ibid., 2010).

As stated above, there are several planning instruments on different levels which have to be considered when assessing acitivities. In the case of the CMA, the NZCPS is of significant importance as it sets out the main objectives and policies for the coastal environment (including the CMA) and any plan on a lower level has to give effect to it (see Figure 8). Its first version was published in 1994 and currently the proposed NZCPS 2008 is being considered by the Minister of Conservation. The priority of the objectives and policies of the NZCPS is set for the preservation of natural character of the CMA and the protection of areas from inappropriate use and development. On the regional level, councils are obliged to have Regional Coastal Plans (RCP), which contain rules regarding the use of the CMA. RCP are developed in conjuction with the Department of Conservation and approved by the Minister of Conservation. An exception to the usual, effects-based planning framework are the so called Aquaculture Management Areas (AMA). For aquacultural activities, a more prescriptive activities-based planning approach is used (see Loomb & Robertson 2009; Rennie, 2009)

5.2.1 THE RESOURCE CONSENT PROCESS IN THE CMA

The decision-making powers regarding activities in the CMA under the RMA 1991 are in the hands of the regional council, unless the application is considered nationally significant or appealed to the Environment Court. A resource consent in the CMA is a 'coastal permit'. Erecting a permanent structure in the offshore environment and occupying the seabed is subject to section 12 of the Act and needs resource consent unless allowed by a rule in the coastal plan.

The process of obtaining a coastal permit is similar to the process of obtaining other resource consents and the same conditions for notification, submission, hearing, decisions and appeals apply (see chapter 5.1.1). Nevertheless, there are certain differences in the coastal permit application process. When making a decision on a coastal permit, the regional council must consider the rules in the relevant RCP and the NZCPS policies. However, the NZCPS schedules certain types of activities, which incorporate the Minister of Conservation into process. Those activities are called Restricted Coastal Activities (RCA) and are types of activities that have or are likely to have a significant or irreversible adverse effect on the CMA.

If an activity is declared as a RCA, the procedure to obtain a coastal permit follows a different way. Until the 2009 amendments of the RMA, the decision-making power regarding RCA was in the hands of the Minister of Conservation. This has changed since October 2009. According to the new procedure for RCA, the council must publicly notify the application and furthermore, it has to provide a copy to the Minister of Conservation and relevant territorial authorities. For the hearing and the decision of the application, the council has to delegate its functions, powers and duties to one or more persons as defined in s 34A(1) of the RMA. This has to include one person nominated by the Minister of Conservation. The decision notice must then be served on the Minister of Conservation who does have a right of appeal under s 120 of the RMA. A coastal permit granted for a coastal marine area (CMA) is to be treated as if it were granted by the regional council. Consequently, although the Minister's decision-making power has been removed, the Minister still has the opportunity to monitor the effect and implementation of coastal permits (Ministry for the Environment, 2009) (Figure 9).

Furthermore, if a project in the CMA is considered as of national significance, the Minister of Conservation can 'call-in' the application, following the same procedure as the Minister for the Environment conducts for applications on land. Consequently, he obtains the decision-making power for coastal permits that are considered matters of national significance.

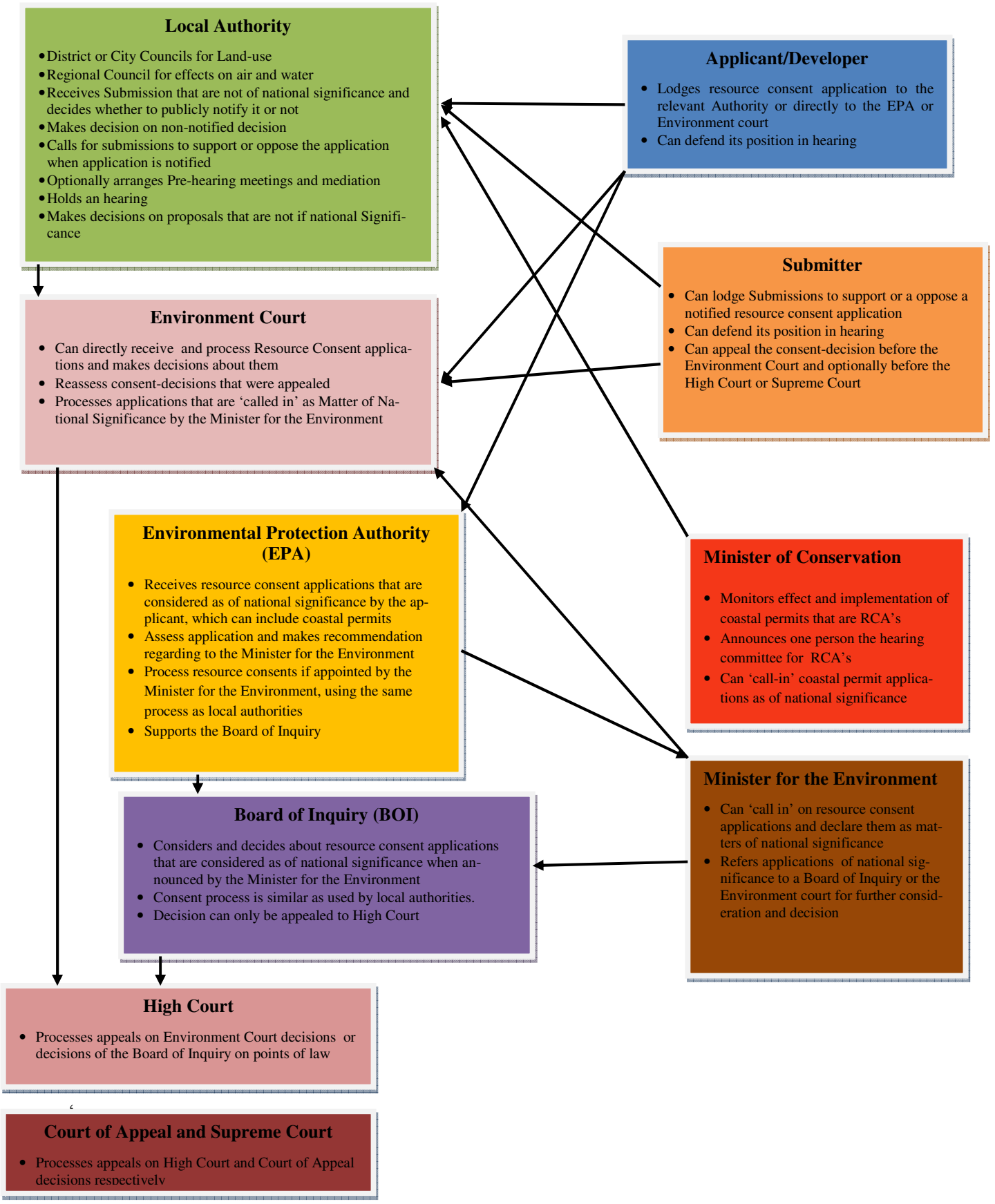

Figure 9: The Framework of the Resource Consent Process (Illustration by the author)

The analysis of the spatial planning frameworks for activities on land and CMA showed that the resource consent processes are similar for both environments. However, there are differences if the activity is classified as a matter of national significance or as a RCA. In both cases a more centralised resource consent process applies. The next sections analyse the application of the existing resource consent framework by looking at three different case studies. Furthermore, the role and characteristics of public perceptions of wind farms in the consenting process are examined.

5.3 CASE STUDY 1: MILL CREEK

In March 2008, Meridian lodged the application for resource consents to the Wellington City Council, Porirua City Council and Wellington Regional Council. Consents that were thought included permission for the erection of the turbines, adjacent service and transformation facilities, earthworks, a new access road, and discharges to land, water, etc. According to the relevant plans under the RMA, which are the operative Regional Plans for the Wellington Region, the Wellington City District Plan, and the Porirua City District Plan, the applications are discretionary activities as most of the proposed activities were 'non-rural'. The application was considered to have effects that are more than minor and was publicly notified in April 2008. The timeframe to receive submissions was extended two times to 50 days in total. In this time 797 submissions were made.

5.3.1 ANALYSIS OF THE SUBMISSIONS LODGED

Of the 797 submissions that were made on the Mill Creek project during the resource consent process, 380 supported the proposal whereas 410 were lodged submission in opposition to the scheme; 7 submissions where neutral (Figure 10). Nine out of ten submissions supporting the project were lodged locally (91%).

Out of 380 supporting submissions, 109 (29%) stated site-specific reasons and 271 (71%) stated support for wind energy in general. These figures indicate that the main share of submitters supports renewable energy schemes in general. Specific support mainly was expressed stating either the benefits of the wind farm for landowners or site-related factors, such as optimal wind conditions or the proximity to Wellington as a centre of demand.

