

**BEFORE CENTRAL OTAGO DISTRICT COUNCIL
AND OTAGO REGIONAL COUNCIL**

IN THE MATTER OF the Resource Management Act 1991

AND

IN THE MATTER OF of applications for resource consents by Meridian Energy Limited to establish, operate and maintain a wind farm (Project Hayes).

STATEMENT OF EVIDENCE BY ADAM JOHN MULDOON

1. INTRODUCTION

- 1.1 I am Meridian Energy's Wind Development Manager. I am currently based in Wellington. I have a Bachelor of Engineering degree in Chemical and Process with honours and have worked in the energy sector for 13 years. I have held roles in a range of energy projects (both in New Zealand and overseas) from the operation and commissioning of major equipment, the design and construction of major energy installations, and the development of concepts through to commercial sign-off. This work has crossed into Natural Gas processing including Liquefied Natural Gas or LNG, Aluminium Smelting, and electricity generation from Geothermal, Hydro, Combined Cycle Gas Turbines and Wind.
- 1.2 I have worked exclusively on wind farm projects for the past four years. During this time I have led the Meridian Energy (Meridian) Wind Development programme from identifying and securing sites through to resource consent and financial sign-off to build. I have led the wind development team through the site securing, design, consenting and business case sign-off for Te Apiti and for White Hill (a project in Southland for up to 70MW) and the investigation, design and consent applications for Project West Wind and Project Hayes.
- 1.3 This resource consent application is the fourth lodged by Meridian for a wind farm development in New Zealand. The first application was for the Te Apiti Wind Farm, now operating north of the Manawatu Gorge. The second was for Project White Hill in Northern Southland, where construction commenced in March 2006. The third was Project West Wind near Wellington which was approved at Council level and is awaiting an Environment Court decision.
- 1.5 I have read, and agree to comply with, the Code of Conduct for Environment Court witnesses and have prepared my evidence in accordance with those rules.

Scope of Evidence

Site Acquisition

- 1.6 Meridian has negotiated landowner agreements with the Project Hayes property owners. Its potential for wind farm development has been known to Meridian staff since the 1980's. Meridian's knowledge of the area and wind regimes has

been developed over a long period of time. Mr Paul Botha will provide evidence on this history and the reasons for the suitability of the site for a wind farm.

Wind Development in New Zealand and Project Hayes

- 1.7 Despite the clearly identified wind resource we have in New Zealand, there is a good reason why we do not have wind farms throughout the country. Until three or four years ago wind technology was not financially viable when viewed against the cost of energy from hydro and gas power development in New Zealand. The New Zealand Government – unlike many overseas countries – had not offered subsidies to developers of wind generation to meet the cost difference. In addition, at present thermal generators are not required to pay for the effects of their carbon emissions, including on climate change.
- 1.8 This requirement that wind farms pay their way as standalone projects is the main reason that, despite the very considerable potential of the wind resource in this country, at present wind generation contributes less than 2% of New Zealand's total electricity generation. Until recent times, wind farms in New Zealand have generally either been experimental (less than 10 turbines) or arbitrated to take advantage of a one-off opportunity in the transmission rules and market pricing mechanisms. The Tararua and Hau Nui wind farms, for example, are embedded in the local Powerco network.
- 1.9 Meridian changed that model in developing the Te Apiti Wind Farm which was the first utility scale, commercial wind farm in the country and the largest in the Southern Hemisphere. This achievement was not a simple process and it took many years of refinement of the wind farm development process to achieve this end. The company's commitment to sustainability and renewable generation allowed the project team to explore a range of options to make Te Apiti feasible.
- 1.10 This has meant that Meridian has provided the resources to invest in research that many others simply would not spend. This research has focused on investigating new developments in wind farm technology, financing, effects assessments, construction techniques and operations that enable Meridian to make these projects work. The Te Apiti project is widely recognised as a benchmark project in New Zealand for building a world-scale wind farm in a rural environment.

