R I D G W A Y

INFRASTRUCTURE CONSULTING

SUBMISSION TO THE COMMERCE PARLIAMENTARY SELECT COMMITTEE'S INQUIRY INTO THE NEW ZEALAND ELECTRICITY INDUSTRY

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Introduction

1. This submission is from Richard MacGeorge of Ridgway Infrastructure Consulting, now at Level 6, 76 Cashel Street, Christchurch.

2. I wish to appear before the committee to speak to my submission. I can be contacted at: 03 353 2771.

3. Ridgway Infrastructure Consulting was established in 1999 and is based in New Zealand. It is the business through which Richard MacGeorge, an investment banker with fifteen years international experience, provides independent project finance advice to clients throughout the Asia Pacific region.

   The purpose of the business is to serve multi-lateral agencies, governments', banks, contractors, developers and other consultants engaged in the private financing of public services. These services include electricity, water/ sewerage treatment, transport, communications and social services to the general public.

   A number of reference materials have been used in developing this submission and these are set out in the section entitled "References" at the end of the submission.

General

This submission is made in response to the Commerce Committee's call for submissions on its inquiry into the New Zealand electricity industry ("Inquiry").

The Commerce Committee will consider eight issues, divided into two parts. The first part deals with the electricity supply and demand imbalance that New Zealand currently faces, especially during dry rainfall years ("Crisis"). The second part is concerned with the profitability levels of electricity lines companies.

This submission deals with the Crisis and not the second of these categories. This is because, in the author's view, the Crisis is more pressing and the Commerce Commission is already undertaking an inquiry into the prices set by electricity lines businesses. That inquiry has led to a draft determination that proposes price controls using, amongst other things, an RPI - X. mechanism.

More specifically, the four issues concerning the Crisis include:

- What the electricity generation companies do in order to ensure balance is struck between thermal and hydro generation, to give security of supply in dry years;

- The asset utilisation by electricity generation companies and their planning for capacity development; The workability of corporate separation of generation and retail activities of the electricity generation companies

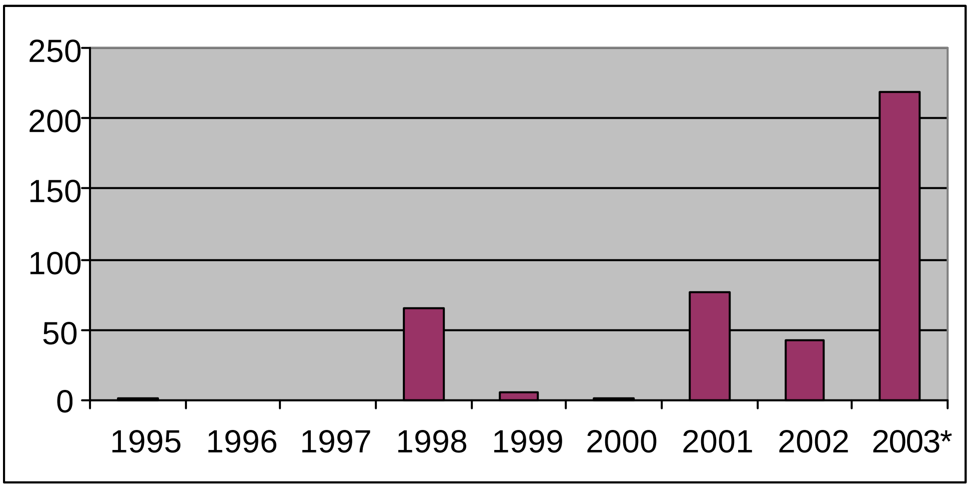
- If and where the retail sector is acting competitively and to ensure that such competition is genuine and that barriers to switching suppliers are extinguished.

I wish to make the following comments on the general intent of the Inquiry.

The Enquiry Is Welcome, But Late

The Economist magazine maintains an index called the "R" Index, which reflects the number of times the word "recession" is mentioned in newspaper and other articles. It is said that this index provides much earlier insight into the likelihood of a recession occurring than economic statistics, which have time lags. Similarly, I have compiled an "electricity crisis" index based on the number of times this term has been mentioned in New Zealand newspapers since 1995. Figure 1, below, illustrates the usage of the term.

