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Consultation on need for additional reserve energy in 2005

Submission to the Electricity Commission

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Preface

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1. Executive Summary

The consequences facing New Zealand if it were to experience another supply crisis in 2005 are clear. The Government Policy Statement released on September 20 2003 states *"Shortage risks occurred in 2001 and 2003, resulting in sustained high spot prices and the need for emergency conservation campaigns. This has caused inconvenience and disruption, and may have affected the attractiveness of New Zealand for business investment, especially for sectors using relatively large quantities of electricity."* Also clear is where responsibility now lies for ensuring security of supply. The Hon Pete Hodgson stated in his media statement of 14 September 2003 that the Electricity Commission has three key tasks, including *"ensuring New Zealand's electricity supply is secure, with adequate generation for dry years*."

If there was a supply crisis in 2005, regardless of the cause, it is inevitable that an inquiry would follow. If the Commission relies on the report *Assessment of Reserve Energy Requirements for 2005* as it stands, it risks this outcome. There are a number of issues regarding the report's conclusions around reserve generation requirements and the operation of the min zone that an inquiry might highlight:

1. The report *Assessment of Reserve Energy Requirements for 2005* is not fit for purpose. The conclusions in the report rely on too many assumptions given the consequences of getting it wrong. A number of assumptions refer to what the Commission might decide to do, but have not been clarified by the Commission. There is also a lack of detail regarding the operational implementation of various policy options and strategies.
2. A number of issues discussed in the report are left with the observation that: the Commission may want to consider this further; it will be some time before the Commission has considered these issues properly; or the issue warrants further scrutiny. For the most part these issues could be resolved prior to 2005 through more detailed consideration, or having the report produced on the basis of a wider brief. Given the extent of assumptions required in the report, and the consequence of facing a dry year in 2005, either further work should be completed before decisions on reserve generation are made, or a reserve generation programme should be pursued in the interim.
3. Failure to secure reserve generation in addition to Whirinaki appears to go against statements made by the Minister of Energy in September 2003 regarding what the Commission is likely to do prior to 2005:
   - *"The Commission is expected to contract for low fixed cost options for reserve energy, which will tend to have high variable costs."*
   - *"New generation plant and plant that would otherwise be mothballed or retired will both be eligible for reserve energy."*

– *"The Commission may contract with large electricity users for demand reductions as part of the reserve energy portfolio."*

4. The report assumes that security of supply policy is limited to ensuring emergency programmes are not called on in a 1 in 60 dry year.

5. The only scenario other than a 1 in 60 dry year which is explored in the paper is an outage at Otahuhu B, and that is only done with reference to its impact on the application of the min zone. It is possible to explore the impact of a variety of scenarios in advance as was done in 2001, 2002 and 2003 in order to test the merits of risk mitigation strategies that may be available, including contracting for more reserve generation. To use the example provided, if Otahuhu B failed at the beginning of the winter there would not be time to activate other schemes. There would be no time to respond to a signal sent by the min zone approach if strategies had not been developed in advance. In addition, there are no sensitivities developed for the 1 in 60 dry year scenario or any other scenario.

6. Analysis of reserve generation options is confined to Whirinaki and ignores locational issues. Whirinaki can provide reserve generation in a number of scenarios, but not in others, especially when southward flows are limited by transmission constraints and HVDC capacity, and South Island hydrology is tight (low storage and the prospect of low inflows).

7. The way the 1 in 60 dry year security of supply policy is represented it is reliant on the probability of particular weather conditions. Climate is not static and extremes are becoming more variable. A 1 in 60 year event could be worse than any of the past 72 years. Professional meteorological advice should accompany the assessment of the need for reserve generation, especially if the security of supply policy is reliant solely on the weather.

8. The assumption that there are no non-hydro fuel supply problems is critical. Other fuel supply may be more reliable than hydro but is still not entirely certain, as is evidenced by the decline in gas delivery flexibility and the fallibility of gas infrastructure, both of which were apparent in early 2003.

