IN THE MATTER OF the Resource Management Act 1991

AND

IN THE MATTER OF applications by Contact Energy Limited in respect of the Te Mihi Geothermal Power Station.

INTRODUCTION

1. My name is Rose Feary. I am a Renewable Energy Advisor with the Energy Efficiency and Conservation Authority (EECA) in Wellington. I hold a Law degree and have practiced in the Resource Management field dealing specifically with electricity and other infrastructure for many years, and I am a member of the Resource Management Law Association.

2. I am here today following EECA's written submission, dated 7 March 2008, in support of Contact Energy Limited's proposal to establish and operate a 220 megawatt (MW) geothermal power station, on the Wairakei–Tauhara Geothermal Field in the Taupo District, to generate electricity and associated ancillary activities ("the proposal"). EECA's support for the proposal lies in the fact that it is a renewable energy development that will make a very valuable contribution to New Zealand's renewable electricity target, government energy policy and international commitments.

3. The evidence will cover the following matters that EECA believes should be given due consideration in the Council's respective decision making processes:

   - New Zealand's Electricity Context;
   - Central Government Energy Policy Context;
   - Resource Management (Energy and Climate Change) Amendment Act;
   - Public Support for Renewable Energy.

   Before further examining these matters, the evidence will briefly outline the role of EECA, and also provide a brief explanation of some of the terms used in this evidence.

THE ROLE OF THE ENERGY EFFICIENCY AND CONSERVATION AUTHORITY

4. 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 get more from their

energy dollar, improving our quality of life by promoting warmer, drier homes and better personal transport choices, and protecting the environment through energy efficiency and renewable energy supply.

5. EECA has been integral in developing the New Zealand Energy Strategy, including the renewable electricity target, and has led the development of the New Zealand Energy Efficiency and Conservation Strategy, with the Ministry for the Environment, for the Minister of Energy and the Government Spokesperson on Energy Efficiency and Conservation.

6. EECA's role is not to comment on the local environmental effects but to put before the decision-maker the positive effects, benefits and national significance of renewable electricity to be weighed in the overall consideration of the achievement of the sustainable management of natural and physical resources.

TERMS USED IN THIS EVIDENCE

7. Before proceeding, a brief description of some of the terms used in the electricity industry to describe electricity production and use is provided below to assist in further understanding this evidence.

8. The standard unit for measuring electricity generation **capacity** is the megawatt (MW). One megawatt is enough power to run 1,000 one bar electric heaters simultaneously.

9. The standard unit for measuring electrical **energy** is the gigawatt hour (GWh). One gigawatt hour is a million kilowatt hours and is the amount of electricity used in approximately 120 houses over the course of a year.

10. A petajoule (PJ) is the measurement used for measuring **energy** on a national scale. A petajoule is equal to approximately 278 GWh, or the annual electricity use of approximately 33,500 houses.

11. One tonne of carbon dioxide (CO_2) is approximately enough to fill one average New Zealand residential house.

ELECTRICITY CONTEXT

Security of electricity supply

12. A reliable, robust and sustainable electricity system is of paramount importance for 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 of national importance. To provide the electricity we need to maintain our current standard of living, the system is required to meet both current demand (at the time and at the levels, that it occurs), and also to meet growing future demand.

New Zealand's electricity generation mix

13. In an average hydrological year, New Zealand generates approximately 70% of its electricity from renewable energy resources, with the balance being made up by fossil-fuelled thermal generation as required.

14. Most of New Zealand's renewable generation comes from hydro and geothermal with smaller but increasing amounts coming from wind. Electricity generated from biogas, waste heat and wood (including cogeneration) also make small but valuable contributions. The remaining 30% of electricity is generated from fossil-fuelled thermal generation plants (i.e. gas, coal and oil).

15. While New Zealand's electricity generation system is predominantly based on hydro generation balanced with fossil-fuelled thermal generation, geothermal generation also plays a significant role currently contributing approximately 434 MW of 'baseload' generation capacity to the system.