Figure 1 - NZ Newspaper References to "Electricity Crisis"



*To 20 May 2003
Source: Newztext

Since 1998, therefore, the term "electricity crisis" has widespread popular recognition. However, energy analysts have been predicting potential crises for at least ten years. For example, reviews every two years from 1992 made by Leyland Consultants/ Sinclair Knight Merz for the Centre for Advanced Engineering have reported on New Zealand's susceptibility to electricity shortages during dry years (with power crises occurring at varying levels in 1992, 1994, 1995, 1997, 2001 and now 2003) (Leyland, 2002).

Therefore, it can be argued that the Inquiry is made more in response to public pressure than from calls from electricity market analysts. The process by which inquiries are called requires review so that the Commerce Committee can be more responsive to expert commentary.

Balance between Thermal and Hydro Generation or Thermal and Hydro Generation - Security of Supply

The Primary Fuel Gap

The reviews discussed above have pointed out the need for increased investment in generation to meet New Zealand's electricity demand to 2015, particularly given the decline of the Maui gas-field. To put this in context, since 1981 New Zealand's total electricity demand has increased at an annual compound rate of 2.54 percent (Welch, 2003). By contrast, New Zealand's installed capacity has increased at a lower annual compound rate, so reserve capacity has suffered as a result.

The decline of the Maui gas-field has implications for dry years too. There is no longer the capacity to supply large volumes of gas during dry years to cover reduced hydroelectric generation, which currently delivers around 60 percent of New Zealand's electricity needs. During dry years the Huntly and New Plymouth power stations have compensated for lower hydro generation by operating over the winter period at full capacity, using large amounts of Maui gas as a consequence. However with the decline in output from the Maui gas-field, this approach is no longer an option and alternative backup power needs to be developed (Leyland, 2002).

Coupled with this decline, is the likely reduction in base capacity of some gas-fired power stations and the postponement of other intended gas-fired power stations such as Genesis's 400 MW expansion of the Huntly power station and Contact Energy's 400 MW Otahuhu C power station because of security of supply concerns.

The decline of Maui underlines our dependency on natural gas, which is the primary fuel for nearly one-third of the country's generating capacity. Maui produces about 80 percent of that gas, but the field is due to run out by

2007 and sufficient alternative gas resources have yet to be identified (Welch, 2003). The government might consider taking a more active role in encouraging exploration for new gas and oilfields, some of which may not be attractive to private firms seeking microeconomic benefits. Instead, some fields may have greater macroeconomic value and strategic importance. If so, that question will require addressing.

Closing the Gap

The gap in New Zealand's primary fuel sources needs to be closed by a portfolio of fuels so that our risk on any one is minimised. Ideologically, most New Zealanders would prefer that primary energy to be renewable (i.e. hydro, geothermal, wind, solar and bio-energy). This sentiment is echoed by the Ministry of Economic Development, which states on its web site that renewables are preferred to meet base electricity demand (MOED, 2003). However, these preferences diverge from the way the NZEM is structured because the cheapest generators are usually the cheapest bidders and they are dispatched first. Even accounting for carbon taxes, renewable energy generators are not always the lowest cost sources of electricity, so there is a conflict between the Ministry's ideal and the market reality the NZEM confronts.

The way the NZEM is arranged, therefore, answers the Inquiry's first question of "What the electricity generation companies do in order to ensure balance is struck between thermal and hydro generation, to give security of supply in dry years". The electricity generation companies quite naturally only respond to the signals from the NZEM - they are not the chief determinants of the balance. If there is an imbalance, it is the NZEM structure that requires review.

