OFFICE OF THE MINISTER OF ENERGY

The Chair
CABINET POLICY COMMITTEE

ELECTRICITY MARKET: SECURITY OF SUPPLY

PROPOSAL

1 This paper reports back on security of supply in the electricity market and makes recommendations on amendments to policy settings.

EXECUTIVE SUMMARY

2 The Minister of Energy reviewed the electricity market in 2006 and concluded, inter alia, that improvements to security of supply were required. On 27 November 2006 the Cabinet Business Committee [CBC Min (06) 20/17] invited the Minister to report back on the following options to improve security of energy supply (dry year management and adequate new generation build):

a More pro-active and authoritative provision of information by the Electricity Commission on short and long term security of energy supply;

b Acquiring more reserve energy (such as standby generation or buffer zone hydro storage) to cover serious dry years and other extreme events; and

c Acquiring consented sites to allow new reserve generation to be built quickly (within 12 months) if required.

3 The Electricity Commission has recently made recommendations to me on security of supply issues following a comprehensive review of the reserve energy policy (as required by the Government Policy Statement on Electricity Governance [GPS] of October 2006).

4 The Commission agrees that it should continue to improve the quality of information it provides on security of supply, risk management and the actual level of risk. In this context it notes that its "Minzone" (minimum hydro levels) measure is commonly misunderstood, and that the actual level of risk of shortages when the initial Minzone is reached (which has not yet occurred) is only around 1.3 percent.

5 The Commission has also recommended that the '1 in 60 dry year' standard for security of energy supply in the GPS should be replaced by a 'winter energy margin'[1] of 17 percent for New Zealand and 30 percent for the South Island. The Commission advises that this will continue to provide a similar level of security as the 1 in 60 standard, but that it is clearer, and easier to calculate and understand.

[1] Margin between forecast capacity to supply in a mean hydro year and forecast demand.

It also allows for a clear trigger to be set for the purchase of additional reserve energy capacity.

6 The Commission notes that, for various reasons, system-wide capacity to supply peak demand (which is different from dry year energy security) is becoming a more significant issue for New Zealand. While the Commission currently monitors peak capacity, it has not yet developed a standard for "peak capacity adequacy" or systematic policy responses to increased levels of risk. I recommend that the GPS require it to do so by mid 2008.

7 The Commission has also concluded however that there is no evidence of any failure by the market to build new generation in a timely manner (to maintain security of supply requirements) and that there is no indication of a requirement to acquire more reserve energy capacity. Nonetheless, the Commission recommends, and I agree, that it should continue to closely monitor new generation build and security of supply projections and to make recommendations on policy responses, if required, to any identified systematic failure.

8 With regard to the possibility of acquiring consented sites for new reserve energy, the Commission considers that the most likely contingency is an unexpected emergency (rather than an ongoing failure to build new capacity) and that re-locatable, containerised diesel-fired generators are likely to be the best supply-side response to such emergencies. I recommend that the Commission be requested to develop this option further and to prepare contingency plans by mid 2008.

9 The GPS needs to be amended to include the decisions in this paper.

BACKGROUND

10 On 27 November 2006 the Cabinet Business Committee considered a suite of three papers from the Minister of Energy which reviewed the electricity market [CBC Min (06) 45/6, CBC Min (06) 20/17 and CBC Min (06) 20/18]. The papers concluded, inter alia, that the current market arrangements should be retained but that improvements, particularly relating to security of supply, should be pursued.

11 With regard to security of supply, CBC [CBC Min (06) 20/17]:

"invited the Minister of Energy to report back by 31 March 2007 on the following options to improve security of energy supply (dry year management and adequate new generation build):

a More pro-active and authoritative provision of information by the Electricity Commission on short and long term security of energy supply;

b Acquiring more reserve energy (such as standby generation or buffer zone hydro storage) to cover serious dry years and other extreme events;

c Acquiring consented sites to allow new reserve generation to be built quickly (within 12 months) if required."

12 The Government Policy Statement on Electricity Governance (GPS) dated October 2006 also required the Commission to review the efficiency and effectiveness of the reserve energy regime and make recommendations to me.

The GPS required the Commission to engage an independent party to undertake an initial review and consult with stakeholders.

