BEFORE THE CENTRAL OTAGO DISTRICT COUNCIL AND OTAGO REGIONAL COUNCIL

IN THE MATTER OF	the Resource Management Act 1991
AND	
IN THE MATTER OF	of an application by Meridian Energy Limited for resource consents to establish, operate and maintain a wind farm on the Lammermoor Range to the west of the Old Dunstan Road (Project Hayes)

STATEMENT OF EVIDENCE BY KEITH SHARMAN TURNER

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1. INTRODUCTION

Qualifications and Experience

1.1 My full name is Keith Sharman Turner.

1.2 I am the Chief Executive Officer of Meridian Energy. I have spent my whole career in the electricity industry. Over the past 20 years I have held senior executive and corporate roles in the electricity industry, particularly the Electricity Corporation of New Zealand (ECNZ) including the role of Generation General Manager. I have also had extensive involvement in electricity reforms from the establishment of ECNZ in 1987, the splitting out of Transpower and later Contact Energy, the setting up of the wholesale electricity market company in 1993 and then the split of ECNZ in 1998/99.

1.3 I have been Meridian's Chief Executive since the establishment of the company in 1999 and was the project manager for the certification of the company under the Interim Development Group in 1998.

1.4 I hold professional qualifications of Bachelor of Engineering with honours, Master of Engineering and Doctorate of Engineering, all from Canterbury University.

Scope of Evidence

1.5 In my evidence I will focus on Meridian's role in the energy sector, the role of renewables in electricity generation and the energy choices facing New Zealand.

2. Introduction to Meridian Energy

2.1 Meridian is a limited liability company wholly owned by the New Zealand Government. It is one of three companies formed from the split of (ECNZ) on 1 April 1999.

2.2 Meridian's Statement of Corporate Intent states that: "Meridian's core business is the generation (including the ownership and operation of related assets),

marketing, trading and retailing of energy and wider complementary products and solutions both within and outside New Zealand".

2.3 As a State Owned Enterprise, Meridian is required by statute to operate as a successful business. A component of that requirement is to be an organisation that exhibits a sense of social responsibility by having regard to the interests of the community.

2.4 Meridian's objectives include maximising long-term shareholder value by its commitment to sustainable management and the development of the natural, physical and human resources utilised in its business.

2.5 Meridian is the single largest generator of electricity in New Zealand. Meridian's hydro generation and storage capacity accounts for approximately 31% of New Zealand's electricity generating capacity and 74% of New Zealand's hydro storage capacity. When Meridian was formed on 1 April 1999 the assets associated with the Waitaki Power Scheme, the Manapouri Power Scheme and the Brooklyn wind turbine were acquired. It is also currently constructing the 58 MW White Hill wind farm in Northern Southland and awaiting the Environment Court's decision on Project West Wind near Wellington. It completed the 90 MW Te Apiti wind farm in the Manawatu in 2004. Meridian is actively investigating and pursuing options for new renewable generation capacity and is investigating a number of sites that have potential for wind and hydro development.

2.6 On 22 November 2004 Meridian announced its commitment to generate power solely from renewable energy in the future. This decision has not been made because we think it will be easy or because it is one with high financial rewards. Meridian has chosen this path because it considers it is the right thing for New Zealand now and in the future and it reflects the preferences of both recent governments and the public of New Zealand.

2.7 Meridian has a proven track record in the development and operation of energy projects both in New Zealand and overseas. It has a proven record in the development and operation of projects within sensitive areas, including the World Heritage listed Fiordland National Park (Manapouri Power Scheme), and an exemplary record of environmental compliance in new projects such as the Te Apiti wind farm. In all the projects it is involved in Meridian has adopted a

"best practice" philosophy. The Manapouri second tailrace project - New Zealand's largest energy efficiency project to date - was completed to the highest environmental standards and was a finalist in the 2002 Financial Times Global Energy Awards.

2.8 In the Te Apiti project Meridian's approach to best practice has been recognised by Horizons Regional Council:

> *Meridian Energy showed that sound planning, implementation and management of earthworks can achieve the required environmental outcomes and in doing so have set the standard for windfarm development in the Manawatu-Wanganui Region. (Letter from Ewan Robertson, Team Leader Compliance, Horizons Manawatu Regional Council).*

Meridian will bring this approach and experience to Project Hayes.