Meeting future demand

16. New Zealand's electricity demand is predicted to continue to grow at the rate of 1.3% or more per annum over the long term[1]. Over the short term, increases in demand will fluctuate. If electricity demand grows at the predicted rate of 1.3% per annum, approximately 3,900 MW of new capacity will be required between 2005 and 2030 to meet New Zealand's electricity demand[2]. This is about 150 MW per annum. If, however, electricity demand grows at a higher rate, say 2%, more than 200 MW per annum will be required.

17. Over the past few decades a large proportion of demand growth has been met using fossil fuel power stations. This has resulted in a long term decline in the proportion of electricity generated from renewable sources. In more recent times, however, new wind farms in the North Island and in Southland have helped to meet new electricity demand. If we continue to build a mixture of fossil-fuelled and renewably-sourced electricity generation, as we have done

[1] New Zealand Energy Strategy to 2050, p.72
[2] New Zealand Energy Strategy to 2050, p.72

over the last 25 years, New Zealand's electricity related emissions will increase by around 50% by 2030[3]. This fact, in combination with the decline of the Maui gas field, means it is now imperative that new renewable electricity generation capacity is developed, such as this proposal, while also implementing energy efficiency and conservation measures, to help New Zealand to meet its future demand for electricity.

CENTRAL GOVERNMENT ENERGY POLICY CONTEXT

Climate change policy and New Zealand's international obligations

18. 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 CO_2 [4] emissions in the first commitment period (2008-2012) to 1990 levels or otherwise take responsibility for any surplus emissions.

19. However, in recent years New Zealand's emission levels have continued to increase. For example, in 2006, approximately 8 million tonnes of CO_2 were emitted into the atmosphere from electricity generation, compared with less than 4 million tonnes of CO_2 in 1990[5]. This represents a doubling of New Zealand's CO_2 electricity related emissions over the past 16 years.

20. It will be an ongoing challenge to achieve 1990 levels but New Zealand remains committed to meeting its Kyoto Protocol obligations. Electricity generated from Contact's Te Mihi geothermal power station will contribute to the reduction in CO_2 emissions and so will assist in the imperative to meet the Kyoto Protocol commitments.

21. The need to address New Zealand's accelerating CO_2 emissions has been an ongoing major policy strand informing subsequent government energy policy.

The New Zealand Energy Strategy

Background

22. The government's commitment to a sustainable energy future and increasing the uptake of renewable energy has underpinned government energy policy for the past 8 years. Both the Energy Policy Framework (2000) and the 2003

---

[3] New Zealand Energy Strategy to 2050, p.72
[4] The commitment relates to greenhouse gases of which CO_2 is the major contributor.
[5] Ministry of Economic Development, *New Zealand Energy Greenhouse Gas Emissions 1990-2006, June 2007*

Sustainable Development Programme of Action highlighted the government's commitment to an efficient, fair, reliable and environmentally sustainable energy supply for New Zealanders. Recently, the government released its New Zealand Energy Strategy and New Zealand Energy Efficiency and Conservation Strategy. Both these documents are built upon previous government policy commitments to renewable energy. They provide an even clearer articulation of the goals of developing and maximising New Zealand's renewable energy resources, reducing greenhouse gas emissions, and achieving an improvement in energy efficiency, while maintaining security of supply.

23. The New Zealand Energy Strategy (NZES) provides comprehensive government direction on all aspects of energy in New Zealand against the background of the two major challenges facing New Zealand, which are :

- responding to climate change and the need to reduce carbon emissions from the energy sector; and
- the need to deliver secure, clean energy at affordable prices.

Fundamental principles

24. It is based on two underlying strategic principles, these being:

- for the foreseeable future, it is preferable that all new electricity generation be renewable, except to the extent necessary to maintain security of supply; and
- investment should occur in energy efficiency measures where this is cheaper than the long-term costs of building extra generation capacity, including environmental costs.

Vision

25. The NZES sets out the government's vision for the energy sector, and a package of actions to respond to the challenges discussed above.

