

**IN THE MATTER** of the Resource  
Management Act  
1991

**AND**

**IN THE MATTER** of the submission by  
**GENESIS POWER**  
**LIMITED** on the  
Horizons Regional  
Plan One Plan

---

**STATEMENT OF EVIDENCE OF ROBERT JOHN WEIR**

---

**1 July 2008**

---

## **1. INTRODUCTION**

- 1.1 I am the General Manager, Production, at Genesis Power Limited (trading as “**Genesis Energy**”), a position I have held since July 2006. Previously, I held the position of Engineering Services Manager at the Huntly Power Station, a position I held since July 2004.
- 1.2 I have worked in the electricity generation industry in New Zealand and Australia for the last 23 years.
- 1.3 I hold the degree of Bachelor of Electrical Engineering from the University of Queensland. I am a member of the Institute of Engineers Australia, a Certified Professional Engineer in Australia and a member of the Institution of Professional Engineers New Zealand.
- 1.4 I am responsible for the management of Genesis Energy's generation assets including the Tongariro Power Scheme, the Waikaremoana Power Scheme, the Hau Nui Wind Farm, and the Huntly Power Station including the Huntly combined cycle gas power station. I am also responsible for trading wholesale electricity and thermal fuel management.
- 1.5 In this position, I am required to ensure that the supply of electricity from all Genesis Energy's hydro, thermal, co-generation and wind-powered plants are available to meet the Company's trading requirements. This involves the management of generating facilities across the Company as a whole, and leading the strategic planning process for these assets and their deployment in the market.

### **Scope of Evidence**

- 1.6 In my evidence, I will cover the following subjects:
  - Background to Genesis Energy's business.
  - The importance of electricity.

- An overview of the New Zealand Electricity Market.
- The implications of the Proposed Horizons Regional One Plan for Genesis Energy and the supply of electricity to New Zealanders, and the importance of renewable energy projects generally and the Tongariro Power Scheme specifically to New Zealand and Genesis Energy.
- Conclude my evidence.

## 2. GENESIS ENERGY

- 2.1 Genesis Energy is a State Owned Enterprise (“**SOE**”) that commenced full operation in April 1999 following the split of the Electricity Corporation of New Zealand Ltd (“**ECNZ**”).
- 2.2 Genesis Energy has generation assets with a combined nominal generation capacity of approximately 2,020 MW, valued at approximately \$2 billion. Genesis Energy’s generation assets currently comprise:
- Three hydro generation schemes, being the Tongariro Power Scheme, the Waikaremoana Power Scheme and the Kourarau Power Scheme.
  - The Hau Nui Wind Farm in South Wairarapa.
  - Co-generation and biomass generation facilities.
  - The Huntly Power Station site, which is the largest thermal power station in New Zealand incorporating four coal fired units, an open cycle gas turbine and a combined cycle gas turbine unit.
- 2.3 Genesis Energy is committed to providing a secure and reliable supply of energy to New Zealand now and in the future. To realise this commitment, Genesis Energy must take a long term strategic approach to managing its generation portfolio.

- 2.4 Current and future planning for additional electricity generation by Genesis Energy includes:
- Specific targets to build 300 MW of renewable energy generation and advance the commercialisation of wave and tidal energy, some of which is likely to occur within the Horizons Region.
  - Fuel exploration to secure future fuel supplies for New Zealand, including for example the Kupe oil and gas field and the Cardiff deep gas prospect, and which may in future fall within the coastal marina area within the Horizons Region.
  - A Genesis Energy and Contact Energy joint venture company (Gasbridge Limited) formed to develop an LNG import and re-gasification facility at Port Taranaki, New Plymouth.
- 2.5 Genesis Energy employs some 513 people and makes significant annual dividend payments to its Ministerial shareholder.
- 2.6 Genesis Energy generates electricity for sale to the wholesale market and to meet the needs of the Retail Group customers. It is one of the largest energy retailers in New Zealand, and has a retail customer base comprising approximately 700,000 electricity and gas customers located primarily in the North Island. Genesis Energy is able to provide an integrated service for households and businesses covering gas, electricity, toll calls and internet services.
- 2.7 As a State Owned Enterprise, Genesis Energy is bound by the State Owned Enterprises Act 1986 that requires Genesis Energy, among other things, to operate its assets in the same manner as a commercial business and to act as a good corporate citizen. To achieve this, Genesis Energy seeks to make the best use of the resources available to it for the benefit of the shareholder and for New Zealand.
- 2.8 I note that in addition to its generation and retailing activities, Genesis Energy exercises social responsibilities within the communities that it works alongside.