3. Renewable generation

3.1 As well as being New Zealand's largest generator of electricity, Meridian is also the country's largest generator of renewable energy. As I said earlier, in November 2004 Meridian committed itself to developing electricity solely from renewable sources. If our commitment to renewables is to succeed we will need all New Zealanders to engage in mature and rational debate about the impact of specific proposals.

3.2 Meridian's Sustainability Policy is a cornerstone of our operating philosophy. It means we balance every decision we make according to the social and environmental as well as financial impacts it will have on our communities, our country and our planet. Sustainability is about being in business for the long haul and Meridian has been committed to sustainability since its inception in 1999. I represent the company on the executive committee of the New Zealand Business Council for Sustainable Development. I am extremely committed to renewable generation and sustainability as it is consistent with the philosophy of leaving this country a better place for future generations to come.

3.3 I would like to explain why Meridian has committed to renewables. Most obviously there is an environmental dividend – renewables have the least life-cycle impact on the environment. In February this year we received official notification from Landcare Research that the generation and retailing of our electricity is certified as carbon neutral. Achieving CarboNZero certification is a major milestone for us, as we have made a commitment to becoming a carbon neutral company. We were required to accurately measure the carbon emissions of our electricity, take active steps to reduce emissions and then offset any remaining emissions by purchasing carbon credits. We know that many of our customers are seeking to reduce their carbon footprint and supplying them with certified carbon neutral electricity means that they can count the emissions from their electricity consumption as zero.

3.4 Of equal importance is the fact that Meridian believes that New Zealand's renewables are the lowest-cost option. We all know that New Zealand has benefited from half a century of low-cost electricity from our hydro stations. We can build on that heritage for another 50 years with innovative development of new hydro, large-scale wind and eventually tidal and solar power. We believe that, provided we skilfully select and then develop the best sites, we can achieve the environmental benefits of renewables and the market benefits of power at lowest cost.

3.5 I want to emphasise that the benefit of low-cost power is a community benefit. The nature of demand for electricity means that even when prices rise, demand does not drop. It is very important that companies such as Meridian meet the challenge of electricity demand that keeps on growing by pursuing the lowest cost options, and not simply developing more expensive options that may be easier to consent but have irreversible environmental impact.

3.6 The scale of New Zealand's renewable potential is enormous. There is scope to develop renewables in many parts of New Zealand. This strengthens the system's responsiveness and avoids concentration of risk. Dispersed development means that each region can make a contribution to a national system, one that is greater than the sum of all its parts.

3.7 The trump card for renewables is that they are an indigenous resource and by developing them we are strengthening the country's capacity to compete on the

world stage and avoiding being tied to external markets which would impinge on our ability to compete internationally.

3.8 New Zealand has a high intensity wind resource by international standards. I believe that there is a large potential for wind generation development between 54 and 112 $ / MWh depending on the site, its wind speed and its proximity to the transmission network. Wind generation tends to have a lower capacity factor (meaning it produces less energy per installed megawatt) than hydro or thermal generation. When wind farms are generating, hydro inflows can be held in storage. When wind generation is low, reserved hydro capacity can make up for the shortfall. Wind variability tends to be over a few days, while hydro storage varies over a longer timeframe (typically six months), so wind and hydro together make an excellent combination for a secure supply.

3.9 Developing renewables now will give New Zealand the time we need to see how indigenous thermal fuel options develop. For example, whether gas will be discovered, when will clean coal technology become economically feasible, and when will carbon capture become economically feasible.

3.10 Developing renewables is good for the environment, good for the economy, good for society, and good for New Zealand. But it's not easy.

4. Our wind development experience

4.1 We have seen in our hydro investigations the competition amongst several sectors for water. Wind farms, of course, have the advantage that there are no competing interests for the allocation of the raw fuel. But there is competition for transmission capacity, for equipment prices and performance. Most of all, we compete for the best sites.

4.2 Meridian's approach is quite clear. We put the total package together and with our existing experience, make the chances of success the highest they can possibly be. We are careful and deliberate in our approach. We focus on developing good relationships that will thrive, not just survive, with the inevitable ups and downs of a project.