- 1.11 The White Hill project in Northern Southland has built on the very successful track record for Te Apiti. The experience gained in those projects, in understanding effects and economics in particular, allows Meridian to take a leading role in wind farm development. Wind can now compete on an even (or better) footing with all other forms of generation in New Zealand in simple cost terms, without factoring in the substantial added benefit of generating electricity from renewable resources.
- 1.12 It is also important to note the overwhelmingly positive support shown for both Te Apiti and White Hill. For example, we received a 10 to 1 ratio of positive submissions for White Hill. This overwhelming community support has to be earned, and Meridian spends a great deal of effort providing all stakeholders with enough (balanced) information to enable an informed decision. We are genuinely proud of our ongoing relationships with the communities of Ashhurst, Woodville, Mossburn, Lumsden, and Dipton near our pioneering projects.
- 1.13 Meridian sees no difference in how communities can react to change between those regions and the Central Otago region. In the Central Otago region, opinion surveys, expressed public support in the media and in discussion, and submissions on the present applications have given very high support to wind generation. Indeed almost all objectors to the Hayes proposal state that they favour wind generation in principle. Meridian believes that the great majority of New Zealanders wish to see energy generation provided through renewable resources.
- 1.14 Meridian Energy has chosen wind energy as a major plank for growth in New Zealand for a number of reasons:
- a. New Zealand has an exceptional wind resource by world standards.
 - b. Wind energy has matured as a technology over the last 25 years and is now a mainstream option for electricity generation. Large multi-national companies such as General Electric and Siemens have entered the wind energy business, resulting in efficiency gains, better durability and more affordable equipment.

- c. Wind is considered to be the most environmentally benign of all economic generation options available today. Friends of the Earth in the United Kingdom state “wind has far fewer effects on far fewer people”.
- d. Wind complements Meridian’s hydro portfolio in being able to match production between the most flexible of generation sources – hydro and wind. New Zealand is unique in that it offers both a substantial wind resource and a generation system built on hydro generation assets. The ability to store water while the wind is blowing is a key advantage to wind development in New Zealand, unlike other countries that use predominantly thermal fuels.
- e. Meridian has built a vast expertise in managing natural resources through its hydro portfolio.
- f. The development of renewable energy is directly in line with government policy, in particular the signing of the Kyoto Protocol, and the draft New Zealand Energy Strategy to 2050.
- g. Wind competes economically with all other generation alternatives.

1.15 The Environment Court decision for the Genesis proposal on the Awhitu peninsular near Auckland summarised the potential positive effects of wind very succinctly:

- a. Electricity is a vital resource for New Zealand;
- b. New Zealand needs more diverse electricity generation;
- c. Thermal generation has adverse effects including climate change and depleting fossil fuels;
- d. As a matter of national Energy Policy New Zealand is pursuing options for renewable energy;
- e. Wind is a source of renewable energy which is plentiful but which is best able to be utilised only in certain locations;

f. Benefits of renewable energy include security of supply, reduction in greenhouse gas emissions, reduction in dependence on the national grid, reduction of transmission losses, reliability, development benefits and contribution to the renewable energy target.

1.16 It must be remembered that wind has very substantial environmental and socio-economic benefits when weighed up against what essentially is a very subjective response to the visual and landscape effects. The footprint of the wind farm (including access roads – many of which are already present) is only 2.5% of the property. The Ministry for the Environment's electricity emissions factor (representing the average reduction in carbon dioxide emissions over the period 2008-2012 that would result from the addition of 1 GWh of new electricity supply with no emissions) is 625 tCO₂ per GWh. Whilst some greenhouse gases are emitted during construction, the Ministry for the Environment's emission calculation methodology indicates that Project Hayes approximate 93,500 tCO₂ construction emissions will be offset by the wind farm's operation within five weeks of operation.

1.17 Using the Ministry's electricity emissions factor, a wind farm of the size and efficiency of that proposed at Hayes (assuming 176 turbines of 3.6MW each) will avoid approximately 1,280,000 tonnes of CO₂ per annum. To put this into context, approximately 185,000 hectares of land would need to be converted to permanent forest sinks¹ to displace 1,280,000 tonnes of CO₂. Alternatively, approximately 296,000 petrol cars would have to be taken off the road².

Why Project Hayes?

1.18 Meridian has been involved in owning and developing wind turbines and wind farms longer than any other party in New Zealand. Meridian staff were involved in the development of the Brooklyn turbine in Wellington in 1992 and many of its staff members have been working in the wind field for over 10 years. With any development there is tension over a number of factors which need to be evaluated as a package to determine whether a site is acceptable for a wind farm. Meridian staff have been involved in evaluating all of the sites on which

¹ According to Landcare Research's carbon calculator, and assuming low site fertility, annual rainfall of 1240 mm, and 25 year old Manuka/Kanuka forest cover.