9. The transmission system has to be relied on more than usual in a dry year. The shortcomings of the system under southward energy flow conditions were critical in 2001. Under these conditions existing standards of security and quality of supply may be adversely affected. For example, the South Island security may at times be reduced to a single contingency level (n). The System Operator should understand from the security of supply policy how to treat any reduction in levels of security.

10. The report assumes that all non-hydro generation will be fully offered under certain conditions. History does not support this, as evidenced in 2001 and 2003. The report refers to some of the powers given to the Commission, but it still has to decide how it will compel non-hydro generation to behave in a certain way. However they do it, it will be a substantial change to the arrangements now in place.

11. The modelling contained in the report assumes a national system with given transmission constraints. This should be tested because a crisis in one or two regions that affected a major urban area would still be a situation for which the Commission's security of supply policy is responsible.
12. The operational aspects of running reserve generation are not clear at all. If participants in the market are second guessing an uncertain running regime there could be adverse effects on market outcomes.
13. The operational implications of adopting a min zone as the sole basis for gaining comfort that supply is secure should be clear in advance. Different interpretations and consequent behaviours may actually bring a crisis closer rather than avert it.
14. The report does not develop the opportunities that exist to encourage retailers and large consumers to make their usage more flexible. Demand-side response and interruptible load were specifically highlighted in the Minister's statements of September 2003, but are passed over lightly in the report.
15. The report advocates adopting a min zone approach and on this basis suggests that no reserve generation is required in addition to Whirinaki. The route by which this conclusion is reached seems little more than adopting specific references raised in the GPS. A prudent Commission would take an holistic view of an appropriate security of supply policy and the steps required to affect it. This would include, but not be confined to specific elements highlighted in the GPS.

The following recommendations take into account the risks of a shortage in 2005, the ability to gain further clarity around a number of issues left unresolved in the paper before decisions are made, and the consequences of supply shortages if they were to occur.

We recommend that Electricity Commission take the following actions to ensure that the security of supply policy delivers what is expected:

1. Define the security of supply policy in a meaningful way so that all stakeholders have a common understanding of what it is and how it will be managed. Steps to achieve this include:
    a. Establish parameters for measuring the state of security of supply
    b. Establish an enduring definition of service expectations and make these public
    c. Develop strategies for improving security of supply
    d. Recommend a process for implementing or triggering risk management strategies and measuring their impact.
2. To the extent that a 1 in 60 dry year yardstick is used, consideration should be given to the meteorological implications of current trends and cycles. If the policy is solely based on the weather this is critical.

3. The Commission should enquire for itself what fuel supply arrangements are in place and draw its own conclusions on the risk of any disruption to these. The Commission should consider what actions it could take to reinforce the fuel supply situation. (This is consistent with the options contained in the Assessments paper: *Monitoring, Clearing house and Fuel commitments*.)

4. In planning for implementation of the security policy, account should be taken of different hydrological scenarios (regional effects) and other events which could conspire to create a crisis.

5. Achieve confidence that the risk of a supply crisis is acceptable by rigorous analysis of transmission constraints and losses. Take full account of the regional nature of the risks to security of supply. Generation embedded in a network (i.e. near load) could reduce losses on a highly loaded transmission system significantly.

6. Urgently review assumptions made in the modelling included in the Assessment paper and reassess the need to procure reserve generation south of Bunnythorpe and/or in the South Island. There are a number of scenarios where Whirinaki will not be able to run.

7. Include sensitivity analysis in the assessment of the scenarios that might occur to threaten security of supply. This should be made public so that any uncertainties or weaknesses in the modelling can be taken into account in the decisions made by those parties practically exposed to individual risks.

8. Advance demand-side response work to include crisis conditions so that consumers can participate when the market signals that a crisis is possible. Make significant progress prior to winter 2005.

9. Consider contracting for generation embedded in local networks at locations that would provide particular benefits in a dry year scenario, taking into account probable transmission power flows, constraints and other beneficial uses of the plant.