4.3 We think very carefully about the community and how a development can enhance its long-term potential. We recognise that we and New Zealand gain a benefit from the use of a local resource, and it is our policy to return some of that benefit to the local community. For example, we have commenced Community Funds that distribute sums of money for community projects in generation communities for our Te Apiti wind farm north of the Manawatu Gorge, and our Waitaki and Manapouri hydro schemes. These are taking over from our existing sponsorships in these areas and have more focus on the community deciding what the priorities are for Meridian to fund. Mr Adam Muldoon will discuss Community Funds further.

4.4 At every level in Meridian, from the Board to each staff member, we put a major effort into communications and consultation. We want people to know about and understand what we are proposing and how it might affect them. We are committed to communication, and we listen very carefully.

4.5 In our preparations for consenting Project Hayes we wanted to use our knowledge from the three wind farm projects we have previously obtained consents for. Project Hayes is a major commitment for Meridian. As later presenters will explain, at Hayes we have all the key ingredients for a successful wind development: a great wind resource, suitable terrain for construction and transmission nearby. The Board of Directors has approved our seeking resource consents for this project because it is satisfied that it is viable. We have spent the time and resource necessary for thorough investigative work on this project.

5. Electricity is a necessity in modern life

5.1 The electricity system from its generation to its local distribution is a critical infrastructure in the New Zealand economy. Over the past 118 years electricity has reshaped how New Zealanders live and work. Electricity has also become so central to day to day life that there are frequently no substitutes, yet its availability is often taken for granted. This is due to its unique advantages over other forms of energy, specifically:

- Flexibility – it can be transmitted over large distances instantly in the quantity required;

- Versatility – it can be converted into three major uses of energy: heat, light and motive power;

- Efficiency – it can be controlled and used with unparalleled precision;

- Availability – it can be produced from a number of different sources.

5.2 As a result, reliable and cost-effective access to electricity is fundamental to the ongoing progress of both New Zealand and its economy.

5.3 Electricity is an essential ingredient to industry. Without modern electric devices and technology New Zealand's industry would be uncompetitive in the world market. Electricity is a critical ingredient to industry and commerce in support of jobs.

5.4 Electricity supply is also critical to the ongoing operation of communication networks and other infrastructure, as well as the operation of banks, hospitals, schools and other public and private institutions that are critical to the ongoing social, economic, and cultural wellbeing and the health and safety, of people and communities.

5.5 The future electricity market outlook is determined by growth in demand and supply, and the design of the policy and regulatory framework. A key target of the Government is to restore New Zealand's per capita income to the top half of the Organisation of Economic Co-operation and Development (OECD) rankings. This will require sustained economic growth of 4% per annum.

6. Demand growth

Electricity Demand Growth to Date

6.1 New Zealand's demand for electricity has grown consistently over the past 20 years. Electricity consumption has increased from approximately 27.7 TWh in 1985 to 41.5 TWh in 2005, an average growth rate of 2.2 percent per annum.

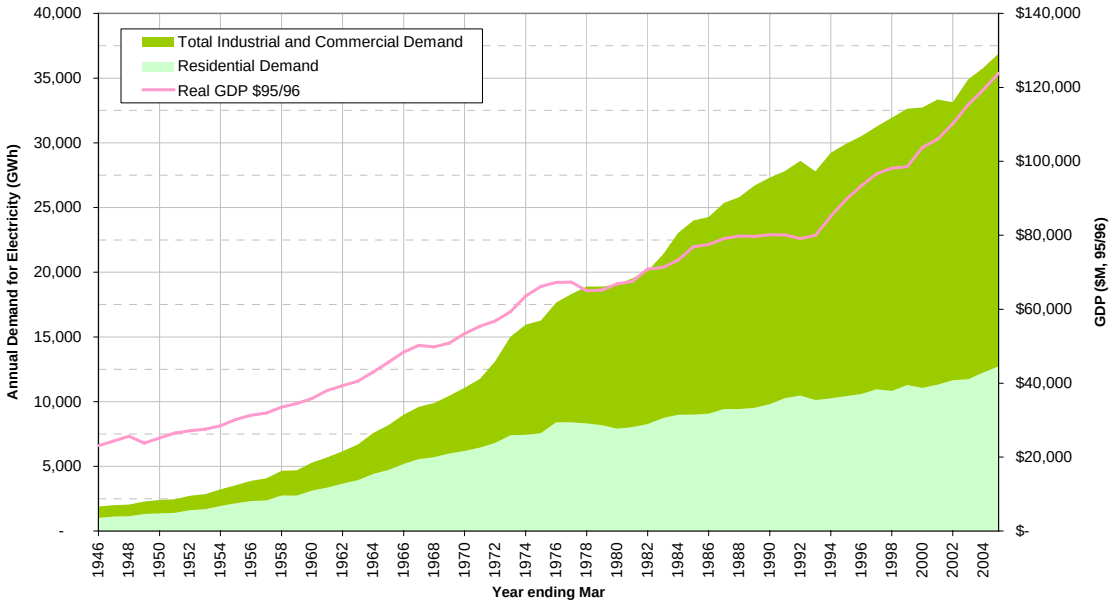
The growth in electricity consumption has been driven primarily by a combination of two factors:

