Review of Reserve Energy Policy

Consultation Paper

September 2007

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1 EXECUTIVE SUMMARY

1.1.1 The Government Policy Statement dated October 2006 (GPS) includes a requirement that the Commission engages an independent party to review the efficiency and effectiveness of the reserve energy regime.

1.1.2 Castalia Strategic Consultants (Castalia) was engaged to undertake this review in November 2006 and provided its final report to the Electricity Commission (Commission) in May 2007 following a period of consultation and submissions from stakeholders.

1.1.3 The Castalia Review makes a number of recommendations and the key ones are summarised in the following table:

Subject	Key Recommendation
Security of Supply Standard	The security of supply standard should be changed from ensuring no demand restraints are required in a 1-in-60 dry year to ensuring that the energy margin does not decline below an optimum level determined by the economic cost.
Desired Energy Margin	Further detailed work should be undertaken to estimate the desired energy margin.
Market Failure	At this point in time there is not sufficient evidence to suggest that the market will fail to deliver the desired level of security of supply. If, over time, evidence emerges that the market is failing to provide adequate security of supply, the Commission should investigate and recommend an alternative approach to the current reserve energy regime.
Monitoring Security of Supply Adequacy	The Commission should retain its 'watch dog' role of monitoring security and, if needed, procuring and dispatching reserve energy to ensure that the security of supply standard is met.
Levy Arrangements	The current levy arrangements should be retained (despite some shortcomings).
Information on Security of Supply	The Commission should improve the understanding of the current policy by providing more information to market participants and by providing simpler and clearer information to the general public on security of supply risks.
Reserve Energy Procurement Process	The policy should be revised to set out a clear trigger for the procurement of reserve energy and set out the detailed procurement process that will be followed.

1.1.4 The main focus of the Castalia Review was on defining an optimal security standard and determining an economic energy margin. Castalia recommended that the Commission undertake detailed market simulation work to establish the optimum security standard by evaluating the economic trade-off between the cost of demand restraints and the cost of reserve energy.

1.1.5 Castalia recommended that, if forward projections of a simple annual energy margin (over a 3-5 year time-frame) fell below the optimum level the Commission should trigger the purchase of reserve energy.

1.1.6 The Commission has undertaken the detailed market simulation work recommended by Castalia and determined that the optimum security standard

could be expressed as an energy margin of 17% of New Zealand winter[1] demand for New Zealand (with an additional standard for the South Island of 28%).

1.1.7 The Commission's analysis suggests that the optimum security standard based on a simple energy margin may not be materially different from the existing standard based on a 1-in-60 dry year.

1.1.8 Castalia also recommended that the Commission should continue to monitor security of supply in the short-term (through the next 18 months) using the traditional Minzone approach that is an integral part of the current arrangements.

1.1.9 The Commission agrees that the traditional Minzone approach could be retained and augmented as part of a new approach to the security standard.

1.1.10 The Commission does not agree that the current arrangements for dispatch of the Whirinaki reserve plant (being the higher of 20c/kWh or SRMC) should be amended to provide for dispatch at the short run marginal cost (SRMC) and, in particular, the Commission suggests that the option to dispatch Whirinaki at a certain storage guideline should be retained.

1.1.11 In terms of the other Castalia recommendations the Commission:

- Agrees that the GPS should be amended to introduce a requirement for the Commission to monitor whether investment in new power stations is consistently late relative to demand growth and to consider alternative security of supply mechanisms if that is found to be the case;
- Agrees that the existing reserve energy levy arrangements should be retained;
- Agrees that the Commission should undertake further work intended to improve the participant and public understanding of security of supply policy;
- Does not agree that a detailed process setting out exactly how the Commission would go about procuring reserve energy is justified, given the potential complexity and cost of developing the process, and the unlikely prospect that it will be used;
- Proposes to further investigate short-term supply-based options for reserve energy to cover possible unexpected security of supply contingencies; and

[1] **1 April to 30 September**

- Agrees that the GPS should be amended to focus on an economic security standard expressed in energy margin terms, remove operational detail, and define the Commission's powers to intervene in the market.

1.1.12 The Electricity Commission invites submissions on this paper. The Commission should receive written submissions no later than **5.00pm on 15 October 2007**; the preferred format is described in Section 2.5. Please note that submissions received after this deadline may not be considered.

2 INTRODUCTION

2.1 Overview

2.1.1 The Electricity Amendment Act 2004 (the Act) and the Government Policy Statement dated October 2006 (GPS) establish a responsibility for the Electricity Commission to manage the security of supply of electricity.

2.1.2 To achieve the security of supply objectives set out in the Act and to meet the requirements of the reserve energy regime set out in the Government Policy Statement on Electricity Governance (GPS), the Electricity Commission (Commission) has developed and implemented a security of supply policy.

2.1.3 The GPS includes a requirement that the Commission engages an independent party to review the efficiency and effectiveness of the reserve energy regime and the security of supply policy (collectively referred to as the reserve energy arrangements) in meeting security of supply objectives. The current GPS contemplates that the Commission would obtain the independent advice by 31 March 2007 and make its own recommendations to the Minister by June 2007.

2.1.4 This is a later timetable than that included in the original GPS and arose from a desire to dovetail the review with the ongoing work being carried out by Ministry of Economic Development (MED) on the New Zealand Energy Strategy (NZES).

2.1.5 The NZES timetable was subsequently extended and the engagement of the independent consultant, Castalia, was delayed to November 2006 to ensure the brief of work aligned with the work on NZES. Consequently the Commission did not receive the independent advice until May 2007. The timetable for receipt of Castalia's advice and the Commission's need for several months to consider and make its own recommendation have been discussed with the Minister.

2.1.6 The purpose of this paper is to outline the key conclusions and recommendations from the Castalia Review, to highlight the views of those stakeholders who made submissions on the Castalia Review, and to provide stakeholders with a report on the Commission’s progress towards a final set of recommendations.

2.1.7 The Commission was not in a position to provide a recommendation to the Minister because the Castalia Review raised a number of issues for the Commission to consider and recommended that the Commission undertake further work in some areas before finalising proposals. This work needed to be completed before the Commission could be comfortable making

recommendations on future security of supply policy and possible changes to the GPS.

2.2 Legislative Framework

2.2.1 The Act and GPS establish a responsibility for the Electricity Commission to manage the security of supply of electricity.

2.2.2 The legal framework for security of supply and the reserve energy policy in New Zealand is provided by a combination of the Act, the GPS and the security of supply policy issued by the Commission.

2.2.3 The functions in the Act that relate to the Reserve Energy Policy include the following:

Act reference	Content
172O(1)(d)	To use reasonable endeavours to ensure security of supply (including contracting for reserve energy), without assuming any reduction in demand from emergency conservation campaigns, while minimising distortions to the normal operation of the market.
172O(1)(j)	To give effect to the GPS objectives and outcomes (*including those relating to security of supply*).
172O(1)(a)	To formulate and make recommendations concerning electricity governance regulations and rules (*to give effect to the principal objectives and specific outcomes as they relate to security of supply*).

2.2.4 The functions set out in the Act prescribe the Commission's legal obligations and provide a broad framework within which the review should be considered. The role of the GPS is to guide the Commission in terms of government expectations about how the Commission is expected to go about meeting its functions under the Act

2.2.5 The GPS sets out a number of requirements that have implications for security of supply policy, the way it should be approached, the means by which it should be monitored, and how reserve energy should be utilised. The following table groups together the key elements that need to be taken into account.

Policy Area	GPS Para	GPS Requirements
Key Objective	37	A function of the Electricity Commission under the Electricity Act 1992 is to use reasonable endeavours to ensure security of supply, without assuming any demand reduction from emergency conservation campaigns, while minimising distortions to the normal operation of the electricity market. In particular, the Government wants the Commission to use reasonable endeavours to ensure security of supply in a 1 in 60 dry year. The Commission should also work with stakeholders to identify industry contingencies and develop strategies consistent with the operation of the electricity market to achieve its security of supply objectives.
Security of Supply Policy	41	The Electricity Commission should develop, consult on and publish a security of supply policy. The security of supply policy should specify the steps that the Commission will take at various stages during a contingent event such as an extended dry sequence. It should also include its procurement policies for reserve energy. The overriding objective is to give as much certainty as possible to the market.
	42	The Commission should develop and publish an operational security of supply standard, possibly expressed as a loss of load expectation.
Minimum Hydro Zone	43	To help ensure security of supply, the Electricity Commission should develop and publish a minimum hydro zone giving its estimate of minimum hydro storage levels required at different times of the year to avoid the risk of shortages in a 1 in 60 dry year. This minimum zone should take into account the expected availability and use of thermal generation. The minimum hydro zone should not be catchment-specific but should be national or based on regions defined by likely transmission constraints during a dry hydro period.
Emergency Zone	45	Within this minimum zone, the Electricity Commission should have a second zone that would trigger a conservation campaign, on the basis that there is a significant probability that we are in a worse than 1 in 60 dry year event.
	72	Although the Government wants the Commission to manage the electricity sector to minimise the risk of supply shortages, it recognises that there will be infrequent circumstances where there is a material risk of shortages (for example in a worse than 1 in 60 dry year). In this event, the Government expects the Commission to activate a conservation campaign in a timely manner, since conservation is significantly less damaging to the economy and less disruptive to consumers and public welfare than actual blackouts.
	73	The Commission is expected to ensure contingency arrangements are put in place for the use of ripple control of hot water heating for use as appropriate if conservation campaigns are required, and as a measure to temporarily reduce demand in events such as major and unexpected plant or transmission line outages. The Commission should recommend regulations and rules if required. (The use of ripple control for these purposes should not preclude its use for other purposes outside of security of supply situations).

Policy Area	GPS Para	GPS Requirements
	74	The Commission is also expected to put in place contingency arrangements to provide for the scheduling of rolling outages in the extreme event that blackouts are required to ensure a balance between supply and demand. The Commission should recommend regulations and rules if required.
Need for Reserves	40	To establish the need for additional reserve energy (see below), the Electricity Commission should look out 3 to 5 years in more detail (given consent and construction timelines for new capacity), collect information, develop a baseline that makes assumptions about what known projects are likely to proceed, and identify any "shortfalls" year by year. The need for additional reserve energy should be based on dry year risk taking into account prudent assumptions about availability of other plant.
Contracting for Reserves	47	The Government wants the Electricity Commission to contract for reserve energy (generation and contracted demand response) to provide additional security of supply beyond the level achieved by the ordinary market. This will be a primary mechanism for the Commission in endeavouring to ensure security of supply in a 1 in 60 dry year. Any reserve energy procured to ensure security of supply in a 1 in 60 dry year should also be available to help cope with other unexpected supply contingencies, such as serious grid, plant or fuel supply disruptions.
	55	The Commission should develop and publish its processes for procuring reserve energy including its processes for assessing competing offers of reserve energy.
Using Reserves	60	Reserve energy should be offered for dispatch to the system operator at 20c/kWh or the variable payments which have been contracted for, whichever is the higher.
	61	However, if the minimum hydro zone is breached reserve energy may be offered for dispatch at a lower price to preserve hydro storage. If the minimum zone is breached and all available thermal generation is not being used to minimise hydro usage, the Commission should investigate the reasons and consider what action, if any, would be desirable.
Monitoring	68	A key requirement for the secure operation of the New Zealand system is that hydro lakes are managed optimally to use as much water as possible while avoiding the risk of running out of storage, and that thermal plants have adequate fuel and operate in a timely manner to complement hydro generation and preserve lake levels when required. Risks of inadequate security of supply co-ordination will need to be monitored by the Electricity Commission.
Information	38	The Commission should undertake and publish detailed supply and demand modelling and forecasting at least annually. The objective is to provide well-researched information on short and long term security of supply, including likely availabilities of fuels, new generation options, and likely price trends under various scenarios.

Policy Area	GPS Para	GPS Requirements
	39	The Commission should ensure that public information is provided on: • thermal fuel availability • hydro lake levels • hydro spill • generation capacity.
	69	Introduction of the reserve energy scheme may also impact on security of supply co-ordination. A risk is that (for example) hydro generators may observe the reserve energy and decide to run their lakes lower than they otherwise would have, or thermal generators might decide to procure less fuel.
	70	The Commission should seek to minimise these risks by compiling and publishing high quality information, including on hydro lake levels, thermal fuel availability, scheduled plant and transmission outages and minimum hydro zones.
Protocols	46	In developing and operating its security of supply policies, the Commission should put in place protocols to manage potential conflicts between its roles as a participant in the market as a contractor for reserve energy and as a regulator.

2.2.6 The GPS provisions cover a wide range of issues relating to security of supply and provide a high degree of prescription about how the Commission must go about implementing the reserve energy policy.

2.2.7 GPS 41 includes a requirement for the Commission to publish a security of supply policy covering a range of operational detail. Accordingly, the Commission published a policy document in June 2005. This is discussed further in section 3.

2.3 Review requirement

2.3.1 Paragraphs 65 to 67 of the GPS outline a requirement for the Commission to engage an independent party to review the reserve energy policy and make recommendations to the Commission. The paragraphs from the GPS are reproduced here for convenience.

GPS reference	Content
GPS 65	The Electricity Commission should contract an independent third party to review the efficiency and effectiveness of the reserve energy policy in meeting security of supply objectives while minimising distortions to investment incentives in the ordinary market. Efficiency should include both static and dynamic efficiency. The review should take into account developments in other areas of security of supply policy such as security of supply co-ordination policy (see below).

GPS reference	Content
GPS 66	The review should consider whether it is appropriate to relax the tight ring-fencing policy after considering any reduction in dynamic efficiency that this might create. The review should also recommend whether alternative levy arrangements would produce a fairer and more efficient outcome. In particular, it should investigate whether to allow for some element of self-provision of security of supply with an associated exemption from the levy, and if so whether the extent of any self-provision should be audited by a body independent of the Commission.
GPS 67	The review should provide an opportunity for public consultation, and should make recommendations to the Commission by 31 March 2007. The Commission should consider the report and make recommendations to the Minister of Energy by 31 June 2007.

2.3.2 Accordingly, the Commission appointed Castalia Strategic Consultants in November 2006 to undertake the review.

2.4 Process for Review

2.4.1 The review has been conducted by Castalia in accordance with the Terms of Reference provided by the Commission. The process followed by Castalia is outlined in the following table:

Timeframe	Item/Milestone
December 2006	Castalia released an Issues Paper intended to set out the key high-level issues relating to the reserve energy arrangements and to invite initial stakeholder feedback on those issues.
January/February 2007	The issues paper was used to facilitate information gathering through interviews with stakeholders (22 in total) and written submissions.
March 2007	Castalia issued a Consultation paper which summarised how the current reserve energy arrangements operate, defined an optimal security of supply standard, considered how best to implement a security standard, and considered possible improvements to the arrangements.
April 2007	Written submissions were received from 11 stakeholders and a public hearing was held to discuss the analysis and draft recommendations, as well as issues raised in submissions.
May 2007	Castalia supplied its Final Report and recommendations, and a summary to the Commission

2.4.2 The process was well managed and allowed several opportunities for stakeholders to provide input. However, several submitters noted that, at the same time as they were preparing submissions on the Reserve Energy Review, they were also preparing submissions on NZES. They felt that they were not able to provide the level of input on the Review that they would have preferred and accordingly have requested that the Commission consult further with stakeholders before finalising a recommendation to the Minister.