26. The overarching vision of the NZES is for ***"a reliable and resilient system delivering New Zealand sustainable, low emissions energy"***.

27. Achievement of this vision will be reached through a series of policy commitments. Two are relevant to this proposal. They are:

- maximising the contribution of cost-effective renewable energy resources while safeguarding our environment; and
- reducing greenhouse gas emissions.

Key Actions

28. The key renewable electricity actions in the NZES, currently being progressed by government, are as follows:

- the adoption of a target for renewable electricity generation of 90 per cent by 2025 (based on delivered electricity in an average hydrological year);
- the introduction of an Emissions Trading Scheme (ETS);
- changes to the Electricity Act 1992 to support the government's objectives for limiting new baseload fossil fuel generation over the next ten years; and
- the development of a National Policy Statement (NPS) for renewable energy under the RMA[6].

29. The NZES builds upon past government policy commitments to increase the uptake of renewable electricity[7], and will help to take New Zealand closer to its goal of a sustainable low emissions energy system.

New Zealand Energy Efficiency and Conservation Strategy

30. The New Zealand Energy Efficiency and Conservation Strategy 2007 (NZEECS) replaces the National Energy Efficiency and Conservation Strategy (NEECS) introduced in 2001. The NZEECS is the detailed action plan for increasing the uptake of energy efficiency and conservation, and renewable energy. It gives effect to a number of objectives set out in the NZES, including the realisation of the renewable electricity target.

The renewable electricity target

31. As set out above, the NZES has established a renewable electricity target that aims for 90% renewable electricity generation by 2025[8]. It replaces the renewable energy target introduced in 2001 via the first NEECS. This target

---

[6] In order to provide guidance on renewable energy projects the government is developing a National Policy Statement for renewable energy under the Resource Management Act. This will help decision makers weigh up the benefits of renewable energy. It is intended that this be in place in 2009.
[7] Energy Policy Framework (2000), National Energy Efficiency and Conservation Strategy (2001), which included a renewable energy target, Sustainable Development Programme of Action (2003). Government Policy Statement on Electricity Governance (2004)
[8] The renewable electricity target is a percentage of total annual generation in gigawatt hours from renewable sources in an average hydrological year.

provides an objective for central and local government, renewable energy developers and the community to work towards, in order for New Zealand to realise a more sustainable electricity future. Achievement of the target will 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. Achievement of the target should also lead to more economic productivity in the energy sector, encourage new industry and business development, and create a more diversified electricity supply portfolio.

Meeting the target

32. To meet the renewable electricity target, to reduce our electricity related greenhouse gas emissions, to meet electricity demand, and to maintain security of supply will require a significant increase in renewable electricity generation.

33. New Zealand is in a fortunate position regarding the proportion of electricity that it already generates from its renewable energy resources. As discussed above, on average about 70% of New Zealand's electricity is generated from renewable resources. This compares very favourably with almost every other country in the world and the existence of considerable quantities of undeveloped renewable resource means that New Zealand is well placed to reach even higher proportions of renewable generation.

34. Meeting the target is challenging and will require, "*a very high rate of investment in new renewable generation with a lower rate of utilisation of existing fossil fuel plant and decommissioning of older fossil fuel plant*"[9]. In short, this means that all new generation investment needs to be renewable. Some new fossil-fuelled generation may be needed in later years to meet peak and dry year demand.

35. Achieving the target will require a diverse range of renewable energy resources such as geothermal, wind, hydro and biomass to be developed. Emerging technologies, such as wave, tidal and photovoltaics may contribute to the target in future. Increased uptake of distributed generation, including small-scale renewable generation, may also make useful contributions to achieving the target in the future.

[9] NZES p.22

36. Modelling led by EECA, jointly commissioned with the Ministry of Economic Development and the Electricity Commission[10] 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 constraints to 95% renewable electricity by 2030. All scenarios required the maintenance of sufficient generation to meet dry year and system peak requirements. The modelling predicts that to achieve 90% renewable electricity, an increase in renewable generation of 3750 MW is required by 2025. This is an installation rate of approximately 200 MW per annum.

