

Sustainable Energy Forum Submission to the Commerce Select Committee Inquiry into the New Zealand Electricity Industry.

31 July 2003

The Sustainable Energy Forum

1. The Sustainable Energy Forum is an informal group of individuals with an interest in the evolution of a sustainable energy future for New Zealand. Membership is unrestricted and ranges from staff in major energy companies to students and retired people. Membership fees are very small. Many members are in active businesses in small-scale energy supply and energy efficiency services.
2. The Forum conducts an e-mail discussion group, open to any interested persons, on sustainable energy issues. This has provided much valuable information and considered opinion, which underpins much of what is written below.

Introduction: sustainable energy options

3. Because of the high percentage of hydro-electricity (65%), installed capacity (MW) has never been the limiting factor in meeting electricity demand, but always energy availability (GWh).
The most important economic problem in New Zealand's electricity sector is that of security of supply – not only in dry years, but in meeting peak demands to avoid local or even system-wide collapse, and to meet the growth in GWh demand. Such problems are recognised world-wide as being made worse in restructured electricity systems.
4. Demand-side management is now recognised by the International Energy Agency (IEA) as a key to improving the reliability of restructured electricity systems. The IEA has just launched a new task group to research and promote the use of demand side management and energy efficiency.
5. The most important environmental imperative of NZ's electricity sector is its emissions of CO₂. These emissions can be reduced through policies to reduce fossil fuel generation and reduce growth in electricity demand. In contrast, transport and especially agricultural emissions are far less tractable. Present projections of emissions from the electricity sector indicate a likely doubling of CO₂ emissions by the end of the first commitment period, rather than reducing them back to 1990 levels in line with New Zealand's obligations under the Kyoto Protocol.
6. The Parliamentary Commissioner for the Environment (PCE) recognises that reducing growth in electricity "demand" (GWh) is of the highest priority in improving the environmental sustainability and reliability of NZ's electricity system. Its second priority is the facilitation of small-scale renewable electricity generation and direct primary energy use to substitute for electricity use. The very significant funding by Parliament of the PCE's electricity sector assessment over its first four years (up to \$400,000/yr) suggests that its assessments will not simply sit on the shelf.
7. Both economic and environmental problems in New Zealand's electricity sector can be addressed through use of "sustainable energy options" (SEOs). These are small-scale investments in energy efficiency and renewable energy, which can be installed in the locations where needs are greatest, and which do not lead to electricity surpluses as happens with large scale generation projects.

8. In order of likely ability to supply energy within the next few years, New Zealand's most relevant SEOs are:

8.1 New renewable energy: wind generation, landfill gas, wood wastes, solar water heating, domestic firewood from pine or coppiced eucalypt, and photovoltaic electricity. The potential resource from wood wastes alone will rise to up to 80 PJ/yr of wood wastes, though less if some trees (e.g. much of Gisborne resource) may not be harvestable.

8.2 Energy efficiency in existing houses, commerce and industry, and importantly also by way of Minimum Efficiency Performance Standards (MEPS) standards for new or renewed buildings and equipment.

Scope of this submission

9. This submission will be centred around the second, fourth and eighth terms of reference:

TOR Two: the asset utilisation by electricity generation companies and their planning for capacity development.

TOR Four: if and where the retail sector is acting competitively and to ensure that such competition is genuine and that barriers to switching suppliers are extinguished.

TOR Eight: what, if any, further reforms to the regulatory regime are required to ensure lines companies in the future receive a fair rate of return on invested capital and that consumers are charged fair prices.

Others of the terms of reference will be referred to as they become relevant in the discussion.

Planning for capacity development

10. From the 1960s to the present time, New Zealand has had sufficient generating capacity in place to avoid power shortages except in years drier than about 1-in-20. The only exception when a serious shortage situation did develop was in the autumn/winter of 1992. Even in the autumn of 2003 when spot prices rose dramatically, inflows were approximately those of a 1 in 20 dry year.
11. Discussion and debate at the 17 June 2003 Energy Federation Conference on the Government's decision on dry-year security measures indicated wide agreement: the high spot prices were caused by a failure to utilise existing capacity rather than by a shortage of capacity. (This is relevant also to Terms of Reference #1). We agree with this.
12. We consider that a modest surplus capacity is appropriate for New Zealand, but that it is inappropriate to build sufficient generating (and transmission) capacity to cover a 1-in-60 dry year. Such a stringent security standard does indeed reflect the importance of electricity to the New Zealand economy – but it does not need to be met entirely through additional installed fossil fuel power station and transmission capacity.
13. A more secure electricity supply can be achieved through appropriate investment at or near the end of the supply chain, in combination with diversification of New Zealand's bulk

renewable electricity supply system via appropriate wind farm developments in addition to other renewable energy generation projects (including hydro and geothermal).

Standby generators

14. Standby generation on the premises of the consumers most sensitive to power outages and also generators owned by lines companies and other generators embedded in lines company networks – all these add local security of supply to the locations where it is most needed.

To the extent that standby diesel generators are used to a greater extent than their originally intended localised emergency-only purposes, they would potentially conflict with the objectives of the Sustainable Energy Forum to promote sustainable energy solutions.

(In fact the fuel for these generators could be made entirely renewable, by using biodiesel. Biodiesel potentially emits less contaminants than diesel from imported oil. However, biodiesel is in its infancy. The environmental and economic implications of its large scale use still need to be much more firmly established, and if so, as a fuel for urban standby diesel generators, biodiesel could be considered as a requirement under city bylaws.)