2.5 Submission process

2.5.1 The Commission invites submissions on this paper, including responses to the specific questions at the end of each chapter, which are also summarised in Appendix 2.

2.5.2 To assist the Commission in its consideration, please supply evidence of facts and analysis to support your views wherever possible.

2.5.3 The Commission should receive written submissions on this paper no later than **5.00pm on 15 October 2007**. Please note that submissions received after this deadline may not be considered.

2.5.4 The Commission's preference is to receive submissions in electronic form (Microsoft Word). It is not necessary for parties submitting to send the Commission hard copies of their submissions, unless it is not possible to do so electronically. Submissions in electronic form should be emailed with "Reserve Energy Review Consultation Paper" in the subject header. Submissions should be sent to:

Email: info@electricitycommission.govt.nz
Jenny Walton
Electricity Commission
Level 7, ASB Bank Tower
2 Hunter Street
PO Box 10041
WELLINGTON
Tel: 0-4-460 8860
Fax: 0-4-460 8879

2.5.5 The Commission will acknowledge receipt of all submissions by email. Please contact Jenny Walton at the Commission if you do not receive electronic acknowledgement of your submission within two business days.

2.5.6 Submissions should be provided in the format shown in Appendix 2.

2.5.7 To foster an informed and transparent process, the Commission intends to publish all submissions received on its website (http://www.electricitycommission.govt.nz).

2.5.8 Please indicate any documents attached in support of your submission in a covering letter and clearly indicate any information that is provided to the Commission on a confidential basis. If your submission contains confidential material, please provide to the Commission both confidential and public

versions of your submission, in both electronic and hard copy forms. The responsibility for ensuring that confidential information is not included in a public version of a submission rests entirely with the party making the submission.

2.5.9 Submitters should note that the contents of submissions on this paper provided to the Commission will be among the information the Commission holds which is subject to public release under the Official Information Act 1982 (Official Information Act). If the Commission receives a request for the release of information contained in a submission, it will be required to consider the release of the submission, in whole or in part, in terms of the criteria set out in the Official Information Act. This would be done in consultation with the submitter. The Commission can withhold official information in certain circumstances, which are set out in the Official Information Act. Any decision by the Commission to withhold information is subject to review by the Ombudsman.

2.5.10 In order to test all information contained in submissions as fully as possible in a transparent manner, the Commission discourages requests for non-disclosure of submissions, in whole or in part.

3 CURRENT ARRANGEMENTS

3.1.1 The Act and GPS establish a responsibility for the Commission to manage the security of supply of electricity. As part of these responsibilities the Commission is required to develop, consult on and publish a security of supply policy and an operational security of supply standard. The current arrangements were developed and consulted on during 2004 and the initial policy was adopted in June 2005.

3.1.2 The initial security of supply policy is attached as Appendix 1 to this paper and summarised briefly in the following table:

Section	Description
Security of Supply Objective	Expected supply under a 60 year return period drought will be sufficient to meet expected demand without the need for emergency intervention.
Approach	Approach is to focus on providing information on security of supply risks, monitoring security in the long-term, medium-term and short-term, and triggering the purchase and use of Reserve Energy as necessary.
Minzone	Minzone is calculated according to the hydro storage required to sustain 1:60 year low inflow sequence with all non-hydro supply committed.
Need for Reserve Energy	Purchase of Reserve Energy is triggered if the top of the Minzone in any of the next two years exceeds a particular storage level (currently assessed as about 70%). The trigger storage level is determined by the trade-off between the cost of Reserve Energy and the cost of spill.
Dispatching Reserve Energy	Whirinaki is offered for supply at the higher of $200 per MWh or the variable cost. If storage falls below the Minzone and Whirinaki is not dispatched, the Commission will investigate the reasons why. A dispatch policy will be developed for each new Reserve Energy option depending upon the characteristics of the option – essentially involving a security guidelines derived to reflect the variable cost.
Emergency Zone	Emergency measures will be triggered when storage falls below a level assessed as 10% risk of shortage.
Monitoring	Energy Security Assessments will be published in three timeframes – up to 6 months, up to 2 years, and up to 10 years.

3.1.3 Since the policy was adopted in June 2005 the Commission has been following it closely by monitoring security of supply in the short-term using the Minzone, undertaking regular assessments of the need for additional reserve energy, and dispatching the Whirinaki reserve power station according to the policy.

3.1.4 The Commission is confident that the existing implementation of the reserve energy policy is in accordance with the provisions of the Act and the GPS, and that the Commission is meeting its reasonable endeavours commitment to ensure security of supply.

4 CASTALIA RECOMMENDATIONS

4.1 Key recommendations

4.1.1 The final report from Castalia is a comprehensive document covering a wide range of issues about the current arrangements for security of supply, alternatives for measuring security of supply, and the theory behind calculating an optimal level of security from an economic perspective. The report also investigates the forms of market failure that could lead to a need to intervene in the market to ensure security of supply and develops some alternatives to the current arrangements that could be more appropriate to different forms of market failure.

4.1.2 This paper focuses on the key recommendations as outlined in the executive summary of the Castalia Final Report. These key recommendations are summarised in the following table:

Subject	Key Recommendation
Security of Supply Standard	The security of supply standard should be changed from ensuring no demand restraints (either voluntary or forced rationing) are required in a 1-in-60 dry year, to ensuring that the energy margin does not decline below a minimum desired amount. The standard itself should be determined by assessing the economic trade-off between the cost of demand response and the cost of reserve energy.
Desired Energy Margin	Further detailed work should be undertaken to estimate the desired energy margin. Castalia estimates the desired margin to be approximately 15 percent (this equates to ensuring no demand restraints are needed in a 1-in-20 dry year rather than the 1-in-60 dry year used in the current standard).
Market Failure	At this point in time there is not sufficient evidence to suggest that the market will fail to deliver the desired level of security of supply. Accordingly, the arrangements should not at this stage introduce mechanisms that involve energy adequacy hedges. If, over time, evidence emerges that the market is failing to provide adequate security of supply, the Commission should recommend to the Minister that a comprehensive solution be introduced based on energy adequacy hedge mechanisms.
Monitoring Security of Supply Adequacy	Given that there is no conclusive evidence to rule out the possibility of the market not providing sufficient security of supply, the Commission should retain its 'watch dog' role of monitoring the situation and, if needed, procuring and dispatching reserve energy to ensure that the security of supply standard is met.
Levy Arrangements	The current levy arrangements should be retained (despite their shortcomings).
Information on Security of Supply	The Commission should improve the understanding of the current policy by providing more information to market participants on the Minzone analysis and by providing simpler and clearer information to the general public on security of supply risks.
Reserve Energy Procurement Process	The policy should be revised to set out a clear trigger for the procurement of reserve energy and set out the detailed procurement process that will be followed.

Subject	Key Recommendation
Reserve Energy Dispatch	The Whirinaki dispatch strategy should be amended to provide that the plant will run whenever price exceeds the short-run marginal cost (SRMC). Any additional reserve energy should also be dispatched at SRMC.
Amendments to the GPS	The GPS should be amended to remove operational detail and focus on defining the energy margin that should be achieved and the Commission's powers to intervene in the market. All other operational detail should be left for the Commission to define as part of the security of supply policy.

4.2 Submissions on the Castalia Review

4.2.1 Submissions were received from 11 stakeholders as outlined in the following table.

Generator/retailer	Consumer/other	Lines business
Contact Energy	Grey Power	Orion
Genesis Energy	MEUG/NZIER	Transpower
Meridian Energy	Molly Melhuish	Vector
Mighty River Power		
Trustpower		

4.2.2 The summary of submissions provide by Castalia comments on areas of agreement and dissent among stakeholders on the key issues and notes a number of other comments which Castalia considered were worth considering further.

4.2.3 The submissions on the key issues are organised in the following table to match the key recommendation as identified in the Castalia Review:

Subject	Submissions
Security of Supply Standard	Submitters were generally in agreement that an economic approach to determining a standard was appropriate, and was preferable to the existing 1-in-60 type approach. However, a number of submitters highlighted the practical difficulties of determining and implementing an economic standard. Several suggested that, while difficult to calculate, the value of business confidence and public acceptability should be included in the determination of the economic level. Transpower suggested that stakeholders needed to be comfortable with the economic standard and its implications. Most submitters agreed that other measures of security, including peak capacity adequacy, summer energy adequacy and transmission adequacy would become increasingly important.
Desired Energy Margin	Most submitters agreed that an energy margin approach was appropriate as it is conceptually easier to understand than the current approach. Vector and Meridian Energy disagreed with the energy margin approach and instead favoured a probabilistic approach to setting the standard.

Subject	Submissions
Market Failure	Most submitters agreed that there is insufficient evidence of market failure to recommend further intervention and several suggested that there is evidence that the market is working well. Most submitters agreed that the "wait and see" approach was appropriate and did not support further intervention in the form of energy adequacy hedges at this point. Molly Melhuish suggested that there was a market failure because of an incentive on generator / retailers to keep the market tight rather than achieve a conservative margin. She proposed that consumers be protected by sanctions on retailers to acquire dry-year hedges.
Monitoring Security of Supply Adequacy	Most submitters agreed with the Commission's monitoring role. Genesis Energy considers it inappropriate for the Commission to have both a "watch dog" role and the ability to intervene by procuring reserve energy, unless the circumstances are very tightly defined. Transpower noted that leaving the decision to procure reserve energy to the last possible time could distort the generation mix and lead to transmission consenting problems.
Levy Arrangements	Views on the levy arrangements were mixed. Some submitters considered the flat levy to be unfair on some consumers, while others supported the current arrangements.
Information on Security of Supply	Several submitters agreed that more information should be made available on the Minzone analysis, but there was a need to maintain confidentiality.
Reserve Energy Procurement Process	All submitters agreed that that a pre-defined trigger for procuring reserve energy, and a defined procurement process, were desirable.
Reserve Energy Dispatch	Views on arrangements for dispatching reserve energy were mixed with some supporting the use of SRMC and others suggesting that the trigger should be the higher of SRMC and $200 per MWh.
Amendments to the GPS	Most submitters agreed that clarification of the roles of the Commission and the Government was appropriate and that the Commission should have more flexibility about how to implement the standard.

5 SECURITY OF SUPPLY STANDARD AND ENERGY MARGIN

5.1 Castalia approach to the standard

5.1.1 The main focus of the Castalia Review is on defining an optimal security standard and a large part of the report is devoted to this issue. Castalia points out that we all know that absolute security of supply is not a sensible objective because of the massive redundancy in plant and fuel supplies that would be needed. The report also points out that, from an economic perspective, the optimal security of supply is that which minimises the total combined cost of "demand restraint" and security of supply mechanisms.

5.1.2 The Castalia report develops an approach to estimating the economically optimal level of security and suggests that this is likely to involve:

- an expected level of demand restraint each year of around 0.05 per cent (compared to their estimate of around 0.014% under the current policy);
- a probability of any demand restraint between 1-in-11 and 1-in-35 (the current policy does not calculate this measure, but does assume 2% demand response reflecting voluntary saving prior to reaching the 1-in-60 minzone);
- a gross annual energy margin of between 12 and 17 per cent (compared to their estimate of 19% under the current policy and 17% under ECNZ).

5.1.3 Castalia stressed that its calculations were preliminary and designed to illustrate the methodology and inform the Commission's thinking. However, the report points out that the estimated plausible range for the optimal security standard could be lower than the current arrangements aim to achieve.

5.1.4 The Castalia recommendation is that the security of supply standard should be changed from ensuring no demand restraints (either voluntary or forced rationing) are required in a 1-in-60 dry year, to ensuring that the energy margin does not decline below a simple percentage annual energy margin.

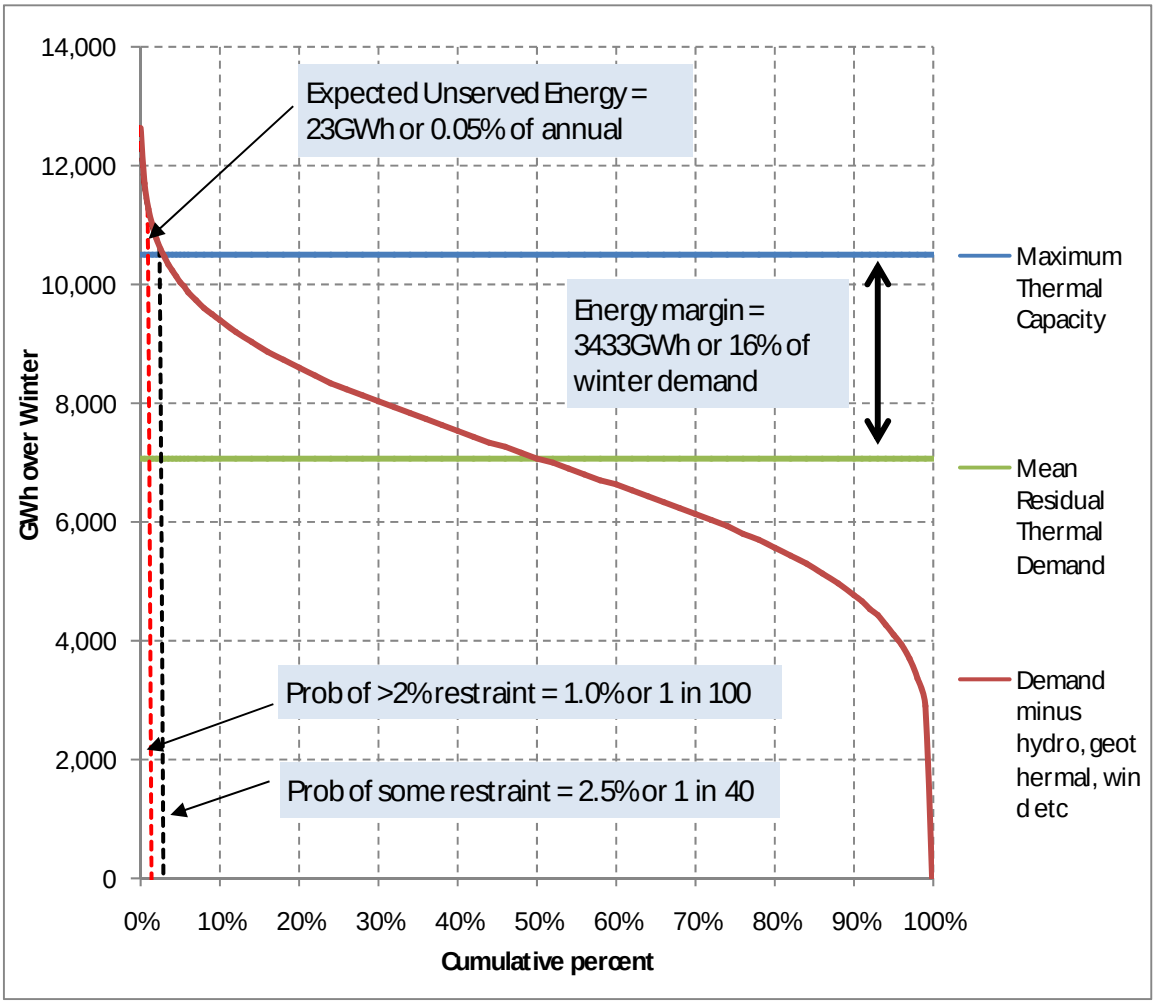
5.1.5 Castalia prefers the energy margin approach over the current approach because it is related directly to the economic cost of the expected level of demand restraint, is simpler and easier to understand, and provides a more direct and obvious trigger for the procurement of reserve energy.