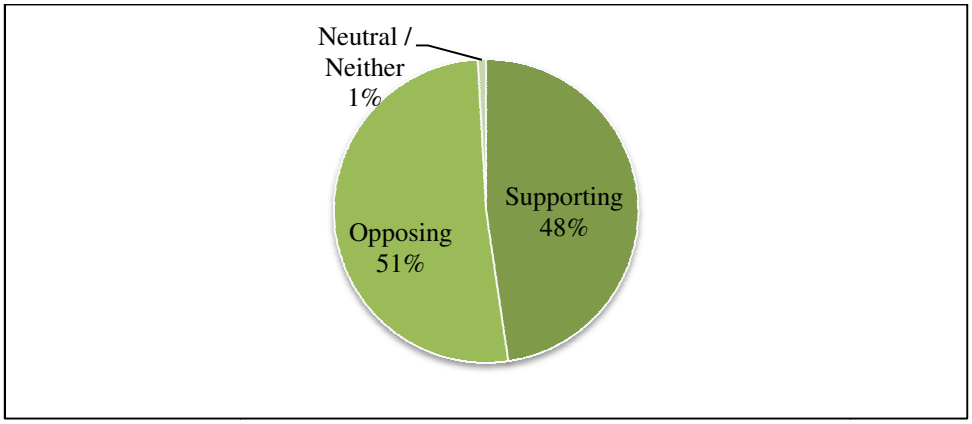

Figure 10: Submissions for Mill Creek

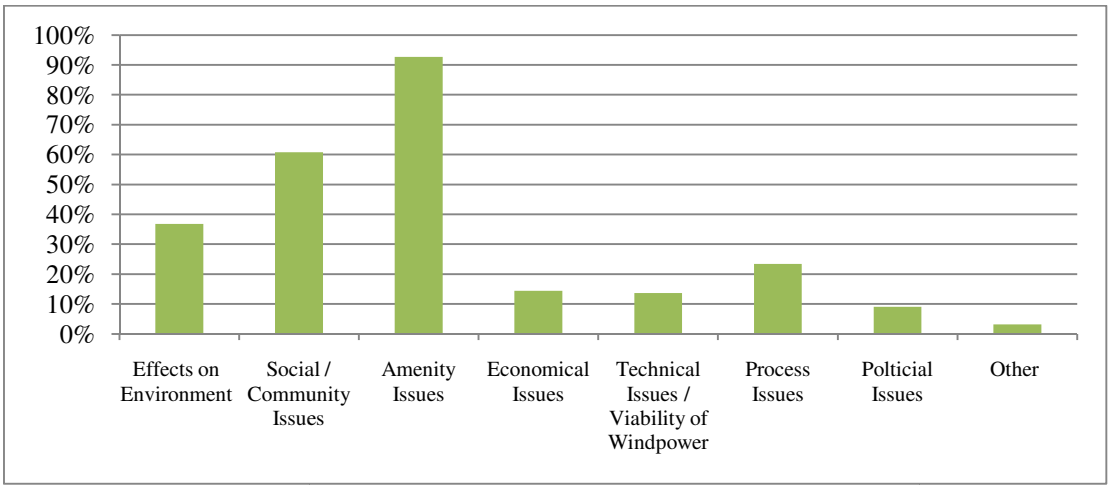

Figure 11: Reasons for the Opposition of Mill Creek

About half (51%) of all submissions opposed the proposed wind farm scheme and 90 % of those, or 369 absolutely, were lodged by persons that live in a 20km radius around the planned location. Only 10% of all submitters opposing the project lived further away from the scheme.

Over 90 % of all submissions that were lodged to oppose the wind farm scheme stated amenity reasons (Figure 11). Looking at the subcategories of the amenity issues, one major concern were the visual effects as expressed by 68% of all opposing submissions. Furthermore, the noise effects were an issue for 63 % of all opposing submitters. More than one-third stated the effects of construction, traffic and the new roading scheme as negative impacts. A further 20 % were worried about the size of the wind farm and/or its cumulative amenity effects with the adjacent West Wind project. Combining the adverse visual, audible, and construction effects, 31% of the opposing submissions stated the proximity to existing dwellings as a main concern (Table 7).

Table 7: Detailed Overview over the Reasons for Opposing Mill Creek

Reason	No.	Percent
Environmental Issues	151	37%
Social / Community Issues	249	61%
Health / Safety effects	240	59%
Recreational effects	31	8%
Cultural effects / Effects on Tangata Whenua	6	1%
Amenity Issues	380	93%
Visual effects	279	68%
Noise effects	258	63%
Construction / Traffic effects	138	34%
Proximity to Houses	126	31%
Size / Cumulative effects	82	20%
Economical	59	14%
Effects on Property Values	47	11%
Effects on Business / Tourism	20	5%
Technical Issues/ Viability of Windpower	56	14%
Process Issues	96	23%
Political Issues	37	9%
Other	3	1%
Total Number of Opposing Submissions*	410	-

*** Note: Submissions can contain more than one reason and do not add up to their total number**

Social and community issues were often named in combination with amenity effects and listed in 61 % of all opposing submissions. In particular, health and safety concerns were mostly raised as an effect of noise of the wind turbines and their proximity to houses. Only 8% of all opposing submissions stated concerns regarding adverse effects on recreation and a marginal share of the submissions stated cultural, heritage issues or adverse effects on tangata whenua. Moreover, about one third of the submissions stated adverse effects on the environment and especially the effects on streams and birdlife as reasons to oppose the project.

About one quarter of all submitters opposing the scheme were not satisfied with the development process, that is either Meridian as a developer, their consultation process or the validity of information for example. Further issues that were raised were economical issues regarding adverse effects on property values, which concerned 11% of the submitters and adverse effects on business and tourism (5%). Two categories of opposing submissions relate to rather general

concerns regarding the construction of wind farms in New Zealand. Hereby, 14 % raised concerns regarding technical issues or the viability of wind power in general and 9 % mentioned that Mill Creek is contradicting existing policies and strategies (Figure 11 & Table 7).

In summary, by far the most submissions opposing the scheme were lodged locally and the main reasons for the opposition were either amenity issues such as noise or visual pollution and/or health and safety concerns.

5.3.2 The Resource Consent Process for Mill Creek to date

After all submissions were received, a joint and combined hearing of Wellington City Council, Porirua City Council and Wellington Regional Council was held in August till October 2008. 142 submitters plus the applicant and the councils were heard during the hearing. After considering all relevant submissions, documents, and the evidence heard in the hearing, the planning commissioners granted the resource consent for the construction of the wind farm, but with 29 wind turbines instead of the 31 proposed by Meridian. The decision was made in February 2009 (Meridian Energy Limited to the Wellington City Council, Porirua City Council and Wellington Regional Council, 2009). The decision was appealed to the Environment Court by the Ohario Preservation Society opposing the decision and also Meridian itself, appealing against the decision not to grant resource consent for two out of the proposed 31 turbines (Ohariu Preservation Society Inc v Wellington City Council [2010] NZEnvC 60). To date, the Environment Court has not dealt with the appeal (Figure 12).

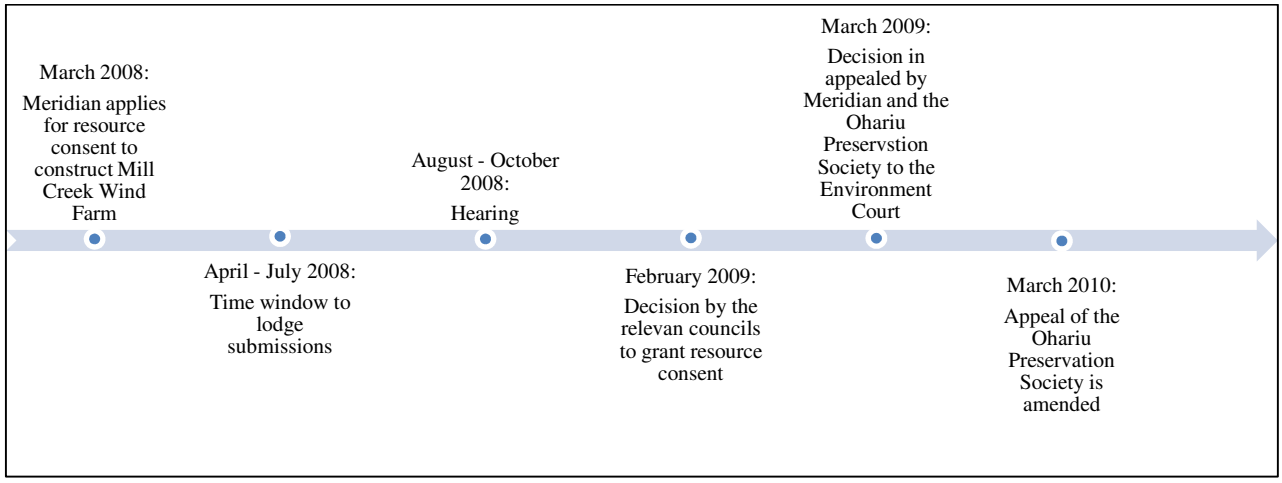

Figure 12: Timeline of the Resource Consent Process for Mill Creek (Author)

5.4 CASE STUDY 2: HAUAURU MA RAKI WIND FARM (HMR WIND FARM)

The resource consent application to construct the HMR wind farm was lodged to the Franklin District Council, the Waikato District Council, and the Waikato Regional Council by Contact Energy in June 2008. The consents that were sought included permission to erect and operate 180 wind turbines, requiring extensive earthworks, water takes, improvement of roads, the erection of public viewing areas, and the erection of substations and 220 kV transmission lines to connect the generated electricity to the grid. The proposed activities are discretionary activities under the relevant statutory plans, the Waikato Regional Plan, Waikato District Plan, and the Franklin District Plan (Contact Wind Ltd. & Contact Energy Ltd., 2008).

In August 2008, the Minister for the Environment 'called in' the proposed scheme by declaring it as a proposal of national significance. The project is one of three wind farms that have been called in to date. The reasons for the call-in as stated by the Minister were the project's relevance in order to reach international obligations to the global environment and the contribution of the proposal towards the achievement of the 90 % renewable electricity generation by 2025 as set out in the NZES. Furthermore, the proposed scheme is likely to affect more than one region or district. According to the RMA 1991, the Minister directed the proposal to a BOI and thereby publicly notified it. The deadline for submissions was in November 2008 (Ministry for the Environment, 2010).

5.4.1 ANALYSIS OF THE SUBMISSIONS LODGED

The Minister for the Environment received 96 submissions to the proposed wind farm (Ministry for the Environment, 2010). The number of submissions lodged for the HMR wind farm is therefore considerably smaller than for Mill Creek. Out of the 96 submissions that were received, 31 supported HMR wind farm. A further 43 opposed the proposal and 22 submissions were either neutral, mixed or did not state a clear position towards the scheme (Figure 13).