37. The most recent modelling by government of the 90% renewable electricity target is the 'Sustainable Path' scenario contained in the draft Grid Planning Assumptions of the Electricity Commission[11]. This estimates new generation for the purposes of transmission planning. The model takes into account the renewable electricity target, maintaining security of supply, and plant retirement. It provides a similar forecast at around 3650 MW of new renewable generation required by 2025 or approximately 200 MW per year.

38. It is clear that significant new renewable generation, from a base of approximately 6100 MW in 2007, will be required to turn the target into reality.

39. Over recent years New Zealand has relied heavily on demand growth being met by fossil fuel generation. Since 2001, approximately 1100 MW of electricity generation capacity has been added to the New Zealand electricity system. Of this, 625 MW was fossil fuel based generation, while 475 MW was renewable. But this can no longer continue; for the foreseeable future all new generation will need to be renewable. Accordingly, renewable electricity projects, such as this proposal, will need to proceed in order for New Zealand to achieve the target.

The role of geothermal generation and the proposal in meeting the target

40. 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. Geothermal generation is crucial to the system because it is a renewable resource which can provide reliable, consistent, non weather dependant 'baseload' generation, whereas both wind and hydro

[10] The Energy Efficiency and Conservation Authority, Ministry of Economic Development , Electricity Commission, *Understanding the Implications of the Higher Proportion of Renewable Electricity by 2030*.
[11] Electricity Commission, 2008 *Grid Planning Assumptions: Consultation material on draft generation scenarios*, 20 February 2008

generation vary according to the weather. Wind generation may be limited by the system's ability to absorb its variability; hydro presents the issue of coping with dry years.

41. The NZES does not prescribe any one type of technology as being more important than any other, rather it emphasises the fact that no single technology by itself will achieve New Zealand's energy objectives, including the renewable electricity target.

42. New Zealand has an excellent geothermal resource located mostly in the Taupo Volcanic Zone. Currently, New Zealand has approximately 434MW of geothermal generation capacity which produced 3,270GWh of electricity in 2007. Many of the existing geothermal power stations achieve high load factors.

43. The modelling led by EECA indicates that the target can be met through a combination of new renewable generation (principally geothermal, wind and hydro), decommissioning of thermal plant and demand side management.

44. While indicative only, and subject to change depending on actual growth rates, economics of proposals and private investment decisions, the modelling indicates that geothermal generation will play an important role in meeting the renewable energy target, by providing approximately 1,270MW of the 3,750MW of additional renewable capacity required to meet the target.

45. The proposed Te Mihi development is scheduled to replace the existing Wairakei geothermal power station. The annual output will be approximately 570GWh or 2.1PJ more than the Wairakei power station output. This will be achieved by using more efficient modern 'double-flash' technology, reducing steam pressure losses by moving the plant closer to the steam field, and by adding an additional 60MW of generation capacity.

46. The additional 60MW of generation capacity is 4.7% of the extra 1,270MW of geothermal generation capacity that the modelling indicated would be required to meet the target[12]. The target will be met by implementing renewable projects of scales from tens to just a few hundreds of megawatts, rather than by building just a few projects closer to the thousand megawatt scale. In the EECA led modelling, Te Mihi was included in the build schedule to meet the target.

[12] Currently, consented geothermal projects, which would help make up the 1,270 MW of geothermal capacity required by 2025, are those at Kawerau. Rotokawa (extension), Poihipi (steam-field), Tauhara (Centennial Drive binary) and Ngawha (extension) total only approximately 215 MW.

47. To meet the 90% renewable electricity target, EECA's modelling predicts that by 2025 an additional 20,500 GWh of electricity generated from renewables will be needed per annum. This proposal, at 570 GWh, or 2.1PJ, of additional renewable generation per annum will provide approximately 2.8 % of the additional annual renewable generation required.