To go further, if the market structure does not (or cannot) induce delivery of the desired levels of renewable generation, regulatory intervention will be required. In this respect, New Zealand can draw on Australia's experience, where the Australian Office of the Renewable Energy Regulator requires retailers to buy at least 2% (a proportion that increases over time) from renewable energy sources installed since 1997 (Resource-solutions, 2002). Failure to do so attracts a penalty of 4¢ / kWh and this has motivated much renewable energy development in Australia. It is submitted that this sets an attractive precedent for the long term development of the New Zealand market, provided there is a reasonable spread of renewable energy types.

In the short term, however, renewables will not be able to close the primary energy gap quickly enough or cost-effectively. Consequently, New Zealand will be penalised for its failure to respond to calls for new capacity. To close the gap, it is suggested that a minimum level of non-renewable fuelled power stations be developed to ensure fuel diversity and security of supply over the coming years. In time, perhaps, that capacity will convert to standby generation as renewables become more cost effective and can provide base load duty.

Asset Utilisation and Capacity Development by Electricity Companies

On the question of capacity planning, Leyland (2002) asserts several reasons why the market has failed to provide adequate new capacity. These include:

- Transpower being unable to provide an adequate transmission system. This is driven in part by the large distances between supply and demand centres;
- The market system not rewarding generators to hold standby capacity for dry years;
- The market not providing long-term price signals;
- The involved and time-consuming approvals process - especially regarding the Resource Management Act ("RMA"), Treaty considerations and Kyoto implications all impede new capacity development.

Transmission Constraints

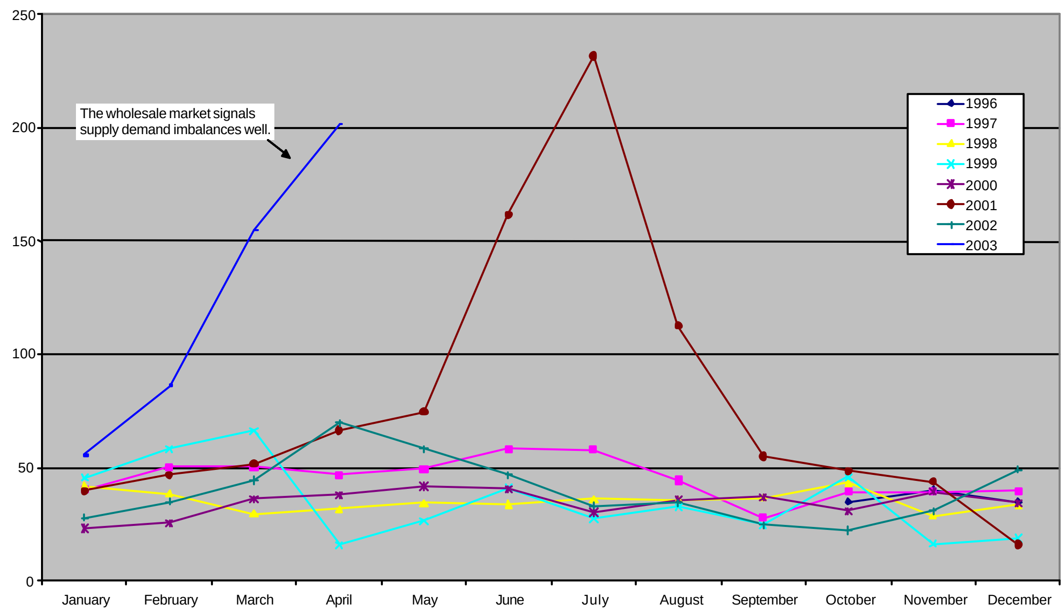
The first of these issues begs for schemes that bring generation closer to load centres, together with higher levels of investment in transmission systems overall. Getting power generation closer to load centres will take pressure off Transpower's grid and will increase transmission efficiency, thereby lowering power prices to the consumer. There is need, therefore, to consider distributed generation projects and also the provision of major generation facilities in the North Island. Leyland (2002) believes that 500 MW of coal-fired power generation could be developed in Northland and in the Waikato. This suggestion is consistent with the short-term closing of the gap discussed above.