Out of the 31 submissions that supported the proposed scheme, 9 were lodged locally. More than two-thirds (22) originated from addresses further away, most of them located in Auckland. The ratio of local and non-local submissions is consequently also significantly different from the supporting submissions that were lodged for Mill Creek. Almost all (29) submissions lodged stated general support for renewable energy, and 2 submissions stated both general

support and site specific support. Only 2 submissions supported the scheme solely on site-specific reasons which are the improvement of roads and benefits for landowners.

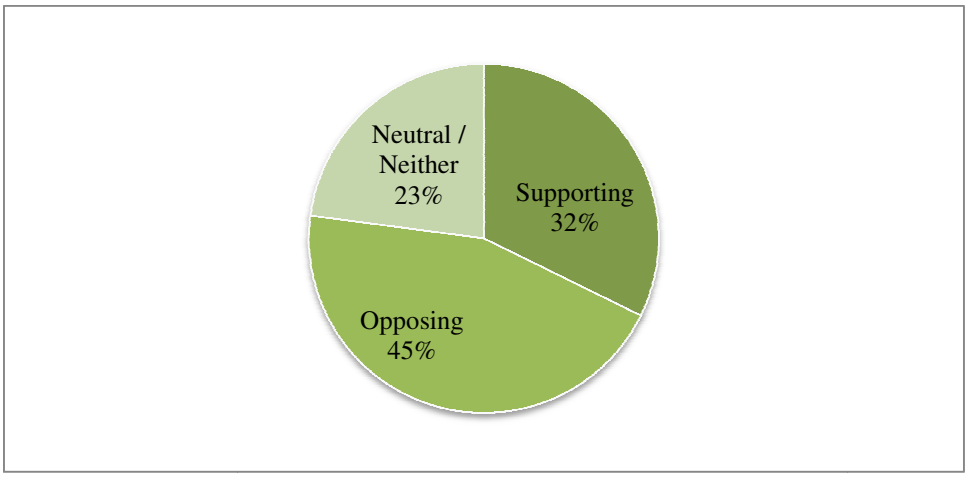

Figure 13: Submissions for the HMR Wind Farm

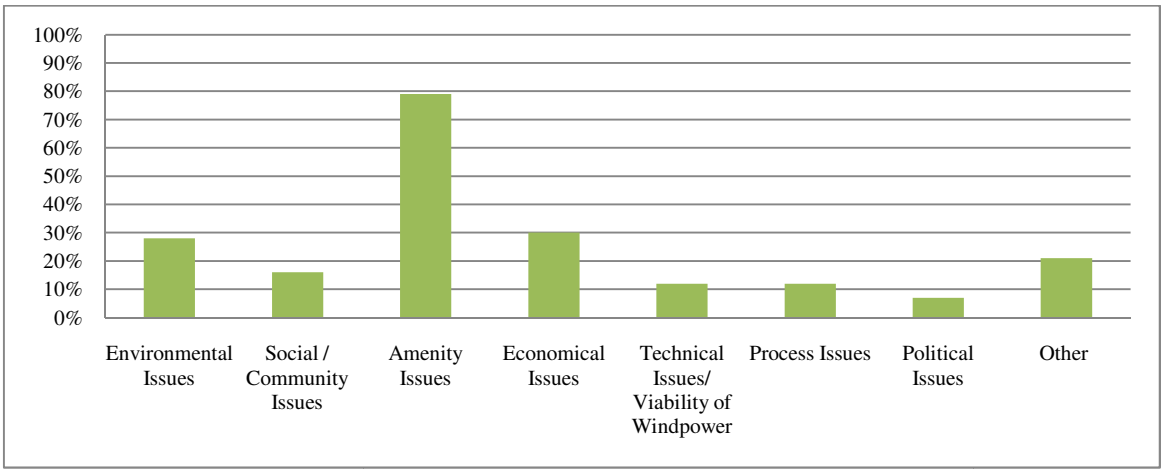

Figure 14: Reasons for the Opposition of the HMR wind farm

45% of all submissions received were in opposition of the project (Figure 13). Out of these 43 submissions, 74% were received from addresses in a radius of about 20km of the proposed location of the wind farm or planned transmission lines. Almost 80 % of the opposing submissions stated amenity issues as a concern (Figure 14). By analysing the different subcategories of the amenity effects, it is revealed that the visual effect and effects on the landscape is the major concern of submitters stated in 70% of all submissions (Table 8). In contrast to the submissions received for the Mill Creek project, noise effects only are stated in 16% of the submissions received in opposition. A further 9 submissions stated concerns regarding adverse

effects of construction and increased traffic. The proximity to houses, the size of the project and cumulative effects were only mentioned in one submission each (Table 8).

Social and community issues and effects on health and safety in particular are not as much concern for the HMR project as they are for the Mill Creek scheme and they are only stated in 16% and respectively 7% of the opposing submissions (Table 8).

Table 8: Detailed Overview over the Reasons for Opposing the HMR wind farm

Reason	No.	Percent
Environmental Issues	12	28%
Social / Community Issues	7	16%
Health / Safety effects	3	7%
Recreational effects	3	7%
Cultural effects / Effects on Tangata Whenua	2	5%
Amenity Issues	34	79%
Visual effects	30	70%
Noise effects	7	16%
Construction / Traffic effects	9	21%
Proximity to Houses	1	2%
Size / Cumulative effects	1	2%
Economical Issues	13	30%
Effects on Property Values	9	21%
Effects on Business / Tourism	8	19%
Technical Issues/ Viability of Windpower	5	12%
Process Issues	5	12%
Political Issues	3	7%
Other	9	21%
Total Number of Opposing Submissions*	43	-

* **Note: Submissions can state than more than one reason and do not add up to their total number**

About one quarter (28%) of the opposing submissions raised environmental concerns and one third of the submitters were worried about adverse economic effects. In detail, 9 submissions stated expected adverse effects on property values and 8 submissions were afraid of adverse effects on business and tourism close to the location. Moreover, 5 submitters were not satisfied with the development and consultation process or the developer in particular.

3 submitters raised concerns regarding the HMR wind farm not being in accordance with national or regional policies and strategies. 5 submitters opposed the scheme because they have doubts about the viability of wind energy in general. The category that is listed as other matters refers to submissions that oppose the construction of the transmissions lines and do not refer to the wind farm scheme directly. These kinds of concerns are raised in 9 submissions. There were no submissions regarding aviation effects.

In summary, the submissions that were received for the HMR scheme were less in quantity and not as locally concentrated is it was the case for the Mill Creek project. In both projects amenity values and especially visual effects were the main reason for opposing the scheme.

5.4.2 The Resource Consent Process for the HMR Wind Farm to date

After the submissions were received, the BOI announced a hearing to be held from April till June 2009. In May 2009 however, the BOI adjourned the hearing to allow the developer time to prepare more detailed evidence relating to the project. The hearing is set to reconvene at the end of September till December 2010, followed by a decision regarding whether to grant or to refuse resource consent for the HMR wind farm (Figure 15) (Ministry for the Environment, 2010).

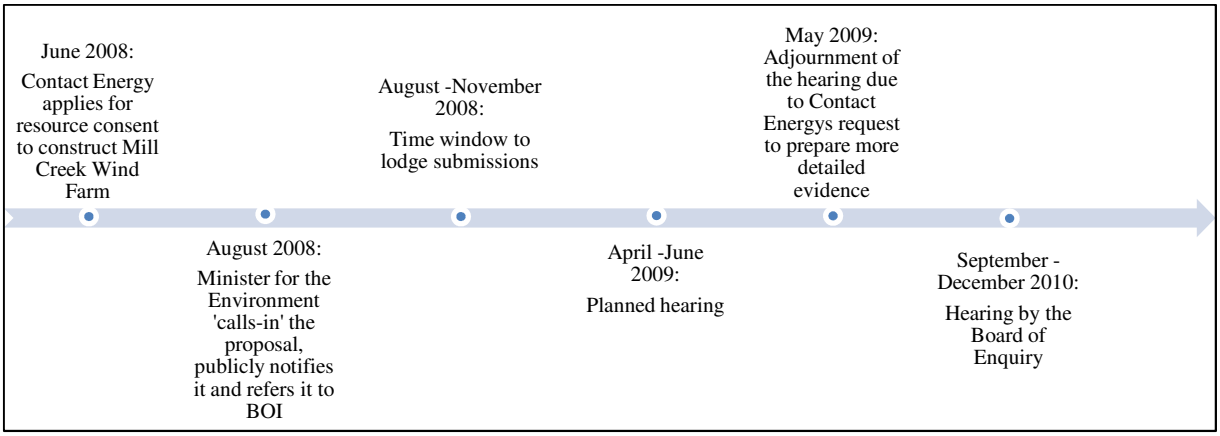

Figure 15: Timeline of the Resource Consent Process for the HMR wind farm

5.5 CASE STUDY 3: THE KAIPARA HARBOUR PROJECT

The resource consent to construct 200 underwater tidal current turbines at the entrance of Kaipara Harbour was initially lodged to the Northland Regional Council, Auckland Regional Council and Rodney District Council by Crest Energy in July 2006. The original application was for the generator array and the construction of two 30km long electric submarine cables. The three councils then publicly notified the application in November 2006. After the first round of submissions was received, Crest Energy amended the proposal. The revised applications required less marine cabling (33 to 7 kilometres), occupied less space in the harbour (1,300 to 350 hectares) and placed turbines deeper below the surface of the sea (5 to 7 metres). Furthermore, the amended proposal now only required resource consent from the Northland Regional Council. The amendment was publicly notified in August 2007 (Crest Energy Kaipara Ltd to the Northland Regional Council 2008).