The activities that Genesis Energy supports span a range of different interests. One of the primary activities supported is the Genesis Oncology Trust, which typifies the company's ongoing commitment to the community and contributes in a positive way to a major health problem in New Zealand. Currently the Trust provides approximately 5% of the total amount of cancer research spending in New Zealand, and runs an annual grant round with a distribution of up to \$1 million.

- 2.9 In addition to the Oncology Trust, Genesis Energy is active in environmental, business, sporting, arts and education, and other community projects. Some examples of these are set out below.
- 2.10 In terms of environmental initiatives in the Horizons Regional Council area, these include supporting, for example:
- Central North Island Blue Duck Trust;
  - Whanganui River Enhancement Trust;
  - Outdoor Pursuits Centre Kayak Education Fund;
  - Ngati Hauiti Cultural/Environmental Enhancement and Education;
  - Ngati Whitikopeka and Ngati Tamakopiri Cultural/Environmental Enhancement;
  - Rangitikei and Whanganui Catchment Fishery Enhancement (Fish and Game);
  - Recreational flows in the Whakapapa River (NZ Recreational Canoeing Association);
- 2.11 Genesis Energy also supports a variety of sporting, arts and education activities and places an importance on its involvement within the communities it operates. Some activities supported by Genesis Energy in the Horizons Regional Council area include:
- Green Rig, a mobile, customer built semi-trailer and truck taking the message of environmental awareness and sustainability to the Manawatu-Wanganui region.
  - The Wanganui Community Splash Centre hydro-slides.
  - Rescue Helicopter in Taupo and Manawatu.

### **3. IMPORTANCE OF ELECTRICITY**

- 3.1 New Zealand currently uses approximately 40,000 gigawatt-hours<sup>1</sup> (“GWh”) of electricity per year across the country. This electricity is used for a variety of activities ranging from domestic uses (home heating, cooking, hot water, etc); municipal uses such as lighting, water supply and wastewater treatment systems; through to large-scale industrial uses. The New Zealand economy and the welfare of the population are dependent on a secure electricity supply, both now and for the years to come.
- 3.2 For many people and businesses, access to a secure energy supply has largely been taken for granted. Many require and expect electricity to be readily available and to be able to increase or decrease consumption at will, and recognise how important it is when supply cannot be guaranteed. Some every day examples of electricity use include traffic lights; water supply; water treatment; sewage treatment and pumping; the function of dairy sheds e.g. milking, cooling and processing; radio and TV broadcasting, office use e.g. computers; entertainment and our general living environment (lighting, cooling heating), as well as keeping local and export industries operating.

### **4. NEW ZEALAND ELECTRICITY MARKET**

- 4.1 The New Zealand Electricity Market was opened in 1996 after the split of the Electricity Corporation of New Zealand (“ECNZ”) into two main generators, ECNZ and Contact Energy. In 1999 the remainder of ECNZ was split into Genesis Energy, Meridian Energy, and Mighty River Power whilst Contact Energy was fully privatised.
- 4.2 Generators sell their generation into the market, and conversely retailers have to buy the electricity that their customers use out of the market. As generators in the New Zealand Market are predominantly retailers, traders are also keeping a close eye on the prices they are paying to cover their retail commitments. The generators compete to generate based on price by offering

---

<sup>1</sup> New Zealand Energy Strategy 2007, pg 106

to generate electricity at different prices. The market operates 24 hours a day, seven days a week. Each day is divided into half-hour trading periods, and for each trading period generators offer their willingness to generate based on the prices, quantities required and generation resources available.

- 4.3 The market is designed to reflect the most efficient means of generating at least cost to the consumer. In the short term, price signals are intended to give indications to generators and consumers as to the supply situation. When supply is tight, prices rise but when supply is plentiful prices fall. A long term increase in the spot price is a signal to generators to invest in more capacity in the market.
- 4.4 The New Zealand Electricity Market is split into four separate areas, being generators, high voltage transmission network owners, distribution network owners and retailers. The main generators are also retailers in the various distribution network areas and hence provide a natural hedge to their retail arm. These Generator-Retailers have become known as GenTailers – as they hedge themselves with contracts for their own retail companies. Transmission lines are owned by Transpower, whilst distribution companies such as Vector and Powerco are owned by various companies and trusts.
- 4.5 The New Zealand Electricity Market was previously a self regulated market overseen by M-Co and the market surveillance committee; however as of March 2004 market regulation has been conducted by the Electricity Commission. The set of rules designed by the Electricity Commission to govern the New Zealand Electricity Market is known as the Electricity Governance Rules or the EGRs.