5.2 Determining the economic energy margin

5.2.1 Castalia recommended that further detailed work should be undertaken to estimate the desired energy margin. Castalia estimated the desired margin to be approximately 15 per cent (this equates to ensuring no demand restraints are needed in a 1-in-20 dry year rather than the 1-in-60 dry year used in the current standard).

5.2.2 The Castalia approach involves detailed analysis of the possibility of shortages by focussing on the residual demand for thermal generation over the critical winter period while accounting for variations in hydro supply, electricity demand, and other non-hydro generation.

Figure 1: Understanding security of supply measures



5.2.3 Figure 1 illustrates the approach by plotting cumulative electricity demand minus hydro, geothermal, wind and other minor sources of generation. This represents the residual demand that must be met from thermal generation. To

the extent that the peak of the cumulative residual demand curve exceeds the maximum thermal supply capacity, there is a (generally small) probability of shortages.

5.2.4 For a level of thermal capacity Castalia has suggested that it is possible to calculate three measures of security of supply, each of which is illustrated in Figure 1:

- The expected level of un-served energy (23GWh per annum or 0.05% of annual demand in the illustration);
- The mean annual energy margin (16% of mean winter demand in the illustration);
- The probability of demand restraint being required (2.5% or 1-in-40 in the illustration).

5.2.5 The probability of demand restraint being required can also be expressed in other ways. For example, the illustration suggests that there is a 1.0% probability (1-in-100) of demand restraint greater than 2.0% being required.

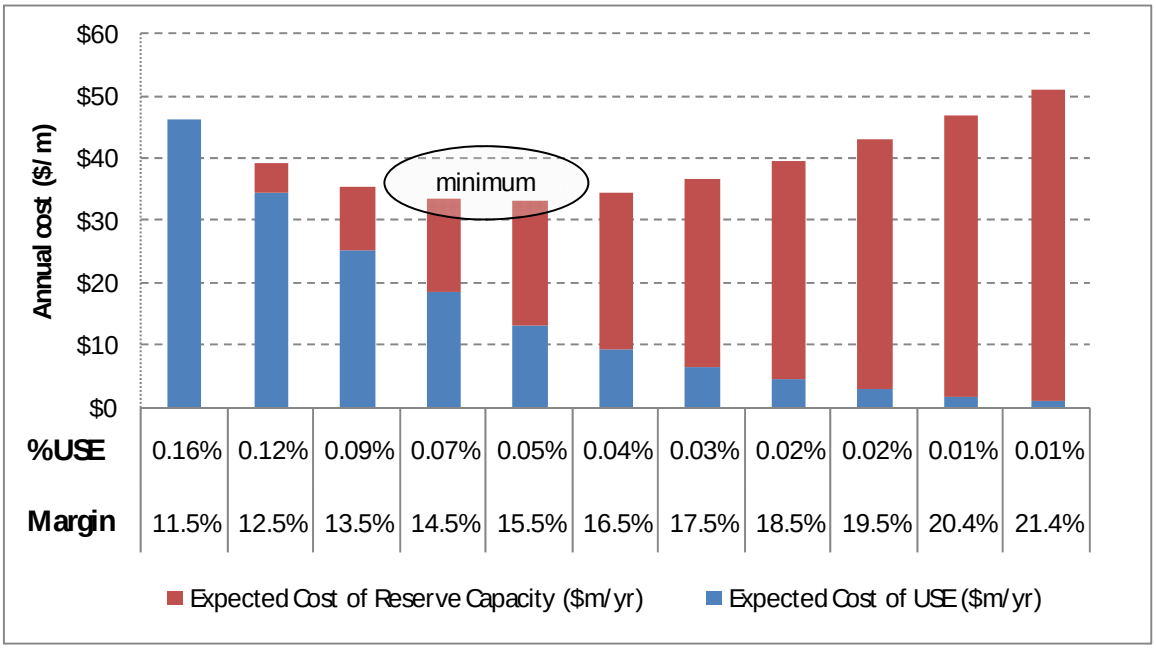
5.2.6 These three measures of security of supply are essentially equivalent and any could be used as an expression of a standard. The choice between these alternative measures depends largely upon a judgment about which measure is more readily understood and comprehensible to the public and participants in the sector.

5.2.7 Regardless of which measure of security of supply is chosen, Castalia recommends setting the standard at a level which minimises the total combined cost of un-served energy and reserve energy. This can most readily be considered using the illustration in Figure 2.

5.2.8 Figure 2 illustrates a stylised trade-off between increasing levels of reserve energy and reducing levels of un-served energy. By varying the level of reserve energy capacity and observing the cost of un-served energy it is possible to determine an optimum level of security of supply at the point where total costs are minimised.

5.2.9 Castalia undertook an analysis to determine this point by making a number of simplifying approximations and recommended that more detailed market simulation work needed to be carried out in order to establish the optimum with a higher degree of confidence.

Figure 2: Cost of un-served energy and reserve capacity as a function of reserve margin



5.2.10 The further work that Castalia recommended included detailed electricity market simulation involving:

- Adjusting the level of reserve energy to explore the trade-off with demand restraint;
- Simulating multiple inflow sequences and ideally synthetic sequences that are worse than historic records;
- Allowing for uncertainty in factors affecting supply capability (including thermal plant outages, transmission constraints and reservoir constraints);
- Modelling the winter period in detail for three years into the future in order to capture storage affects.

5.3 Submissions

5.3.1 Most submitters agreed that a simple standard based on an energy margin was appropriate although there appeared to be some support for a probabilistic approach based on un-served energy. There were also suggestions that, rather than an annual margin, it may be more appropriate to use a margin for the likely period of shortage (three to six months).

5.3.2 Several submitters also suggested that other measures of security, including peak capacity adequacy, summer energy adequacy, and transmission

adequacy would become increasingly important and that the Commission should consider assessing at least some of these other measures.

5.3.3 Most submitters, including all participating consumer representatives, agreed that the current security standard may be too high and that the Castalia analysis was likely to produce results that were closer to the optimal level. However, some submitters suggested that, while difficult to calculate, the value of business confidence and public acceptability should be included in the determination of the economic level. Transpower suggested that stakeholders needed to be comfortable with the economic standard and its implications.

5.3.4 On the acceptability and implications of a lower standard, the Castalia Review acknowledges the political economy issues and that the unpopularity of potential power cuts when a shortage is in prospect, can lead to calls for further restructuring of the electricity sector. Rather than add a margin of extra conservatism, the Castalia Review recommended that the Commission should approach this issue with publicity material that seeks to communicate a simple message about New Zealand's unique supply situation and the need for occasional conservation campaigns.

5.4 Further analysis undertaken by the Commission

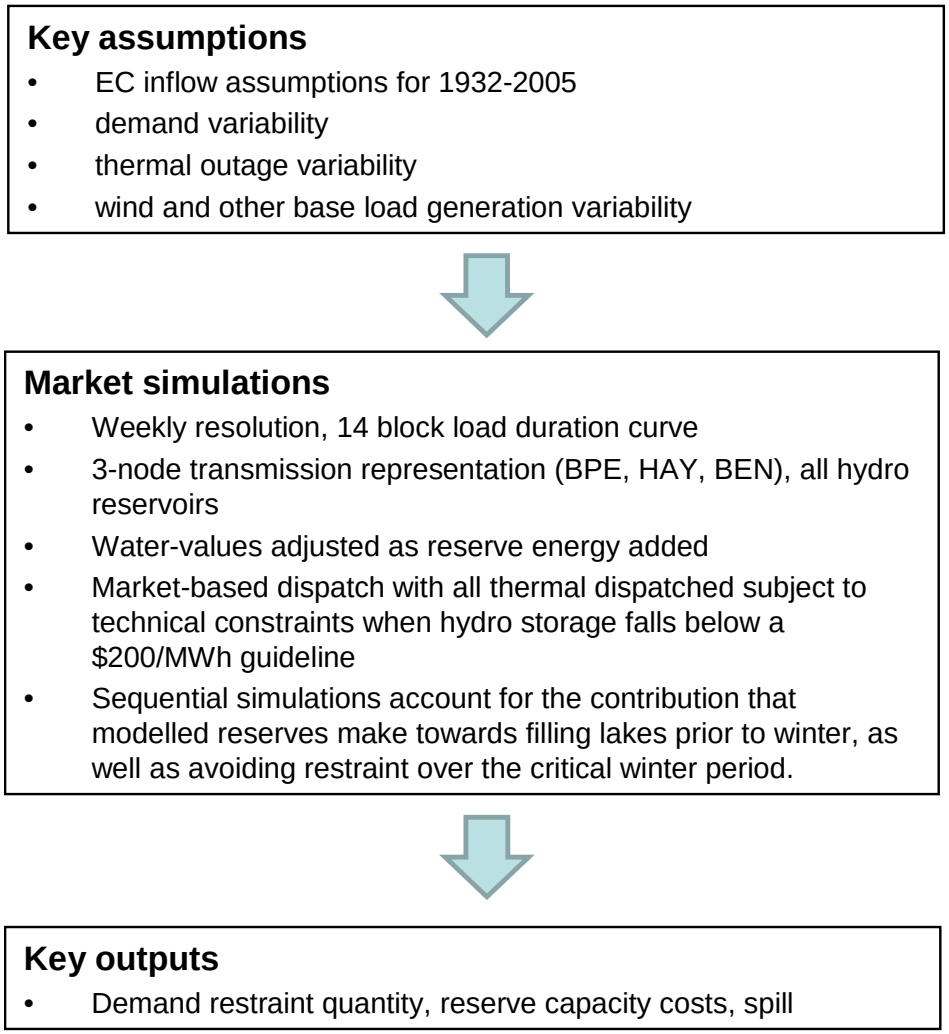
5.4.1 The Commission agrees that, at least in theory, it is possible to establish an economically optimal security standard and considers that the Castalia analysis is a reasonable approach to determining this. However, the determination of a security standard in this way requires detailed simulation and modelling work that requires a number of assumptions to be made about market behaviour, the management of hydro storage levels over time, and patterns of possible demand restraint. The application of this approach needs to be considered carefully before the Commission could recommend it to the Minister.

5.4.2 Accordingly, the Commission has undertaken the more detailed analysis recommended by Castalia. This has involved:

- Establishing an initial supply and demand scenario with relatively low energy margins in order to allow an exploration of the optimal level of reserve energy;
- Carrying out multiple simulations repeated for several levels of reserve energy in the form of open-cycle gas-turbine generation;
- Assessing the total combined cost of reserve energy and un-served energy.

5.4.3 The approach to this analysis is described further in Figure 3.

Figure 3: Approach to modelling



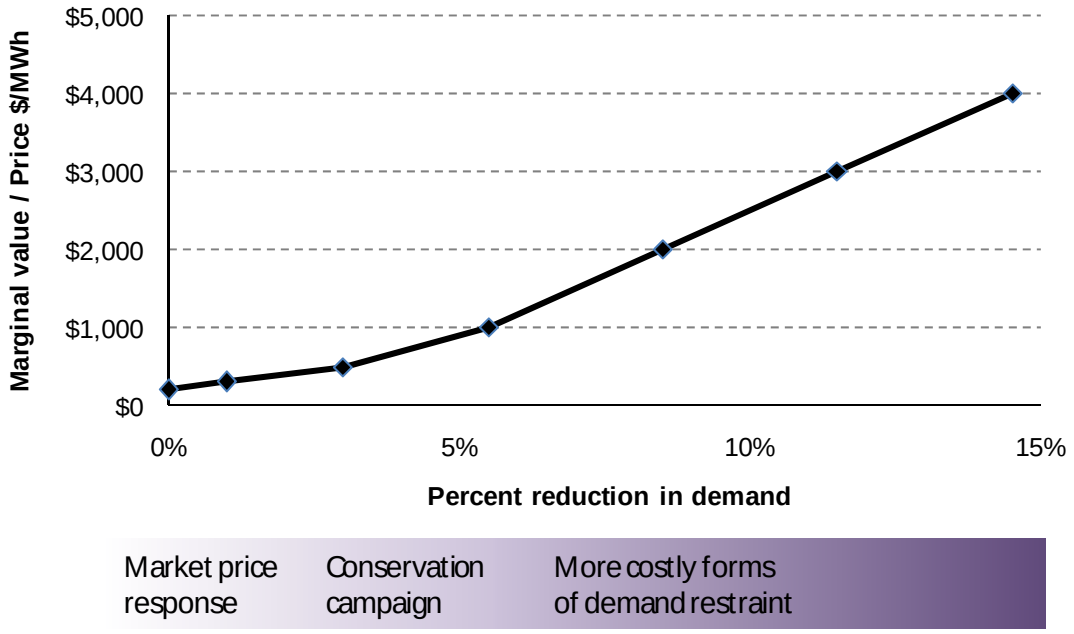
5.5 The cost of demand restraint

5.5.1 The analysis requires some key assumptions about the cost of various levels of demand restraint. The base case assumptions are outlined in Figure 4 and are relatively similar to those used by Castalia. In particular they are based on the following observations:

- When spot prices rise to $300/MWh a demand response of approximately 2% can be expected;
- Increasing levels of demand restraint will impose higher incremental costs;
- Emergency conservation measures could deliver 2% demand restraint at a cost of $500/MWh;

- Demand restraint at 10% is likely to impose costs on society of the order of $2500/MWh;
- If savings of greater than 10% are required, cost will rise towards $5000/MWh[2];

Figure 4: Cost of demand restraint



5.5.2 These costs of demand restraint are consistent with many international observations about the costs on un-served energy[3]. Nevertheless, the costs of demand restraint are the subject of much conjecture, especially as the level of required demand savings rises. We have therefore tested the sensitivity of the analysis to variation in these costs.