The resource consents sought were for coastal permits to disturb the seabed, for discharge and to place, use or occupy the seabed. Overall the application was classified as a non-complying activity. Those parts of the application that relate to the occupation of space by the generation array and the disturbance of seabed caused by transmission cables were considered as RCAs, because it falls within the criteria of section 1.9(a) of the NZCPS regarding the exclusion of public access of the CMA and section 1.9(c) regarding the occupation of the CMA restricting public access. Furthermore, the transmission cable burial is a RCA due to section 1.6(b)(iii) (Department of Conservation, 1994).

5.5.1 ANALYSIS OF THE SUBMISSIONS LODGED

Public submissions on the amended resource consent application for the Kaipara Harbour project closed in September 2007. At closing date of the second notification, 245 submissions were received in total (Crest Energy Kaipara Ltd to the Northland Regional Council 2008). 124 or 51 % of the submissions supported the proposed scheme and 119 were received in opposition of the project. 2 submissions were neutral (Figure 16). Out of the 124 submissions that were lodged in support of the proposed scheme, 34 were received from addresses that are located within a 20 km radius of the Kaipara Harbour and 90 submissions, which are about two thirds of all supporting submissions originated from areas which are further away.

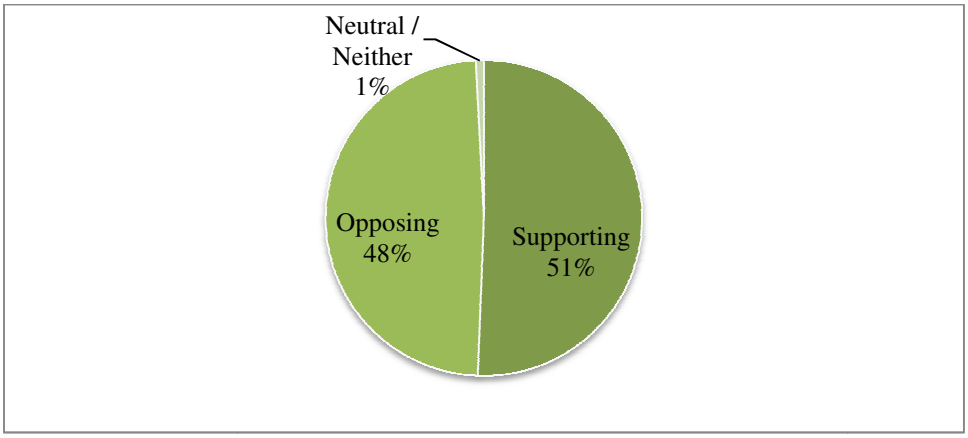

Figure 16: Submissions for the Kaipara Harbour Project

Almost all submissions stated general reasons for their support, such as the security of supply, the benefits of renewable energy and the project's contribution towards energy objectives and international obligations. Only 4 submissions stated site specific reasons for the support. A further 8 submissions lodged raised issues of concern but generally supported the project.

About half (48%) of all submissions opposed the project and 70% of 119 opposing submissions were received from addresses within a 20 km radius around the Harbour. The main reasons for the opposition differ significantly from previous case studies. Whereas amenity values were the main concern for the wind farm proposals, it is only mentioned in 17% of the opposing submissions (Figure 17). Within the category of amenity issues, only 5 submissions stated visual effects as a concern and 4 submissions each were worried about construction and traffic and the size of the projects or cumulative effects. Only 1 submission stated noise as a reason to oppose the project (Table 9).

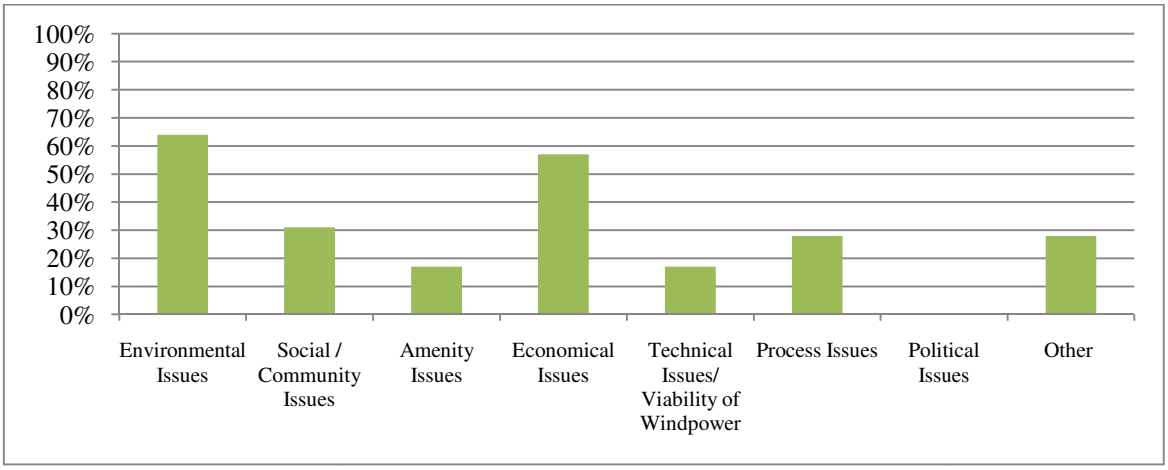

Figure 17: Reasons for the Opposition of the Kaipara Harbour Project

Concerns regarding social or community issues were raised in 31% of the opposing submissions and within this category, 21 submissions stated worries about health and safety effects. 24 were not satisfied with the project's effects on recreation and the restricted public access to the area. A further 9% included cultural effects and the effects on Tangata Whenua as a reason in their submission (Table 9).

Table 9: Detailed Overview over the Reasons for Opposing the Kaipara Harbour Project

Reason	No.	Percent
Environmental Issues	76	64%
Social / Community Issues	37	31%
Health / Safety effects	21	18%
Recreational effects	24	20%
Cultural effects / Effects on Tangata Whenua	11	9%
Amenity Issues	20	17%
Visual effects	5	4%
Noise effects	1	1%
Construction / Traffic effects	4	3%
Proximity to Houses	0	0%
Size / Cumulative effects	4	3%
Economical Issues	68	57%
Effects on Property Values	2	2%
Effects on Business / Tourism / Fishing	64	54%
Technical Issues/ Viability of Windpower	20	17%
Process Issues	33	28%
Political Issues	0	0%
Other / Navigation	21	28%
Total Number of Opposing Submissions*	119	-

*** Note: Submissions can state than more than one reason and do not add up to their total number**

Two categories of reasons to oppose the project were stated in the majority of the submissions. One of the two categories is environmental concerns which occur in 64% of all opposing submissions. In particular, marine life, the effects on the seabed, and the physical harbour dynamics were major points of concern. The other category is economical issues. Whereas only 2 submissions complained about the expected effects on property values, 64 out of 119 opposing submissions stated the effects on businesses and in particular fishing and marine farming as the

main concern and reason to refuse the consent. However, the available data does not distinguish between commercial and recreational fishing concerns, so that they are combined in one category.

Doubts in the viability of the new technology were stated in 17% of the opposing submissions. Furthermore, 33 submissions stated process issues such as not enough research regarding the appropriateness of the site and the effects of the technology as well as issues regarding consultation as a reason to refuse the consent. Another 21 submissions included navigation issues as a major concern (Table 9).

In summary, due to the different technology used and the project's location in the marine environment, the reasons for opposition differ significantly from the concerns raised regarding to proposed wind energy schemes. Whereas amenity values only play a minor role, environmental effects and conflicts with different uses in the marine area prevail as the main reason for opposition.

5.5.2 The Resource Consent Process for the Kaipara Harbour Project to date

After the closing date for submissions in September 2007, the detailed consideration of the project started in October 2007. A hearing was held by the Northland Regional Council in May 2008 and included three independent commissioners. With consideration of all relevant information the hearing committee recommended to the Minister of Conservation to grant the consent under certain conditions in August 2008. As the application was made before the amendments of the Act in 2009, the Minister of Conservation has the decision making power regarding the approval or refusal of the consent.

In September 2008 the two parties launched appeals to the Environment Court requesting the project to be declined in its entity. Two further appeals centred on consent conditions rather than objections to the entire project. In June 2009, the Environment Court re-considered the applications and in December 2009, an interim decision indicated a positive recommendation for the project subject to some additional fact finding and the preparation of a draft environmental monitoring plan. The requested information was provided by Crest Energy to the Environment Court in August 2009. The final Environment Court's recommendation is soon to be forwarded to the Minister of Conservation who will make a decision (Figure 18) (Crest Energy Kaipara Ltd v Northland Regional Council [2010] 8 BRMB 123).