² Assuming 3.2tCO₂ for every 1000 litres of petrol used and an annual average of 4.33 tCO₂/car.

wind farms have been constructed in New Zealand and are familiar with many of the sites that other developers are promoting.

1.19 There are five key considerations when selecting a wind farm site. First and most important is wind speed. A high average wind speed is the main criteria in identifying a potential site. It is common for hills and ridges in New Zealand to have high wind speeds but given the requirement for spacing distances between turbines, there are relatively few areas which combine high wind speeds with suitable topography for development. It is also necessary to install a high number of turbines to cover the costs of fixed infrastructure (such as roading upgrades and transmission). Project Hayes with its high natural elevation and flat plateau exhibits exceptional qualities in this regard. Mr Paul Botha will provide more information in his evidence on how good this is in relative terms. This will result in Project Hayes having an overall capacity factor (the percentage of time that it is expected to operate at its full potential) of 37%. This is significantly higher than the international average capacity factor of 23% for existing wind farms. Due to the consistency of the wind resource Project Hayes will be generating electricity for over 88% of the time. If 3.6MW turbines are selected this will allow up to 2050 GWh of energy per year to be produced, which is enough to power up to 263,000 average homes, or slightly less than all the homes in Canterbury and Otago (273,000)³.

1.20 The second main consideration is infrastructure access. The key considerations here are proximity to transportation routes, labour pools and transmission. Project Hayes is very well served by all three factors. Mr Guy Waipara will provide more information on transmission in his evidence but suffice to say Meridian has chosen this site for its access to a strong part of the transmission system. Similarly other witnesses will detail how the transportation infrastructure of the area is sufficiently robust, with mitigation of some effects, to provide good access to the site for people and equipment. Consultation with contractors' associations in Central Otago and other groups such as the local branch of the Institution of Professional Engineers New Zealand has demonstrated a very keen and willing group of people sufficiently capable of building and operating the wind farm, are based in the greater Otago area.

³ 2006 Census regional summary table for occupied dwellings

- 1.21 The third consideration is consentability. This is our fourth wind farm application and with networks and access to the latest development techniques internationally, the Wind Development team at Meridian is well skilled and experienced in wind farm design and has incorporated many of the points raised in consultation over a number of years. The team is guided by the plans and policies in districts and develops a wind farm in tandem with those provisions. Coupled with this is the need to avoid, remedy and mitigate effects associated with the development. In choosing a site such as Hayes, which is grazed by stock and highly modified, remote from habitation and direct effects on people (such as noise, blade flicker etc) and taking into consideration a number of elements of direct feedback from people through consultation and surveys where they support wind farms if they are built away from population bases, then Project Hayes is an entirely appropriate place to build a wind farm.
- 1.22 Constructability is also a key consideration. Many of New Zealand's best wind farm sites have complex terrain in which to build the tracks needed to move equipment and install the turbines. Meridian will build on its established record at Te Apiti and White Hill where we have demonstrated we can construct wind farms on challenging terrain and complete projects on time, despite the devastating Manawatu floods of 2003 and the sub-alpine environment of Southland.
- 1.23 The final key consideration for developing a wind farm is saleability of the energy. The majority of Meridian's customer base is located in the South Island including New Zealand's largest consumer of electricity, the Tiwai Aluminium Smelter located in Southland. As described by Dr Turner, the location of this plant is logical given Meridian's portfolio, the growth of demand in the South Island and the nature of the electricity industry.
- 1.24 All of these factors come together on Project Hayes in a way like no other site that Meridian has investigated in New Zealand, or is aware of internationally. The culmination of these factors is an exceptional project. All other opportunities with a similar wind resource in New Zealand are either located in particularly sensitive areas, are away from transmission or a load centre, or are unable to be accessed. In Projects Hayes we have a commercially viable project that has the capacity to be an exceptional wind farm based on wind resource, latest turbine technology and scale.