48. The total output of 1,790GWh per year from the proposal is predicted to provide 3.3% of the total electricity generation output for 2025.

49. Accordingly, EECA considers that the proposal will make a valuable contribution towards the renewable electricity target.

Effects of the renewable electricity target and other measures on emissions

50. As stated previously, if demand and supply were to continue growing in the same way that they have done in recent years, electricity related greenhouse gas emissions are predicted to double by 2030, but it is possible to reduce emissions significantly through a combination of the proposed NZES and NZEECS measures.

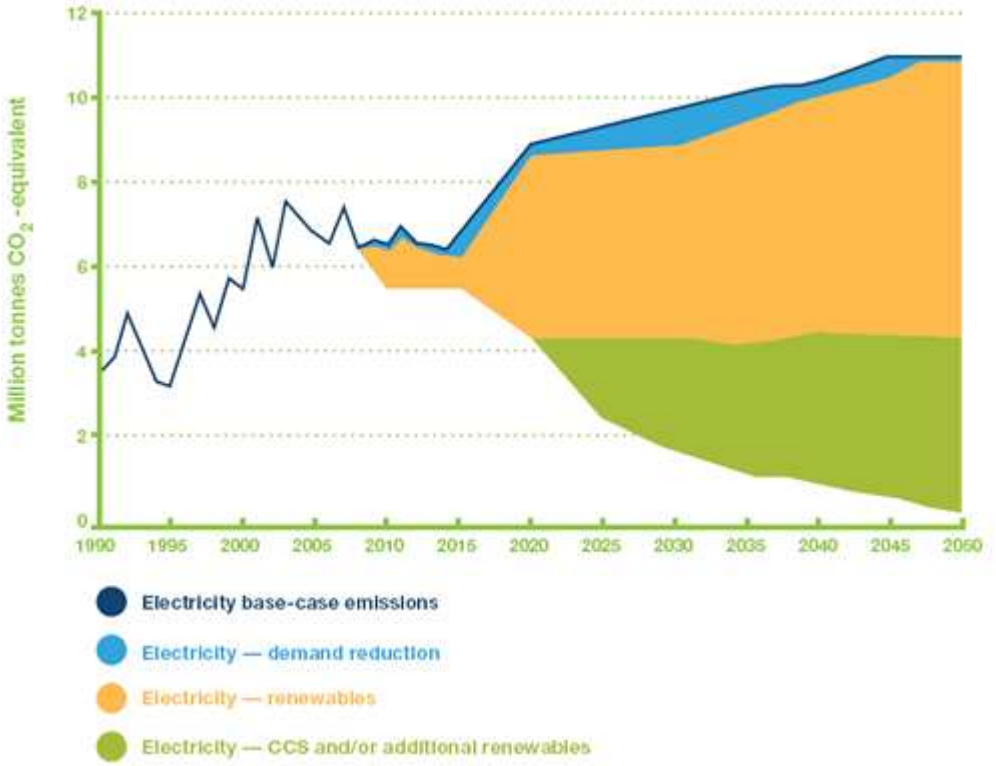
51. The government's commitment to reducing greenhouse gas emissions is illustrated by the fact that it has chosen to utilise a number of measures designed to work together to achieve the required reduction; the renewable electricity target, the promulgation of a national policy statement on renewable energy, an emissions trading scheme, and the limiting of new baseload fossil fuel generation over the next ten years. These measures are designed to work together to achieve results in the short and long term. No one of these methods alone will achieve the required result.

52. The renewable electricity target is critical to achieving New Zealand's goal of returning its electricity related emissions back to 1990 levels. Modelling completed by EECA[13] 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 emissions at or below 2005 levels, but this will not be sufficient to reach 1990 levels as agreed to under the Kyoto Protocol.

[13] Concept Consulting, NZEECS Renewable Electricity Target; Modelling Results June 2007

53. Figure 1[14] further illustrates this point; it shows that the required reduction in emissions to 1990 levels relies heavily on renewable electricity making up an increasingly greater share of total electricity generation.