- Economic growth measured by Gross Domestic Product (GDP). Electricity is an important factor of production in energy-intensive industries such as dairy farming, forestry, metal smelting and agricultural-based products. Income is also an important driver of electricity demand.

- Population growth.

The relationship between electricity demand and GDP is shown in the figure below.

Figure 1: New Zealand Electricity Demand and Real GDP, 1946-2005



6.2 Electricity price is also an important factor affecting electricity demand. To date, price has not had a significant impact in New Zealand. There are three main reasons for this:

- Price has been historically low by world standards. Until the last few years, changes in price have been modest.

- Residential consumers are on fixed-price contracts; these are usually reviewed annually. This lack of price information limits demand responses.

- There are no energy substitutes in many applications.

6.3 However, wholesale electricity prices have increased significantly over the past few years. There are two main reasons for this. First, the gas contracted under the Maui Gas Contract is running out. The period of low gas prices driven by this contract is ending and gas-fired generation is using gas supplied at a much higher market price. Second, New Zealand's cheapest generation options have already been built. New generation plant will inevitably be more costly.

Information presented later on the cost of new generation shows that there will continue to be upward pressure on the wholesale electricity price in the medium term, unless a significant, low-cost gas discovery is made. As the wholesale electricity price increases, we expect it to have a greater impact on electricity demand. Amongst other things, higher prices should encourage improvements in energy efficiency.

Demand growth rates in recent years have been at a higher rate in the South Island than the North, mostly as a result of dairying and forestry development. Last year the southward transfers on the Cook Strait cables reached the maximum and during the winter of 2006 the South Island was a net importer of electricity from the North Island. With its ability to produce up to 2000 GWh, Project Hayes will ensure security of supply in the South Island, even in dry years. Mr Guy Waipara will discuss these matters further.

Historic Response to Meeting Demand Growth

6.4 Historically, electricity demand growth has been met from a diverse range of fuel sources with a heavy emphasis on renewables - particularly hydro energy. Around 60 percent of New Zealand's electricity is produced from hydro resources. From time to time, however, it has led to New Zealand being susceptible to climate-related risk, especially during dry years.

6.5 The strong base of hydro generation has been supplemented by geothermal and more flexible "hydro-firming" thermal generation from New Plymouth, Huntly

and more recently combined cycle gas turbine stations in Auckland and Taranaki. Thermal generation has provided the New Zealand power system with the flexibility required to provide the ongoing balancing of supply and demand across a broad range of hydrological sequences. In the past, these sequences have varied as much as 25 percent above or below average.