13 This paper reports back on the matters identified by CBC, taking into account the Commission's recommendations to me following its review of the reserve energy policy. The Chair of the Cabinet Policy Committee agreed to a deferred report back of 7 December 2007 to allow time for the Electricity Commission to consult on and complete its wider review of the reserve energy policy and to take into account the finalised New Zealand Energy Strategy.

COMMENT

14 This section comments on the issues identified by CBC for further analysis and report back.

More pro-active and authoritative provision of information by the Electricity Commission on short and long term security of energy supply

15 The Commission currently undertakes regular monitoring and analysis of security of supply in consultation with stakeholders. It publishes an assessment of security and reserve energy needs in October each year.

16 The Commission's recent review of the reserve energy policy concludes, inter alia, that:

a The Commission should and will continue to improve the quality of the information it provides on security of supply and risk management

b The 'Minzone' (minimum hydro levels) remains the best approach for monitoring *short term* security of energy supply, but better explanatory information is required on actual levels of risk (which are far below common perceptions)

c For *longer term* security of supply monitoring, an 'energy margin' approach (rather than the Minzone) would provide more certainty and better quality information

d The indicator standard for security of (energy) supply should change from the '1 in 60 year' standard in the GPS to a 17 percent winter 'energy margin' for New Zealand as a whole and a 30 percent margin for the South Island

e Further work needs to be done on setting a security standard for 'peak capacity adequacy'.

17 These issues are explained more fully below.

Minzone: short term security of supply

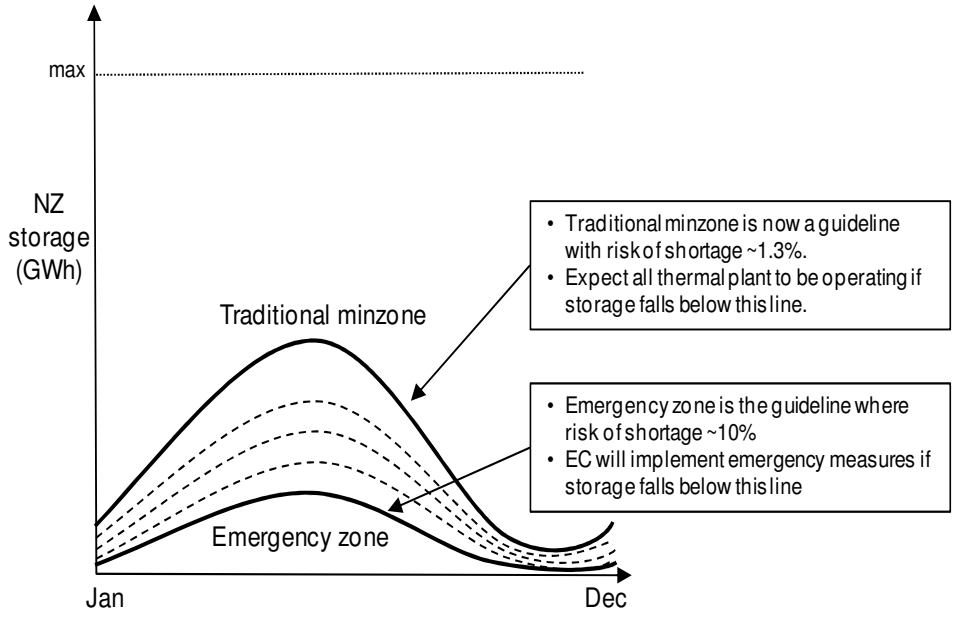
18 The Commission uses the concept of a 'Minzone' to monitor security of energy supply. This essentially indicates the level of hydro storage required at any point in time to avoid shortages if a repeat of the worst historical inflows occurs from that point on. (This is where the 1 in 60 standard was originally derived, because at the time it was first set, following the Ministerial Inquiry into the 1992 hydro

shortage, there were 60 years of historic inflow records. There are now 75 years of records, so the standard, on a similar basis, is now effectively 1 in 75).

19 The Commission's review concluded that there are risks with the Minzone concept, because it is popularly perceived as a "cliff edge", that is, that if the Minzone is reached, or even approached, there is a high likelihood of shortages. In fact, the risk of a shortage when the Minzone is reached is only 1.3 percent.

20 Accordingly, the Commission proposes to develop a series of "Minzones" for different levels of risk of shortages (eg 1.3%, 2%, 5%, and 10%) along with information on the actions and responses that will be taken at different levels of risk.