Renewable energy generation and distributed generation

15. Renewable energy generators distributed throughout local lines networks (distributed generation, or DG) improve reliability in the event of network breakdowns. At the same time they augment New Zealand's primary energy supply, adding diversity that is sorely needed given our dependence on South Island hydro (which may become increasingly unreliable as climate changes), and on gas (increasingly expensive with the demise of Maui). The most common examples are:

- 15.1 wind generation from wind farms and individual properties
- 15.2 small hydro and micro-hydro schemes
- 15.3 photovoltaic generation (currently economic only in remote areas).

16. All these generation types can and should be interconnected to the local lines network. Generation at individual properties should be connected with "net metering", so the meter will run backwards if the generation is in excess. The interconnection equipment to do so safely is fully developed and not expensive compared to its value in augmenting New Zealand's primary energy supply and easing transmission constraints. Objections to net metering are due largely to commercial rather than security concerns, or come from people unfamiliar with modern interconnection safety systems.
17. The recently released report of the Centre for Advanced Engineering, "DG - A Study of Capital Opportunities", assesses a potential of 750 MW of DG that could be realised within about 12 years. This however would require an electricity market specifically "engineered" to overcome today's strong barriers to DG. It is noted that the CAE report identifies that most of this capacity is based on fossil fuel generation. This is not compliant with SEF objectives. The use of biodiesel may overcome some of SEF's concerns if the environmental and economic implications of its large scale use are much more firmly established.
18. To the extent that DG reduces demand from the grid, and thereby eases transmission constraints and GWh demand, it has a useful function. However, SEF would much prefer that net generation into the local lines network (or the grid) from DG systems comes from renewable energy sources.

Fuels that substitute for electricity generation

19. Security of electricity supply is also improved by direct use of energy other than electricity.
20. For example, solar heaters are being installed by Eastland Networks to reduce energy demand on their rural networks, where ripple control is not being used. Wood fired domestic heating, water heating (and even cooking) reduce winter peak demands that cause the greatest stress on supply through the national grid and often even more stress on local networks.
21. Portable LPG heaters are widely used and provide a convenient quick heat source, and also reduce the demand on networks. However the exhaust gases and moisture go into the living area, causing dampness and potential health problems in all but excessively ventilated houses.

TOR Four: if and where the retail sector is acting competitively and to ensure that such competition is genuine and that barriers to switching suppliers are extinguished.

22. Electricity retailers almost without exception fail to promote sustainable energy options (especially energy efficiency retrofits) that would be cost-effective for their customers. This is understandable because their profits are largely determined by the amount of energy they can sell.¹
23. It would be desirable to offer new retailing options that reward customers for being responsive to the actual costs of electricity supply. Since generator-retailers have no incentive to do this, we favour the facilitating of specialist energy traders, who could offer to customers, energy services to reduce the cost of electricity supply.
24. Energy traders could provide advanced meters (which are becoming cost-effective for an increasingly large number of customer types), and provide the appliances or building envelope retrofits, which improve the efficiency of the customer's electricity use. The traders would be most active in areas where networks are constrained, where they could work with lines companies to defer network investment.² The very substantial savings in cost of supply would be shared between the specialist retailer and the customer.

Issues connected with Electricity Commission

25. A major concern is that the Commission, following the concept in the Electricity Amendment Act 2001, is required to give effect to Government Policy. The Commission will have functions both in regulating market participants (through its evolution of electricity market rules) and in intervening in the market (through the dry-year reserve capacity decision).

25.1 The confidence of investors in the electricity system – both supply side and demand side – will be reduced if the market rules can be changed as a matter of government policy.

¹ Profits are also made from fees – especially from very-low-income consumers who fall behind in payments. These consumers are considered “uneconomic” by retailers, who charge high fees for disconnection and reconnection, thereby making significant profit from them instead of making a loss.

² In remote rural networks, distribution plus transmission network costs account for up to 80% of the total cost of supply. Mainpower, pers. comm.

This function of the Commission needs to be ring-fenced and surrounded by a guaranteed fair process.

25.2 Investment in dry-year reserve capacity by the Commission has the potential to negatively affect the uptake of demand-side options and renewable generation options. These include promoting energy efficiency that reduces winter peak loads – in particular, additional ceiling insulation in poorly insulated or uninsulated houses, also energy-efficient light bulbs and also include new renewable electricity generators which do not suffer dry-year shortages – wind generation in particular.

25.3 Government's decision to contract for 8 years of large-scale coal supply for Huntly, (Dominion 22 July 2003) would appear to contravene the "environmental sustainability" objective of the Electricity Amendment Act. That quantity of coal will help prevent NZ from meeting its Kyoto obligations.

General comments

26. A return to a substantial surplus of generating capacity would drive wholesale prices down, to the benefit of major electricity users who buy much of their electricity from the spot market. But the cost of building that capacity and storing the fuel would raise average electricity prices for all consumers. This may offset the advantage of more stable spot prices, so that "the net impact on economic growth prospects is uncertain"³
27. Government's proposed investment in reserve capacity would make new peaking stations much less risky investments for generators, and thereby could increase risks to investors in small-scale "sustainable energy options".

Conclusions

28. Planning for generating capacity development needs to be done with caution, to avoid surplus generating capacity which would crowd out renewable distributed generation, solar, wind and biomass energy and energy efficiency investments.
29. As noted by the PCE, sustainable energy options provide the most economic way to improve environmental sustainability and reliability in New Zealand's electricity sector. SEF is concerned that through its actions to give effect to Government Policy, the Electricity Commission's decisions may have a very negative impact on sustainable energy options. This applies particularly to the implementation of the Government's May 2003 dry-year reserve capacity decision.

On behalf of the Sustainable Energy Forum

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³ Treasury Report, Electricity Sector- Ensuring Long Term Reserve Capability, 8 April 2003, released under OIA.