Figure 1: Emissions reduction opportunities in the electricity sector



54. It is clear that achievement of the renewable electricity target plays a significant role in New Zealand's ability to reduce emissions adequately. It is therefore important that the need to achieve the renewable electricity target, and this proposal's contribution to the target, be given appropriate weight in the consideration of this resource consent application.

55. To summarise, the development of renewable electricity, such as this proposal, is essential to meet demand growth and to maintain security of supply. The proposal will also make a valuable contribution to the renewable electricity target and will help reduce CO_2 emissions and climate change effects.

The role of energy efficiency

56. Maximising the contribution of cost-effective energy efficiency and energy conservation is vital if New Zealand is to realise its goal of a reliable and resilient energy system that delivers sustainable, low emissions energy services.

[14] NZES p.36

57. Improving New Zealand's energy efficiency and energy conservation efforts will help to keep electricity demand in check. In fact the more we can keep electricity demand in check the more likely New Zealand is to reach the renewable electricity target.

58. 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 the renewable electricity target (approximately 2,700 MW of renewable generation, or 150 MW per annum), and therefore there is less need for more expensive renewables to be developed. Also, under this scenario, cumulative CO_2 emissions over 2007 to 2030 would be 6% lower.

59. 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, despite our future efforts to keep electricity demand in check, there will still be an ongoing need for new electricity generation to meet new demand and to meet the renewable electricity target.

60. Whilst New Zealanders need to improve energy efficiency, avoid energy waste and reduce energy use, New Zealand also needs new renewable energy developments.

THE RESOURCE MANAGEMENT ACT - SECTION 7 (i) AND (j)

61. The Resource Management (Energy and Climate Change) Amendment Act 2004 introduced the following matters into Part II, section 7, of the Resource Management Act 1991, which are relevant to this proposal:

> *"(i) The effects of climate change*
>
> *(j) The benefits to be derived from the use and development of renewable energy*"

- The following definition of "*renewable energy*" was added to section 2 as part of the Amendment Act, "*energy produced from solar, wind**, geothermal**, hydro, biomass, tidal, wave, and ocean current sources*" [emphasis added].

62. With regards to section 7(j), the benefits to be derived from the use and development of renewable energy, the particular benefits of this proposal can be summarised as follows:

Security of supply benefits

63. The proposal will contribute to meeting demand. It is crucial, particularly with the decline of the Maui gas field, that sources of renewable generation such as this proposal are developed and maintained. At a total of 220MW generation capacity, it is calculated that this proposal will generate approximately 1,790 GWh or 6.4PJ of electricity per annum. This equates to 4.3% of New Zealand's present annual electricity output and is enough electricity to supply approximately 220,000 households per annum.

64. Geothermal electricity generation plays a particularly important role as it assists with long-term electricity supply security by adding to, and diversifying, New Zealand's electricity generating base. As geothermal generation is not intermittent and can be run continuously as 'baseload' generation it gives a highly predictable and reliable output. This allows a greater quantity of the hydro resource available to be stored for use in balancing the more intermittent renewables, such as wind generation, which will become increasingly important as the wind generation capacity is expected to grow rapidly over the next decade. This reduces the reliance on hydro resources and helps to minimise the effects of dry years.

65. Geothermal energy is also a relatively reliable resource in economic terms. While all primary fuels for thermal-powered electricity generation (oil, coal, natural gas and liquefied natural gas) have been subject to significant price increases and volatility over the last few years, there is no cost for the primary fuel for a geothermal power station. Therefore, once commissioned, geothermal power stations have no ongoing fuel price issues. The only economic volatility that geothermal generation faces is the electricity wholesale price.

66. Diversity in energy supply through the development and maintenance of renewable energy, such as electricity generated from geothermal resources, 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.

67. The position of the project in central North Island is relatively close to the main demand centre in upper North Island. This has the potential benefit to reduce electricity transmission losses because of the proximity to demand and also

provides new generation for the main demand centre that does not rely on transfer via the inter-island HVDC cable.