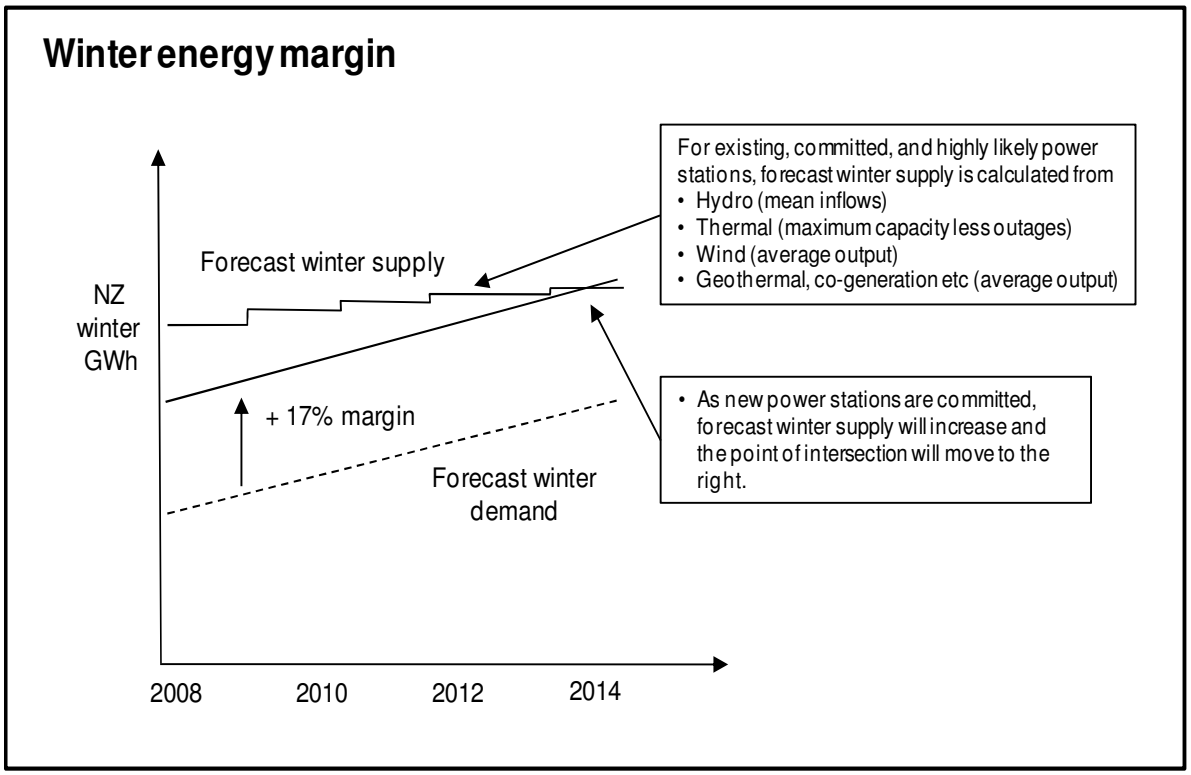
Hydro risk curves



Winter energy margin of 17 percent (30 percent for South island) instead of the 1 in 60 standard

21 For longer term (multi-year) monitoring of security of supply, the Commission recommends replacing the 1 in 60 year standard in the GPS with winter energy margin of 17 percent (and 30 percent for the South Island[2]). The energy margin is the margin between forecast capacity to supply in a mean hydro year and forecast demand.

[2] The South Island margin is higher because the main hydro storage lakes are located in the South Island, the South Island lacks thermal backup, and the amount of power that can be transmitted from the North Island is limited by the capacity of the HVDC link.



22 The Commission concluded that the 1 in 60 year standard is not well defined and understood. In contrast, the energy margin provides greater clarity and will enable the Commission to develop clearer trigger points for when it would consider tendering for additional reserve capacity.

23 The appropriate energy margin can also be derived using an economic approach, based on the optimal trade-off between the cost of additional measures to ensure a higher level of security of supply and the costs of demand restraint (including non-supply).

24 The Commission has undertaken and consulted on this economic analysis. While the analysis justifies a slightly lower security standard than implied by the '1 in 60' standard, the Commission has been conservative in its calculations to allow for the hard-to-determine value of public and business confidence in on-going security of supply.

25 In practice, the proposed winter energy margin of 17 percent (and 30 percent for the South Island) gives a similar level of security to the current '1 in 60' standard.