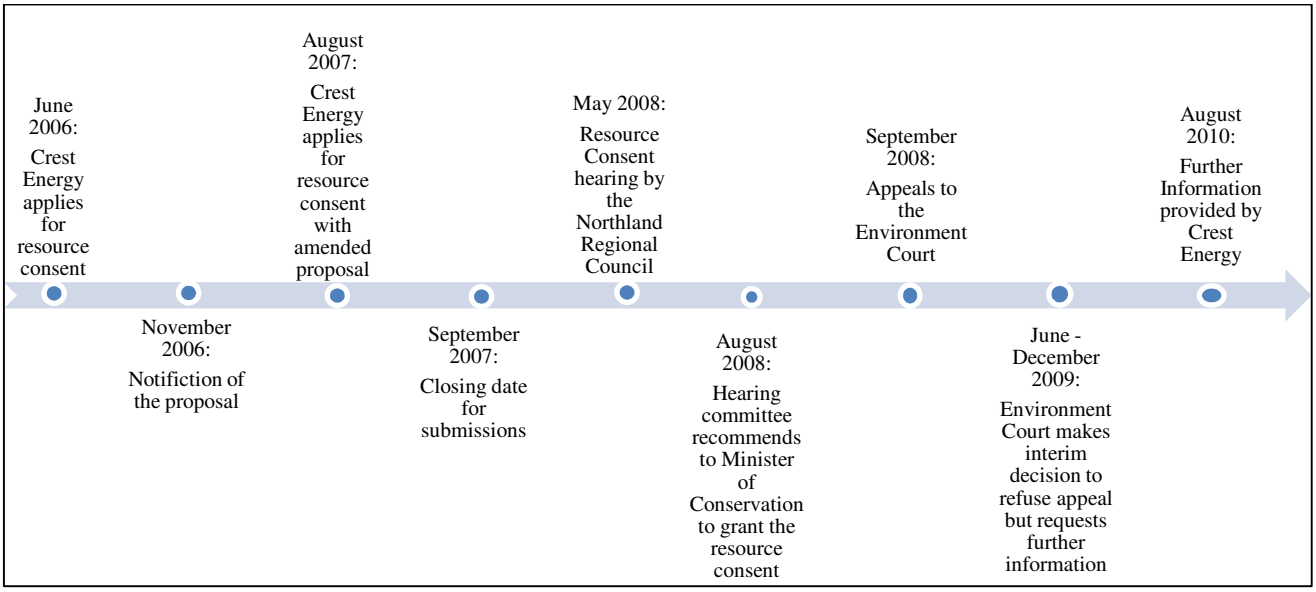

Figure 18: Timeline of the Kaipara Harbour consent process

In conclusion, the analysis of the case studies reveals that the consenting procedure in all three cases is time consuming and characterised by delays. In none of the projects a decision has been reached yet. Looking at the level of support and opposition during the consent procedure, it is relatively even in terms of numbers in all three cases. The total number of submissions however, varies considerably depending on the individual project. Most of the supporting submissions stated general reasons in favour of renewable energy rather than site specific reasons. Regarding the submitters opposing the projects, the main reasons for concern draw a certain pattern for the two wind farm case studies. Yet there are also considerable differences in the opposing reasons, which arise out of the individual context. However, in both cases amenity issues were the main concern and reason to oppose the projects. In case of Kaipara Harbour, the main concerns were not amenity issues, but rather environmental effects and concerns regarding competing land uses and in particular fishing and navigation.

6. DISCUSSION

The analysis that was conducted in the previous chapters provides valuable information in order to achieve the research objectives of this dissertation. The discussion is separated into different parts. The first part discusses the spatial planning processes for renewable energy schemes in New Zealand and the role of public perception of such schemes. The second part discusses the options and limitations of establishing renewable energy generation in New Zealand's marine environment and offshore wind farms in particular as an alternative to land from a planning perspective.

6.1 PLANNING FOR RENEWABLE ENERGY GENERATION IN NEW ZEALAND

As it is stated in chapter 2.1.3, there are ambitious plans regarding the construction of new wind energy projects all over New Zealand. However, most of the projects have to face significant delays in the resource consent process. This has several consequences. First of all, time delays lead to additional costs for the developer. Moreover, the long-lasting consenting process leaves the developer and more important, its investors, with uncertainty regarding the success of the whole scheme. This can be a major obstacle for the future of wind energy development in New Zealand. The analysis of the two wind farm case studies showed that consenting processes can take far longer than two years when considering appeals to the Environment Court and subsequent courts (Figures 11 & 14). In the case of the Mill Creek wind farm, the application was processed in a joint and combined hearing, and it took about 12 months until a decision to grant the resource consent was made. Further delays in the resource consent process in this case are caused by appeals to the Environment Court which is still processing the reassessment of the application. For the HMR wind farm, the Minister for the Environment declared the proposed scheme as a Matter of National Significance and used the 'call-in' option. Due to its status, the project was scrutinised very specifically and the effort to voluntarily provide more information by the developer lead to adjournments of the hearing which is now held more than two years after the initial application for resource consent. The analysis of the case studies indicates that, although different procedures to obtain resource consent were used, there is no fast way for projects of this scale under the RMA 1991.

However, although the resource consent process under the RMA 1991 is often criticised by industry and science (see e.g. Barry & Chapman, 2009) as too time and cost-consuming to enable a sound development of the wind industry in New Zealand, it should be not forgotten that the planning framework is structured in this way for several essential reasons. As set out in the purpose of the Act it has the function to sustainably manage the physical and natural resources. Accordingly, the resource consent process ensures that proposals are properly assessed within the context of other land-uses and interests, environmental concerns and moreover, it makes sure that the public can participate in the decision-making process.

In summary, the resource consent process may be time and cost consuming and generates uncertainty for investors and developing companies of renewable energy schemes, but in order to fulfil the purpose of the Act, this procedure is essential. This however, leads to one of the classic dilemmas in planning theory. The central government aims at reaching the renewable energy targets of the New Zealand Energy Strategy and international obligations while simultaneously maintaining the sustainable management of natural and physical resources through the spatial planning process. Consequently, in order to find a balance between renewable energy development and sustainable management, compromises in the design and location of wind farms as well as in the spatial planning process may have to be made.

In recent years, first steps into this direction were taken and several policy tools were utilised to facilitate the construction of renewable energy projects in New Zealand. Besides the targets of the New Zealand Energy Strategy, this was the publication of the proposed National Policy Statement for Renewable Energy Generation. It has the purpose to promote renewable electricity generation and has to be taken into account when assessing resource consent applications under s 104(1)(b) of the RMA 1991 (Ministry for the Environment, 2008). Moreover, the insertion of s 7(i) and s 7(j) under Part Two of the RMA 1991 is a major step into the promotion of renewable energy when assessing resource consent applications (see chapter 5.1.).

The issue of time and cost-consuming resource consent processes was addressed with the simplifying and streamlining amendments of the RMA 1991 in 2009. One of the amendments is the introduction of the direct referral in which it can be requested that resource consent applications can be directly lodged to the Environment Court under new ss 87C to 87I of the RMA 1991. This would mean that the decision by the Environment Court could only be appealed to the High Court by points of law and therefore could save time in the process when comparing

it to case study Mill Creek for example. Further changes are aiming at streamlining the resource consent process itself, such as changes in notification criteria and changes in deadlines. Another important amendment is the introduction of the EPA which deals with Matters of national significance and thereby introduces another authority into the resource consent process. The efficiency of the 2009 amendments however, remains to be proven yet and the handling of future wind farm proposals will show if they are successful. In order to provide for a sound development of the renewable energy industry in New Zealand, the policy tools that are applied to date are a step into the right direction, but it has to be questioned if they are sufficient.

However, there are further policy and planning tools that could be implemented in order to encourage the development of renewable energy generation in New Zealand. Looking at the planning system in countries where wind power schemes are more successful, such as e.g. Germany, certain best-practice methods could be also applied in New Zealand. Besides effective subsidy mechanisms, such as the feed-in tariff, which will not be discussed in detail this dissertation, there are certain planning instruments that support the growth of wind energy and could be similarly applied in New Zealand as well. In Germany local authorities are forced by law to designate areas within their administrative boundaries for wind parks (Breukers & Wolsink, 2007; Markard & Petersen, 2009).

Having national policy statements, regional policy statements, regional and district plans in place in New Zealand, the insertion of a rule that directly promotes the construction of wind parks at adequate places in sensitive landscapes or alternatively, that stated that a certain share of the administrative area of the authority has to be used for renewable energy generation would facilitate their development. The proposed NZCPS 2008 has such directions in place regarding to the protection of surf breaks and in order to identify appropriate areas of land for subdivision. Those provisions could function as precedents provided that the government accepts these recommendations. Moreover, it would not interfere with the effects-based structure of the RMA 1991. However, it has to be stated spatial planning in Germany is generally more regulative than in New Zealand where there is neoliberal approach towards planning and such provisions might be easier to implement.

Another factor of the success of wind power in Germany is the small scale of wind parks which often only consists of three to six wind turbines (Ashby, 2004; Barry & Chapman, 2009). As exemplified by Barry and Chapman (2009), one of the two major limiting factors to

the potential development of the industry is a trend towards large scale energy schemes. The main share of the proposed wind farms schemes are of a medium to very large size (Table 3). Looking at the wind farm case studies that were analysed in this dissertation, Mill Creek could be classified as a project of medium scale, but has certain cumulative effects due to the proximity of another wind farm. The HMR wind farm is a scheme of very large scale itself. The fact that both projects are facing significant delays and a high level of opposition during the consenting process goes along with the statement that small-scale wind farms are more likely to gain resource consent in a shorter time. However, as the resource consent procedure for small scale developments is the same as for large-scale developments, it is very expensive as economies of scale do not apply. Making the construction of e.g. up to three small-scale turbines a permitted activity in relevant plans would support the growth of the industry considerably.

6.2 Role of the Public Perception of Wind Farms in the Spatial Planning Process

The main reason why small scale wind farms are more likely to be faster and successful in the resource consent process is the reduced public opposition in comparison to large-scale schemes. As public participation is an essential part of the consenting process in New Zealand, the public perception of individual wind energy projects is likely to have a significant influence on the length of the process, its decision and therefore the realisation of the wind farm. Graham et al. (2009), who explored the public perception of wind energy proposals in New Zealand, point out that it is especially the views and attitude of local people which are directly affected by the individual proposed project that is an important contributor to the decision-making process.

The analysis of the public perception of the two wind farm case studies in this dissertation reconfirms that statement. In both proposed projects about half of the submissions that were lodged opposed the individual scheme. Furthermore, in both cases the majority of the opposing submissions were received from people that live near the area on which the wind farm is planned to be located. Moreover, the analysis of the case studies proved the general academic cognition that the public perception of wind farm schemes is strongly dependent on the context in which the planned project is embedded. This is expressed by the number of submissions that

were lodged for each project. The high amount of submissions that was received for the Mill Creek project can be explained with its location close to densely populated greater Wellington and furthermore due to its cumulative effects with the West-Wind wind farm. The HWR wind farm however, is planned to be located in an area that is not densely populated but that is well-known for its outstanding landscape. Whereas the HWR wind farm, although being about five times larger in size, only received 96 (43 in opposition) submissions, the number for Mill Creek was 797 (410 in opposition). It has to be noted however, that the quantity of submissions is no decision-making criteria under the RMA but rather the quality of the submissions. Yet, the number of submissions lodged often indicates the general level of public response to a project.