Standby Capacity

The Leyland study concluded that New Zealand currently has insufficient reserve capacity to cover a 1 in 20 year drought (falling to a 1 in 5 year risk beyond 2005) and, beyond 2010, planned capacity increases would not meet demand growth. The response to this crisis should not be to cause even further reliance on hydro generation, but to seek greater fuel diversity by building or re-commissioning non-hydro facilities. A further appropriate response is the creation of specific standby capacity to cover dry years, accepting that special arrangements will need to augment the wholesale market to achieve this.

Some industry commentators advocate a return to public ownership and management of the electricity sector through a single body similar to ECNZ. It is submitted instead that this would be a retrogressive step because: (1) supply-demand imbalances pre-date the NZEM and (2) the wholesale market, while it has its flaws, signals supply-demand imbalances well, as Figure 2 below demonstrates.

Figure 2 - Wholesale Spot Prices by Month



Saved by the Electricity Commission?

On 20 May 2003, the Ministers of Finance and Energy made a joint media statement regarding the establishment of an Electricity Commission ("Commission"). The Commission will replace the Electricity Governance Board, which was voted against by electricity sector participants as a means of self-regulation of the electricity industry on 17 May 2003 (NZ Herald, 17 May 2003).

The aim of the Commission will be to establish reserved capacity that meets New Zealand's needs in all but a 1 in 60 rainfall year. This objective is made in recognition of the current market structure not encouraging generators to establish reserved capacity (MOED, 2003).

The Commission will contract directly with generators for standby capacity that will only be dispatched during dry years, otherwise leaving the wholesale market intact. It is thought that the commission will charge a levy of around $40 per household per year through either generators or retailers. It is expected by the government that this reserved capacity will take approximately three years to develop. That capacity is likely to be derived from: (1) existing mothballed plant such as the Marsden B and Otahuhu A oil fired facilities amongst others; (2) Generators agreeing to reserve existing units; and (3) Greenfield capacity.

The balance between existing and new plant should be a function of the way that competitive tenders are called. Initially standby capacity is likely to come from existing capacity, with new capacity taking a later role. However, the more that existing units are contracted for standby duty, the greater will be the gap in our capacity serving base load duty.

Specific Issues That Require Addressing

The principle of the Commission contracting directly with standby generators has considerable merit, although the Devil will in large measure be in the detail, which has yet to be worked through. The Ministry of Economic Development web site has a useful section of questions and answers, but three major questions have not been dealt with. These are:

- How will reserved generation be contracted?
- How will standby generators be paid?
- When will capacity be dispatched?

Unless these questions are dealt with properly, the Commission may inadvertently end up as a long-term manager of wholesale prices by its intervention.

Contracting for Standby Power

The Commission will need to conduct a competitive tender for standby capacity that not only provides the cheapest levelised price to the Commission, but also provides a degree of fuel diversity so that there is reduced reliance on any one type of fuel during dry year periods. The Commission will then need to dispatch standby generators on a merit order dispatch basis and, accordingly, it will need to establish clear rules that are transparent to the market in this regard. Thus, the Commission will need to develop a standardised Request for Proposals (“RFP”) and other model documentation for procuring standby power.

Insofar as contract structure is concerned, the Commission ought to enter into Power Purchase Agreements (“PPAs”) with those standby generators, similar to those concluded for Independent Power Producer (“IPPs”) projects in Asia and elsewhere. A cornerstone PPA should be developed by the Commission and included in the RFP for each solicitation of standby power.

The term of the PPAs should depend on the remaining life of the asset and the period for which that asset has committed capital. A balance needs to be struck between the Commission’s desire to maximise the contract term, yet also minimise the tariff.