10. Consider in detail how and when Whirinaki will be operated. Make these details public so the market's expectations are unambiguous.

11. If a min zone concept is to be relied on to support a security of supply policy, consider the operational details of how it will operate. Make these public so that all stakeholders share a common understanding of it.

12. Fully develop a tender process for reserve generation that accounts for locational benefits, the different forms that reserve can take and any associated uses for it. Take stock of and account for plans to supply reserve generation especially for 2005. These might be abandoned if there is a change to the plans for reserve generation previously released by the Minister.

2. Introduction

The consequences to New Zealand if it were to face another supply crisis in 2005 are inconvenience and disruption for all users, and costs to the economy as a whole. If the Electricity Commission fails to set an appropriate standard and make appropriate arrangements it may affect the attractiveness of New Zealand for business investment, especially for sectors that use relatively large quantities of electricity.

In September 2003, the Government announced decisions on security of supply that included enabling the Electricity Commission to contract for up to 1200 GWh (400 – 500 MW) of reserve energy over a four month period. The Government's announcement also indicated that the Electricity Commission may contract with large electricity users for demand reductions as part of the reserve energy portfolio, and that the Commission should implement a clear process for assessing competing offers of reserve energy. In response to the Government's statements a number of parties have investigated potential reserve energy generation or demand management processes for 2005 and beyond.

A report has been prepared for the Ministry of Economic Development (MED) on short-term security (the Assessment report) and the Electricity Commission has sought submissions on its conclusions.[1] The report suggests that the Commission exhaust a number of options before making any decision to proceed with a tender for more reserve energy. The immediate impact of these statements has been that potential investors in reserve energy or demand response processes have reconsidered those schemes.

However, the Assessment report is not a robust piece of analysis, and it does not demonstrate that this is an appropriate conclusion. In this report we show the risks and unanswered questions in the analysis. We do not undertake the analysis, and as such do not reach a conclusion about whether additional reserve capacity should be sought.

A robust piece of economic analysis has several components:

- It identifies the objectives of the agent (in this case the government).
- It sets out a method for measuring performance against those objectives.
- It identifies the source of the problem.
- It promulgates a list of options that would 'fix' the problem.
- It tests the options against the objectives.

[1] Concept Consulting Group *Assessment of Reserve Energy Requirements for 2005* prepared for the Ministry of Economic Development, February 2004.

- It reaches a conclusion about the most efficient (least distortionary) option for altering incentives to meet the agent's objectives.

This is a general outline of how economic analysis is undertaken – clearly there are details missing, such as how to measure the effect of changes. This is often not able to be done directly; a model is used. Economic models are based on reality, but abstract from the complexity of reality where that complexity does not have a material bearing on the question at hand. Where material information is not directly observed, economists make assumptions based on intuition or other data.

The attitude of the agent to risk is an important consideration in modelling. But even someone who is comfortable with undertaking risky propositions will want to understand the nature of the risk they are taking. This means that it is important to indicate the vulnerability of the model's conclusions to the simplifications and assumptions made. This will include an indication of how likely it is that an assumption is incorrect (and how incorrect it might be).

The Assessment report does not measure up against this description of economic analysis:

- It focuses on a single governmental objective.
- It does not comprehensively describe the source of the problem.
- A single option for 'fixing' the problem is noted and its practical implementation is not discussed.
- The model for measuring the effectiveness of the option contains a number of significant assumptions and simplifications. Little analysis of the risk associated with relying on these is included.

Given these issues it would be inappropriate to rely on the conclusion of the report without further analysis. We submit that the Commission should consider each of these issues before accepting the report's conclusions at face value. The Commission will probably have to take the lead on any emergency conservation programme if there is a shortage of supply in 2005. One way or another they will be seen as responsible for getting into that position if it occurs, and will be held responsible for the effectiveness of any programme then undertaken.