5.6 Simulating supply uncertainties

5.6.1 Castalia noted that the extent to which the peak of the cumulative residual demand curve (as illustrated in Figure 1) exceeds the maximum thermal supply capacity is the key to the economic approach to determining the standard. Castalia also noted that, although modelling hydro variability is the main issue, augmenting this to allow for other types of energy outages, demand uncertainty and operational constraints in the system is also important. The reason is that the optimal standard for security of supply depends on ensuring a particular

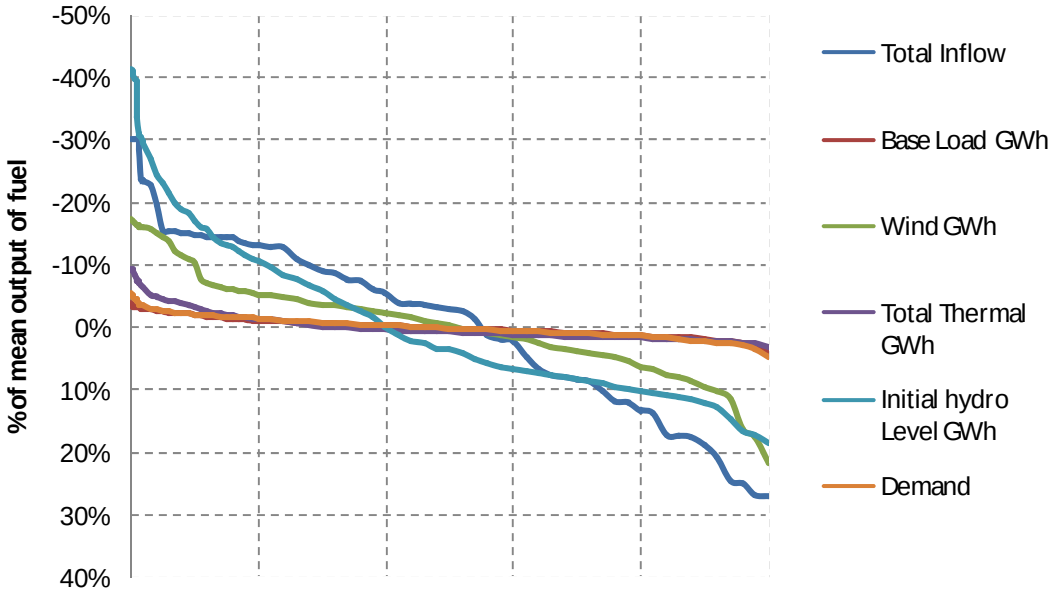
2 Note that this is expected to be significantly less the cost of unplanned transmission-related outages represented by the $20,000/MWh figure used in transmission reliability analysis.
3 Morrison & Co, 2004 Issues Concerning the Reserve Energy Proposal, Report to MED by John Culy, 22 January 2004, Appendix D page 89 to 92.

level of un-served energy (the area in the tail of the supply distribution) so getting the necessary energy margin right depends on getting the shape of the tail right.

5.6.2 In order to take account of the uncertainty in the factors affecting supply capability the analysis undertaken has therefore simulated variations in demand, hydro inflows, thermal outages, wind and other base load generation as illustrated in Figure 5.

5.6.3 Figure 5 indicates the variation in each quantity expressed as a variation of the mean for that quantity. For example, wind generation is assumed to vary between -16% and +22% of mean wind generation, while electricity demand is assumed to vary by ±5% of mean electricity demand.

Figure 5: Variations around mean energy supply



5.6.4 Combining all the uncertainties illustrated in Figure 5 yields approximately ± 1550 GWh variation around expected residual winter demand of 8100 GWh. The uncertainty in residual demand is dominated by the hydro variability, because the variation in hydro is large as a proportion of mean hydro and hydro generation is a large proportion of total generation. Nevertheless, the other elements remain important, particularly at the tail of the distribution where demand restraint is required. This is demonstrated in Figure 6 and in Figure 7.

5.6.5 Figure 7, in particular, highlights that the tail of the residual thermal demand distribution is dominated by situations where uncertainty in demand and

thermal outages can combine with low hydro inflows to create situations where demand restraint may be necessary.

Figure 6: Residual Thermal Demand Distributions (GWh)

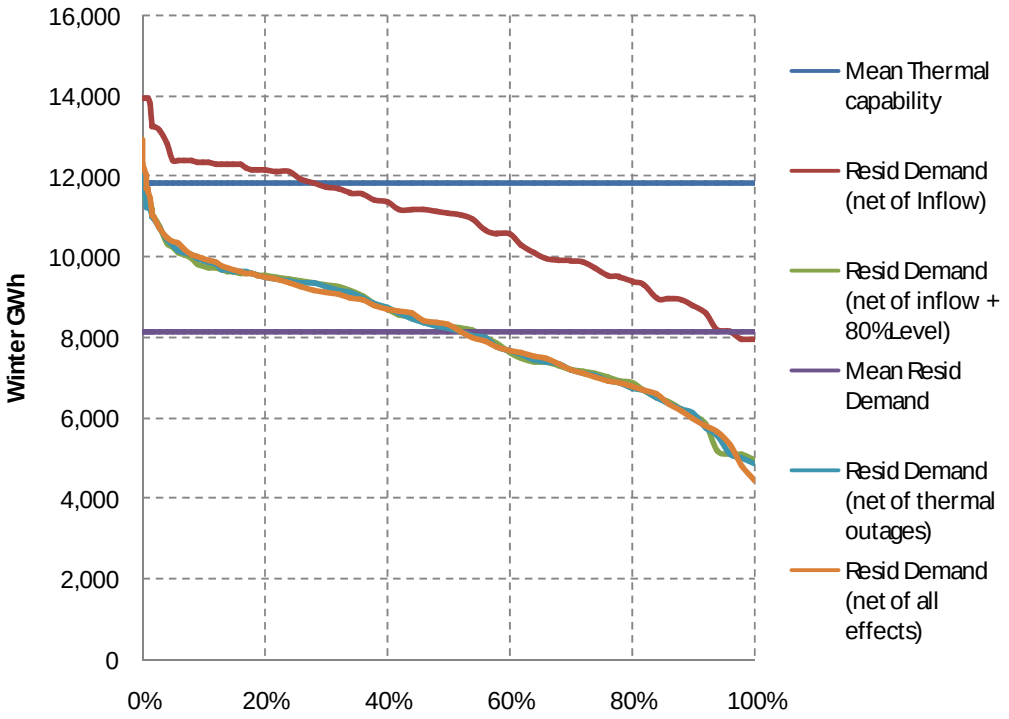
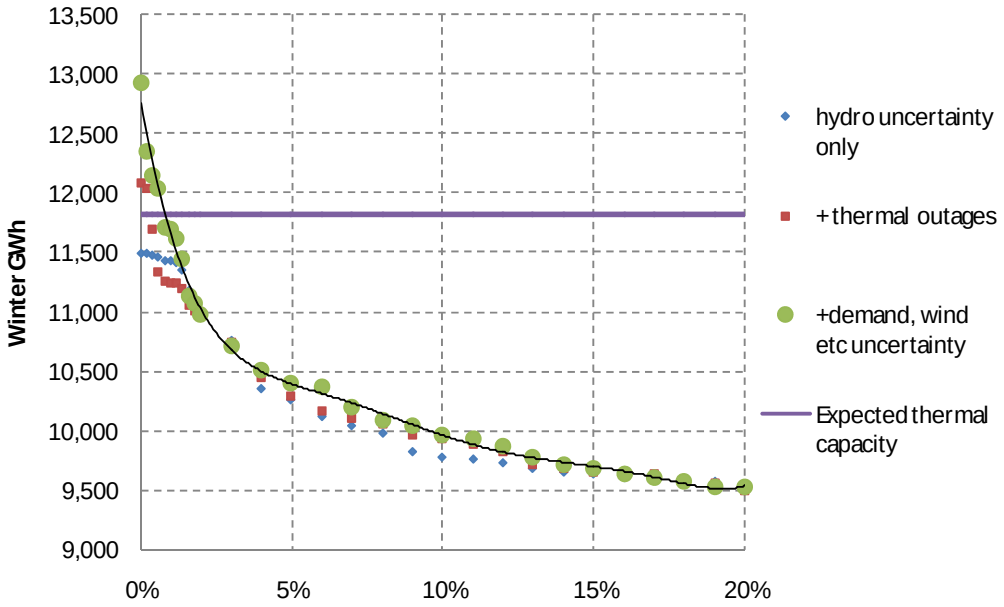


Figure 7: Residual Thermal Demand Distributions (GWh) – worst 20%

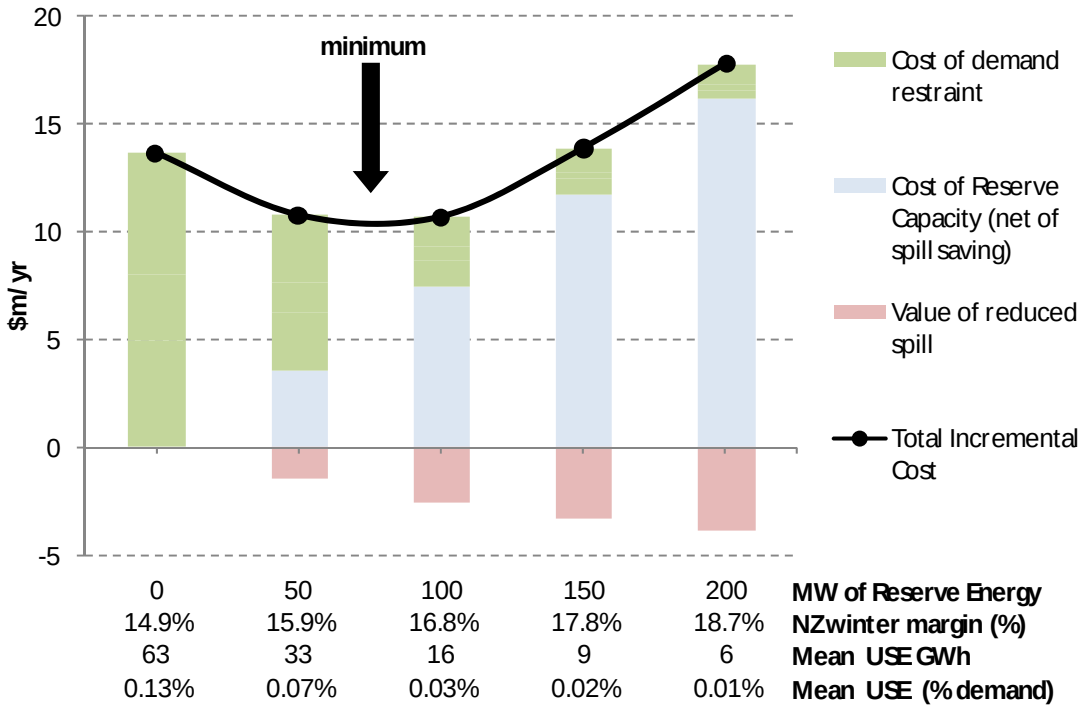


5.6.6 It is the shape of the tail of the supply distribution that is important in determining the level of un-served energy that would be expected. The analysis undertaken by the Commission has therefore focussed on the expected elements that could impact on supply uncertainties.

5.7 Results of analysis

5.7.1 Using the techniques proposed by Castalia, the amount of reserve energy has been varied in the simulations to determine the point at which the combined costs of demand restraint and reserve energy may be minimised. In the Commission's analysis, the value of reduced spill that arises with higher levels of reserve energy has also been included. The results are summarised in Figure 8.

Figure 8: Reserve energy and un-served energy trade-off



5.7.2 This figure suggests that the optimum level of un-served energy is somewhere between 0.03% and 0.07% and the optimum energy margin lies between 16% and 17% of New Zealand winter[4] demand. If the value of reduced spill is ignored, the optimum moves towards 16%.

[4] **The period from 1 April to 30 September has been used.**

5.7.3 This result lies within the plausible range of 12-17% suggested by Castalia. Note that the optimum point appears to be relatively flat between 16% and 17%.

5.7.4 Figure 8 expresses the optimum energy margin as a percentage of winter demand. However, it is possible to express the optimum energy margin in a number of different ways including:

- A mean annual energy margin;
- A mean winter energy margin (as used in Figure 8); or
- A dry winter energy margin.

5.7.5 The Commission prefers a standard based on the margin during the winter months rather than using an annual measure because this places more weight on the critical availability of generation during the periods of low inflows and high demand. Expressing the standard in annual terms could place undue emphasis on summer generation.

5.7.6 The Commission has also considered expressing the optimum energy margin as a percentage of winter demand during a "dry" winter. This may have presentational advantages because it focuses on the required margin to cope with a period of extended low inflows. However, it does require choosing some definition of "dry". It is noted that NZED[5] used a definition of inflows at 85% of mean[6] to characterise a dry year when it planned the development of new power stations using a 7% "dry year margin" through the 1970s and 1980s.

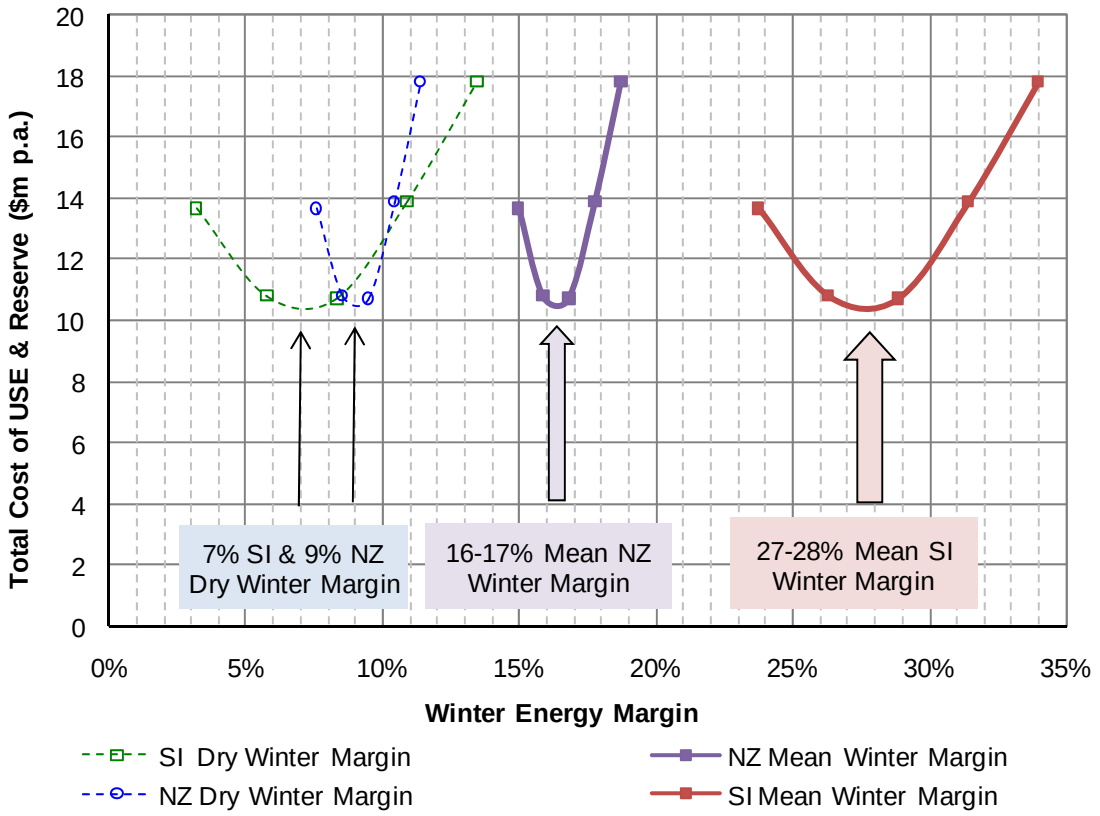
5.7.7 Transmission constraints between the North and South islands and between Bunnythorpe and Haywards have also been included in the analysis. These constraints dictate that it is necessary to explore security in the South Island as well as for New Zealand as a whole. Figure 9 summarises the results of the analysis for both the South Island and New Zealand as a whole. Note that the results are expressed in both "mean winter" and "dry winter" terms. For the "dry winter" the NZED standard of 85% of mean has been used.

