

IN THE MATTER OF the Resource Management Act 1991

AND

IN THE MATTER OF an application by Hydro Development Limited's to the West Coast Regional Council and the Buller District Council for resource consent for a hydroelectric power scheme on the Stockton Plateau.

INTRODUCTION

1. My name is Tania Hood. I am a Renewable Energy Advisor with the Energy Efficiency and Conservation Authority (EECA) in Auckland. I hold a Bachelor of Resource and Environmental Planning (with first class honours) and have practiced in the Resource Management field for approximately six years. I have been in my current position for the past year and a half. I am a Graduate member of the New Zealand Planning Institute and a member of the Resource Management Law Association.
2. I am here today following EECA's written submission, dated 23 February 2009 in support of Hydro Development Limited's proposal to construct and operate a hydro power scheme and associated services on the Stockton Plateau in the Buller district ("the proposal"). EECA's support for the proposal lies in the fact that it is a renewable energy development that will result in significant benefits associated with reducing greenhouse gas emissions and improving security of electricity supply.
3. The evidence will cover the following matters that EECA believes should be given due consideration in the Councils' decision making process:
 - New Zealand's electricity context;
 - Resource Management Act – section 7 considerations; and
 - Resource Management Act – section 104 (1)(c) considerations.
4. Before further examining these matters, I will briefly outline the role of EECA.

THE ENERGY EFFICIENCY AND CONSERVATION AUTHORITY

5. EECA is a Crown Entity established by the Energy Efficiency and Conservation Act 2000. EECA's statutory mandate is to encourage, promote and support energy efficiency, energy conservation and the use of renewable sources of energy. EECA's work includes helping businesses to implement energy efficiency measures, improving New Zealander's quality of life by increasing the supply of warmer, drier homes, by increasing the energy efficiency of products and by promoting better personal transport choices, and protecting the environment through energy efficiency and renewable energy supply.
6. In supporting this proposal, EECA has taken into account its statutory goal to promote and support renewable energy, and the sustainability principles in section 6 of the Energy Efficiency and Conservation Act, including the principles of the Treaty of Waitangi, acknowledging that the comprehensive analysis and balancing of all issues is to be completed by the decision maker.

NEW ZEALAND'S ELECTRICITY CONTEXT

7. In an average hydrological year, New Zealand generates about 70% of its electricity from renewable energy resources, with the balance being made up by fossil-fuelled thermal generation as required. Most of the renewable generation comes from hydro and geothermal with smaller but increasing amounts from wind. Electricity generated from biogas, waste heat and wood (including cogeneration) also make small but valuable contributions.
8. Despite this, over the past few decades a large proportion of demand growth has been met using fossil fuelled power stations. This has resulted in a long term decline in the proportion of electricity generated from renewable sources. This is in contrast to some OECD countries, like Denmark and Germany, which have seen marked increases in the proportion of renewable generation.
9. If we continue to build a mixture of fossil-fuelled and renewably-sourced electricity generation, as we have done over the last 25 years, the rate of increase of New Zealand's electricity related emissions will continue to escalate.

10. This fact, in combination with uncertainty around the long term supply and price of future gas resources^{1,2}, means it is now imperative that new renewable electricity generation capacity is developed, while also implementing energy efficiency and conservation measures, in order to help New Zealand to meet its future demand for electricity and to ensure security of electricity supply.

THE RESOURCE MANAGEMENT ACT 1991 – SECTION 7 CONSIDERATIONS

11. Part 2 of the Resource Management Act 1991 (RMA) includes section 7 which contains matters to which particular regard must be had by decision makers in achieving the purpose of the Act. This includes matters such as:

(b) The efficient use and development of natural and physical resources

(ba) The efficiency of the end use of energy

(f) Maintenance and enhancement of the quality of the environment

(g) Any finite characteristics of natural and physical resources

(i) The effects of climate change

(j) The benefits to be derived from the use and development of renewable energy.

12. I will now describe the range of benefits and positive effects of the proposal consistent with these matters. In particular, the proposal will assist in reducing the impact of climate change, ensuring security of electricity supply and contributing towards long-term economic development.

The effects of climate change and New Zealand's international obligations

13. A large and increasing body of evidence indicates that due to climate change, the world is experiencing a rise in global average temperatures, resulting in increased glacier retreat, more frequent extreme weather events and a change in rainfall patterns. These climatic changes will potentially impact on New Zealand's native ecosystems, industries, infrastructure, health, biosecurity and economy.