The paper includes a number of assumptions and refers to the need for a number of issues to be explored further. In particular the authors of the paper note "*this has required us to make a number of assumptions as to how the Electricity Commission might approach its security of supply responsibilities.*" It is difficult to interpret why the Commission has sought submissions on analysis that assumes what they might do when they could have advised the authors or clarified some of these issues with the release of the paper. We list a number of areas below where clarification could be provided in time to enable a number of courses of action to be taken prior to

2005. Clarification will also assist in achieving a common understanding of the policy and its implementation.

3. What is 1:60?

> *The practicalities of what is meant by the concept of a 1 in 60 dry year security policy will need to be determined by the Electricity Commission.… However, it is beyond the scope of this report to undertake and apply this sort of [statistical] analysis and clearly an Electricity Commission responsibility to consider. (Assessment p. 4)*

The Electricity Commission needs to give urgent consideration to the objective of the security of supply policy. If a 1 in 60 event relates solely to weather then this should be made clear. If it includes the possibility of other events that could have an impact on security of supply then what these events are should be clarified (and whether the probability of them occurring is independent from or related to the probability of low inflows).

The statistical likelihood of a particular sequence of inflows occurring can be calculated from the 72 years of historical data that is available. It will be important to explicitly consider how to account for:

- The quality of the data (older data is likely to be less comprehensive).
- Trends in weather (including the Interdecadal Pacific Oscillation and climate change).[2]
- Serial correlation of weather (i.e. the reliance of the probability of a particular outcome next year on this year's weather).
- The appropriate measure of variance (if the wet years are getting wetter and the dry years drier).
- Conversion of inflows to GWh (which will include the effect of location).

There is also the point that it is not possible to confirm that a year is a 1 in 20, 1 in 60 or 1 in 100 year sequence until after the event. If there are supply disruptions, and after the event it was deemed to be a 1 in 100 year, it is unlikely that that would excuse those responsible for the disruption caused to households and businesses. This is especially so given the repeated

[2] Climate variability observed in the Pacific is dominated by changes in the tropics on timescales ranging from interannual to interdecadal. Research show that the Interdecadal Pacific Oscillation (IPO) modulates South Pacific climate on the decadal time scale. Three phases of the IPO have been identified during the 20th century being: positive (1922-1944), negative (1946-1977) and another positive phase (1978-1998) recent findings show that there has been another shift towards a negative IPO since 1999. These changes cause climate shifts in the South Pacific. Rainfall patterns vary significantly between positive and negative phases of the IPO and distinct region changes in precipitation have occurred since 1930.

undertakings from government that they have moved to address security of supply.

The Commission, the market, consumers and government should all understand a set of defined parameters covering how a 1 in 60 event would be judged, and what will happen if it occurs. The Assessment paper assumes (and admits to the crudeness) that a 1 in 60 year event implies that emergency measures would be needed if inflows were lower than the worst historical sequence (with no mention of how location is accounted for).

If security of supply is intended to cover a 1 in 60 dry year *at the same time as* other contingencies then the security standard has been set too low in the Assessment paper. If the security of supply policy is to be based on the weather, there should be a significant input from meteorologists to ensure that the policy matches what is known about its underlying influences.

4. What is a min zone and how should it be used?

Morrison & Co suggested that the Commission could monitor short-run security by calculating a *min zone*.[3] A min zone is the minimum level of hydro storage that is required at a given point in time that would ensure that there would be no shortage of electricity supply if inflows were at a '1 in 60 low' and all thermal plant ran at full capacity.

This is a theoretical minimum below which security would become a concern. Importantly it assumes that thermal plant will run at full capacity (all the time). Clearly, it does not imply that the *only* time that security is a concern is when storage enters the min zone. Security could be a concern at storage levels greater than the min zone if:

- An unplanned, sustained outage occurred (in generation or transmission).
- A fuel shortage occurred.
- The price of electricity was below that necessary to ensure that all thermal stations operated at full capacity.
- Demand was unexpectedly high.
- Transmission capacity constrained the ability to transport electricity supply to demand.