Despite the differences in the general number of submissions lodged in both projects, the analysis showed that there is a consistency-pattern when analysing the perception towards both wind farm proposals. In both case studies, the main reason for the opposition of the individual scheme were negative perceptions on amenity issues, which are visual effects, noise effects, the proximity to existing dwellings, construction traffic and, in case of Mill Creek, cumulative effects to other wind farms. Differentiating different subcategories of amenity values, the visual impact was the major issue of concern in both cases, but whereas many people were concerned about the proximity of existing turbines and their visual and audible effects on existing dwellings in case of Mill Creek, it was the visual impact on outstanding landscape and scenery in general which was a main concern for the HWR wind farm. Environmental concerns were stated in a number of submissions for both case studies, but to a lesser extent than amenity issues. Further concerns that were mentioned were economic effects on property values and businesses, as well as process issues, where concerns about the consultation process and dissatisfaction with the developer where stated. Interestingly, the case study also showed that health effects of wind farms are primarily an issue when the proposed location of the turbines is close to populated areas as it was a major concern for many people opposing the Mill Creek project, but only a minor issue for the opposition of the HMR wind farm.

In conclusion, it can be stated that the public perception of wind farms plays a major role in the decision making process for resource consents also in New Zealand and therefore is a major obstacle for the development of the wind industry. Public opposition was considerably strong in both projects expressed through submissions and appeals of consent decisions to the

Environment Court resulting in delayed consent procedures. Thereby, the majority of opposing submitters was located in immediate surroundings of the wind farms and the main reasons for the opposition were amenity issues rather than technological, environmental or economical concerns. However, the case studies also revealed that the level of opposition also depends on the context of the project and individual site, size, developer etc. Consequently, to overcome the obstacle of public opposition due to a negative perception of wind farms proposal by maintaining the level of public participation in the consent process will be an important task for the future.

The analysis showed that the siting of a wind farm is a crucial factor in determining public opposition of a project. It should not just consider the wind availability of a location but also the bigger picture and the context in which the project is embedded, which is the proximity to existing dwellings and populated areas, cumulative effects to other wind farms, and to what extend people value the scenery and landscape in which the wind farm is planned to be constructed. Furthermore, an optimal consultation process can reduce opposition. As stated before, the size of a wind farm is a significant factor in order to reduce local opposition, as it minimises the visual impact on the landscape and therefore the major issue of concern. Experiences from other countries also show that community ownership or local shareholding of wind farms is a good measure to reduce local opposition (Barry & Chapman 2009; Graham et al. 2009). It was also stated in several submissions supporting Mill Creek.

6.3 New Zealand's CMA: An Alternative for Renewable Energy Generation?

The next research objective in this dissertation was to assess if the marine environment can be an alternative location for renewable energy generation and in particular wind farms, given significant local opposition and delays in the consenting process for projects on land. In other countries, the development of offshore wind farms as a response to difficulties in the planning process is already reality since several years. The lack of a spatial framework and therefore less public resistance facilitated the exploration of the marine environment in several countries, as Jay (2008; 2010) states using the United Kingdom as an example. The introduction of marine spatial planning in recent years was a reaction to the increased uses of the offshore environment primarily in European countries, and facilitated their development.

With the implementation of the RMA in 1991, New Zealand was among the first countries that introduced a statutory planning framework governing the CMA. Consequently, the lack of an integrated spatial planning system in the marine environment as an advantage in order to facilitate development offshore does not apply in New Zealand. To gain permission for the exploration for the CMA, a coastal permit has to be obtained.

The analysis showed that the procedure to acquire a coastal permit is not significantly different from the resource consent process on land. One exception applies when the proposed activity is classified as a RCA. In that case the Minister of Conservation is included into the process, and due to a more complex procedure, applications for RCA's usually take longer to be processed than usual coastal permits. If a coastal permit is considered as of national significance the Minister of Conservation becomes the decision-making authority.

If an offshore wind farm would be considered as a RCA cannot be said with certainty as the relevant schedules of the NZCPS leave room for interpretation. In other words, schedule 1.6 (disturbance of seabed), schedule 1.7 (depositing substances on the seabed), and schedule 1.9 (occupation of the CMA) of the NZCPS potentially could apply if the cumulative effects of constructing more than one wind turbine would be seen as one activity (Ashby, 2004; Department of Conservation, 1994). It is however likely, that they would be considered as RCA as case law decisions regarding the cumulative effects of developments indicate (AFFCO NZ Ltd v Far North DC (No 2) [1994] NZRMA 224 (PT); Central Plains Water Trust v Ngai Tahu Properties Ltd [2007] 13 ELRNZ 63).

Comparing the time frame of the resource consent application process of the third case study, the Kaipara Harbour Project, with the consenting procedures of the wind farm case studies, it can be stated that in New Zealand, the location in the CMA is not necessarily an advantage. In all three cases, the procedure takes longer than two years and in all projects no decisions have been made. The Kaipara Harbour project was thereby classified as a RCA. However, it has to be noted that the Kaipara Harbour project is different from the other case studies for several reasons. First of all its technology, underwater tidal turbines, is very innovative and there is a high degree of uncertainty regarding its effects. Consequently, the research undertaken and information requested by the decision-makers is more complex compared to wind farm applications. This can have significant influence on the lengths of the application process. Consequently, there are certain limitations in the comparability between the resource consent proc-

esses for the Kaipara Harbour tidal current scheme and potential offshore wind farms. Yet, as both types represent renewable energy generation in the coastal environment, there are as well certain similarities in the process.

In order to promote the development of renewable energy generation in the marine environment there already have been some changes in the spatial planning framework in recent years. The proposed NZCPS (Department of Conservation, 2008) introduces Policy 17 regarding the Crown's interest in making land in the CMA available for renewable energy generation. So far the NZCPS has been seen by developers as a significant barrier to obtain consents as to the risk of highly visible structures (such as turbines) could be considered to adversely affect the coastal environment under the NZCPS. The new policy might balance this argument. Furthermore, the proposed National Policy Statement for Renewable Electricity Generation also applies for the CMA and therefore should be given weighting in the consent decision-making process (Ministry for the Environment, 2008)

As stated in chapter 5.2.1, the simplifying and streamlining amendments to the RMA 1991 in 2009 also included amendments regarding the resource consent procedure of RCA's. Whereas the Kaipara Harbour application is dealt with under the old procedure regarding RCA's and the Minister of Conservation is the decision-making authority, his powers now have been removed and the relevant regional council is the consent authority. The initial reason for this amendment was to reduce the number of actors in the decision-making-process and therefore to fasten the procedure. However, in how far the recent changes will affect time and cost of the resource consent process remains to be seen and it is doubted that they are sufficient in order to guide a sustainable development of electricity generation in the CMA.

In conclusion, the resource consent process in the CMA does not have advantages regarding the development of renewable energy schemes offshore compared to land. However, 'the disadvantage' of having a spatial planning framework in the marine environment in place can be turned into an advantage when the development of electricity generation schemes is generally encouraged as it provides certainty for developers. There are various policy tools that could be applied in order to decrease time and cost in the resource consent process for activities in the CMA and therefore would increase the certainty of success for developers.

Looking at developments in other countries, the marine spatial planning (MSP) approach that is applied e.g. in various northern European coastal areas does provide for the development for

offshore wind farms and other forms of renewable energy generation in suitable locations and prevents conflicts with the emerging competing uses in the marine environment (Douvere, 2008; Jay 2010). Having the NZCPS, regional policy statements, and regional coastal plans as major planning tools under the RMA 1991 opens an opportunity to guide a sustainable development if there are policies and rules providing for offshore wind farms and other forms of renewable electricity generation including specifications of how to treat these developments. Hereby, a main difference to the MSP-approach would be the effects-based planning approach of the RMA 1991 versus a more prescriptive activities-based zoning in MSP (see also Loomb & Robertson, 2009, Power projects ltd. 2010). Thus, the RMA 1991 does not provide a strategic allocative mechanism. The only allocative mechanism under the RMA is the coastal tendering approach to the management of AMA's but this method lacks the strategic component and is rather reactive to a high demand of certain areas.

Yet, relevant policy statements and plans could give guidance on how and where to develop those electricity schemes in the CMA by introducing policies and rules that facilitate the development. In the long term however, considering the limited availability of suitable sites and the increasing uses of the CMA, an integrated strategic allocation regime similar to MSP may be required.

6.4 Does the Relocation into the CMA Circumvent Local Opposition?

As the 'advantage' of having no spatial planning framework in the marine environment, facilitating offshore development, does not apply in New Zealand, the question remains if those developments would face less public opposition, which is seen as one major obstacle in the consenting process. The analysis of the case studies on land showed that in both projects the majority of opposing submissions was lodged locally and the impacts on amenity, which are visual impact, noise, construction effects, the proximity to houses and cumulative effects, were the main reasons for concern. In case of the Mill Creek wind farm, being located close to populated areas, health and safety issues were also a considerable concern. This goes along with international findings regarding the perception of wind energy schemes (Pasqualetti, 2004; Sagemuller, 2006; Markard & Petersen, 2009).

In order to analyse if these forms of opposition would also apply for projects in the marine environment it has to be discussed to what extent a person is 'local' in the CMA as the proximity

to houses or ownership of land is not an indicator anymore. The marine concept of 'local' can therefore be residents of the nearest township, adjacent landowners, or competing users of affected marine spaces (Rennie, 2010). In other words, although there is usually nobody living in the immediate surroundings of projects in the marine environment, a person can be defined as local if he or she is directly affected by a project. Taking this issue into account, it can be stated that with the relocation of wind farms into the offshore environment, most of the main reasons of concern that were expressed in case of Mill Creek and the HMR wind farms would not apply. Major concerns in the Mill Creek project were the noise and health and safety issues due to the projects proximity to existing dwellings. Being located in the offshore environment, this concern would not apply anymore. Furthermore, the construction issue, increased traffic, dust, noise etc. was a matter that was raised by many submitters, Although there are construction sites in form of substations and grid connection works which are not out at sea, the lion's share of construction work would not affect 'locals' on land.