¹ The Electricity Commission revised its gas availability and price assumptions based on publicly available information: *Gas for Electricity Generation: Availability and Price Forecasts*, Erwan Hemery, 14 April 2009. www.electricitycommission.govt.nz/pdfs/opdev/modelling/pdfsmodelling/gas-generation.pdf

² Contact Energy state in their March 2009 presentation to Investors that "Gas remains an unlikely source of new generation, given supply and price uncertainty" slide 14, www.contactenergy.co.nz/web/pdf/legal/240309March09InvestorOffsite_v3.pdf

14. In the long term, if unchecked, climate change increases the risk of major and irreversible changes to the Earth. The cost of doing nothing about climate change will be severe and the impacts on our environment, economy and society are likely to get steadily worse if greenhouse gas emissions are not reduced significantly over the coming decades³.
15. New Zealand is a signatory to the Kyoto Protocol, which came into force on 16 February 2005. The protocol is the principal international response to climate change, following on from the United Nations Framework Convention on Climate Change. As a signatory to the protocol, New Zealand has agreed to reduce its carbon dioxide (CO₂)⁴ emissions in the first commitment period (2008-2012) to 1990 levels or otherwise take responsibility for any surplus emissions.
16. New Zealand is actively working towards a climate change agreement to succeed the Kyoto Protocol after 2012. At present it is consulting on an appropriate emissions reduction target for 2020, which it intends to announce at the next stage of international negotiations in August.
17. Underlying this consideration is the fact that New Zealand's emissions have significantly increased since the 1990's irrespective of New Zealand's stated intention to reduce them. The largest percentage increase by far has been in the electricity industry at 91%, followed by a 70% increase in transport emissions and a 12% increase in agricultural emissions.
18. Despite this growth in emissions, New Zealand will meet its Kyoto Protocol commitments because of extensive forest plantings in the 1990's, however once these forests are due for harvest in 2020 it will be difficult for New Zealand to meet emissions targets. Unlike some other parts of the New Zealand economy, there are significant economic opportunities to reduce electricity sector emissions.
19. In this regard, this proposal will not only contribute 50 megawatts (MW) towards the region's electricity requirements, but it will also not emit any greenhouse gases (other than the relatively small amount emitted during construction and embodied in its construction materials). Accordingly, at up to 240 gigawatt hours (GWh) of electricity per, the proposal would avoid between approximately 91,000⁵ and 220,000⁶ tonnes of

³ Stern, 2006, *The Economics of Climate Change – The Stern Review*.

⁴ The commitment relates to greenhouse gases of which CO₂ is the major contributor.

⁵ 0.38 kt CO₂/GWh Gas generation emission factor *New Zealand's Energy Outlook to 2030*, p.41 footnote 86

carbon dioxide equivalent (CO₂e) per annum, depending on whether gas or coal generation is avoided⁷.

20. In summary, maximising electricity generated from renewable sources now, rather than using fossil fuel resources, will help New Zealand meet its current Kyoto Protocol commitments as well as any future international commitments, it will reduce liability for surplus emissions, and will allow businesses to remain more competitive in a future where the costs of emissions are priced in the market.

Security of supply

21. I will now outline that benefits and positive effects which the proposal will create in regard to improving security of electricity supply, meeting local demand for electricity, contributing towards a diversity of supply and reducing transmission losses.

Meeting electricity demand

22. New Zealand's electricity demand is predicted to continue to grow and if demand continues to grow at the recent historical rate of 2% per annum, between 105⁸ and 240⁹ MW of new capacity will be required per annum to meet New Zealand's increased electricity demand in 2030 (this is without replacing current generation capacity which may be retired for reasons of age or fuel source by 2030).
23. The proposal will contribute to meeting demand for electricity and with an installed capacity of 50 MW, will generate approximately 240 GWh of electricity. This is equivalent to meeting the electricity demand of approximately 28,000 households per annum.
24. The proposal will contribute in a significant way to meeting demand for electricity in the West Coast region which is a net importer of electricity and where electricity demand is increasing. The proposal will make the region more self sufficient in electricity supply

⁶ 0.90 kt CO₂/GWh Coal generation emission factor *New Zealand's Energy Outlook to 2030*, p.41 footnote 86

⁷ Recent work by the Energy Data and Analysis Co-ordination cross-government group has predicted an average reduction of CO₂ equivalent emissions of 0.2 kt CO₂/GWh per annum, for the next 10 years, as a result of the installation of new renewable projects and energy saving measures. This reflects the expectation that a mixture of renewable and fossil-fuelled generators will be the marginal generator throughout any year and so the new generation of this proposal will displace a mixture of fossil-fuelled and renewable generation. Using this factor the predicted reduction in CO₂ emissions from this proposal would be 48,000 tonnes of CO₂ equivalent per annum. (www.med.govt.nz/upload/55313/emisison%20reduction%20effects.pdf)

⁸ Based on a capacity factor of 90%.