Peak capacity adequacy

26 The Commission has concluded that, in addition to a security standard for energy (in effect a dry year standard), a standard needs to be developed for peak capacity adequacy. In effect, the 'energy margin' standard is the ability to supply *over time* (in the light of possibility of hydro shortages) while 'peak capacity' is the ability to supply to meet peak demand *at a point in time.*

27 Historically, New Zealand has not had a peak capacity issue (unlike other countries), because the need for thermal capacity to back up the hydro system

when inflows and lake levels are low meant that there was always a large margin between total generating capacity[3] and peak demand. This situation is changing with growing demand and declining hydro share.

28 On 19 July 2006, total demand very nearly exceeded available system capacity (taking into account standards for maintaining security) as a result of unavailability of some generating stations at short notice. While all demand was met on that occasion, the risk of widespread interruptions to supply in the event of further plant outages was higher than is normally considered acceptable.

29 The recent standing down of Pole 1 of the HVDC link[4], and Contact's announcement that New Plymouth will be unavailable for 6 months to remove asbestos, have also reduced total peak capacity. (Risk levels are considered to be acceptable but require monitoring).

30 On a longer term basis the expected increase in renewable generation also increases the importance of monitoring peak capacity since renewables (notably wind) do not provide a high certainty of supply at a point in time.

31 The Commission currently monitors and analyses peak capacity, but it has not developed a *security standard* for peak capacity adequacy. It proposes to do so by August 2008 along with proposed actions to respond to differing levels of increased risk of breaching those standards.

32 This work will also be a key component of its wider review of the market design. The review includes consideration of how best to maintain the incentives of generators to invest in short-term, flexible, back-up capacity.

Acquiring more reserve energy to cover serious dry years and other extreme events

33 The Commission's review indicates that:

a The reserve energy policy (specifically the availability of the Whirinaki station as a stand-by generator) is operating satisfactorily and does not appear to be having discernible negative effects on the market and the incentives of generators to construct new capacity

b There is no evidence to suggest that the market has or will fail to deliver the desired level of security of supply (ie, new generating capacity is being built and planned in a timely manner and security of supply standards are being maintained)

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[3] Including hydro stations running for short periods. In other countries, which rely primarily on thermals, the margin between total capacity and peak demand tends to be smaller, and abnormal levels of demand (for example, caused by air conditioning load during heat waves) can cause supply shortfalls. Thus their main concern is peak generating capacity, rather than the energy margin (which is about the ongoing availability of fuels including water).

[4] Pole 1 is one of two "poles" (each comprising two cables, with one spare cable) comprising the HVDC link. This has reduced the capacity of the HVDC link from 1040 MW to 700 MW, which in turn reduces the peak capacity of the New Zealand-wide generating system.

c Thus there are no indications of any need to increase the level of reserve energy capacity

d The Commission will continue to closely monitor security of supply projections

e The GPS should be amended to introduce a requirement for the Commission to continue to monitor whether investment in new power stations is meeting demand growth and to consider alternative security of supply mechanisms if that is found not to be the case

f The most likely policy response would be to introduce a comprehensive solution, such as an Energy Adequacy Hedge mechanism[5].

34 I accept the Commission's assurances that there is no indication of a requirement to acquire additional reserve energy capacity and agree that the GPS should be modified to require the Commission to continue to monitor the adequacy of new generation build.

Acquiring consented sites to allow new reserve generation to be built quickly (within 12 months) if required

35 On the basis of its conclusion that there is no indication of market failure to build new capacity and no indication of a requirement to acquire more reserve energy capacity, the Commission considers that there would be little benefit in acquiring pre-consented sites for reserve energy capacity.

36 The Commission considers that the most likely eventuality requiring emergency capacity would be in response to an unexpected "supply contingency" (as opposed to an on-going failure to build new capacity in time). It considers that the most appropriate supply-side response to such an emergency would likely be to acquire re-locatable containerised diesel-fired generators.

37 The Commission proposes to undertake further work on options and to develop contingency plans for an emergency response of this nature[6]. It has undertaken to report to me on this issue by June 2008.