Other

68. Geothermal resources can be utilised in a sustainable manner and will not deplete finite coal and gas resources.

69. Other benefits, addressed elsewhere in this evidence include a reduction in greenhouse emissions, consistency with government energy policy and New Zealand's Kyoto Protocol commitments, and the proposal's contribution to the renewable electricity target.

Climate Change-Section 7(i)

70. In regard to section 7(i), the effects of climate change, EECA notes that the proposal will have a positive effect on climate change, by reducing greenhouse gas emissions compared with fossil fuelled sources of generation, as outlined below.

- It is widely accepted that one of the principle contributors to accelerated climate change are greenhouse gas emissions generated from human activities, such as the burning of fossil fuels for electricity generation and transportation. Accordingly, in order to minimise the adverse effects of greenhouse gas emissions any new electricity generation needs to come from renewable sources of energy, such as geothermal, rather than coal or other fossil fuels.
- During production of electricity from geothermal resources, CO_2 comes to the surface with the geothermal fluids and is released. Emissions from geothermal fields vary significantly between fields in New Zealand from 10g to 600g CO_2 equivalent per kWh of electricity produced. The proposal is located on the Wairakei–Tauhara geothermal field, which is characterised by low emissions rates equivalent to approximately 50g of CO_2 equivalent per kWh of electricity generation for this proposal. This compares to typical emissions factors for combined-cycle gas turbine plant of 380g CO_2 equivalent per kWh, and for existing coal generation plant of 900g CO_2 equivalent per kWh.
- The proposal, with a capacity of 220 MW, will generate approximately 1790 GWh of electricity annually towards New Zealand's electricity needs and towards the renewable electricity target. If 1,790 GWh of electricity

were to be generated annually from gas or coal resources, rather than by this proposal, approximately an additional 600,000[15] or 1,500,000 tonnes[16] of CO_2 respectively would be emitted, taking into account the predicted CO_2 emitted by the Te Mihi plant. To put this into context, if 1,790 GWh of electricity were to be generated from coal resources approximately 2,300,000 [17] trees would need to be planted or approximately 470,000 petrol cars[18] would need to be taken off the road for a year to displace this amount of CO_2[19].

71. Each year New Zealand publishes a statement of the difference between 1990 emission levels and the levels predicted to arise during the Kyoto commitment period (2008 – 2012). The 2007 Net Position Report[20] predicted New Zealand's excess in emissions to be 45.5 million tonnes of CO_2 over the commitment period or approximately 9 million tonnes per year. The most recent provisional predictions show the projected deficit to be 21.7 million tonnes of CO_2 over the commitment period or approximately 4 million tonnes per year. This figure illustrates that reductions can be achieved by utilising measures designed to reduce emissions, such as the ETS and investment in renewable generation. The figure also takes into account rising oil prices and a slower growth rate.

72. While the amount of CO_2 savings attributable to this proposal is moderate in terms of the total reduction required, its significance lies in its contribution to the whole. Each reduction helps New Zealand to take a step towards achieving its goal of reducing emissions to 1990 levels.

PUBLIC SUPPORT FOR RENEWABLE ENERGY

73. EECA has completed a public opinion survey[21] of attitudes towards energy issues which indicated that New Zealanders overwhelmingly support renewable