Future Electricity Demand Growth

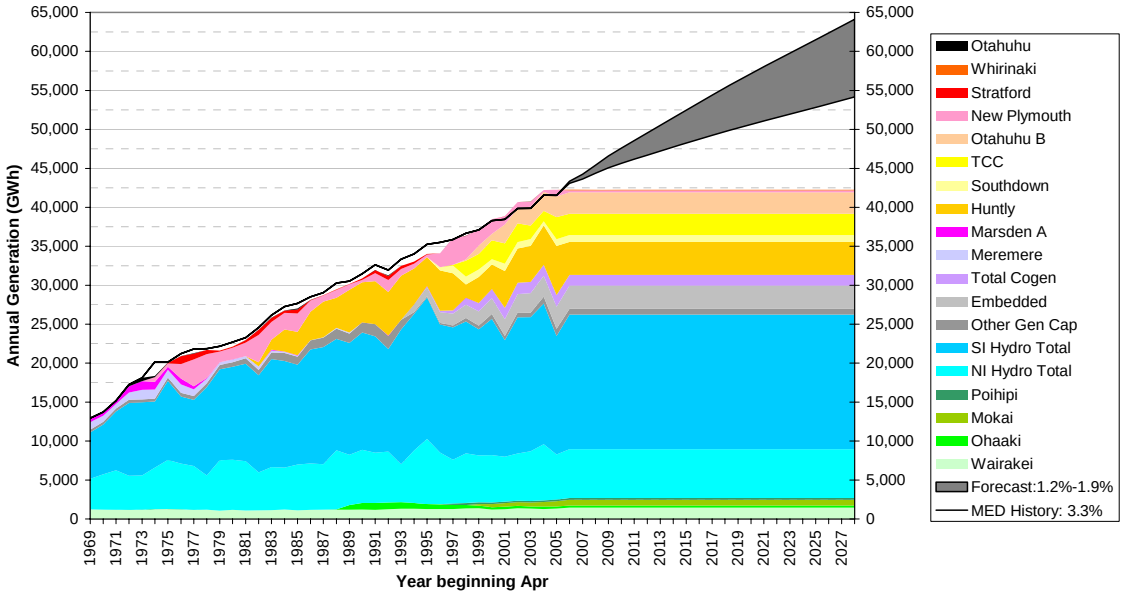
6.6 It is likely as New Zealand moves forward, that there will be some "decoupling" of GDP and electricity growth over time as:

- The New Zealand economy matures and there is an increased focus on services and value-added products;
- Electricity prices rise;
- There is an increased focus on energy efficiency.

6.7 The key area of uncertainty is the rate of growth and how specific regions will vary in response to local economic conditions. At a national level, our view is that electricity demand growth will continue to be significant. The rate of growth will require new base load generation to be installed in the order of 500 - 900 GWh per annum.

6.8 We expect electricity demand in 2030 to lie somewhere between 55,000 and 65,000 GWh. This equates to an increase of 30-60 percent in generation capacity. The graph below illustrates New Zealand's historical generation output across all major sources against demand growth. The demand growth is forecast from 2006 as a potential range. Even with the most conservative demand growth assumptions, which include a high degree of demand side initiatives such as energy efficiency programmes, there is a significant gap between supply and demand. The need for additional generation capacity is clear.

Figure 2: Electricity Demand and Generation Production, 1969-2027



7. New Generation

Generation Options Currently under Investigation

7.1 A range of new generation proposals has been put forward by both established participants and new entrants to the industry as market conditions have tightened. These proposals are at various stages, from initial pre-feasibility proposals through to committed projects.

7.2 There have been public announcements relating to 22 wind farm proposals at different stages of evaluation, planning or construction. There are also 15 hydro, 8 geothermal and 12 natural gas, coal, cogeneration or landfill gas options at various stages. These projects have a combined production of around 24,900 GWh. In addition to these projects, there are others that are not in the public arena. In Meridian's view, many of these projects are unlikely to proceed, at least in the short to medium term due to a number of factors including project economics, technology, transmission and consentability.

8. Economics of New Generation

8.1 Availability and price of fuel sources and consentability are the key issues for new generation options. Of the projects that can be consented, from an economic perspective the projects that should proceed are those with the lowest cost. The main fuel sources to meet new generation are:

Gas

If a large gas discovery is made in a location with supporting infrastructure, for example on the west coast of the North Island, the wholesale gas price could be at the lower end of the scale – perhaps $4.50/GJ, depending on field economics. At this price, gas-fired new generation would dominate most other generation options. New generation would tend to be gas-fired, though there would be some renewable investment. There would be no new coal-fired stations. A price on carbon or other changes in regulatory settings alters this conclusion. Given the lack of success in this region over the past seven years, this scenario is unlikely.