⁹ Based on a capacity factor of 40%.

along with TrustPower's proposed Arnold River hydro scheme and Meridian's proposed Mokihinui hydro scheme.

Diversity of supply

25. Hydro electricity, particularly that having storage capacity such as this proposal, will complement New Zealand's growing wind generation portfolio. Hydro storage based generation is valuable because it would allow relatively fast responses to demand changes and storage ability, thus enabling it to be used to balance rapid changes in demand and the intermittency of the wind. Hydro storage can be dispatched rapidly when required (i.e. when the wind stops blowing), or can be saved to be used later when demand is high and other forms of generation are scarce. In the future, with an increasing share of generation being met by renewables, this feature will become even more important. Therefore the proposal would not only provide more overall generation capacity, but it may also facilitate more wind generation to be incorporated into the electricity system.
26. The proposal will also contribute to the geographic diversity of the electricity system as a whole, adding to its resilience. Diversity in energy supply through the development and maintenance of renewable energy reduces exposure to energy supply disruptions or price shocks that are associated with fossil fuels. Consistently lower priced energy is a key component of national economic growth and development necessary to maintain our standard of living.

Transmission losses

27. A significant benefit of the proposal is that it will be installed relatively close to the source of electricity demand in the West Coast and Upper South Island, with electricity being injected into the local distribution network, thereby avoiding losses from transmitting the electricity on the national grid.
28. Reduced transmission losses will offset more expensive generation (in terms of transmission losses) from the South Island which has the potential to put downward pressure on wholesale electricity prices, resulting in lower electricity costs. This will result in an efficient end use of electricity consistent with RMA section 7 (b) and (ba).

29. The average losses due to transmission were 3.8%¹⁰ of the total electricity generated in 2008. The West Coast endures significantly higher transmission losses at peak times from power delivered from the Waitaki hydro system¹¹.

Other benefits

30. The proposal and its utilisation of a renewable source of energy, will contribute to maintaining and enhancing the quality of the global and national environment, by encouraging and facilitating a move towards renewable energy and by reducing the emission of greenhouse gases, consistent with RMA section 7 (f). It is also benign in regards to air quality, avoiding the emission of contaminants into the air such as particulates, sulphur dioxide, nitrous oxides and carbon monoxide.
31. In addition, as a sustainable resource, the utilisation of hydro energy does not deplete other finite natural and physical resources, such as fossil fuels, and may slow the rate of decline of burning fossil fuels for electricity consistent with RMA section 7 (g).
32. Lastly, the promotion and development of electricity generated from hydro resources will also result in short and long-term employment opportunities, and may have positive flow-on effects for businesses in the region, including industry.
33. To summarise, the proposal will result in a range of benefits and positive effects. The development of renewable energy will make a valuable contribution towards reducing CO₂ emissions making a significant contribution to improving New Zealand's overall greenhouse gas emissions profile and will assist in maintaining security of electricity supply.

THE RESOURCE MANAGEMENT ACT 1991 – SECTION 104(1)(c) CONSIDERATIONS

34. Section 104 of the RMA includes matters to which regard must be had by decision makers when considering resource consent applications in achieving the purpose of the Act. This includes any other matter which is considered relevant and reasonably necessary to determine the application for resource consent (section 104 (1)(c)).

¹⁰ *New Zealand Energy Data File*, July 2009 (www.med.govt.nz/templates/StandardSummary_15169.aspx)

¹¹ *West Coast Regional Renewable Energy Assessment*, August 2008, page 20 indicates transmission losses of up to 50%.

35. It is my opinion that the Government's commitments to climate change, the target that 90% of New Zealand's electricity will be generated from renewable sources by 2025, and the Proposed National Policy Statement on Renewable Electricity, are all particularly relevant considerations to the determination of this application because they are recognition of the national level at which renewable energy is being addressed.