Other GPS issues

Levy funding of reserve energy

38 The GPS requirement for the Commission to review the reserve energy policy included a requirement to consider whether alternative levy arrangements (to fund the reserve energy policy) would produce a fairer and more efficient outcome. In

[5] Such a mechanism would be designed to incentivise generators to build new capacity by requiring them to compensate buyers against high prices in the event of a supply constraint. While such a mechanism received quite widespread support in submissions to the Commission, there was no agreement on design details. There was also recognition that the mechanism would be complex and contentious to introduce.

[6] Generator submissions to the Commission disagreed with the proposal that the Commission investigate short-term supply-side options.

particular, the GPS required consideration of allowing for some element of self-provision (of security of supply).

39 The current security of supply levy raises around $25m a year, essentially to cover the standing costs of Whirinaki.

40 The Commission concluded there were no obvious or agreed alternatives to the current levy, that alternatives are too complex and that the current levy arrangements should be maintained.

Amendments to the GPS

41 The GPS should be updated to reflect the outcomes of this paper, including

- Replacing the '1 in 60' standard with an energy margin standard
- Requiring the Commission to develop a standard for peak capacity adequacy, and responses to breaches and risk
- Requiring the Commission to undertake further work on developing contingency plans for acquiring containerised diesel-fired plant if required for dealing with supply emergencies.

42 The opportunity should also be taken to remove operational detail regarding the reserve energy policy now that it is well-established and operating effectively.

43 Specific wording will be included in a draft revised GPS (which takes account of the NZES) to be submitted in the near future.

CONSULTATION

44 This paper has been prepared by MED in consultation with the Electricity Commission, Treasury, MfE and EECA. DPMC has been advised of the paper.

FISCAL IMPLICATIONS

45 There are no fiscal implications from this paper.

HUMAN RIGHTS

46 There are no human rights implications from this paper.

LEGISLATIVE IMPLICATIONS

47 There are no legislative implications from this paper.

REGULATORY IMPACT ANALYSIS

48 Not required.

PUBLICITY

49 The Minister of Energy will make appropriate announcements when releasing the draft revised GPS for comment.

RECOMMENDATIONS

50 It is recommended that the Committee:

1 **Note** that the Minister of Energy's review of the electricity market in 2006 concluded that improvements concerning security of supply were required;

2 **Note** that on 27 November 2006 the Cabinet Business Committee [CBC Min (06) 20/17] invited the Minister of Energy to report back on the following options to improve security of energy supply (dry year management and adequate new generation build):

2.1 More pro-active and authoritative provision of information by the Electricity Commission on short and long term security of energy supply;

2.2 Acquiring more reserve energy (such as standby generation or buffer zone hydro storage) to cover serious dry years and other extreme events;

2.3 Acquiring consented sites to allow new reserve generation to be built quickly (within 12 months) if required;

Provision of information

3 **Agree** that the Electricity Commission should be requested to continue to improve the quality of information it provides on security of supply, risk management and the actual level of risk;

4 **Agree** that the '1 in 60 dry year' standard for security of energy supply be replaced by a 'winter energy margin' (between forecast capacity to supply in a mean hydro year and forecast demand) of 17 percent for New Zealand and 30 percent for the South Island;

5 **Agree** that the Commission should be requested to develop a standard for 'peak capacity adequacy' along with responses to increasing levels of risk by August 2008;

Acquiring more reserve capacity

6 **Note** that the Electricity Commission, following a review, has concluded that there is no evidence of any failure by the market to build new generation in a timely manner (to maintain security of supply requirements) and that there is no indication of a requirement to acquire more reserve energy;

7 **Agree** that Commission should not be requested to acquire more reserve energy capacity at this time;

8 **Agree** that the Commission should be required to continue to closely monitor new generation build and security of supply projections and to make recommendations on policy responses, if required, to any identified systematic failure;

Acquiring consented sites for new reserve energy

9 **Note** that the Commission considers that the most likely contingency is an unexpected emergency (rather than an ongoing failure to build new capacity) and that re-locatable, containerised diesel-fired generators are likely to be the best supply-side response to such emergencies;

10 **Agree** that the Commission should be requested to develop this option further and to prepare contingency plans by mid 2008;

Government Policy Statement

11 **Agree** that the Government Policy Statement on Electricity Governance (GPS) be amended to include the decisions in this paper;

12 **Note** that proposed text for an amendment to the GPS will be provided in a future paper;

Publicity

13 **Invite** the Minister of Energy to make announcements on the decisions in this paper when releasing the draft GPS for comment.

Hon David Parker
Minister of Energy

Date signed: _____