Alternatively, if current gas contract price expectations persist, at around $6-7/GJ, then the Combined Cycle GasTurbine (CCGT), Long Run Marginal Cost (LRMC) would be approximately $75 - 80/MWh, excluding any carbon price. A greater range of renewable projects is economic under this scenario, as well as some coal options. There would be a mix of new generation forms. Again, a carbon regime alters this conclusion.

A new CCGT plant running on LNG gas at delivered prices of $10-11/GJ is uneconomic, at least in the medium term. Importation of LNG in this price range only appears to be economic for re-firing existing gas-fired plant where the capital cost is already sunk.

Coal

The economics of new coal generation plant are much more site specific than CCGT gas plant – even when running on imported coal. The key difference is the specific infrastructure that needs to be developed to service particular coal plant options.

The cheapest greenfields coal generation option in New Zealand appears to be a large Southland lignite plant located next to the lignite coal fields at approximately $70/MWh, excluding the cost of carbon. Other coal options are significantly more expensive than this. New North Island coal generation using imported coal is likely to sit somewhere between $85-100/MWh – mostly depending on the proximity to an existing large port.

Coal is likely to be particularly affected by the introduction of a carbon regime. In a scenario where there is a price on carbon emissions, most new coal-fired generation projects are uneconomic.

Hydro

Similar to wind, the costs of hydro are driven by the local resource and the ease or difficulty of particular sites. As such, the LRMC of hydro is highly project specific.

Hydro projects are capital intensive and take a number of years to develop. As such, economies of scale are important for project economics. The LRMC of possible "economic" hydro generation options ranges from $65 to $100/MWh. Meridian is pursuing its investigations into a number of hydro options including the North Bank Tunnel concept on the Lower Waitaki and Mokihinui on the West Coast.

Geothermal

While the geothermal fuel resource is "free", finding and maintaining the resource for the life-time of the plant can be difficult and expensive. Sites and fields that have a proven track record are therefore more attractive than completely untested resources. Given this, a brownfields expansion of an existing project is typically the cheapest and most successful type of geothermal project. The Mokai extension project is an example of a brownfields expansion. These brownfields sites are possibly the cheapest of all of the new generation options with a LRMC estimated to be around $50-70/MWh. However such developments are limited largely to the eight key existing geothermal generation fields – up to about 2,500 GWh potential.

A new geothermal project on top of a good reliable resource could have a LRMC in the range of $75- 85/MWh depending on the technology selected. Beyond this, if the geothermal resource is either not ideal or deteriorates over time, then the unit cost can climb rapidly.

8.2 Other technologies

There is a range of other generation options. For various reasons, these options are unlikely to be a significant part of New Zealand's electricity industry over the next 20 years. They are:

Marine

The marine industry is at a similar stage now to the wind industry 25 years ago. It may be able to speed up the development cycle to achieve comparable performance and LRMC to wind. This is dependent, however, on a number of factors including technology improvements

Marine power generation refers to a range of methods and related technologies for capturing the energy potential of the ocean. These can be grouped into three main areas:

- Tidal barrages
- Ocean current
- Wave power.

.A large number of issues will need to be resolved before ocean current or wave power technologies can be deployed successfully in New Zealand. These issues include the potential effects on marine life, technology robustness, integration with the electricity system, visual and noise effects and potential conflicts with other users of marine resources.

In the early years of commercial production, wave and ocean current generation will be very costly relative to established renewable technologies such as wind, hydro and geothermal. Unless developers wish to be at the bleeding edge of technology adoption, the next several years may be limited to trying to better understand New Zealand's marine resources.

Biomass

Biomass can be used either as a source of energy or for its chemical components. It includes trees, crops, algae and other plants, as well as agricultural and forest residues. The definition also includes materials found in waste dumps.

In the energy sector, there are three relevant biomass resources:

- Woody biomass – wood (including residue and by-products) and dedicated trees and bushes.
- Landfill gas – from municipal solid waste.
- Sewerage, animal effluents and agricultural biomass (residues and dedicated crops).

These resources are mainly used as a fuel for heat. They are relatively expensive to transport. Some woody and landfill gas heat plants are cogeneration plants that produce limited amounts of electricity.

The East Harbour report "Availabilities and Costs of Renewable Sources of Energy for Generating Electricity and Heat" discusses biomass in detail (East Harbour, 2005). East Harbour has estimated there could be around 100 GWh per annum of electricity generation from landfill gas (10 percent cost of capital; medium confidence estimate) in the $40 – 60/MWh range.