Large versus small scale windfarms

1.25 Reference has been made to the report *Wind Power, People, and Place*⁴ by a number of submitters and the Central Otago District Council Planner's report in which a key finding of the report was that potentially "smaller scale, dispersed wind turbines and farms, and community ownership of smaller, commercial wind farms have proved successful in other countries." Before commenting on this statement I will also provide the other key findings that that report determined:

a. *"Wind Energy is a plentiful renewable resource that can be harnessed without harming ecosystems.*

- *Using wind power instead of fossil fuels reduces greenhouse gas emissions and reliance on non-renewable energy. To improve the sustainability of the electricity system, we need a long-term strategy that increases the proportion of renewable energy and improves energy efficiency.*

b. *Wind farms will only ever occupy a very small proportion of New Zealand's landscapes. Wind farms can have positive impacts.*

- *Even if high growth predictions for wind power eventuate over the next 10 years, wind farms will not dominate New Zealand's landscape, meaning impacts nationally will be very minor. Wind farms can be seen as positive elements in the landscape because of their sculptural qualities, and because they are seen to symbolise clean, green energy.*

c. *The location of the best wind resources and the push for large-scale wind farms is causing localised impacts on particular valued landscapes and communities.*

- *Wind farms are being proposed and built in outstanding natural landscapes, areas of moderate-to-high natural character on the coast, and near to residences. Other factors leading to significant localised*

⁴ Parliamentary Commissioner for the Environment, November 2006.

adverse effects are the trends towards larger wind farms (both in size and number of turbines) and clustering of wind farms.

d. Consultation early in a project and meaningful efforts to address community concerns are a vital part of developing wind power.

- Maintaining and increasing support for renewable energy, including wind power, is a key aspect of a sustainable energy future. Evidence of growing local community opposition to recent proposals is a concern, despite the general public's strong support for wind power.*

e. A strategic framework is needed to address location, scale, distribution, and ownership of wind farms, and to give robust consideration to alternatives through specific policy, plans, and guidance.

- A case-by-case approach to decision making to date has been reasonably robust. However, trade-offs are more likely to occur under a case-by-case approach. To ensure positive outcomes for wind power, landscapes and communities, stronger leadership from central government and regional councils is needed on the way wind power is growing. A range of measures will be needed to achieve this leadership.*

f. Robust national criteria are needed for assessing landscapes, and regional councils should lead landscape management.

- We need to address the ways landscapes are managed in New Zealand. There is evidence of inconsistency and lack of clarity about how landscapes are managed between regions and districts.*

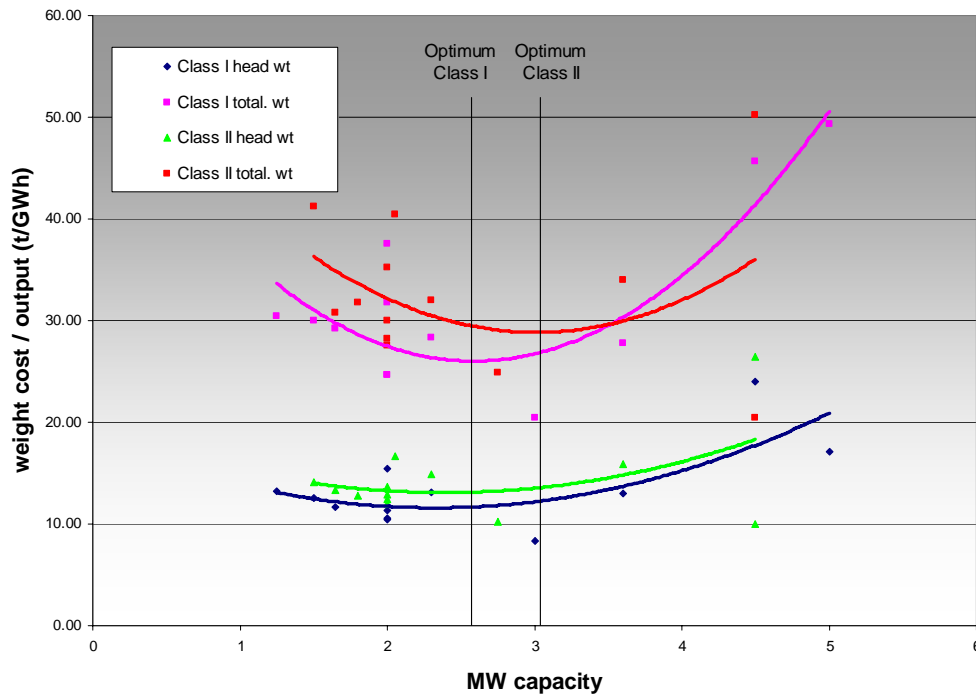
g. We can learn from other countries' approaches to wind farm development.