The analysis contained in the Assessment paper assumes away all of these uncertainties (although it notes that most of them exist). These issues are considered in more detail below. As it stands, the paper only addresses the technical capability of the system and whether a minzone approach will give

[3] Morrison & Co *Issues concerning the reserve generation proposal*, 12 August 2003.

the Commission confidence of a low probability that emergency conservation programmes will be required.

Given that the min zone is a monitoring tool, what action will the Commission take if it is breached? This question is not considered in the Assessment report. We discuss this further in section 6.

5. What if…?

If the security policy is confined to a dry year, the Commission may be left exposed to the combination of a series of other events that creates the same effect. Each scenario is unique. For example, in February 2003 it became clear that: inflows were low and lakes were not filling; the operational requirements on gas following re-determination meant gas was less flexible and more expensive; and at the same time there was rising concern over the amount of coal stockpiled. While that convergence of events may not be replicated, another set of circumstances could conspire to create a supply problem. The formation of a security of supply policy and modelling what mitigation strategies are required should consider a range of scenarios and undertake sensitivity analysis of these.

In this section we consider some of the critical assumptions made in the Assessment analysis and answer the questions:

- What could happen to breach the assumption?
- What is the impact of assuming it will not happen?
- What are the prudent steps for the Commission?

5.1 There is an outage

Forced outages are not uncommon and do not necessarily fall at convenient moments. By using a de-rating technique no account is taken of the impact of actual forced outages.

The two recent crises were both aggravated by untimely outages. The Otahuhu B outage in the last week of May 2001 exacerbated the rising concern over low inflows, and may have acted as a partial trigger for that crisis. A forced outage could be the result of a generation plant failure, a transmission line failure or the failure of plant supplying fuel for electricity generation.[4] The outages on the Maui plant in early 2003 were especially disruptive because of the poor information that fed back into the electricity market.

[4] An outage could also occur as a result of a distribution line failure, but is likely to be of less significance in this context.

The Commission should analyse scenarios to determine the vulnerability of supply in 2005 to a forced outage at different times. This may increase the reserves that the Commission chooses to hold to ensure security of supply in a dry year.

5.2 There is a fuel shortage

This has a similar effect to an outage. In 2003 a combination of fuel shortages resulted in an electricity shortage. Based on MED's assurances, the Assessment report assumes that the only fuel shortage possible in 2005 is water. While recognising that MED has access to confidential information, the underlying assumption is bold. It implies that coal supply is continuous. Even if there are sufficient stockpiles of coal, an interruption in Maui gas supply could shut down thermal plant.

By assuming fully fuelled plant the Assessment report has underestimated the level of hydro storage required to stave off all security threats.

The Commission should consider the level of thermal fuel shortage it wants to insure against, and incorporate this in its security monitoring arrangements.

The Commission should also take account of differences in the hydro catchments. In the end, the Assessment paper only partially outlines how a min zone might work in reality, leaving us with the observation "*The interaction between North and South Island reservoirs probably warrants further scrutiny."* We agree, and urge further scrutiny before this mechanism is relied on.

5.3 Thermal generation is not running at full capacity

A key assumption in the Assessment report's analysis is that thermal generation will run at full capacity. We have already outlined reasons that this may not be possible because of an outage or fuel shortage. Even if it is technically possible it may not occur. We saw very clearly in 2001 and 2003 that thermal generators responded to price, or, more correctly, their perception of what prices would be. They staffed their units and brought their units on based on their own short-term price forecasts.