At around 100 GWh, biomass does not have the ability to make a major contribution to new generation.

Nuclear

Globally, there are 442 nuclear power plants in 30 countries providing 16 percent of the world's electricity. Most are in developed countries, although the industry has stagnated in Western countries in recent years. Nuclear power has been growing in Asia, with 24 of the last 34 nuclear plants commissioned in the region (IAEA, 2006).

There has been increasing publicity about a revival in the nuclear energy industry. This has stemmed partly from the greenhouse debate over

alternative options to thermal electricity generation. For example, President Bush said earlier this year: "[The] United States of America must aggressively move forward with the construction of nuclear power plants."

The main impediment to nuclear power in New Zealand is its social acceptance. However, there are also significant economic and technical issues that make nuclear power an unlikely option for this country. These issues include:

- The use of nuclear energy for electricity generation in New Zealand is prohibited by legislation.

- Significant debate about the costs of nuclear power plants, including issues around insurance, capital costs, operating costs and decommissioning costs. Nuclear plant is generally regarded as being around twice as expensive as gas-fired plant. Given the other generation options available, nuclear energy is a relatively uneconomic option for New Zealand.

- Nuclear power plants are run at full capacity, and cannot follow demand up or down. This would have significant implications for the way in which other generation plant is operated.

- The minimum economic scale would be about 600 MW compared with New Zealand's current largest single generation units, which are 385 MW. The cost of providing an additional 200 MW or more of instantaneous spinning reserve or load shedding would be excessive.

- New Zealand would have to purchase fuel overseas, and would find it very difficult to store waste for any significant period of time due to the lack of a stable geological structure.

- Substantial infrastructure would be required to construct, operate and run a nuclear power station as well as handle fuel and waste. In addition to the physical structures, the associated industry that goes along with nuclear energy would be required - including the training of specialist engineers, management systems and operating expertise in aspects such as fuel transport and waste handling.

Significant research is being conducted into ways of overcoming the issues of scale, safety and waste management with nuclear power plants. We believe that it will be at 20 years before these technologies could become viable in New Zealand.

Solar

Solar water heating has an estimated unit cost of between 80 and 160 $/MWh and will only be attractive to some domestic users. Based on its high cost, solar water heating is unlikely to make a significant contribution to meeting electricity demand in the near to medium term.

Distributed Generation

Distributed generation has long been mentioned as a replacement to mainstream electricity generation and transmission. The most commercial opportunities rely on matching energy needs within a host business. Meridian has an associated company, Energy for Industry (EFI), which provides a service to industrial and large scale commercial businesses in order to maximise the energy conversion and minimise costs for customers. The most economic large-scale prospects which have the potential of deferring expenditure in mainstream electricity supply have already been done. There is the opportunity for this contribution to grow as technology costs decline, but no major new opportunities are expected to arise that would replace the need for a reliable and sustainable supply of electricity from the grid.

Emerging technologies in this category include photovoltaics (PV), fuel cells, small-scale combined heat and power and micro-scale wind and hydro options. While the costs of all of these technologies are falling over time, Meridian's analysis suggests that none offer a clear economic alternative in New Zealand conditions at this time.

Meridian is the majority owner of Whispertech (a producer of gas-fired, small-scale combined heat and power (CHP) units for home use) and has supported the development of this technology over many years. There is market readiness for this solution – but not in New Zealand. Whispertech's business is replacing central heating system boilers in the United Kingdom and European market where consumers have higher heat loads in their homes which can be

served by CHP units and the energy prices are generally higher. Even then, only approximately 30% (less in the New Zealand environment) of a home's electricity need is met by a Whispergen unit, still necessitating a significant purchase of energy from the grid. Uptake of Whispergen units is not expected to significantly impact on demand for grid services within planning horizons.

At Meridian we have taken the decision to make wind power part of our core business to provide an essential diversity in our generation portfolio. I believe that Project Hayes will be an important step in lowering New Zealand's exposure to the risk of hydro and gas shortages.