## **5. GENESIS ENERGY'S INTEREST IN THE HORIZONS REGIONAL ONE PLAN**

### **Introduction**

- 5.1 The ability of Genesis Energy to generate electricity for national supply depends on access to natural and physical resources (water, land, air and structures) for the generation of hydro, thermal, and wind powered electricity.

- 5.2 The proposed One Plan will have a significant influence on such resource access over the next decade at least. Hence, Genesis Energy's interest in the proposed One Plan, especially for existing operations such as the Tongariro Power Scheme and future renewable energy proposals.
- 5.3 Genesis Energy is generally in support of the policies, objectives, methods and rules contained within the proposed One Plan, although it is seeking some changes to improve the One Plan.

### **The Tongariro Power Scheme**

- 5.4 The Tongariro Power Scheme (“**TPS**”) is located on the central volcanic plateau south of Lake Taupo, which will be discussed in further detail by Mr Bowler.
- 5.5 The TPS provides water to the Tokaanu (240 MW) and Rangipo (120 MW) power stations and uses a series of lakes, canals and tunnels to do so. Tokaanu Power Station is located on the slopes of Mount Tihia, near the township of Turangi, south of Taupo. Rangipo Power Station is situated underground in the Kaimanawa Forest Park, on the eastern side of the TPS.
- 5.6 The water from the TPS contributes approximately 1,800 GWh per annum<sup>2</sup> (including Waikato River generation) to New Zealand’s electricity supply – about 4% of the country’s total electricity generation. The Tokaanu power station is also used as a frequency control station (controls the power system frequency) when required.
- 5.7 The TPS is unique in New Zealand in that water from the Horizons region diverted through the scheme is used in not only the TPS stations (Tokaanu, which uses water from the Whanganui catchment and from the Whangaehu and Moawhango catchments; and Rangipo, which uses water from the Whangaehu and Moawhango catchments) but enables Mighty River Power to generate an additional approximately 430 GWh<sup>3</sup> of electricity per year from the

---

<sup>2</sup> Based on typical Genesis Energy TPS generation and estimated Mighty River Power generation.

<sup>3</sup> Estimated Mighty River Power generation in evidence to TPS resource consent hearings.

Waikato Hydro System. The water from the TPS also supports the generation of electricity at Huntly by contributing to the cooling water taken from the Waikato River for the station. Any loss in water supplied to TPS is therefore lost to generation throughout the Waikato hydro system and constrains generation at Huntly.

- 5.8 The provisions of the One Plan will have an influence on the operation of the TPS. Genesis Energy therefore seeks that the provisions of the One Plan recognise the importance of the TPS, and protects existing infrastructure supplying renewable electricity generation to the National Grid.
- 5.9 Mr Bowler will discuss the TPS in more detail, and will provide clarification of how the present minimum flow provisions applying to the scheme, and the resource consents granted on the basis of present Horizons Regional Council policies are leading to significant improvements to aquatic and other habitats in the Horizons Region.

### **Provision for Existing and New Renewable Electricity Generation**

- 5.10 In 2007, (including data up to December 2007) New Zealand's mix of generation was predominantly hydro generation with around 55%<sup>4</sup> of generation coming from hydro sources. New Zealand's hydro storage capacity is also relatively small in comparison to other systems around the world, with typically only approximately six weeks of storage available to supply New Zealand's electricity needs. This is evidenced by the current threat of power supply constraints this winter, due to low hydro storage, as I will now elaborate on.
- 5.11 The uncertainty about electricity security of supply has been highlighted this year as a result of the following factors:
  - The power cable which runs across the Cook Strait supplying electricity to the North Island consumers has been constrained. Transpower has shut down part of the cable (which will require in the order of \$700

---

<sup>4</sup> Ministry for Economic Development, Quarterly Update, December 2007.

million<sup>5</sup> to replace) leaving the North Island and South Island connected by a single link. This means that power supply between the islands is therefore limited.