5.7.8 Because most of the hydro variability occurs in the South Island and the South Island demand is much smaller than New Zealand as a whole, the optimum mean winter margin, expressed in percentage terms, is much higher (27% to 28%) than for New Zealand. Expressed as a dry winter margin the percentages are similar (7% for the South Island and 9% for New Zealand).

[5] **The New Zealand Electricity Department which became a division of the Ministry of Energy in 1985.**
[6] **Analysis of the historical inflow records indicate that 3 of the 75 annual inflow sequences have been lower than 85% of mean**

5.7.9 Note that the optimum standard, when expressed in "dry winter terms", appears close to the 7% "dry year margin' used by NZED, however one is expressed on a winter basis and the other is expressed on an annual basis. When the derived dry winter margin for New Zealand as a whole is expressed in annual terms (for comparison with the NZED standard) it becomes approximately 6%.

Figure 9: Optimal Dry and Mean Year Energy Margins (original)



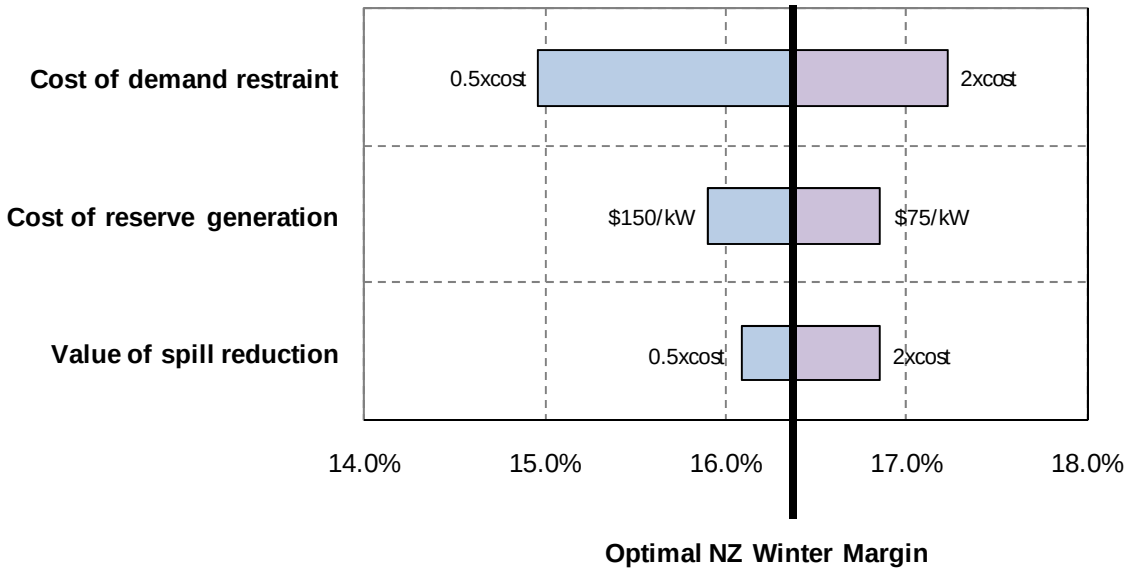
5.7.10 The Commission has a preference to use the "mean winter" energy margin rather than the "dry winter" energy margin. This is because the two approaches are essentially a different expression of exactly the same standard and choosing a definition for a "dry winter" is a relatively arbitrary exercise.

> The mean winter energy margin has been defined as the maximum expected supply from thermal plant plus the expected supply from other supply sources (including hydro, wind and geothermal) during the winter period, minus the demand for generation over the same period, all divided by the demand for generation during the winter period.
>
> Note that the expected supply from hydro includes both inflows and expected initial storage in April. The average historical storage is around 2750GWh for NZ and 2400 GWH in the South Island.

5.8 Sensitivity analysis

5.8.1 The key assumptions that drive the trade-off between reserve energy and demand restraint are the costs of reserve energy and the costs of demand restraint. The value of spill has also been factored into the analysis. Accordingly, the sensitivity of the results to variations in these assumptions has been tested. The cost of reserve energy has been varied by -25% and +50%, while the costs of demand restraint have been varied by -50% and +100%, and the value of spill has been varied between -50% and +100%. The results are summarised in Figure 10.

Figure 10: Sensitivity analysis



5.8.2 The sensitivity analysis suggests that the optimal standard is most sensitive to the variations in the cost of demand restraint, and that the plausible range for the optimal NZ winter energy margin is between 15% and 17%

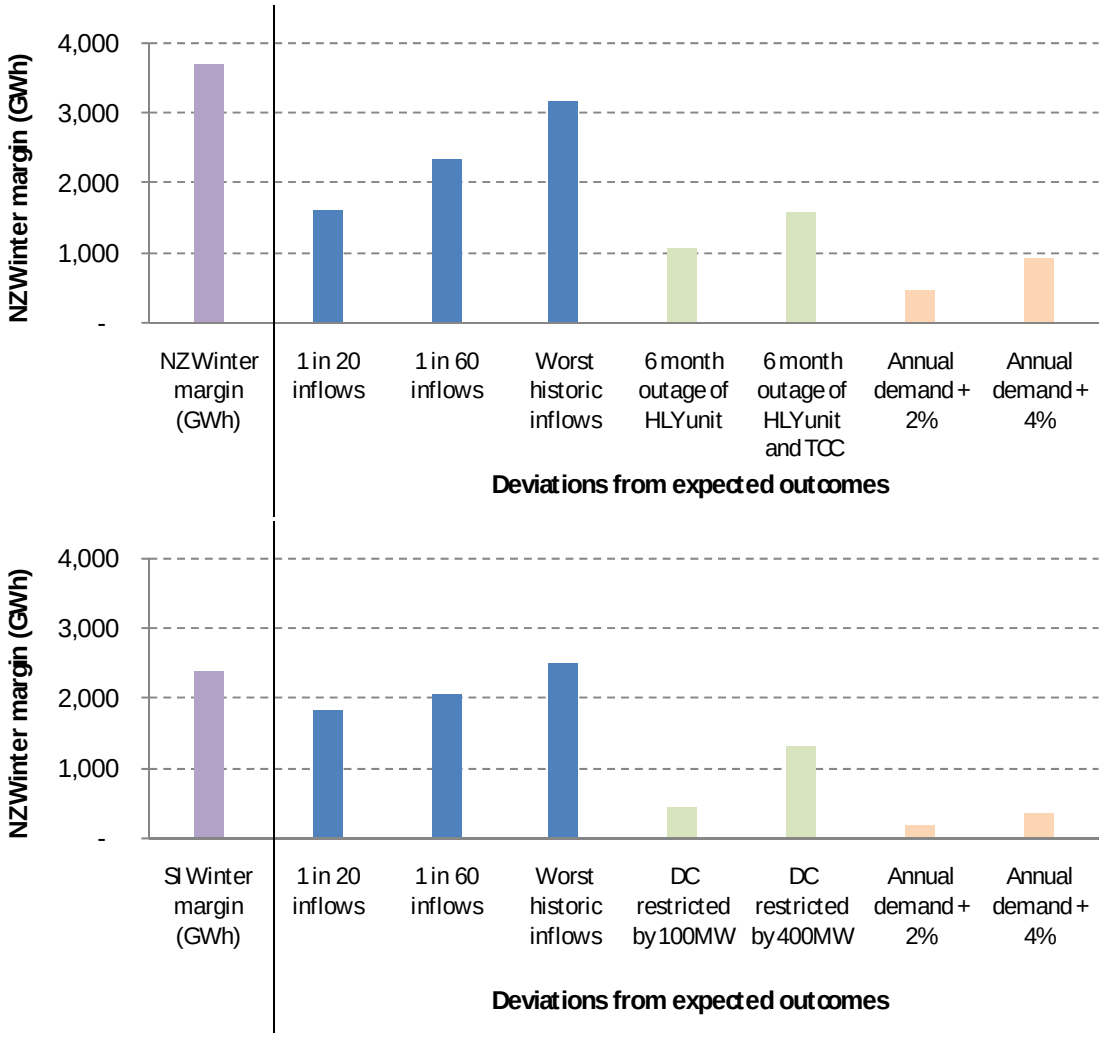
5.9 Relationship to plausible security contingencies

5.9.1 It is useful to consider how the derived mean winter energy margins for the South Island and for New Zealand as a whole compare with typical security contingencies that could emerge. Figure 11 illustrates the optimal energy margins, expressed in GWh terms and compares these with a range of possible contingencies.

5.9.2 Figure 11 suggests that:

- The optimal New Zealand winter energy margin would be sufficient to cover most low inflow contingencies and most plausible long-term thermal outages, but not sufficient to cover extended multiple contingencies;
- The optimal South Island winter energy margin would be sufficient to cover some low inflow contingencies, but would require some back-up supply from the North Island.

Figure 11: Energy margins and contingencies



5.9.3 Both of these outcomes seem intuitively realistic and confirm that proposed standards bear some relationship to the type of contingencies intended to be covered by the reserve margins.

5.10 Comparison with existing policy

5.10.1 The existing policy for triggering the purchase of reserve energy involves forecasting the Minzone over several years, making assumptions about the availability of existing generation, new generation developments, and the level of demand. If the top of the Minzone exceeds a trigger storage level, the Commission would contemplate purchasing reserve energy.

5.10.2 The trigger storage level is set by evaluating the trade-off between the expected cost of spill and reserve energy. For recent assessments the Commission has used a guideline trigger storage level of 70%, however the top of the Minzone has always been well below this level of storage and it has not been necessary to consider purchasing further reserve energy. The Commission has also identified that further work would be necessary to determine with confidence the most appropriate level for the trigger. This further work was deferred pending the outcome of this review.

5.10.3 Figure 12 illustrates how the application of the existing approach compares with the application of the energy margin approach developed using the Castalia methodology.

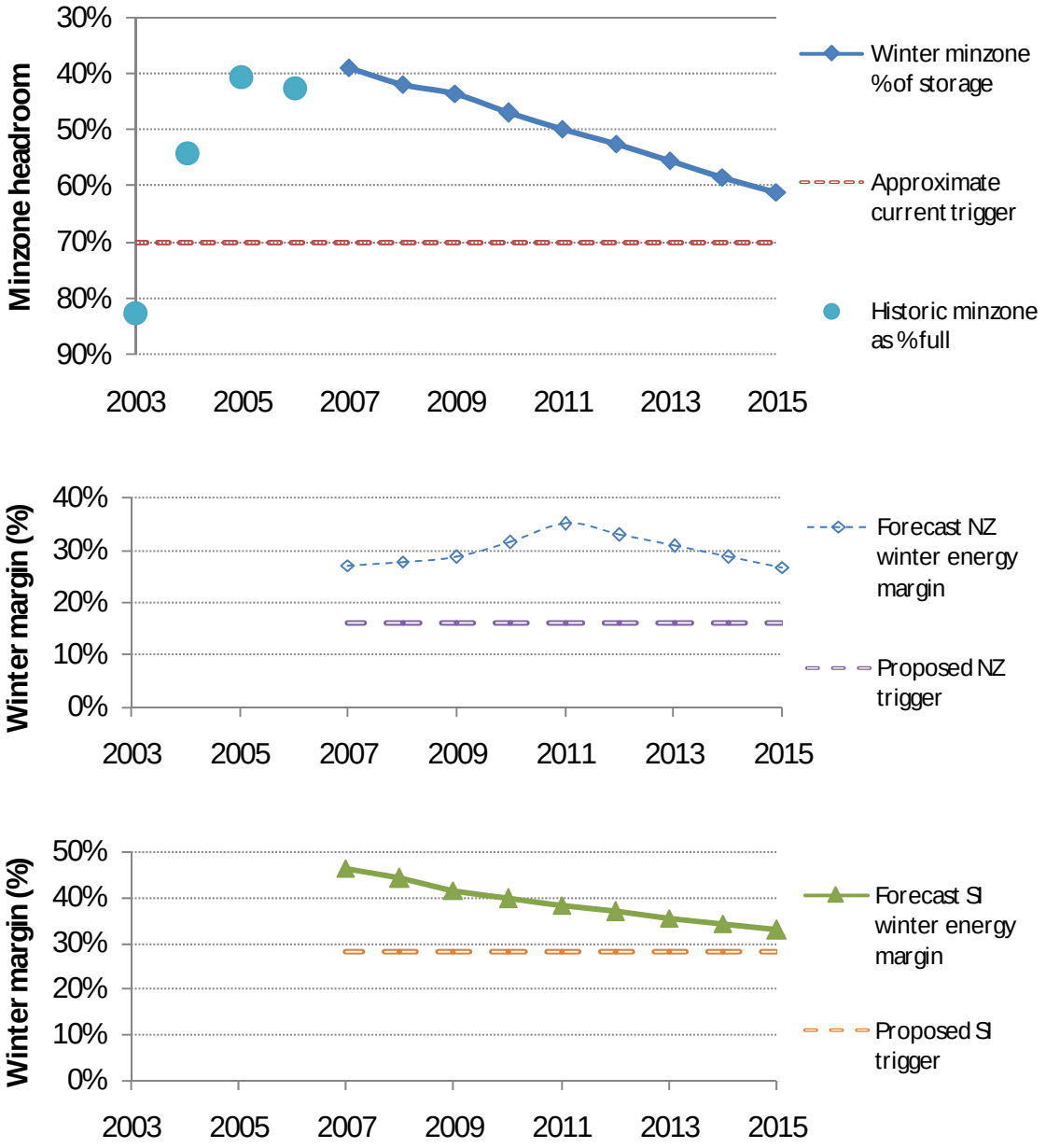
5.10.4 The key observations that can be made from Figure 12 are that:

- Applying the existing policy using the assumptions from the 2006 reserve energy needs analysis suggests that an energy security issue is unlikely to emerge until post 2015;
- The top of the Minzone has consistently been lower than the 70% trigger level for each of the reserve energy needs analyses undertaken through the last three years;
- Applying the analysis retrospectively to the 2003 situation (when low storage levels combined with fuel supply constraints) suggests that application of the policy would have highlighted potential security of supply problem (because the top of the Minzone would have been well above the 70% trigger level)[7];
- Applying the energy margin derived from the Castalia methodology suggests that the New Zealand winter energy margin of 16-17% would be unlikely to be breached until post 2015;
- Applying the energy margin derived from the Castalia methodology suggests that the South Island winter energy margin of 27-28% could

[7] Following the problems in 2003, government moved to provide additional security by contracting for the commissioning of the Whirinaki reserve energy plant

be breached soon after post 2015 (unless additional generation was developed).