We assume that the Commission is not intending to short-circuit the market by simply forcing generators to run.[5] This implies that generators have to have some other incentive to operate. In general, this incentive would be price. Each generator makes a decision about the price at which to offer to supply electricity based on the short-run marginal cost of operating. This

[5] This option is open to it, but it would contravene the Government's stated policy objective of minimising distortions to the normal operation of the market. It also raises issues of property rights, and could require legislation.

includes operations and maintenance costs and the cost of fuel that will be consumed. Although hydro generators do not explicitly pay for fuel, the cost is not zero. If stored water is used today, it is not available tomorrow. This means that the cost of the water is its expected future value. That may be quantified as the option of having it available to cover future opportunities or cover the risk of other generation in the generator's portfolio failing. A number of factors affect the option value of stored water:

- Level of existing storage.
- Expected inflows.
- Short-term considerations, such as plant outages.
- Forecast prices.

In addition to these considerations, generators may want to use the full range of their reservoirs prior to spring inflows to optimise the value of the storage capacity. A national min zone strategy does not take into account the fact that each generator has hydro generation in its portfolio, and optimises seasonal drawdown within its own portfolio after taking into account its own load. Each hydro catchment also has distinct storage and inflow patterns, which are managed by each individual generator.

Not only do generators have to make the decision to switch on in advance of running, but when they run they may cause prices to fall below their short-run marginal cost (SRMC), especially if they all come on together.

These considerations will affect when thermal plant runs. They will also affect the amount of storage that can be assumed to be held.

The issue of the Commission's comfort with a 100% operating assumption is raised in the conclusion to the Assessment report, but no recommendation is considered on how it might be achieved.

By assuming that all thermal plant will run 100% of the time under certain conditions the Assessment paper has underestimated the level of hydro storage required to stave off all security threats.

The Commission should consider what more realistic expectations might be. It might do this by reviewing the level of thermal plant operation in other years. These assumptions could then be incorporated into its security monitoring arrangements.

5.4 Demand is unexpectedly high

Demand for electricity could be higher than expected, for example because of a severe winter, or because of a change in technology or plant expansion by a business. For example a dry hot summer on the east coast of the South Island can easily cause extended use of irrigation load through late summer

and autumn. This would result in the level of hydro storage required to ensure security of supply being higher than the Assessment paper has concluded.

Only one scenario of demand growth appears to have been taken into account. "*Demand growth of 2% was agreed with the Ministry of Economic Development.*" The Commission should incorporate other demand growth scenarios into its modelling as a base for security monitoring arrangements. This should include taking account of regional variations in demand growth.

5.5 Transmission

Whilst we have no grounds to doubt the results of the modelling regarding the system's technical capability, it is important to understand what that conclusion means in practice. The Commission needs to be satisfied that both the results, and the actions that will be taken to achieve the results, are acceptable. This needs to be viewed in the overall context of security of supply.

In its most simple form, a security of supply policy or a reserve generation procurement strategy should take into account three rules:

1. South Island generation in a 1 in 60 dry year has to be able to meet South Island load after taking into account north/south flows.

2. North Island generation in a 1 in 60 dry year has to be able to meet North Island load plus transfer requirements south.

3. The transmission system has to be capable of carrying the north/south requirement, or reserve generation is required south of the transmission constraint.

If conditions 1 and 3 are not met then supply is short either south of Bunnythorpe or in the South Island.[6] To determine the possibility of any of the three scenarios the following information is needed for the period under consideration:

A. South Island generation capability under 1:60 conditions

B. South Island demand

C. North Island generation capability under 1:60 conditions

D. North Island demand

[6] Based on winter 2001, 2002 and 2003, during the daytime the main constraint is to energy transfer south of Bunnythorpe, and at night the main constraint is the HVDC link southward transfer capability. The location of the constraint is affected by the Wellington regional load profile. At peak times the Wellington regional demand reduces the southwards energy transfer across the HVDC link to 250MW. If the South Island demand from the HVDC link is greater than 250MW then reserve generation south of Bunnythorpe is required to avoid load shedding.

(A-B) + (C-D) must be greater than zero, or reserve generation is required.

If (C-D) > (A-B) and (A-B) is in shortfall then the transmission system must be capable of transferring the energy (A-B) southward. If the transmission system does not have this capability, then reserve generation is needed south of the transmission constraint.