Payment for Standby Power

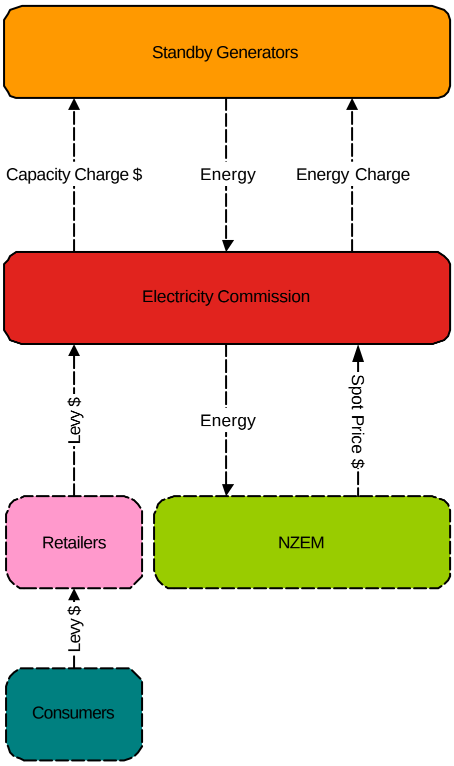
The PPAs should provide for a two-part tariff to be paid to standby generators, being an Availability Charge and an Energy Charge.

The Availability Charge would be payable to the standby generators irrespective of whether they are dispatched. This payment would cover the debt and equity capital cost of the facility together with fixed operation and maintenance charges. The standby generator would, however, be required to be available if not at all times, at least during the winter period when dry year shortages are felt most acutely. Scheduled maintenance would need to be conducted outside of these periods and the standby generator would be required to maintain sufficient fuel reserves to cover dispatch during a dry year period. Fuel stock holdings will probably exceed those of base load power stations, so standby generators will have higher working capital needs that will, in turn, be reflected in their Availability Charges.

The Energy Charge, on the other hand, would be payable by the Commission to the generator to cover the variable costs of generation. The Energy Charge would comprise a fuel component reflecting the actual cost to the generator of fuel consumed and secondly a variable operation and maintenance charge that reflects the incremental operating cost of generation.

The Commission's levy should be based on the aggregate Availability Charges paid to standby generators. This will leave Energy Charges when those standby facilities are actually dispatched to be recovered by the Commission selling standby electricity into the wholesale market and receiving in return the spot rate applicable at the time of sale. Those spot prices will be considerably higher than the Energy Charges payable to standby generators and the Commission should set off the resulting profit against the levy that is charged to industry. Figure 3, below, illustrates these payment flows.

Figure 3 - Suggested Payment Flows



Timing of Dispatch

The next question to be addressed is when the Commission will be permitted to sell standby electricity into the market. It does not necessarily follow that standby generators will only produce electricity during the winter months of dry rainfall years. This is because it can be predicted some months before a dry winter year that standby generation will be required. Should the Commission call on standby generation when a shortage is predicted or should it wait until shortages actually occur? The mechanism by which standby generation is triggered requires careful thought.

Mechanisms that might be considered include one or a combination of:

- Price Triggers – for example, if the spot price exceeds, say, $50 per megawatt-hour the Commission would dispatch standby generators until the price settled below that level again. However, this approach assumes that prices only increase in response to the short term supply-demand imbalances addressed by standby capacity. What happens, if once all standby capacity is dispatched, prices do not settle below the trigger because base demand fundamentally exceeds base supply?

- Rainfall forecast triggers - if standby capacity is to address dry years, why not dispatch standby generators based on rainfall/ lake levels? This approach is, however, probably not workable because of the many competing uses of water and also because standby generators would not then be dispatched for emergencies such as when two Maui gas generators had forced outages earlier this year (Welch, 2003).

- Availability Trigger – in this case, if forecast available MWh falls below a certain level, standby generators would be dispatched. This requires base duty generators to declare their expected future levels of availability. Base duty generators might object to this requirement because that information is commercially sensitive. However, disclosure could be made in confidence to the Commission.

  If generators were required to declare their availability, a generator is also more likely to be exposed if it goes off-line in order to game the market. It is further suggested that generators be required to make their capacity available to the market other than for forced outages that can be justified and scheduled maintenance that is conducted in accordance with manufacturer specifications and Prudent Utility Practices.

Long-Term Price Signals

The establishment of the Commission and its stated remit must be applauded. While the Commission's early objective will be to alleviate dry year electricity supply constraints, a longer-term objective should be to minimise the Commission's role in contracting for standby capacity by reforming the NZEM. Those reforms should aim at motivating generators to develop standby power and respond to long-term price signals.