Figure 12: Illustration of existing and proposed approaches for assessing need for reserve energy



5.10.5 This comparison suggests that the existing policy for triggering the purchase of reserve energy and the approach recommended by Castalia may not result in significantly different outcomes. This is despite the Castalia report indicating that the estimated range for the optimal security of supply was expected to be lower than the current arrangements aimed to achieve.

5.10.6 The Commission's analysis suggests that the Castalia report overlooked the Commission's interpretation and implementation of the current GPS requirement that the Commission "*ensure security of supply, without assuming any demand reduction from emergency conservation campaigns…….to use reasonable endeavours to ensure security of supply in a 1-in-60 dry year*". It is the Commission's view, as expressed in its published security of supply policy, that this requirement allows for some level of demand restraint in a 1-in-60 year while meeting the reasonable endeavours obligation.

5.10.7 Accordingly, when determining the electricity demand to be met during a 1-in-60 dry year, the Commission allows for a 2.0% level of demand response to price. As long as an emergency conservation campaign can be avoided in a 1-in-60 dry year, the standard will be met.

5.10.8 The Castalia analysis includes all forms of demand restraint, including market based price response. It is therefore necessary to exclude the price based response from the Castalia analysis to compare the economic standard with 1-in-60.

5.10.9 When the 2% price response is excluded from the Castalia analysis, the optimal probability of demand restraint falls from approximately 1-in-20 to approximately 1-in-60, and the optimal un-served energy falls from 0.05% to 0.015%.

5.10.10 When expressed on the same basis, Castalia's estimate of the optimal economic standard is therefore consistent with the existing 1-in-60 standard. This is confirmed by the analysis reported in this paper

5.11 Peak capacity adequacy and the durability of the standard

5.11.1 Several submissions suggested that changes to the plant mix that have taken place over the last few years, and changes that are expected over the next few years, could lead to a situation where peak capacity adequacy could become more important and that it may be necessary to establish measures of peak capacity adequacy as well as energy adequacy. The Commission agrees that peak adequacy needs to be considered.

5.11.2 As a first step the Commission is considering the issue of peak capacity as part of the current assessment of the need for reserve energy at the same time as the review of energy adequacy. However, the timetable for the current review has limited the review to the question of energy adequacy. Once this work has been completed the Commission plans to consider the question of peak adequacy.

5.11.3 The analysis undertaken for this report has focussed on the existing transmission system and, in particular, the existing inter-island transmission and constraints south of Bunnythorpe. These transmission arrangements contribute to the need for a higher winter energy margin in the South Island than for New Zealand as a whole. Any changes to inter-island transmission and transmission south of Bunnythorpe are expected lead to a change in the standards that should apply.

5.11.4 Accordingly, the Commission has concluded that the security of supply standard should be reviewed prior to January 2012.

5.12 Conclusions on the security of supply standard

5.12.1 The Castalia Review recommends that the Commission should remove the uncertainty associated with the current approach by clearly establishing a minimum annual energy margin that would define the trigger for purchase of additional reserve energy.

5.12.2 Castalia suggests that the Minzone is likely to be the best available tool for monitoring security of supply within a one to two year horizon, but may not provide the most straight-forward trigger for signalling the need for further procurement of reserve energy.

5.12.3 The Commission agrees that the approach recommended by Castalia has merit because it is derived using an economic approach, is reasonably well defined, and can be more readily explained and understood than the existing approach to triggering the purchase of reserve energy. It also has the potential to provide a clearer signal to market participants about when the Commission would move to purchase reserve energy.

5.12.4 The detailed modelling and analysis undertaken by the Commission confirms that the approach is capable of implementation and yields results that appear plausible. Application of the resulting standard is not inconsistent with the existing 1-in-60 standard and analysis suggests that it is unlikely to result in lower security of supply than the existing approach.

5.12.5 The Commission therefore agrees that the 1-in-60 standard outlined in the GPS could be replaced with a standard based on an economic approach and the existing reserve energy procurement trigger could be replaced by South Island and New Zealand winter energy margins of 28% and 17% respectively. If this standard is adopted it should be reviewed before January 2012.

Q1. **Do you agree with the approach recommended by Castalia to develop an economic approach to establishing a security standard?**

Q2. **Do you agree that the approach developed by trading off the cost of demand restraint against the cost of reserve energy is an appropriate means of implementing an economic approach?**

Q3. **Do you agree that the most appropriate expression of an economic standard as a trigger for the procurement of reserve energy is a mean winter energy margin?**

Q4. **Do you support the Commission's conclusion that the economic standard derived using the Castalia approach yields a security standard that appears unlikely to result in a lower security of supply than the existing standard?**

Q5. **Do you support the Commission's conclusion that the GPS should be replaced with a standard based on an economic approach and the existing reserve energy procurement trigger should be replaced by South Island and New Zealand winter energy margins?**

Q6. **Alternatively, and because the two approaches appear to yield a similar result, do you consider that the Commission should retain its current approach involving triggering reserve energy when the top of the Minzone exceeds a particular storage level such as 70%?**

6 MONITORING SECURITY AND DISPATCHING RESERVE ENERGY

6.1 Castalia recommendations

6.1.1 The Castalia Review suggests that, given there is no conclusive evidence to rule out the possibility of the market not providing sufficient security of supply, the Commission should retain its 'watch dog' role of monitoring the situation and, if needed, procuring and dispatching reserve energy to ensure that the security of supply standard is met.

6.1.2 The review also suggests that the Minzone remains the most appropriate tool to support the short-term monitoring function and that participants generally found that it was a sensible way to operationalise the security of supply regime. However, Castalia recommended that market participants should be given more information on the assumptions behind and the workings of the Minzone analysis.

6.1.3 Most submitters agreed with the Castalia recommendations that the Commission should retain its current monitoring role, that the Minzone be maintained as the most appropriate short-term monitoring tool, and that better information about the Minzone analysis should be provided to stakeholders.

6.2 Minzone monitoring

6.2.1 The key element underlying the Minzone and the current monitoring arrangements is the 1-in-60 standard. A 1-in-60 Minzone would be derived by determining the level of hydro storage required for a particular time of the year to avoid a future supply shortage should a 1-in-60 inflow sequence occur from that point forward.

6.2.2 The Commission's Security of Supply Policy contemplates that the Minzone analysis would be based on statistically derived 1-in-60 dry year hydro inflows over various timeframes. However, in advance of the statistical work being completed, the Minzone analysis has been based on the worst historical inflow sequence on record (effectively 1-in-75 or a risk of 1.3%).

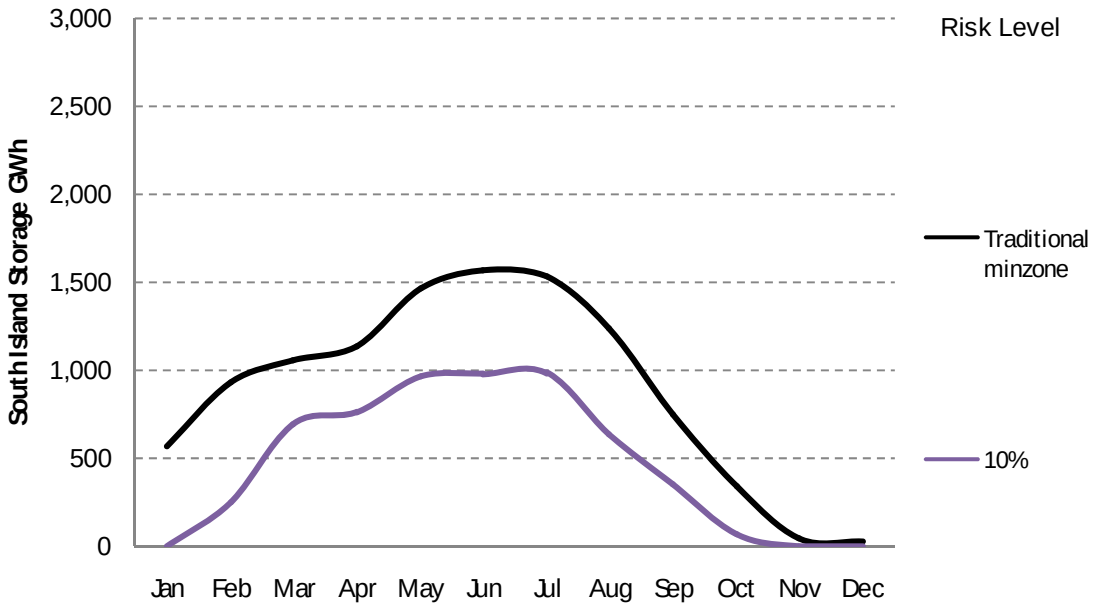
6.2.3 A simple statistical analysis of inflows undertaken as part of the 2006 assessment suggests that a 1-in-60 statistical approach may lower the Minzone by a few hundred GWh over the winter period relative to using the worst historical sequence. However, that analysis is not considered sufficiently robust to rely upon. In practice, the Commission has therefore continued to use the worst historical inflow sequence to derive the Minzone.

6.2.4 From this point in the paper we will refer to the 1-in-75 Minzone as the "traditional Minzone".

6.2.5 The Commission has also derived an emergency zone as part of its approach to implementing the GPS requirements. The emergency zone is the storage level over time which, should storage fall below that level, would trigger the use of various emergency measures. The emergency zone has been derived by determining the level of hydro storage required for a particular time of the year to avoid a 10% chance of a future supply shortage.

6.2.6 The traditional Minzone and emergency zone guidelines for 2008 are illustrated for the South Island in Figure 13.

Figure 13: South Island Minzone and emergency zone



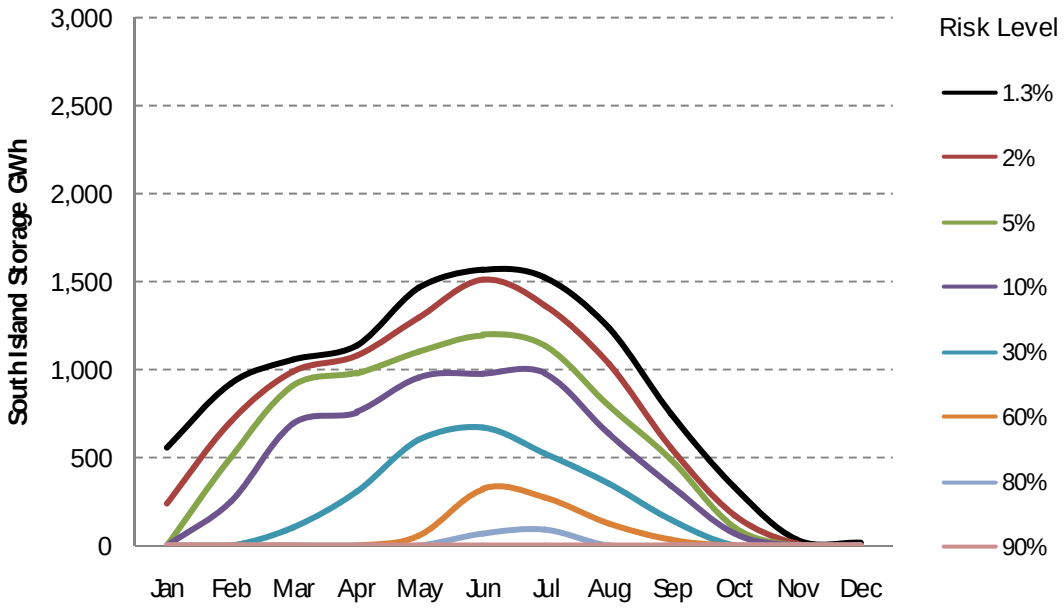
6.2.7 If storage falls below the traditional Minzone it is expected that all thermal generation would be running to preserve South Island storage, prices would rise above $200/MWh, and the Whirinaki reserve plant would be dispatched. If storage continued to fall and reached the emergency zone, the Commission would introduce a range of emergency measures including an emergency conservation campaign.

6.2.8 Although the concept of 1-in-60 is an integral component of the Minzone in its current form, the practical implementation of the Minzone has resulted in the application of a 1-in-75 standard for monitoring purposes. The Castalia Review proposes that the 1-in-60 approach should be replaced by deriving an optimum level of security based on an economic trade-off between the cost of reserve energy and the cost of demand restraint. This begs the question about what

the 1-in-60 Minzone should be relaced with for short-term monitoring purposes, if the economic approach is adopted.

6.2.9 Using the same techniques developed to establish the traditional Minzone and the emergency zone, it is possible to derive a series of guidelines reflecting different levels of risk and different expected spot price levels. This is illustrated in Figure 14.

Figure 14: South Island Minzone guideline illustration



6.2.10 The successive guidelines in Figure 14 reflect an increasing risk of demand restraint being required. The top line is the traditional Minzone based on avoiding the lakes running empty with the worst historical inflow. Because the water value[8] at the traditional Minzone is estimated to be approximately $200/MWh and most thermal plant has a marginal cost of less than $200/MWh, the traditional Minzone could remain as the key short-term monitoring measure.

6.2.11 Guidelines based on other levels of risk and falling between the traditional Minzone and the emergency zone (10% risk of future shortages) could be a useful adjunct to the current approach. The concept of expressing security risk as a probability of future demand restraint could also be a useful means of simplifying the public presentation of security risks during extended dry periods and avoid the perceptions about the traditional Minzone being a “cliff edge”.

[8] [8] The water value is the value of an increment of hydro storage at this point. It has been estimated by simulating the operation of the reservoirs taking into account the same economic costs of demand restraint used in the reserve margin trade=off analysis

6.2.12 Storage falling below the traditional Minzone does not imply future shortages; it merely indicates that the risk of future shortages has risen from 1.3% to a slightly higher risk level that is still small. When storage falls to the red line in Figure 14, for example, the risk of future shortages has only risen to 2%.

6.3 Reserve energy dispatch

6.3.1 The Castalia Review recommends that the Whirinaki dispatch strategy should be amended to provide that the plant will run whenever market price exceeds the short-run marginal cost (SRMC) and that any additional reserve energy should also be dispatched at SRMC.