---

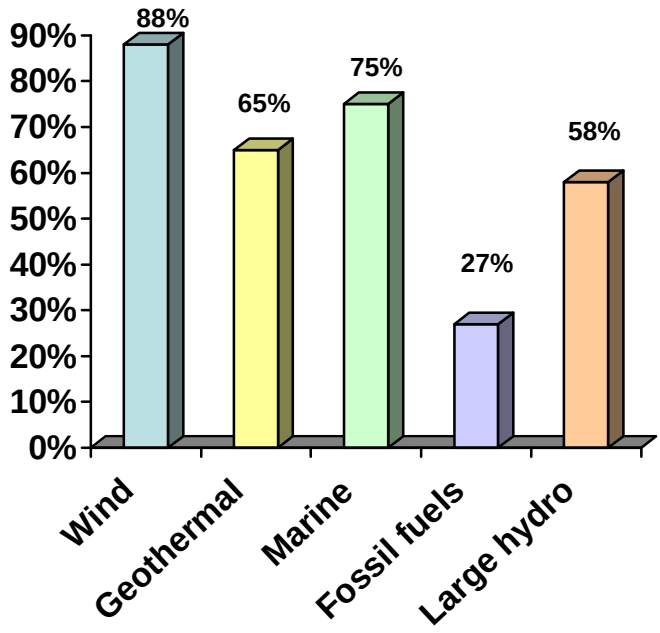
[15] 0.38 kt CO_2/GWh Gas generation emission factor *New Zealand's Energy Outlook to 2030*, p.41 footnote 86
[16] 0.90 kt CO_2/GWh Coal generation emission factor *New Zealand's Energy Outlook to 2030*, p.41 footnote 86
[17] Model Tree - Mark Ashby Winds Up- Planning for the Future Now (pub 2004)
[18] Car Emission Factor - MED
[19] Recent work by the Energy Data and Analysis Co-ordination cross-government group has predicted an average reduction of CO_2 equivalent emissions of 0.2 kt CO_2/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 CO_2 emissions from this proposal would be 275,000 tonnes of CO_2 equivalent per annum, which takes account of the predicted fugitive emissions from Te Mihi.
(http://www.med.govt.nz/upload/55313/emisison%20reduction%20effects.pdf)
[20] Ministry for the Environment, *Net Position Report , September 2007*
[21] EECA commissioned AC Nielsen to conduct a survey comprising s sample of 1,000 online interviews of the general public between January and March 2008. The survey is part of EECA's ongoing research strategy that will examine consumer attitudes to renewable energy and energy efficiency and will provide a benchmark to allow an analysis of public perceptions over time. Final results will be available on the EECA website in due course.

electricity generation with 94% of respondents indicating that renewable energy is something New Zealand needs to focus on for the future.

74. The results reveal that New Zealanders consider where their energy comes from as being important enough to personally do something about or think about what they could do (i.e. become actively involved) and consider that where energy comes from will have an impact on future generations.

75. The survey examined approval ratings for different types of energy resources. The preliminary results show that renewable energy sources are favoured highly over fossil fuel sources, with geothermal energy being supported by 65% of the respondents, as shown in Figure 2.

Figure 2: Approval ratings for electricity generation from various sources



76. Of respondents, those that thought geothermal energy has a negative impact now, or would have a negative impact in 5 years' time, were both just 6%. All renewable energy generation sources are perceived as having a positive impact from now into the future, with 67% of respondents considering that geothermal has a positive impact now, and 70% considering it will have a positive impact in 5 years' time. Fossil fuel sources are seen as having largely negative impact, both now and in the future.

CONCLUSION

77. In conclusion, our society is consuming increasing amounts of electricity in order for us to maintain and improve our lifestyles. If we are to take sustainability seriously we need to increase the proportion of renewable energy in the provision of electricity as well as improving electricity efficiency and conservation.

78. To recap on why EECA supports this proposal:

- it will contribute to meeting current and future electricity demand, and will help to maintain a reliable, robust and sustainable electricity system;
- it is a renewable energy development, and such developments are vitally important for New Zealand's sustainable energy future;
- 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 CO_2 emissions;
- the proposal is consistent with government sustainable energy policies and strategies, in particular the New Zealand Energy Strategy and the New Zealand Energy Efficiency and Conservation Strategy, and is therefore of national significance;
- it will make a very valuable contribution to the New Zealand Energy Strategy's renewable electricity target; and
- for all of these reasons, the proposal is of national significance and value and will provide national benefits and positive effects.

Rose Feary

Advisor Renewable Energy
Energy Efficiency and Conservation Authority

23 June 2008