- Smaller-scale, dispersed wind turbines and farms, and community ownership of smaller, commercial wind farms, have proved successful in other countries. Overseas approaches have increased community acceptance, reduced impacts on valued landscapes, distributed benefits and impacts more evenly, and involved communities in sustainable*

energy projects. Central government should take the lead in investigating how these approaches could benefit New Zealand.”

- 1.26 When read collectively, the recommendations from the Parliamentary Commissioner for the Environment’s report suggest that wind farms can have positive effects and benefits but can place pressure on communities given the nature of the sites being developed and the scale of the wind farms. Frameworks are a way of dealing with assessing the issues around a wind farm, but the identified problems are not necessarily universal to every windfarm, ridgeline, and hill top.
- 1.27 I was interviewed by the authors of this report and was also involved in a feedback session with the authors after the report was published. In my opinion the report missed a number of very valid points in making the general assertion that more smaller wind farms located closer to load centres and utilising overseas community ownership models, should be adopted in New Zealand. With regard to smaller wind farms closer to load, this assumes that all of the criteria for choosing a site listed in paragraph 1.19 (in particular wind speed) are satisfied. Smaller wind farms closer to the area of need are referred to as being preferable. There are, however, two case studies of wind farms that have been proposed in New Zealand as being close to load which have not met with the success described by the report, one being the original Makara wind farm undertaken by ECNZ where many of the local community opposed the wind farm, even when it had been reduced in size to six sub 1MW turbines which could not be seen from any residential property in Makara. The other example is the Awhitu wind farm project. The Awhitu wind farm project promoted by Genesis Energy was for a 19 turbine project close to Auckland. This small wind farm utilising small turbines (sub 1 MW) went through the council and Environment Court processes and ended up with consent, but unfortunately is an unbuildable project. The combination of smaller turbines and small site with relatively low wind speeds means the project is not economic and Genesis Energy has stated this publicly.
- 1.28 The graph below illustrates that there is an optimum size wind turbine which has been developed and why wind farms are being developed at the size they are. The graph shows weight per GWh against MW for a number of turbines on sale on the market today. Weight is a good proxy for cost, as the cost of a

turbine is directly related to the amount of material present in the machine. Class I and II describes different turbine designs based on wind regime, with Hayes falling into the Class II regime. As can be seen, the optimum based on this work lies in the range of 2.3MW to 3.6MW.



1.29 Another point that was missed by the report was that it was basically advocating a higher number of transactions and effects on more communities. If we use the Awhitu project as an example, approximately 33 wind farms of the same size as the Awhitu wind farm would be needed to deliver the same MW as Project Hayes. This infers 33 more sets of effects that would need to be assessed, 33 more substations and transmission lines, most likely more turbines of different types and 33 more sets of landowners that would need to have contracts and agreements processed at a cost. Indeed there would need to be 33 consent processes which would all have to be processed, potentially with appeals. A direct comparison to describe these types of effects can be made by looking at the Tararua ridgeline near Palmerston North. If extended across the Manawatu Gorge to include Te Apiti to the proposed Motorimu in the south and including the Tararua wind farms, Te Rere Hau and the Turitea site, the “project area” would be 33 km long (c.f 26km for Project Hayes). Yet if all turbines which are

proposed or already consented for this area are built, there will be 455 turbines over six wind farms, which will deliver 530MW. When compared with the 176 wind turbines for Hayes and the potential 630MW, then this becomes a true reflection of the world class nature of Project Hayes, and leadership in its design of which Otago can take ownership.

It is also interesting to note that Project Hayes has a very small visual catchment on a population basis compared to those wind farms in the Manawatu. The ratio would be within the hundreds for Project Hayes compared to tens of thousands for the Manawatu. This again demonstrates the benefit of scale.