The Government's energy objectives

36. EECA's submission referred to New Zealand's 90% renewable electricity target, the New Zealand Energy Strategy and the New Zealand Energy Efficiency and Conservation Strategy which are all interlinked with New Zealand's climate change commitments. Since then the Government has announced that the New Zealand Energy Strategy is being reviewed and the New Zealand Energy Efficiency and Conservation Strategy is being updated to refocus on security of supply, affordability, and environmental responsibility, with the overriding goal of maximising economic growth.
37. The Government maintains its commitment to promoting the efficient uptake of renewable generation and this emphasis has recently been confirmed in the Government Policy Statement on Electricity Governance¹². This document sets the objectives and outcomes that the Government wants the Electricity Commission to give effect to in relation to the governance of the electricity system. It sets objectives in relation to renewable electrical energy that:
- “undue barriers to investment in renewables should be reduced or removed;*
- the efficient uptake of renewable generation should be promoted;*
- the national transmission grid should be planned and made available so as to facilitate the potential contribution of renewables to the electricity system; and*
- the specification of the grid planning process and approval criteria should allow grid upgrade plans to facilitate the efficient and timely development of renewable generation resources, taking into account any difference in lead times for transmission and generation investment.”*

¹² Government Policy Statement on Electricity Governance, May 2009

38. The Government has also initiated a review of the emissions trading scheme and a review of the electricity market however the Government's broad strategic focus continues to be on the reduction of greenhouse gases and the greater use of renewable energy for electricity generation. The Government maintains continued support for the target that 90 percent of the country's electricity will be generated from renewable sources by 2025 providing it is not at the expense of security of supply.

The renewable electricity target

39. Achievement of the renewable electricity target should lead to increased economic productivity in the energy sector by encouraging new industry and business development, and by creating a more diversified electricity supply portfolio. It will also help to return New Zealand's greenhouse gas emissions back to 1990 levels and thereby assist New Zealand to meet its obligations under the Kyoto Protocol and future international agreements.

Meeting the target

40. To meet the 90% renewable electricity target, to maintain security of supply, and to reduce New Zealand's electricity related greenhouse gas emissions will require a significant increase in renewable electricity generation. In meeting the target sufficient generation capacity can be maintained to meet electricity demand both in dry years and during the increasing electricity demand peaks, without incurring substantial costs.
41. New Zealand has world-class developed and undeveloped renewable energy resources and in the short term, the demand for electricity will be met by a mixture of more wind, hydro and geothermal energy. All renewable energy resources, including biomass energy and emerging technologies such as wave, tidal and photovoltaics, will contribute to the maintenance of the target in the long term. Distributed generation, including small-scale renewable generation, will also continue to make useful contributions to electricity supply in the future.
42. Modelling lead by EECA, jointly commissioned with the Ministry of Economic Development and the Electricity Commission¹³ was instrumental in setting the renewable electricity target. The electricity system was modelled for the period 2007 to 2030. A number of different scenarios were modelled, ranging from no target or no

¹³ The Energy Efficiency and Conservation Authority, Ministry of Economic Development, Electricity Commission, *Understanding the Implications of the Higher Proportion of Renewable Electricity by 2030*.

constraints to 95% renewable electricity by 2030. All scenarios required the maintenance of sufficient generation to meet dry year and system peak requirements.

43. While indicative only, and subject to change depending on actual growth rates, economics of proposals and private investment decisions, the modelling predicts that to achieve 90% renewable electricity an increase in renewable generation of 3,750 MW is required by 2025. This is an installation rate of approximately 200 MW per annum. In terms of generation, the modelling predicts that by 2025 an additional 20,700 GWh of electricity generated from renewables will be needed per annum.
44. As previously mentioned, over recent years New Zealand has relied heavily on demand growth being met by fossil fuel generation. It is clear that significant new renewable generation, from a base of 6,300 MW, will need to proceed in order for New Zealand to achieve the renewable electricity target. The proposal will contribute towards the achievement of this target.

The role of hydro generation in meeting the target

45. New Zealand has an excellent existing hydro resource with approximately 5,376 MW of hydro generation capacity in 2008, producing 22,091 GWh of electricity¹⁴.
46. New Zealand has sufficient undeveloped geothermal, wind and hydro resources to achieve the target but each different type of generation plays a unique and critical role. In this regard, the 90% renewable electricity target will not be achieved by any one technology, rather a mixture of generation is required to meet the target.
47. Electricity supply must be matched to demand in real time and hydro generation with storage capacity like this proposal plays a crucial role in this. Hydro generation is essential to the system because it is a renewable resource which can provide:
 - firm capacity at times of peak load;
 - the flexibility to respond to changes in demand and supply by adjusting the output up and down rapidly;
 - reserve cover for contingencies;
 - both frequency and voltage support; and

¹⁴ At an average capacity factor of 48%

- storage capacity which is particularly valued because of its ability to complement intermittent wind generation.
48. Recent modelling analysis indicates that hydro generation may provide approximately 25% of the additional amount of renewable generation required to meet the target and satisfy the increase in overall demand for electricity¹⁵.
49. Accordingly, EECA considers that the proposal and its utilisation of hydro energy resources will make a valuable contribution towards the renewable electricity target.