If southward energy transfer is available and required, then consideration of the transmission constraints will determine whether reserve generation is required and where it should be located.

In order for the Commission to accept that there is no need to contract for further reserve generation, they will need to satisfy themselves that they have sufficient comfort that the assumptions made in the modelling can be achieved in practice.

Bearing in mind that all generation south of Bunnythorpe is hydro, a key point for the Commission to consider is the level of comfort they have that the capacity of the transmission system southwards through Bunnythorpe to Haywards and across the HVDC link will be able to be maintained throughout a dry year winter period. And that this capacity is sufficient to maintain supply to the South Island during what is defined as a 1 in 60 dry year event.

Transpower has developed options to reconfigure the transmission system to enable increased transmission capacity. Implementation of these options has been contentious as they can reduce the security of supply to consumers. The assumption that higher line flows would be achievable before calls for conservation implies that some consumers would face a lower level of security to avoid other consumers being asked to take conservation measures. As this may involve lowering security to major industrial consumers more detailed knowledge of the issues should be gained.

Additional reserve energy capacity may enable security levels to be maintained and provide additional voltage support if it is located appropriately. A combination of the min zone and additional reserve capacity may be needed if the Electricity Commission defines that security and quality, as well as quantity of supply, is to maintained throughout a 1 in 60 dry year event.

6. What is the Commission actually going to do?

The previous section showed that the Assessment paper makes a number of significant assumptions that result in a min zone that is potentially too low. We have suggested that the Commission reconsider the validity of these assumptions and hence the minimum level of hydro storage that would be required to ensure that forced savings are not necessary.

In addition to this, it is not clear how the Commission will operationalise the min zone. Different parties may behave quite differently as a min zone is approached. Calls for the Commission to act may come long before the min zone is breached especially if there is poor definition over what the security of supply policy means and how the Commission will act as a 1 in 60 year appears more likely. The lack of clarity and lack of common understanding of what will and will not happen under different conditions may create unnecessary disruption in the market.

A number of parties throughout New Zealand have acted on announcements made by the Minister of Energy on September 14 2003: *"The Electricity Commission will contract for reserve energy to help ensure New Zealand's electricity needs can be met even in very dry years without power savings campaigns."* The Assessment paper essentially concludes that it is unnecessary to tender for dry year reserve in 2005, but is not so clear about 2006 and beyond. A consequence of not proceeding with procuring more dry year reserve for 2005 may be that there is more reluctance to invest subsequently in case the Commission changes its policy again. At the very least the Commission should enquire of the market place what plans have been developed in response to the announcements so they are aware of the consequences of not proceeding.

There is yet to be clarity on whether dry year generation must be ring fenced or whether contracts would take the form of a first ranking for its use thereby releasing the plant for alternative purposes. These might be opportunities in the market as reserve generation could be used as back-up for other plant failure within a generator's portfolio, or may be embedded generation which could be used to manage constraints within a network unless called upon by the Commission in a dry year.

The Commission should explore the benefits to the electricity market and the economy as a whole from generation embedded in local distribution networks that could be available to run in dry years or at other times of crisis. Embedded generation can also be used for 'peak lopping' to lower demand within the network at times when the network is congested. Typically, local networks will only be congested for a few hundred hours a year, making the plant available as a contribution to dry year reserve. Embedded generation is closer to its load, so reduces the quantum of electrical line losses on the transmission system, particularly when run at times when the transmission system is highly loaded, such as during any likely dry year scenario.

There have been calls for greater access to voluntary demand-side response, and the ability to get rewarded for it. Any programme to ensure supply security would benefit from making strong progress with encouraging retailers and the market as a whole to provide for more intra-day management and flexibility of contracts within a season. The Assessment

paper is almost silent on the benefits that can be gained by following this path.