1.30 Perhaps the most unfortunate leap of assumption in the PCE report is that the European model of smaller wind developments has seen wind power take off overseas and this should be copied here. Part of this statement is correct – for the 1980s and 1990s, but it only occurred because there were direct tax incentives for the owners of the wind turbines in reducing their tax burdens. In a rural environment (where a large number of councils were the landowner) this became the norm while turbines were small. Now that turbines are multi-megawatt and are in a position to offset other forms of generation (such as thermal) in Europe the wind farms are, by necessity, becoming large utility scale developments due to their cost and grid connection requirements. Indeed in Denmark the owners of smaller wind turbines are being paid to replace the older machines with fewer, larger, more efficient modern turbines and communities are no longer able to afford the larger ones.

1.31 It is my Professional opinion based on my qualifications and experience that the Parliamentary Commissioner for the Environment's report, while touching on a number of issues, did not fully evaluate in sufficient depth a number of the issues presented in its report.

Site Optimisation

1.32 Another matter that has been raised by objectors is the potential removal of a turbine or turbines from the project. When considering each concern raised, we need to evaluate the impact of such a deletion:

- a. each 3.6MW turbine generates enough electricity to supply approximately 1500 homes;
- b. each turbine provides part of the revenue which underpins the overall project viability and in consequence any reduction leaves establishment and infrastructure costs to be met by a smaller number of turbines, so reducing the NPV and therefore project viability;
- c. project effects arising from the construction period and from the establishment of roading, transmission, and other infrastructure change very little if a turbine is deleted;
- d. the available energy resource will not be captured in any other way and in consequence there is inefficient use of resources;
- e. for each turbine that is not constructed other energy sources will have to be utilised, with possible carbon generation consequences.
- f. Removing an individual turbine or small groups of turbines does not necessarily change the overall visual effect of the project but can have more significant effects on project economics. Therefore project viability can be compromised with little real reduction in visual effects.

Community opinion on wind

1.33 In January 2007 UMR Research Limited was commissioned by Meridian to conduct a telephone survey of a random sample of 500 Otago residents who were asked questions relating primarily to their:

- views regarding natural places in the Otago region generally, and the Lammermoor Range in particular;
- views on future electricity generation options for New Zealand;
- support for building a wind farm in their area;
- support for the building of Project Hayes in the Lammermoor Range.

1.34 Results are also based on questions asked in the UMR Research nationwide omnibus survey where 750 randomly selected New Zealanders aged 18 years and over were asked questions relating to:

- their views on future electricity generation options for New Zealand;
- their support for building a wind farm in their area.

1.35 I have copies of the report here for tabling. In summary, the results show a majority of Otago residents expressed support for building a wind farm in their local area. The key findings were:

- The Lammermoor Range around the Logan Burn Reservoir received the lowest number of firmly positive ratings as both a special place and an iconic feature of 10 places in the Otago region queried.
- Respondents who had visited the Lammermoors clearly value the area. A majority rated three of six amenity values highly. The area is most valued for its visual and landscape appeal; being a pleasant place to visit; and its recreational value. Very few respondents gave low ratings for any amenity measures of the Lammermoors.
- Wind power was given a firmly high approval rating by a significant majority – 71% of Otago and 76% of national respondents.
- Wind power was the most preferred commercially available generation option for meeting New Zealand’s future electricity needs, with 43% of all respondents supporting it both in Otago and nationally. Hydro power was the next most preferred in Otago on 42%.
- A slight majority of Otago residents expressed support for building a wind farm in their area. 52% of Otago residents gave a high support rating, slightly lower than 57% nationally. 17% of all respondents were firmly opposed to a local wind farm.
- A majority 61% of Otago respondents expressed firm support for Project Hayes. Of these, 16% strongly supported the project, 28% were neutral and only 11% of respondents were firmly opposed to Project Hayes.
- Those opposed to Project Hayes, who would support a wind farm being built anywhere in the Otago region, suggested a wide number of alternative sites. No single site, however, enjoyed a consensus.

1.36 The survey conveyed a level of reinforcement and confirmation that while the Lammermoor area is known for its visual and amenity values, it ranks well below other ‘iconic’ landscapes in the Otago region. It also provided

reinforcement that wind power is still the most favoured form of currently employable generation.

Community Benefits

1.37 Meridian established the Meridian Energy Community Funds in 2005. There are currently Funds established and operating for the benefit of the communities associated with Te Apiti, Waitaki and Manapouri-Te Anau.