The main reason for opposition that was stated for both case studies is the visual impact of wind turbines which includes its impact on the landscape, blade glint, unwanted shadows etc. However, the visual impact can also be an issue for offshore locations and heavily depends on the individual site of the wind farm as the example of the highly visible offshore wind farm 'Cape Wind' in Nantucket Sound (MA) in the United States shows (Pasqualleti 2004; Firestone & Kempton, 2007). However, if sites are chosen that are not highly visible to a densely populated coastline, the offshore location can become one big advantage. In New Zealand there are a few places that combine shallow water, a good wind resource and minimise visual impact such as e.g. offshore south of Taranaki. With deepwater turbine technologies becoming viable in the coming years the number of suitable locations will increase significantly.

The analysis of the submissions of the third case study in Kaipara Harbour was undertaken in order to find out if there are new forms or reasons of opposition occurring the in CMA that would also apply for offshore wind farm proposals. However, the technology which is used and therefore certain effects differ significantly from off shore wind turbines. The most obvious difference is the potential visual impact. As tidal current turbines are under water their visual impact is very low and it therefore was only a minor issue when analysing the submissions of this project. Furthermore, the harvesting of tidal energy requires locations close to the shore whereas wind turbines could be located further out at sea. The two main aspects that people

opposed in the Kaipara Harbour Project were environmental effects and the effects on recreation, recreational and commercial fishing and aquaculture as a competing uses. Both of these aspects could apply to offshore wind farms. The environmental effects however would be different as the technology of wind turbines is more mature and there is not much uncertainty about what can happen. Furthermore, most of the environmental issues associated with offshore development in other countries are either similar to or less than those typically experienced on land. Experience from several offshore wind farms even suggests that they can have a positive effect on fish populations. Those with gravity foundations can act as artificial reefs, increasing the amount of food available to fish (Ashby, 2004). The main reason for opposition of offshore wind farm developments is often the competition with other uses, such as recreation and fisheries. The MSP-zoning approach does minimise those conflicts and implementing a regulating system through the existing planning framework for the CMA could reduce the opposition significantly. Furthermore, there could be also synergistic effects with other uses, e.g. through the combination of aquaculture and wind turbines.

One issue that only occurred in a few submissions of the Kaipara Harbour scheme but can have a significant impact on future renewable energy schemes in the marine environment is the relationship of local Iwi to the seabed. Whereas the offshore environment is usually common property, there is a conflict in which Maori groups claim the right of customary title of the foreshore and seabed. In how far this will affect the development of future projects in the CMA remains to be seen and depends on the outcomes of the ongoing foreshore and seabed-discussion (Ministry of Justice, 2010). It was however not considered as a major issue for the decision-making process in the case of the Kaipara Harbour project (Crest Energy Kaipara Ltd to the Northland Regional Council 2008)

In summary it can be stated that the CMA in New Zealand is governed by a spatial planning system which is very similar to the spatial planning on land as they are governed by the same Act. Relocating the development of wind farms out to the offshore environment does therefore not facilitate the resource consent process as it has been the case in other countries (see Jay, 2010). In terms of public opposition, the construction of wind energy schemes offshore is likely to lead to less resistance as the main reasons for opposition on land would not apply in this environment and new issues, such as competing uses, can be mitigated by introducing an efficient spatial management scheme that considers and encourages these developments.

7. CONCLUSION

A decreasing share of renewable electricity generation in the national energy mix and increasing demand in electricity consumption requires new developments of renewable energy schemes in order to reach the New Zealand Energy Strategy - target of 90% renewable electricity generation for the year 2025. Wind power seems to be the most viable option to achieve this. Having great resource potential, there are still many wind energy sites to be utilised.

Regarding the first objective of this dissertation to gain new insights into spatial planning for renewable energy generation in New Zealand, the research ascertained that the neoliberal, effects-based spatial planning framework under the RMA 1991 seems to be an obstacle in the realisation of new renewable energy projects. Time and cost consuming procedures and strong public opposition occurring in the consenting process slow down the development of wind energy in New Zealand. Yet, having an integrated planning system in place is essential as it ensures that projects are properly considered within the context of competing land uses, interests, and environmental concerns. Consequently, to ensure a sound development of energy sources in New Zealand, a balance has to be found in order to establish new renewable energy schemes, whilst at the same time, not compromising an adequate planning framework.

Drawing from practices in other countries and the analysis of New Zealand's planning framework regarding renewable energy schemes, measures supporting the development of renewable energy could be the insertion of special provisions in relevant policy statements and plans, facilitating the construction of wind turbines in suitable locations. Furthermore, small scale projects are likely to be processed faster in the resource consent process as they attract less public opposition. Providing for these schemes in the planning framework could support the growth of renewable energy in New Zealand. One of the most essential tools in order to promote new renewable energy projects however is to reduce public opposition as a major barrier in the realisation of new wind farms. The analysis of the submissions of two wind farm case studies showed that the public perception of wind farms depends on the context in which it is embedded. Consequently, the siting process has a major influence on the level of public opposition. It is more likely to reduce public opposition of wind farm proposals if they are in distance of populated areas, do not have cumulative effects with other wind farms and are not located in sites which have outstanding amenity values. Furthermore, comprehensive consultation is essential. However, these conditions reduce the number of potential locations for wind

energy generation significantly and it has to be asked when the limit of social capacity for wind farms in New Zealand is reached.

The second objective of this dissertation was to assess if New Zealand's CMA can be an alternative location for renewable energy generation from a planning perspective as it can be seen in other countries. The analysis of the spatial framework on land in comparison to the offshore environment ascertained that New Zealand's CMA is not a shortcut for obtaining permission to construct renewable energy schemes. Its integrated and sustainable management is well governed by the RMA 1991 and there is no time or cost-advantage in the coastal permit process compared to the resource consent procedure on land. The analysis of the consent material and the submissions of the two wind farm case studies and the Kaipara Harbour project however showed that the main reasons of public opposition of the wind farms on land do not necessary apply in the CMA, in particular when offshore locations are chosen that do not have strong visual impacts. Main reasons of opposition for renewable energy schemes in the offshore environment are therefore rather environmental concerns and competing uses, in particular fisheries. Here, the 'disadvantage' of having a functioning planning framework in place can be turned into an advantage if it provides for the strategic development and allocation of renewable energy schemes in the offshore environment by setting environmental conditions and regulating conflicting uses.

In summary, with the current planning legislation under the RMA 1991, it will be not likely that the renewable energy targets of the NZES are met. Consenting processes are too long and costly to enable a sound development of the wind industry. However, New Zealand's CMA can be a feasible alternative location for renewable energy schemes and offshore wind farms in particular. Whereas projects on land are more likely to be realised faster in the future when they are of smaller scale and in remote locations, large scale-projects could be realised in the offshore environment. The Kaipara Harbour project is expected to be approved, showing that the realisation of large scale offshore wind farms is possible. Yet the consenting process in the CMA still is too long, costly, and contains uncertainty for developers. Thus, a planning framework that includes provisions which effectively and strategically support renewable electricity generation in the marine environment is essential to promote this development. This, however, may mean a fundamental change in the approach to planning in marine areas in New Zealand and include more regulative and prescriptive allocation mechanisms.