The government outlined its policy objectives in the September 2003 Government Policy Statement (GPS):

> *1. The Government's overall objective is to ensure that electricity is delivered in an efficient, fair, reliable and environmentally sustainable manner to all classes of consumer. Consumers' electricity requirements should be met in a manner which is least-cost to the economy as a whole over the long term and is consistent with sustainable development.*
>
> *2. Consistent with this overall objective, the government is seeking the following specific outcomes:*
>
> > *a. energy and other resources are used efficiently;*
> >
> > *b. risks including price risks relating to security of supply are properly and efficiently managed. In particular the Government wants the Commission to use reasonable endeavours to ensure security of supply in a 1 in 60 dry year, without assuming any reduction in demand from emergency conservation campaigns, while minimising distortions to the normal operation of the market;*
> >
> > *c. barriers to competition are reduced for the long-term benefit of end-users;*
> >
> > *d. incentives for investment in generation, transmission, lines, energy efficiency and demand-side management are maintained and do not discriminate between public and private investment;*
> >
> > *e. the full costs of producing and transporting each additional unit of electricity are signalled so that investors and consumers can make decisions consistent with obtaining the most value from electricity;*
> >
> > *f. delivered electricity costs and prices are subject to sustained downward pressure;*
> >
> > *g. the electricity sector contributes to achieving the Government's climate change objectives by minimising hydro spill, efficiently managing transmission losses and constraints, promoting demand-side participation and energy efficiency and removing barriers to investment in new generation technologies, renewables and distributed generation.*

These objectives should form the decision-making framework for options relating to ensuring the security of supply. Each option will have advantages and disadvantages relative to the GPS. The type of questions that need to be asked are:

- Is the least cost method of generating electricity being employed? For example, if the min zone is mandatory, i.e. there are penalties for running lakes below this level, is it possible that higher cost generators will be dispatched ahead of hydro (depending on the implicit option value of the water)?
- Are the resources being used earning their opportunity cost? For example, this could be a decision factor with respect to ring-fencing plant, if it could be used to alleviate other concerns, such as peak lopping.
- Where do the costs of regulation lie (taxpayer, industry/consumer)? For example, if the min zone and reserve plant are contracted by tender, who runs the process, and how is it funded (industry levy or general taxes)?
- Are transmission and generation losses minimised? For example, if the potential shortage is in the South Island, what level of losses should be priced in for local reserve generation as compared to transmitting electricity from reserve plant at Whirinaki?
- Does the policy allow competition? For example, will reserve contracts be tendered openly, or will restrictions be placed on what type of offer will be accepted, does demand-side management 'count'?
- What are the environmental effects (if any) of the policy? For example, if the minzone is mandated does this increase the likelihood of hydro spill in the spring?

The paper makes a single bold assumption on the Commission's behalf with respect to the one reserve generation plant contracted so far: "*The Electricity Commission will need to decide at what point Whirinaki (and any other energy contracts) is committed. We believe it is reasonable to assume that an operational min zone would commit Whirinaki.*" If that is the case it should be confirmed by the Electricity Commission. In doing so the Commission should confirm whether it would be dispatched based on price and if dispatched otherwise, under what conditions. They should also confirm the conditions under which it would stop running. The expected impact of running Whririnaki should be signalled in advance and its impact should be reviewed after it has run. This should be made public.

7. Conclusion

We submit that the Commission should take a more holistic view to security of supply and spend the time to clarify what is meant by the policy, how dry year reserve would be contracted, how a min zone would work, whether a min zone would really be effective and whether there are significant gains to

be had by promoting demand-side response. The consequences of accepting the paper at face value are too great to accept the proposition that no more dry year reserve is required, and that the min zone approach discussed in the paper will achieve a level of security that the Commission is comfortable being answerable for.

We submit that the Commission should not be satisfied by the assurance given in the paper that the level of security for 2005 is acceptable without any further action. We share the conclusion of the Assessment paper that there is much that can be done for 2005 to improve the Commission's level of comfort. We have listed our recommendations, and urge the Commission to act now.