1.38 The purpose of the funds is to recognise the contribution our generation communities make to our hydro and wind operations and to the country's electricity sector.

1.39 Meridian Energy has sought to support projects which will contribute to sustaining and building the capacity and capability of these communities. The process of establishment therefore seeks to identify those issues of importance to the community which the community thinks would be best for the fund to support.

1.40 The geographic area to be covered by the fund is first determined, based on the area of influence of the project. A survey of that community seeks feedback on which of the issues identified in District Plans and LTCCPs are most important to them, and which of those important issues the fund should address. Typically this will result in a clear priority for five or six issues. In the case of the Manapouri-Te Anau Fund, for instance, the objectives are:

- Promoting environmental awareness and sustaining the quality of the environment in the community;
- Contributing to the sustainability of volunteer services;
- Promoting access to quality healthcare;
- Promoting life-long learning opportunities;
- Fostering opportunities for sporting, social and recreational activities.

- 1.41 Proposals for funding are considered by an advisory panel, which for each fund consists of an equal number of Meridian and community representatives. This Panel decides which projects should be funded and for how much.
- 1.42 The funds represent an opportunity to work in partnership with the community to facilitate community outcomes of real value.
- 1.43 The amount available through each fund is determined by the Meridian Board on a three year basis, and reflects the long-term average energy output from the facility or scheme. The Waitaki Scheme is currently \$1 million over three years; the Manapouri-Te Anau fund is \$500,000 over three years, and the Te Apiti scheme \$120,000 over three years.
- 1.44 The exact amount of a Fund for Project Hayes would depend on the output of the facility which was finally constructed. However, indications are that the Fund could be in the range of \$500,000 to 750,000 over the initial three years, or \$6.5 million to \$9.75million over a 40-year life of the project.
- 1.45 Meridian has been in discussions with the Maniototo Community Board about how a community fund could be applied to Project Hayes. These discussions have been positive with both sides being open about the opportunities and Meridian has been presented with some firm views on what the issues are the community is working with. We are optimistic that an appropriate mechanism can be negotiated with the Community Board that covers the Development Impact Levy, any construction effects and an ongoing Community Fund type mechanism.

Matters raised in Submissions and the Planners report

- 1.46 I have covered a number of matters regarding the size and scale of the proposal as raised in the planner's report and in submissions. I have also covered issues raised about benefit schemes that can be developed with the local community in recognition of its contributions, a matter also raised by submitters.
- 1.47 I note one submitter, M&K Schlup suggest putting turbines out to sea as a solution as seen in Denmark. Denmark has over 12,000 wind turbines installed in an area the size of Canterbury (43,000km² for Denmark compared with

45,000km² for Canterbury). It has already embraced wind in sufficient numbers and it is continuing to develop wind farms. The move to offshore wind increases the cost of developing a wind farm by 50% and with New Zealand's steep continental shelf any perceived benefit of going offshore soon disappears as the turbines would generally have to be located no more than a few hundred metres offshore, or in shallow areas, such as harbours or bays that are generally used by many people.

1.48 P&D Scott and G.C Sydney submitted regarding the emissions generated during construction and manufacturing in respect of the carbon balance which I have provided information on.

1.49 G.C Sydney describes an emotive scenario of wind turbines potentially standing derelict because of maintenance and replacement problems. I have visited the area described in the submission from G.C Sydney and am familiar with the isolated cases he refers to. The turbines he is referring to are small-scale developments using small turbines from turbine suppliers trying to forge a position in a crowded market in the early 1980's. Many of these developers and suppliers no longer exist and the scale of the operation does not warrant any money being spent on them. Meridian is providing a solution to this problem by developing a project which has a substantial capital investment of which the owner (in this case Meridian who is 100% Government owned) is very unlikely to leave as a stranded asset due to its inherent value. Meridian also only purchases turbines from a small portion of the worlds best turbine suppliers.

Conclusions

1.50 Meridian has developed a model for wind development based on responsible development. The community response to the Te Apiti and White Hill resource consent projects has been overwhelmingly positive.

1.51 The Hayes site is considered to be entirely appropriate for large-scale wind development and it is located on privately owned farm land that has been grazed for at least 150 years.

1.52 Meridian is an experienced and credible wind farm developer and operator capable of constructing and operating a facility that will be a considerable asset to this district and the nation as a whole for many decades.