- There are low hydro levels in New Zealand lakes<sup>6</sup>.
  - Outages for maintenance at thermal plants have put even more pressure on the network.
  - High river temperatures and low river flows have constrained output from Units 1 – 4 at the Huntly Power Station.
- 5.12 The present electricity supply situation highlights the effect of a move away from use of renewable resources for electricity generation. The South Island hydro lakes have below average storage available for generation, putting greater emphasis on supply from other generation resources. In particular, over the week ending 2 June 2008, thermal generation provided up to 50%<sup>7</sup> of New Zealand's total electricity, compared with an average of about 33%<sup>8</sup> for the 2007 year. If present renewable generation resources are reduced, or if future renewable options are unnecessarily restricted, the difference between generation and demand is likely to be made up via thermal (fossil fuel) generation options.
- 5.13 Even allowing for a considerable uptake of electricity efficiency gains, electricity demand is projected to grow at around 1.3% per annum<sup>9</sup>. There will also be periods of much higher local growth rates in areas of higher economic activity. The New Zealand Energy Strategy ("NZES") notes that this projected growth is significantly lower than recent historic levels of growth (around two percent per annum), with improved energy efficiency throughout the economy lowering the growth in demand. A significant amount of new generation capacity will still be needed to meet this growth.

---

<sup>5</sup> Transpower NZ, HVDC Grid Upgrade Project Proposal Application for Approval, May 2008.

<sup>6</sup> Winter Power Group, June 2008.

<sup>7</sup> Winter Power Group, June 2008.

<sup>8</sup> Ministry for Economic Development, Quarterly Update December 2007.

<sup>9</sup> New Zealand Energy Strategy, October 2007, pg 72.

- 5.14 Some forecasts predict electricity demand to grow at around 2% nationally for the next 40 years, with more rapid growth, possibly up to 5% annually in some areas<sup>10</sup>, with others predicting growth rates between 1.7% and 2.3%<sup>11</sup>.
- 5.15 At a growth rate of 1.3% per annum, the NZES anticipates that approximately 3,900 MW of new capacity will be required to meet demand growth between 2005 and 2030<sup>12</sup> (assuming the status quo situation remains in respect of existing electricity supplies); otherwise New Zealand will require more energy than can be generated. This projected generation requirement takes into account advances in energy use efficiencies and increased savings as more efficient electricity utilisation is commissioned.
- 5.16 The Genesis Energy response to increasing electricity demand has been to investigate and implement, as appropriate, a range of new generation facilities, enhancements to existing generation facilities, and measures to improve the efficiency of electricity use (demand side management). However, it must also ensure that access to existing generation sources is maintained and protected, and that potential sources of electricity generation are not unnecessarily restricted.
- 5.17 In this regard, and by way of an example, I note that when the TPS was initially commissioned it was able to generate up to approximately 1,800 GW/h per annum (excluding any contribution made through the Waikato hydro system) utilising the water naturally flowing in the relevant TPS river catchments. Following various agreements regarding flow regimes, the setting of minimum flows and the establishment of new resource consent conditions (particularly during the 1990s and early 2000s) the maximum output of the TPS is now limited to approximately 1,435 GW/h per annum, a reduction of more than 20%. Any further increases in minimum flow requirements or allocations to other users that would constrain the operations of the TPS would result in further constraints to the supply of electricity from the TPS and the Waikato hydro system.

---

<sup>10</sup> Sustainable Energy Supply Options for Rodney District, April 2006, Sinclair Knight Merz).

<sup>11</sup> New Zealand's Load Growth from 1974 and Expected Demand to 2025, B Leyland, 2004.

<sup>12</sup> New Zealand Energy Strategy, October 2007, pg 72.

5.18 The Environment Court in its decision on the Genesis Energy resource consent applications<sup>13</sup>, considered this issue and the importance of TPS to the electricity supply system of the New Zealand economy as follows:

[401] We have found that the TPD makes a significant contribution to the hydro electric production of New Zealand. Its infrastructure, with its "sunk-costs" and existing capacity to produce 360MW — not to mention the reuse of the water down the Waikato River — reflects its contribution to the New Zealand economy. More importantly, any constraining by way of further releases of water down the streams and rivers affected by the diversions, will result in loss of hydro generation with significant economic implications as earlier discussed in this decision.

[402] Clearly, it is in the national interests for the TPD structure to be as fully utilised as possible. The water and the waterways, utilised by the TPD, can in an average year and in the absence of providing any flows for environmental reasons, produce 1,801GWh/yr of electricity [fn382 Bowler, EiC, paragraph 4.9]. The potential generation has been reduced as a result of environmental constraints to a potential annual generation of 1,437GWh/yr. In reality, the actual average annual generation for the period 1989 to 2003 was only 1,246GWh/yr — the difference being that not all available water can be diverted all the time [fn383 Bowler, EiC, paragraph 4.10].