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APPENDIX – MAPS OF THE LOCATIONS OF THE CASE STUDIES

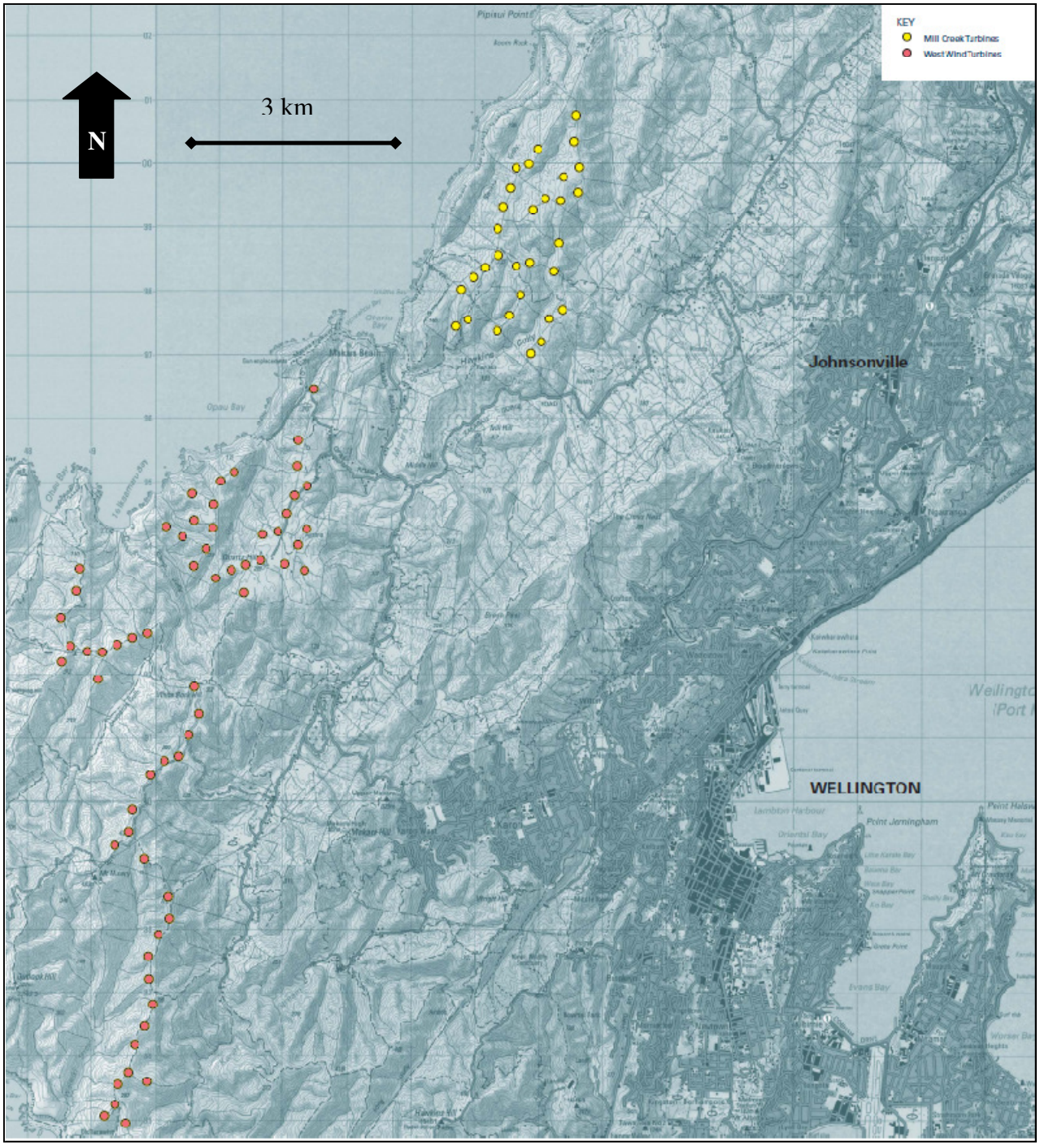

Figure A1: Project Location Mill Creek (Meridian ltd., 2010).

Figure A2: Project Location for the HMR wind farm (Contact Energy, 2010)

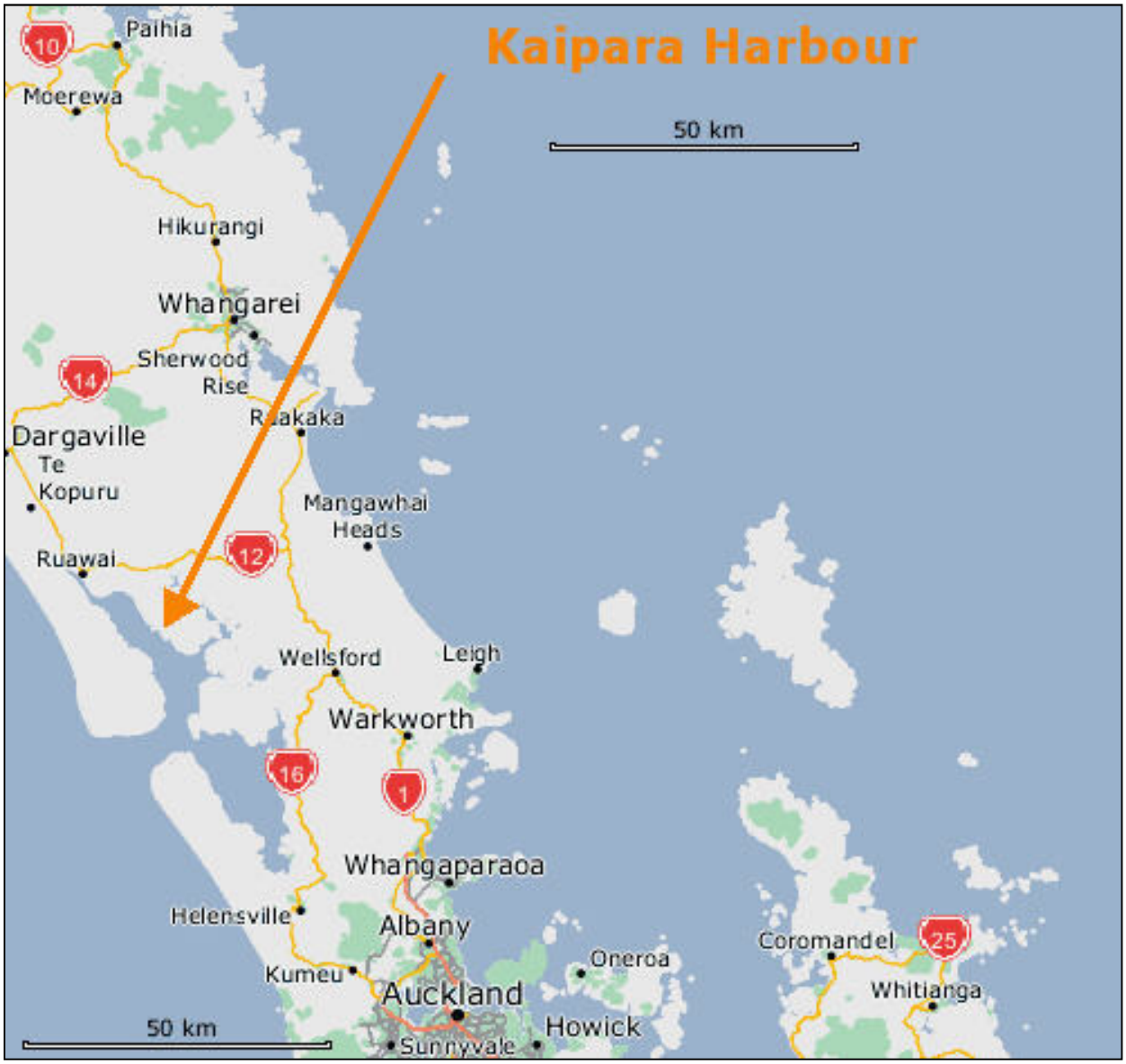

Figure A3: Location of Kaipara Harbour (Crest Energy ltd., 2010)

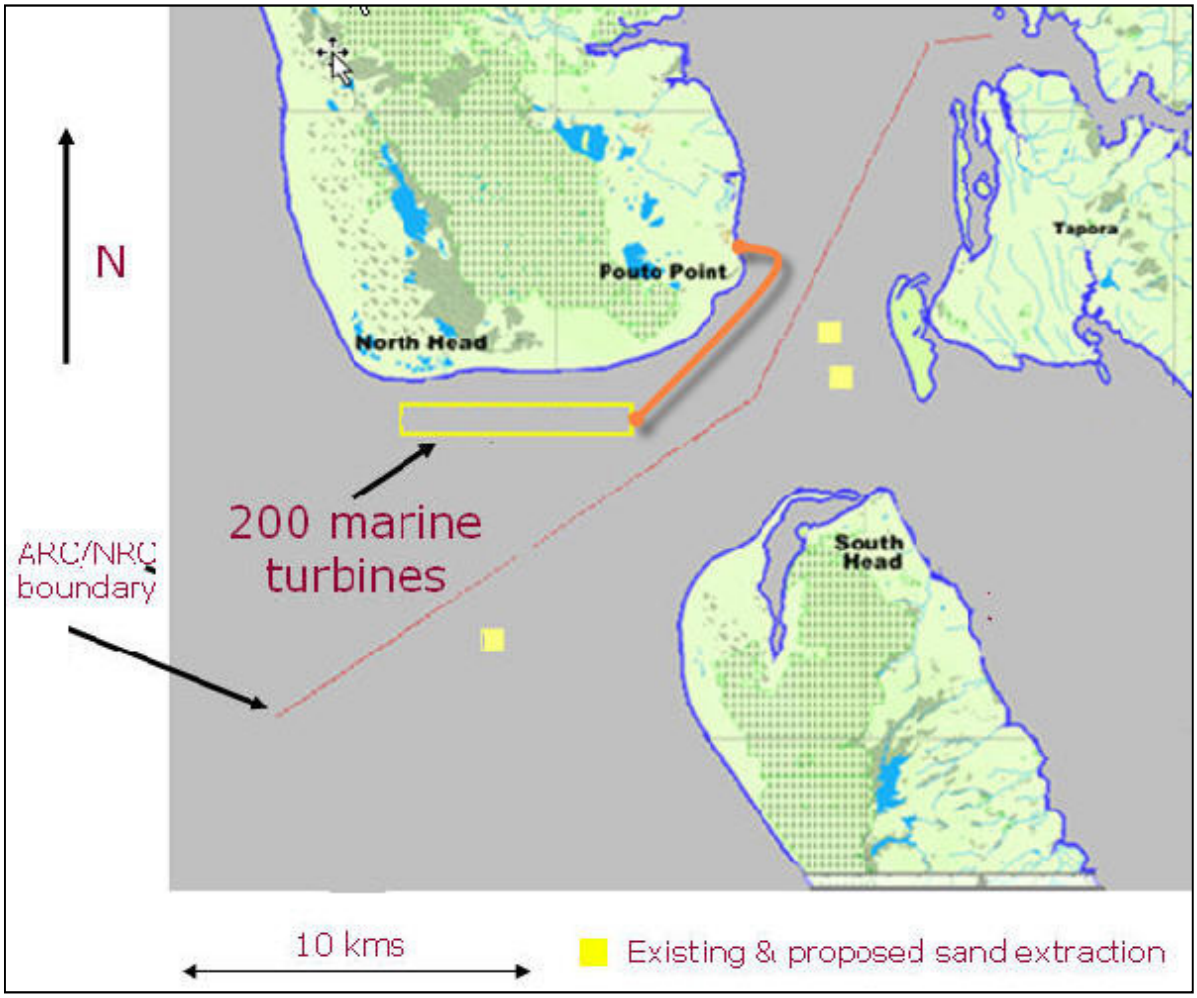

Figure A4: Location of the Underwater Turbines in Kaipara Harbour (Crest Energy ltd., 2010).