9. Transmission grid and new generation

9.1 The location of new renewable generation is determined by the location of renewable resources. Renewable generation is very site specific, with project economics hinging on the resources of individual locations. Mr Guy Waipara will discuss transmission issues further and Mr Adam Muldoon will describe the process of selecting wind sites.

10 Energy Efficiency and Conservation

10.1 Energy efficiency is defined, in simple terms, as doing something that enables the consumer to use less input energy but still to achieve the same outputs. Meridian is strongly in favour of this objective and works with its customers to develop, sell and promote energy efficient practices and products. For example:

- The initiative between the Electricity Commission, Meridian Energy and Orion to distribute energy efficient light bulbs in Christchurch and central Canterbury;
- Co-marketing and development of energy efficient pumping and cooling systems for on-farm milking;
- Intelligent systems to improve efficiency of irrigation systems by optimising for moisture, climate and power prices;
- Intelligent demand response in commercial and industrial processes or premises;

- New, more efficient domestic and commercial hot water heating solutions;

- Efficiency product offerings to our mass market and business customers;

- Promotion of efficiency and conservation measures to our customer base.

10.2 Energy efficiency is important to Meridian but it is not nearly enough to prevent the need for new generation. We will continue to promote energy efficiency as it makes sense for us and our customers to explore this fully. In October last year we launched a new business aimed at providing comprehensive advice for building energy efficient homes focussing on the passive measures such as designing to maximise solar gain and on systems such as heat pumps or solar water heating. Making better use of electricity is part of sustainable practice.

10.3 Meridian has invested significantly in renewable energy efficiency and improvement projects associated with its current assets since its inception. These include the second tailrace project at Manapouri which I mentioned earlier, and the Manapouri half-life refurbishment which will deliver further efficiency improvement. We have also developed sophisticated control systems and management tools during the automation and remote control project that has delivered efficiencies in water management for the Waitaki power scheme, and completed a rerunnering of the turbines at the Aviemore Power Station.

10.4 Energy conservation, which is defined as doing without energy services, is desirable but difficult to sustain on an ongoing basis without compromising lifestyle or employment. In recent energy crises the voluntary 10% savings made by consumers rapidly declined (i.e. consumption increased again) after a short period, in spite of the financial savings made from this behaviour, and added measures to incentivise consumers.

11. Wind and Government policy settings

11.1 Development of wind farms is consistent with many Government policies and initiatives. The Government's draft New Zealand Energy Strategy to 2050 released in December last year proposes that as much new electricity

generation as possible should be renewable. The strategy aims to ensure New Zealand develops a sustainable and affordable energy system which minimises greenhouse gas emissions and which will give New Zealand an enduring competitive advantage over other countries.

11.2 The Government's Climate Change Response Act (2002) acknowledges wind power as part of the solution to reducing the impact of energy use on New Zealand's increasing greenhouse gas emissions.

11.3 Wind power also contributes to the National Energy Efficiency and Conservation Strategy renewable energy targets. Project Hayes is proposed to have a generation capacity of up to 2050 GWh per annum. That is equivalent to 7.4 PJ for the purposes of the National Energy Efficiency and Conservation Strategy or 1,281,250 tonnes of CO2 per annum. These matters directly and substantially affect New Zealand's obligations to the global environment pursuant to the Kyoto Protocol.

11.4 Energy, and specifically renewable energy, is also highlighted as part of the solution to achieve long-term sustainable development goals in the Government's Sustainable Development Programme of Action.

CONCLUSION

1. New Zealand has a high intensity wind resource by international standards. When wind farms are generating, hydro inflows can be held in storage. When wind generation is low, reserved hydro capacity can make up for the shortfall making an excellent combination for a secure supply. Wind power can provide the diversity in New Zealand's energy supply mix, making all energy consumers less vulnerable to low hydro lake levels and gas shortages.

2. Meridian is at the forefront of the wind industry in New Zealand and has a reputation for sustainable development.

3. Providing more renewable energy is consistent with New Zealand's goal to use its own abundant energy resources to ensure long-term energy security, reliability and protection from international fuel price volatility. New Zealand has vast environmentally sustainable renewable resources across a range of costs and locations, which once captured have unlimited fuel. Wind farms such as

Hayes are one of the best options available for meeting future electricity requirements and this project directly supports the Prime Minister's call this year for sustainable development.