Effects of the renewable electricity target on emissions

50. If demand and supply continue growing in the same way that they have done in recent years, electricity related greenhouse gas emissions are predicted to double by 2030.
51. The achievement of the renewable electricity target will enable New Zealand to reduce electricity related emissions to 1990 levels. Modelling completed by EECA¹⁶ shows that to return annual electricity related emissions to 1990 levels, the proportion of renewable electricity needs to be over 90% by 2025. The modelling also illustrates that a lower renewable electricity generation share of 80% by 2025/30 will maintain electricity emissions at or below 2005 levels, but this will not be sufficient to reduce electricity emissions to 1990 levels.

The role of energy efficiency

52. In addition to increasing the proportion of renewable energy, maximising the contribution of cost-effective energy efficiency and energy conservation is vital if New Zealand is to realise its goal of delivering electricity in an efficient, secure and affordable manner.
53. New Zealand's energy efficiency and energy conservation efforts will help to keep electricity demand in check. Modelling undertaken by EECA shows that if annual electricity demand can be reduced from 1.5% to 1% or lower, less new capacity is required to meet demand, and therefore there is less need for the more expensive renewables to be developed. Also, under this scenario, cumulative CO₂ emissions over 2007 to 2030 would be 6% lower.

¹⁵ Concept Consulting, *NZEECS Renewable Electricity Target; Modeling Results* June 2007.

¹⁶ Concept Consulting, *NZEECS Renewable Electricity Target; Modeling Results* June 2007.

54. Energy efficiency and conservation measures, along with technologies such as solar water heating, are vital and necessary parts of New Zealand's future energy mix. However, on their own these measures and technologies will not be enough to offset the need for new generation. New Zealand also needs new renewable energy developments.

Proposed National Policy Statement on Renewable Electricity

55. To further assist the achievement of the renewable electricity target a national policy statement on renewable electricity generation under the RMA has been developed. The proposed national policy statement¹⁷ (PNPS) was notified in September 2008. It is expected to be Gazetted in October 2009.
56. Its proposed objective is: *“to recognise the national significance of renewable electricity generation by promoting the development, upgrading, maintenance and operation of new and existing renewable electricity generation activities, such that 90 percent of New Zealand's electricity will be generated from renewable sources by 2025 (based on delivered electricity in an average hydrological year)”*.
57. In achieving this objective, five policies are proposed. In particular, Policy 1 is that: *“The benefits of renewable electricity generation activities, at any scale, are of national significance. Decision-makers must have particular regard to the national, regional and local benefits relevant to renewable electricity generation activities. These benefits may include, but are not limited to:*
- i. maintaining or increasing electricity generation capacity while avoiding, reducing or displacing greenhouse gas emissions;*
 - ii. maintaining or increasing security of electricity supply at local, regional and national levels by diversifying the type and/or location of electricity generation.”*
58. The PNPS, while not yet finalised, is a strong indication of government intent to formalise the national significance of renewable electricity.

¹⁷ www.mfe.govt.nz/publications/rma/nps-renewable-electricity-generation/proposed-nps-for-renewable-electricity-generation.pdf

CONCLUSION

59. Creating an efficient, secure and affordable electricity system while upholding our environmental responsibilities is of paramount importance to the New Zealand economy. Electricity is a vital input for businesses and consumers and, therefore, the efficient and cost-effective provision of electricity services over the long-term is significant at a national level. To provide the electricity New Zealand needs to maintain society's current standard of living, the electricity system is required to meet both current demand (when, and at the levels, that it occurs), and to also meet growing future demand.
60. New Zealand still has substantial renewable energy resources that have not yet been developed. It makes sense to cost-effectively utilise our untapped renewable energy resources to: reduce our greenhouse gas emissions, diversify our generation portfolio, to improve security of supply; and reverse our declining share of renewable generation.
61. To recap on why EECA supports this proposal:
- it is a renewable energy development, and such developments are vitally important for the production and delivery of electricity in an efficient, secure, affordable and environmentally sustainable manner.
 - it will increase the supply of renewable electricity thereby being well aligned with New Zealand's commitment to the Kyoto Protocol and its efforts to reduce electricity related CO₂ emissions; and
 - it will contribute to improving security of electricity supply; will meet current and future electricity demand in the region; and will contribute towards the achievement of New Zealand's renewable electricity target.
62. For all of these reasons, the proposal is of national significance and value and will provide national and local benefits and positive effects. With specific regard to the Resource Management Act 1991, EECA submits that the proposal is consistent with section 7 of the RMA and that all of the above reasons should be given weight in the consideration required to achieve the purpose of the Act.

28 July 2009