[403] The current situation (prior to these new resource consents becoming operative) has resulted in the spillage of water for environmental reasons such that approximately only 82% of the potential generation is able to be achieved [fn384 Copeland, EiC, paragraph 5.3]. We are thus conscious of the effect of further eroding the available water that can be used."

5.19 The Government has set a target for 90 percent of New Zealand's electricity to be generated from renewable sources by 2025 through the NZES.

5.20 The NZES states:

"Achieving the target of generating 90 percent of electricity by renewable sources by 2025 will require:

- Market and regulatory structures to enable investment in a diverse range of renewable generation projects, including small-scale and distributed generation.

...

The government is confident sufficient quantities of renewable generation exist and can be developed without unacceptable or adverse environmental effects" (section 9.3.2).

5.21 The NZES also states:

---

<sup>13</sup> *Ngati Rangi Trust v Manawatu-Wanganui Regional Council*, Environment Court, Auckland, A067/2004, 18 May 2004, Judge Whiting.

"The government has stated a clear preference that all new electricity generation be renewable, except to the extent necessary to maintain security of supply. In support of this principle, and providing time for the full introduction of a price on greenhouse gas emissions, the government's view is that there should not be a need for any new baseload fossil fuel generation investment for the next ten years. The government expects all generators, including state-owned enterprises, to take its views into account when considering new generation investments, and the government will advise state-owned enterprises that it expects them to follow this guidance" (section 9.3.3).

- 5.22 The latest New Zealand Energy and Efficiency and Conservation Strategy (released in October 2007) states:

"Meeting the target will require generating electricity from a diverse range of renewable sources such as wind, geothermal, hydro and biomass. Emerging renewable technologies such as wave, tidal and solar photovoltaic, may also contribute to achieving the target. More distributed generation, including small-scale generation, could also make useful contributions to achieving the target" (page 68).

- 5.23 The NZES also identifies the "critical" importance of the Huntly Power Station in providing security of supply to the New Zealand electricity system, further reinforcing the supportive role that the TPS maintains in providing cooling water flow to the Huntly Power Station:

"A greater reliance on renewable generation has implications for the way security of supply is managed. Thermal plants such as Huntly will continue to play a critical role in New Zealand's electricity system, providing necessary security and versatility to both the provision of energy and the stability of delivery (voltage and frequency)" (page 64).

- 5.24 The Manawatu – Wanganui region is important in that it contains extensive natural water and wind resources of sufficient quality that are able to be harnessed economically for renewable energy generation. In addition, these resources are reasonably close to the northern load centres and the national transmission grid. There is significant potential within the region for renewable generation developments. These matters are of such significance that further consideration should be given to identifying the benefits derived from such energy sources in the One Plan in a way that would further support current government policy regarding electricity generation.

- 5.25 Genesis Energy believes that the use of renewable energy resources and the benefits that accrue from it should be specifically and explicitly recognised in the One Plan and that the policy direction within the One Plan needs to reflect

that, in some instances, the development and use of renewable energy resources of the region needs to occur to provide for the economic well being of New Zealand.

- 5.26 Genesis Energy seeks that the One Plan recognises the importance of a reliable and secure energy supply system as a pivotal component to the sustainable management of natural and physical resources and recognises the renewable energy resource base of the region, to provide for the continued social, economic and cultural wellbeing of the community as discussed in more detail by Mr Matthews.

## **6. CONCLUSION**

- 6.1 Genesis Energy currently owns and operates a diverse range of assets essential for maintaining an effective generation business. The assets include co-generation, wind generation, hydro generation and thermal generation power stations as well as a significant retail customer base and investment in gas resources.
- 6.2 New Zealand depends on the utilisation of natural and physical resources (water, land, air and structures) for the generation of hydro, thermal, and wind powered electricity.
- 6.3 Genesis Energy's interest in the proposed One Plan is from the perspective of the implications for the security of existing operations such as the Tongariro Power Scheme as well as in relation to the significant national benefits that accrue from these and from future renewable energy proposals.
- 6.4 Genesis Energy seeks that existing electricity generation operations are recognised in the One Plan and that the development of new renewable electricity generation is supported throughout the One Plan, this being consistent with central government policy (both statutory and non-statutory) regarding electricity generation.