On this question of long term prices, the Commission is also expected to have responsibility for the long-term supply-demand balance. This is where there is a further benefit in generators being required to declare forecast availability, as this would help provide some guidance regarding long-term prices, thus helping the Commission in its forecasting role.

Nonetheless, a long-term price market does not fully exist in New Zealand yet. In fact, price signals only really exist for each half-hour tomorrow, although electricity futures contracts are planned to be developed for the New Zealand's market by D-cypher, a subsidiary of Transpower. The development of futures and a forward market generally is a cornerstone for the separation of generation and retail, which is discussed below.

The Approvals Process

Generators will only respond to the call for new base and standby capacity if impediments to development are eased. The RMA, in particular, imposes a significant obstacle in this respect and requires: (a) specified relief for developers in the short term to stimulate development and (b) review in the long term to achieve a proper balance between legitimate consumer needs and resource sustainability.

RMA reform should be aimed at reducing the time and cost of approvals for projects that are reasonably justifiable. In particular, consultation needs to be conducted in a shortened time-frame, addressing only authentic concerns of groups that are genuinely affected by the project concerned. The scope for corruption must be limited too, perhaps with objectors not being entitled to financial compensation unless approved by a probity auditor (Brash, 2003).

Corporate Separation of Generation and Retail

A separation between generation and retailing is workable, but efforts are required to (1) offer consumers contracts that align retail price movements with wholesale price movements and (2) create a forward market against which retailers and certain consumers can protect themselves from the vagaries of the spot market.

Retail Contract Improvement

Most generators, especially Trust Power and Genesis, now have significant retail customer bases that create a natural hedge between the cost of generation and the volatility of the wholesale market. Through this arrangement, retail consumers are also sheltered from sharp increases in spot prices. However, retailer-generators give up the opportunity to make short-term profits when spot prices are high because they have already allocated capacity to retail consumers. Equally, retail consumers are blocked from enjoying lower power prices when spot prices are low and they do not change their consumption patterns when prices are high because they are protected (Morgan, 2003).

Morgan (2003) argues that if retail prices that reflect the spot market more closely were offered to consumers, then they would change their consumption patterns, producing a beneficial flattening of the load curve and lowering overall demand. Morgan also argues that if retail and wholesale price movements match each other more closely, increased national economic efficiency will result. This is because a less volatile spot market would reduce the need for businesses that purchase electricity on that market to periodically scale down production.

Morgan asserts that the mismatch between wholesale and retail pricing is because the electricity industry does not have the right commercial incentives. This might be because generators are state-owned and governments are less sensitive to equity returns than private sector investors. Part of the answer, then, might be self-evident: The government could finish the job of privatising state-owned power generation companies (Morgan, 2003). This would have the additional benefit of creating an infrastructure asset class for private investors in New Zealand, which will become increasingly important as the challenges of financing much-needed infrastructure in this country dawn upon us fully. The government's superannuation fund would also be an ideal investor in these newly privatised companies, since there would be a matching between the investor’s need for a long-term stable return and the generator’s ability to deliver this rather than the short-term results the current investor base demands.

Hedge Market Development

Generators should lose the comfort of captive customers against which they lay off their sales price risk, but before this happens an alternative means of risk management must be available. A transitional process might therefore be followed, which sees generators giving up increasing proportions of retail customers over time.

As a first step, generators might be required to sell controlling interests in retail businesses within a stipulated time-frame, but be permitted to enter into contracts for differences with retailers for a period. That approach is consistent with vesting contracts in the Australian experience and CFDs in the UK between generators and the Regional Electricity Companies.

In tandem with this step, a forward market for electricity sale and purchase will need to be designed and established, probably as a public entity in the first instance. Generators would sell electricity on one side of the business and, on the other side, retailers and major users would purchase electricity forward. A light-handed regulatory approach that allows market participants to decide hedging volumes and tenors for themselves would be a better starting point than compulsorily requiring certain levels of hedging. After all, commercial lenders to market participants usually play a pivotal role in determining an appropriate level of their hedging.