6.3.2 At present, Whirinaki is dispatched at $200 per MWh or at the variable cost of the fuel if that is higher. If storage falls below the Minzone and Whirinaki does not run, the Commission will investigate why this is the case, and reserves the option to dispatch Whirinaki at a lower price if it considers such action would contribute to attaining security of supply.

6.3.3 This is consistent with the requirements of the GPS and is intended to provide economic dispatch outcomes while minimising distortions to the market.

6.3.4 Castalia suggests that, from an economic perspective, it would be better to simply dispatch the plant at SRMC. This is because the main distortion to the market occurred with the decision to contract for the construction of the plant and any further possible benefit from withholding the plant from the market will be more than offset by the loss of efficiency if more expensive generation sources run ahead of Whirinaki.

6.3.5 The Commission is concerned about the potential impact on the normal operation of the market and notes that the minimum dispatch price required in the GPS was an attempt to address this issue, by providing certainty to market participants that reserve plant would not be dispatched in competition with “normal” generation with marginal costs less than $200/MWh. The Commission also notes that the SRMC of Whirinaki is very close to $200/MWh and hence the short run efficiency gains from dispatching at a slightly lower price than $200/Mwh should be minimal.

6.3.6 The Commission also considers that it would be prudent to retain the option for it to investigate and act under circumstances where thermal and reserve plant (currently Whirinaki) are not running and storage has fallen below the Minzone. This is because the analysis in this report suggests that the value of running reserve plant to reduce the risk and economic cost of demand restraint is approximately $200/MWh at the Minzone

6.4 Conclusions on monitoring and dispatch

6.4.1 The Commission proposes that, even with a possible change to the 1-in-60 standard, to reflect an economic approach to security of supply, and a trigger for procuring reserve energy based on a mean winter energy margin, the traditional Minzone should be retained as a key short-term monitoring tool.

6.4.2 The Commission also suggests that developing a series of risk guidelines reflecting varying risk levels, as an adjunct to the traditional Minzone, would be a helpful addition to the monitoring process and potentially assist with the public presentation of security of supply risk during a period of extended low inflows.

6.4.3 The Commission proposes to retain the current approach to dispatch of reserve energy, dispatching the Whirinaki reserve plant at $200/MWh, while retaining the option to lower the offer price if storage falls below the traditional Minzone guideline.

Q7. Do you agree that the traditional Minzone should be retained as a key short-term security of supply monitoring tool?

Q8. Do you agree that a series of risk guidelines reflecting vary risk levels could be a useful adjunct to the traditional Minzone?

Q9. Do you agree that the Commission should retain the current approach to dispatch of reserve energy rather than move to dispatch at SRMC?

7 OTHER CASTALIA RECOMMENDATIONS

7.1 Market failure mechanisms

7.1.1 A further substantial section of the Castalia Review considers the extent to which there may be a "market failure" to deliver a socially optimal level of security of supply and considers a range of intervention options that could be appropriate deal with different types of market failure.

7.1.2 If there is a need for the Commission to intervene in the electricity market and purchase reserve energy, the Review suggests that there is likely to be some form of market failure occurring. If that is the case the Review goes on to suggest that it is important to identify the type of market failure in order to choose the most appropriate corrective mechanism.

7.1.3 The Review identifies three broad categories of possible market failure, but concludes that there is insufficient information to determine what the exact nature of the market failure is, or indeed if there is a market failure at all.

7.1.4 The Review also explores some alternative intervention options that might help address the different failure categories. These alternative intervention options focus on different approaches to implementing an Energy Adequacy Hedge arrangement designed to ensure that customers receive, and generators have strong incentives to provide, an adequate security of supply.

7.1.5 Castalia concludes that an Energy Adequacy Hedge arrangement is only likely to be an appropriate solution if systematic[9] market failure is occurring. The current arrangements are assessed as likely to be the least cost solution for other possible forms of market failure.

7.1.6 Castalia recommends that the arrangements should not at this stage introduce mechanisms that involve Energy Adequacy Hedges, as there is no evidence to suggest that the market will fail to deliver the desired level of security of supply. If, over time, evidence emerges that the market is systematically failing to provide adequate security of supply, Castalia suggests that the Commission should recommend to the Minister that a comprehensive solution be introduced based on Energy Adequacy Hedge mechanisms.

7.1.7 Most stakeholders agreed that there is no evidence to suggest that the market will fail to deliver security of supply to the desired standard and did not support further intervention in the form of Energy Adequacy Hedges at this point. Most stakeholders accordingly agreed that the "wait and see" approach was

[9] Systematic failure in the electricity market would lead to investment in new power stations being consistently late resulting in security margins being consistently low.

appropriate. However, some consumers were sceptical and favoured some form of intervention.

7.1.8 The Commission agrees that there has not been sufficient time, and there is insufficient information, to suggest that there is a market failure and/or the nature of that failure. In the event that it became apparent that there was some form of systematic market failure, the concept of Energy Adequacy Hedges merits further consideration.

7.1.9 The Commission therefore proposes that the GPS be amended to introduce a requirement for the Commission to monitor whether the investment in new power stations is consistently late relative to demand growth. If the Commission finds that is the case it should consider possible future amendments to the GPS to require a comprehensive solution be introduced based on Energy Adequacy Hedge mechanisms.

7.2 Levy arrangements

7.2.1 The requirement for a review of the levy arrangements was to determine whether alternative arrangements could produce a fairer and more efficient outcome. In particular, the possibility of allowing for some element of self-provision associated with an exemption from the levy was to be considered.

7.2.2 The Castalia Review concludes that, despite some shortcomings, the current levy arrangements should be retained. This is because alternatives are too complex, there are no efficiencies to be obtained in connection with the Whirinaki costs because they are sunk, and there is no clearly “fairer” arrangement than the current levy.

7.2.3 Castalia also suggests that the levy arrangements may have been included in the GPS review requirement because it was regarded as possible that the Commission could be intervening regularly by purchasing reserve energy. In Castalia’s view this is unlikely to be the case, and if it was, they would support a move to an Energy Adequacy Hedge arrangement which would remove the need for a levy mechanism.

7.2.4 Support for the levy arrangements from stakeholders was mixed, with some stakeholders suggesting alternatives. However, none of the alternatives were supported by Castalia.

7.2.5 The Commission agrees that the current levy arrangements should be retained.

7.3 Information on security of supply

7.3.1 The Castalia Review suggests that the Commission should improve the understanding of the current policy by providing more information to market participants on the Minzone analysis and by providing simpler and clearer information to the general public on security of supply risks.

7.3.2 In respect of the Minzone analysis, the report acknowledges that some of the information that the analysis is based upon is commercially sensitive, has been provided in confidence, and it is important that this information remains confidential. Nevertheless, the review suggests that the Commission should look to improve the transparency and clarity of the Minzone analysis.

7.3.3 The review also points to problems with public perceptions of the actual risk to security of supply caused by the Commission's use of Minzone analysis. It suggests that this could be assisted by making it more obvious that the Minzone boundary records the point at which the risk reaches 1-in-60, not the point at which conservation campaigns are required. Some targeted publications for lay-people are also recommended.

7.3.4 All stakeholders supported Castalia's view that the Commission needs to improve how it provides information on the standard and actual level of security of supply.

7.3.5 The Commission has earlier concluded that its approach to ensuring security of supply should be based primarily on providing a well-informed market[10]. Accordingly, the Commission monitors in several timeframes and places a lot of emphasis on publishing information on supply and demand and security of supply. It is therefore of critical importance that the Commission provides accurate and readily digestible information to market participants and other informed commentators, in particular. The traditional Minzone is a key part of the information package and the Commission will undertake further work to ensure that it is well understood.

7.3.6 The Commission also agrees that public understanding of security of supply issues, particularly during periods of low hydro-inflows, could be improved. To this end the Commission is investigating how best to communicate security of supply issues in a relatively simple way to the general public.

[10] **See the Initial Security of Supply Policy attached to this document**

7.4 Reserve Energy procurement process

7.4.1 The Castalia Review recommends that the security of supply policy should be revised to set out a clear trigger for the procurement of reserve energy and set out the detailed procurement process that will be followed.

7.4.2 The Review suggests that a clear definition of the reserve energy procurement process is required in order to give market participants and other stakeholders some certainty about how additional reserve energy will be procured. Because either diesel-fired or gas-fired peaking plant, or contracted demand response are likely to be the most appropriate forms of reserve energy, the report suggests that the Commission should be readily able to define in advance the process and requirements for any future reserve energy tender.

7.4.3 The report also suggests that pre-consenting sites for reserve generation could help reduce lead times for commissioning plant and allow more waiting time to see if the market will respond.

7.4.4 All submitters agreed with the Castalia recommendations on the reserve energy procurement process. In particular they supported a clearly defined and transparent contestable tendering process that allowed for reserve demand and reserve generation.

7.4.5 The Commission undertook analysis of reserve energy procurement processes in 2004 and concluded that either diesel-fired or gas-fired peaking plant, or contracted demand response, were likely to be the most appropriate forms of reserve energy. This work also established that further defining the procurement process and developing the contracting mechanisms for both reserve generation and reserve demand involved some detailed and potentially complex analysis.

7.4.6 Because the forecast need for reserve energy procurement was considered to be low at that time, the Commission decided to defer the further detailed and potentially complex and costly work on the procurement process.

7.4.7 The Castalia analysis appears to conclude that there may be no need for the Commission to procure reserve energy again and that there is a good chance that the market will maintain an adequate security margin and establishing Whirinaki as a reserve energy station may have resolved any specific dry-year problem.

7.4.8 The Commission agrees that it is likely that the market will maintain an adequate security margin and that Whirinaki may be sufficient to provide the necessary additional security to cover a dry year. Accordingly, it may not be sensible to undertake further work developing detailed and potentially complex procurement processes.

7.4.9 On the other hand, possibly the most likely requirement to procure reserve energy will arise, not from a two year forward view about the need for reserve energy, but some contingency that requires urgent action. Under these circumstances having procurement processes and draft contract arrangements in place, and/or some pre-consented sites for diesel-fired peaking plants, may be an appropriate strategy. Although these suggestions are straight-forward in concept, they will inevitably involve a lot of work to design and implement in practice.

7.4.10 The Commission suggests that short-term supply-based alternatives (such as containerised diesel-fired plant) should be investigated further, rather than focus on complex procurement processes and pre-consenting options.

Q10. Do you agree that the GPS should be amended to introduce a requirement for the Commission to monitor whether the investment in new power stations is consistently late relative to demand growth?

Q11. Do you agree that if the Commission finds that the investment in new power stations is consistently late relative to demand growth it should consider possible future amendments to the GPS to require a comprehensive solution be introduced based on Energy Adequacy Hedge mechanisms?

Q12. Do you agree that the existing levy mechanisms should be retained?

Q13. Do you agree that the Commission should investigate short-term supply-based alternatives (such as containerised diesel-fired plant) rather than focus on complex procurement processes and pre-consenting options?

8 AMENDMENTS TO THE GPS

8.1 Castalia recommendation

8.1.1 The Castalia Review notes that the GPS is detailed and prescriptive, leaving little flexibility for the Commission to develop a policy to implement the reserve energy regime. The review suggests that this was a result of the perceived need for immediate action at the time the Commission was established. Providing detailed instructions to the Commission reduced the risk of delay by providing clarity about exactly what was intended.

8.1.2 The review of the reserve energy arrangements was intended to provide an opportunity for the Commission to take stock about how the arrangements were working and propose amendments, following an initial period of operation.

8.1.3 The Castalia Review recommends that this opportunity to propose amendments should be taken and that the Commission should propose to modify the GPS in order to remove operational detail, focus on defining the energy margin that should be achieved, and define the Commission's powers to intervene in the market. It suggests that all other operational detail should be left for the Commission to define as part of the security of supply policy.

8.1.4 This approach is recommended in order to provide a clear regulatory objective to the Commission and market participants, and provide clarity and certainty about costs the Commission can impose in order to achieve the objective. This approach is considered to provide a more stable investment environment.

8.1.5 Most stakeholders supported these recommendations.

8.2 Commission conclusions

8.2.1 The Commission agrees with the Castalia recommendation that the GPS requirements relating to security of supply could be usefully updated to focus on the security of supply standard, to remove operational detail, and define the Commission's powers to intervene in the market.

8.2.2 The Commission also notes that some aspects of the GPS are no longer relevant and could be removed from the GPS (such as the requirement to undertake this review).

8.2.3 The changes recommended are outlined in the following table. Detailed proposals to amend the GPS will be drafted once submissions from stakeholders have been considered.

Section	GPS requirements	Proposed changes
Background GPS 35-36	Outlines key priority to reduce shortage risks and avoid disruptions to the economy.	Minor changes to place emphasis on cost-effective and secure supply
Security of Supply Objective GPS 37	Specifies reasonable endeavours to ensure security of supply without emergency conservation campaigns in a 1-in-60 dry year.	Modify to replace reference to 1-in-60 with an economic approach to determining the standard and incorporate NZ and SI mean winter energy margins
Information, modelling and forecasting GPS 38-40	Details requirements to undertake and publish modelling and forecasting of security of supply.	Delete much of the detail and replace with a general obligation to undertake modelling and forecasting work and to publish information on security of supply risks
Security of Supply Policy GPS 41-42	Requirement to develop, consult on, and publish policy and standards	Retain, but modify to incorporate the proposed new standard
Minimum Hydro Zone GPS 43-45	Requirement to develop, consult on, and publish a minimum hydro zone and emergency zone	Modify to remove reference to 1-in-60 but retain a requirement to monitor against storage guidelines and an emergency zone
Trigger Mechanism GPS 60-61	Details that reserve energy should be dispatched at $200 per MWh or (at EC option) when minumum hydro zone is breached.	Modify to provide for reserve energy to be dispatched according to EC policy. The policy would retain the option for EC to dispatch reserve energy if storage falls below the relevant guideline
Levy GPS 62-63	Species use of spot revenues from reserve energy and levy collection mechanism.	Retain
Security of Supply Co-ordination GPS 68-71	Details a lot of requirements that the Commission is expected to implement or investigate	Modify to incorporate a general obligation for EC to investigate, consider and recommend alternative approaches
Conservation Campaigns GPS 72	Requirement to activate a conservation campaign in worse than 1-in-60 dry year	Replace with an obligation to establish an emergency response plan with a range of measures to cover contingencies that fall outside those covered by the standard.
Use of Ripple Controls GPS 73	Expectation that the Commission will put in place arrangements to use ripple controls	Delete from GPS – EC previously considered and abandoned the use of ripple controls as likely to be ineffective.
Co-ordination of Outages GPS 74	Expectation that the Commission will put in place arrangements to schedule rolling outages in extreme events	Retain

Q14. Do you agree that the general approach to modifying the GPS as outlined in section 8 is appropriate?

APPENDIX 1 - EXISTING SECURITY OF SUPPLY POLICY

Security of Supply Objective

1 ***Expected Supply*** under a 60 year return period drought (of any duration) will be sufficient to meet ***Expected Demand*** without the need for emergency intervention.

- **Expected Supply** will be simulated using:
- Design 1 in 60 year inflow sequences scientifically derived from historical inflow data
- An assumption that all non hydro plant is fully available up to its expected availability after accounting for planned and random outage factors and the impact of transmission and fuel deliverability constraints.
- **Expected Demand** will be based on scientific forecasting methods and intelligent information gathering processes. This will include:
- The use of econometric forecasting techniques.
- Analysis of demand trends in different regions.
- Analysis of the trends in key consumer segments of the energy sector.
- Analysis of the expected[11] demand response to spot price.
- **Expected Supply** and **Expected Demand** will be assumed by the Commission and will be reviewed at least every six months and revised to reflect the best information available.
- Non-hydro plant will include all thermal, geothermal and cogeneration plants, and all wind farms.

The Approach that the Commission will Adopt

2 The Commission will adopt an approach to ensuring security of supply that includes*:*

- A strong focus on providing information and analysis of supply and demand and security of supply, in order to maximise the opportunity for market participants to manage security of supply risks.
- Monitoring security of supply in the long term (7 to 10 years) and publishing forecasts to provide information that participants can use to assist risk management and investment decisions. The aim is to avoid the requirement for reserve energy by encouraging timely investment decisions.

[11] **The effects of conservation campaigns will be excluded.**

- Assessing Reserve Energy needs in the medium term (2+years). If insufficient new generation or demand side initiatives are forthcoming then additional Reserve Energy may be required to be contracted. The decision to contract will be delayed as long as possible in order to provide as much opportunity for other solutions to be implemented and to reduce the possibility of redundant Reserve Energy.

- Monitoring security of supply in the short-term (less than a year) and regularly publishing a Minzone in order to encourage participants to manage security of supply as much as possible.

- Monitoring market outcomes as a security of supply situation develops and publishing expectations of outcomes that would be consistent with ensuring security of supply.

- Closely monitoring supply whenever storage falls near or below the Minzone in order to establish whether all non-hydro plant is operating at levels consistent with the assumptions that underpinned the Minzone projections.

- Triggering the use of contracted Reserve Energy as the Minzone is breached if these are not already in operation due to the price trigger.

- Considering what other action is necessary if all non-hydro plant is not operating at levels consistent with the assumptions that underpinned the Minzone projections.

Establishing an Operational Minzone

3 The Commission will adopt a traditional approach to calculating the Minzone, based on 1 in 60. This approach:

- Calculates the amount of hydro storage required to sustain a 1 in 60 year low inflow sequence with all non-hydro supply fully committed.

- Is forward looking in that it takes no account of the reasons why the Minzone storage has been reached.

- Is relatively simple to calculate and should be readily determined by participants with a strong interest in security of supply.

4 Where transmission constraints have a significant effect, separate additional assessments will be made for each region.

5 The Commission will supplement the Minzone with Energy Security Assessments over 2, 4 and 6 month timeframes and update these assessments monthly for operational monitoring purposes.

6 For the initial policy, the Commission will adopt a simple statistical approach to deriving 60 year return period inflows over different timeframes in preference to simply using the worst of the current 72 sequences.

Assessing the Need for Reserve Energy

7 The Commission will forecast a Minzone over a two year timeframe and will use a trigger for the purchase of additional Reserve Energy based on the top of the Minzone exceeding a particular trigger storage level. The trigger storage level will be set according to an approach that involves assessing a trade-off between the cost of Reserve Energy and the cost of spill. This would involve establishing a trigger level below 100% storage at the top of the Minzone.

8 The Commission intends to undertake additional work on the precise trigger to be used for determining the need to purchase Reserve Energy.

9 For the initial security of supply policy, the Commission will not adopt a precise trigger for the purchase of Reserve Energy, pending the completion of the additional work.

10 In the meantime, the Commission will continue to undertake detailed analysis of the Minzone, taking into account transmission constraints, over a forecast two year period, at least once every year, and consider the need for Reserve Energy. If circumstances change that would have a material effect on the Minzone assessment, the assessment will be repeated more frequently.

Dispatching Reserves to Meet the Security Standard

11 Reserve Energy contracts will normally be offered for dispatch at the higher of 20c/kWh or the variable cost of each Reserve Energy option. A dispatch policy will be developed for each Reserve Energy option that depends upon the characteristics of the option (for example, to account for lead times). This policy may lead to more complex offers involving several offer prices reflecting different circumstances as is the case with the existing Whirinaki reserve plant.

12 When storage falls below the Minzone, Reserve Energy is expected to be dispatched at security guidelines derived for different levels of Reserve Energy variable cost (accounting appropriately for start up costs and the like).

13 Reserve Energy is expected to be withdrawn when storage rises above the security guideline appropriate to the Reserve Energy option.

Establishing an Emergency Zone

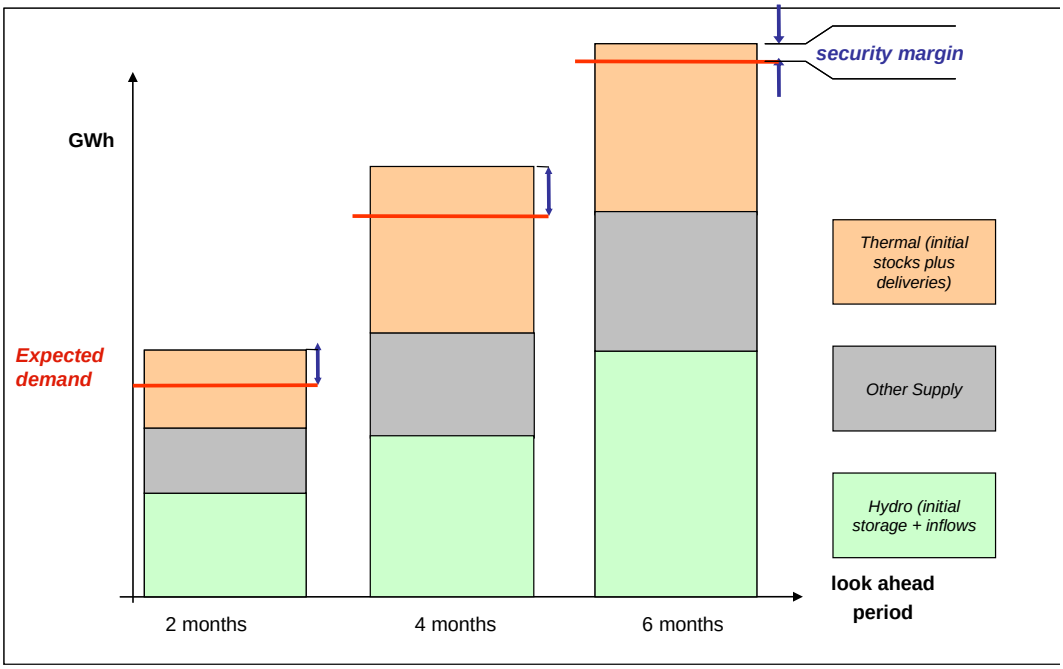
14 The emergency zone will be set at a level consistent with a 10% risk of shortage (consistent with a cost of emergency measures in of $2.00/kWh).

Monitoring and Information Publication

15 The Commission will monitor security of supply over a ten year timeframe and publish three types of ***Energy Security Assessments*** as follows:

- Short-term assessments of the security margin for two months, four months and six months in the general form indicated by Figure 1.

Figure 1: 'Current' Security Margin Projection



- A two year forecast of the 1 in 60 Minzone calculated using the definitions of expected supply and expected demand as illustrated in Figure 2.

- A ten year security projection expressed as a winter energy margin at 70% storage as indicated in Figure 3.

Figure2: Over Time Security Margin Assessment

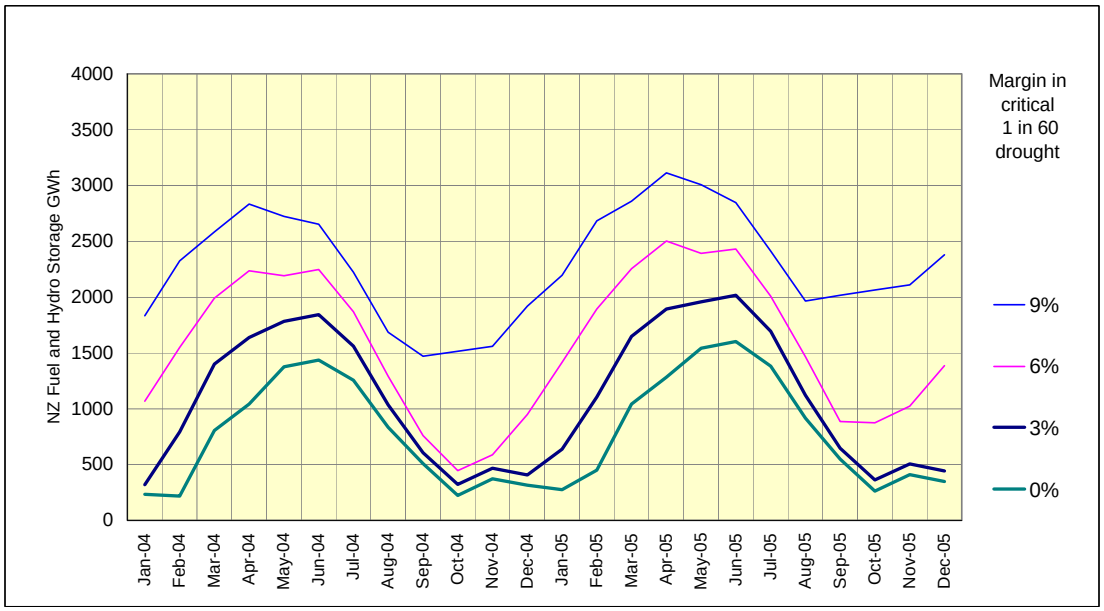
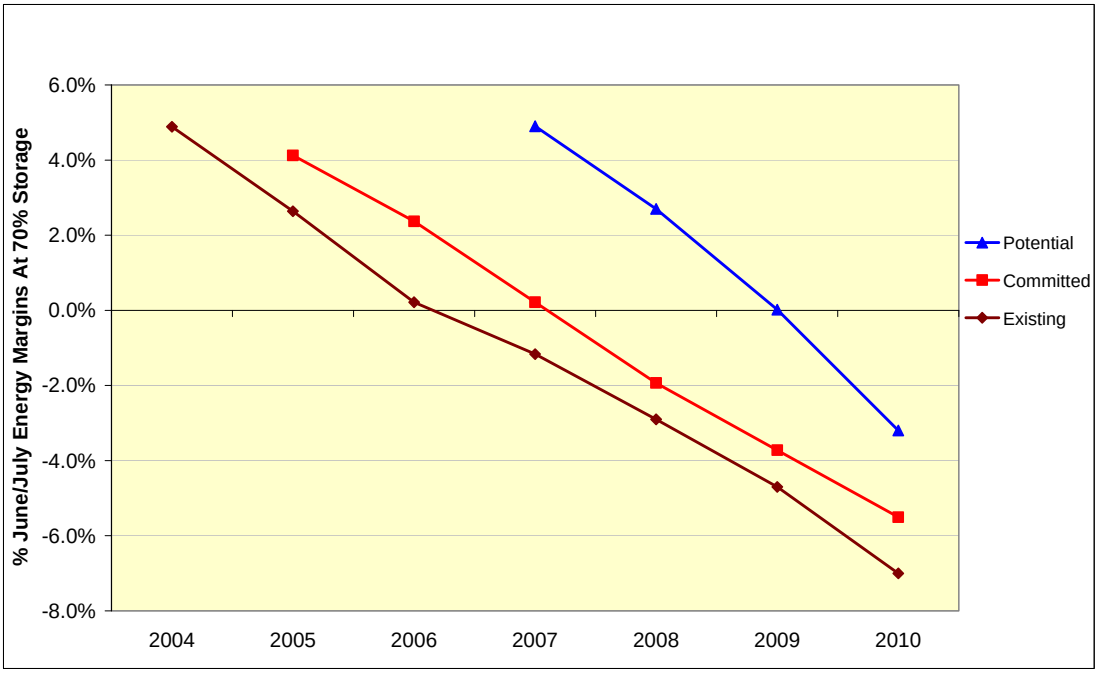


Figure3: Longer Term Security Projections



16 The emergency zone will be set at a level consistent with a 10% risk of shortage (consistent with a cost of emergency measures in of $2.00/kWh).

APPENDIX 2 - QUESTIONS FOR SUBMITTERS

Security of supply standard

Q1. Do you agree with the approach recommended by Castalia to develop an economic approach to establishing a security standard?

Q2. Do you agree that the approach developed by trading off the cost of demand restraint against the cost of reserve energy is an appropriate means of implementing an economic approach?

Q3. Do you agree that the most appropriate expression of an economic standard as a trigger for the procurement of reserve energy is a mean winter energy margin?

Q4. Do you support the Commission's conclusion that the economic standard derived using the Castalia approach yields a security standard that appears unlikely to result in a lower security of supply than the existing standard?

Q5. Do you support the Commission's conclusion that the GPS should be replaced with a standard based on an economic approach and the existing reserve energy procurement trigger should be replaced by South Island and New Zealand winter energy margins?

Q6. Alternatively, and because the two approaches appear to yield a similar result, do you consider that the Commission should retain its current approach involving triggering reserve energy when the top of the Minzone exceeds a particular storage level such as 70%?

Monitoring and dispatch

Q7. Do you agree that the traditional Minzone should be retained as a key short-term security of supply monitoring tool?

Q8. Do you agree that a series of risk guidelines reflecting vary risk levels could be a useful adjunct to the traditional Minzone?

Q9. Do you agree that the Commission should retain the current approach to dispatch of reserve energy rather than move to dispatch at SRMC?

Other Castalia Recommendations

Q10. Do you agree that the GPS should be amended to introduce a requirement for the Commission to monitor whether the investment in new power stations is consistently late relative to demand growth?

Q11. Do you agree that if the Commission finds that the investment in new power stations is consistently late relative to demand growth it should consider possible future amendments to the GPS to require a comprehensive solution be introduced based on Energy Adequacy Hedge mechanisms?

Q12. Do you agree that the existing levy mechanisms should be retained?

Q13. Do you agree that the Commission should investigate short-term supply-based alternatives (such as containerised diesel-fired plant) rather than focus on complex procurement processes and pre-consenting options?

Amendments to the GPS

Q14. Do you agree that the general approach to modifying the GPS as outlined in section 8 is appropriate?

APPENDIX 3 - FORMAT FOR SUBMISSIONS

Submission summary table

Question	**Comment**	**Response**
Q1	[Submitter] considers that…	[Submitter] recommends that…