A well-developed hedging market will break down barriers to entry for generators and retailers alike. IPP development is more likely to be fostered in this environment (Small, 2002), because they are financed as stand-alone businesses and their financiers require a high level of cash flow certainty. Smaller developments are also more likely to find support, which is important because many renewable generation initiatives are at this lower end of the spectrum. Equally, smaller retailers that are more responsive to consumer needs are more likely to enter the market, creating greater competition than is currently the case.

Genuine Competition and Removal of Barriers

Encouraging new retailers into the market through the creation of a deep hedge market is necessary to reduce the market power of incumbent retailers. In the interim, something of an oligopoly exists and retailers do not compete fully. The debacle with On Energy in 2001 (when it raised retail prices because it was unhedged, then recanted, then sold customers to other retailers, then exited the market) is still fresh in the minds of consumers. That example only served to reduce competition through a reduction in retailers and because the retailers that bought On Energy's customers subsequently refused further new customers.

Aside from the hedge market, however, other measures require adoption so that consumers get the best possible power prices. The first of these is to educate consumers further about retail competition. The Consumer Institute's web based retail price comparison calculator is an invaluable tool, but an expanded calculator should be developed by the Commission and its existence "taken to the people". In this way, consumers will be able to make more informed choices.

Having made a decision on which retailer offers a particular customer the best prices, if a switch is required, then barriers to that switch need to be minimised. One area where attention is required is in metering – meters and their readings should be owned and undertaken by the lines company. This centralisation will engender better and more cost-effective systems, especially through the deployment of fewer meter readers. The Sustainable Energy Forum goes further by suggesting that meters should provide real-time information (requiring remote reading) that enables time of use billing arrangements with retailers (Melhuish, 2002).

Empower Limited is a good example of a new retailer that is receptive to consumer needs. The company will install a time of use meter that logs electricity consumption half-hourly and remit that information to Empower electronically (Empower, 2003). Provision of such a state-of-the-art meter should be the domain of the lines companies, but the essential point is the example of a new market entrant with something new on offer. The Empower example proves that a blend between profit maximisation and demand side management can be found.

Ultimately, the success or otherwise of retail competition can be gauged by the level of advertising by retailers. In fact retailer advertising is low, which indicates a degree of market failure.

Recommendations

In conclusion, I recommend to the Inquiry that:

- Parliamentary Select Committees considering the electricity sector become more responsive to expert commentary;
- The primary fuel gap emerging from the decline of the Maui gas-field be met by new power stations using a mix of primary energy;
- It be accepted that installation of a limited amount of non-renewable electricity capacity is a price that will have to be paid for responding slowly to the Crisis;
- Incentives for longer term renewable energy generation along the lines of the Australian model be explored;
- Transmission systems investment and the encouragement of new capacity near load centres be considered;
- The foundations of the NZEM remain intact, but that consideration be given to reforms that encourage standby capacity development without Electricity Commission intervention in the longer term;
- The Electricity Commission contract generators through a competitive process that employs pre-determined model documentation. That documentation should guide desired outcomes regarding: amount of capacity offered; tariffs and the blend between existing and new capacity used as standby;
- Standby generation be contracted for terms that reflect the remaining life of the asset concerned and the tenors of its underlying capital;
- Timing of standby generation dispatch take account of the MWh available from generation facilities on base duty;
- A long-term pricing market be established as: (1) a precursor to disaggregating generation and retail; (2) encouraging new entrants into generation and retail and; (3) assisting the Commission with its long term planning role;
- The RMA be reformed to better facilitate capital investment by reducing consulting periods and excluding spurious objections;
- Regarding the separation of generation and retail, a phased approach to separation be adopted that initially sees ownership replaced with contracts for differences between generators and retailers;
- A non-mandatory hedge market be created, initially by a governmental entity;
- Regarding greater competition in the retail sector; the Electricity Commission take responsibility for consumer education on retailers. It is further recommended that the Commission consider the merit of meters and their reading being managed centrally by relevant lines companies.

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