

Emergency Response Plan

Explanatory Paper

1 May 2009

Glossary of abbreviations and terms

Act	Electricity Act 1992
AUFLS	Automatic under-frequency load shedding
Australian NEM	The National Electricity Market in Australia
Developing Event	Event that evolves over time, e.g. as the result of a period of unseasonably low inflows to hydro catchments
Immediate Event	Event that occurs with little or no warning, e.g. as a result of a transmission or major power station failure
Commission	Electricity Commission
Emergency Storage Guideline	A guideline that corresponds to a 10% risk of electricity shortages – if storage falls below this the Commission will initiate a series of emergency measures that are set out in the ERP
ERP	Emergency Response Plan published by the Commission
GPS	Government Policy Statement, published May 2008
Hydro Risk Curves	Curves prepared by the Commission that reflect the risk of future electricity shortages taking into account the range of likely inflows to hydro catchments
Interim ERP	The Interim Emergency Response Plan published by the Commission in April 2005
Minister	Minister of Energy and Resources
POPs	Participant Outage Plans, to be published by scheduled participants under the Electricity Governance (Security of Supply) Amendment Regulations 2009 ¹
PPOs	The System Operator's Primary Performance Obligations
Regulations	Electricity Governance Regulations 2003
RETP	Reserve Energy Trigger Price – the wholesale market price that will trigger the use of the Whirinaki reserve generation
Rules	Electricity Governance Rules 2003
Security Alert	Declaration by the Commission that a Security Alert Phase has commenced

¹ <http://www.legislation.govt.nz/regulation/public/2009/0040/latest/contents.html>

Security Alert Phase	Phase in which the risk of shortage is deemed to be between 4% and 10%
Security Emergency	Declaration by the Commission that a Security Emergency Phase has commenced
Security Emergency Phase	Phase in which the risk of shortage is deemed to be at least 10%
Security Normal Phase	Phase in which the risk of immediate shortage is deemed to be small
Security Watch	Declaration by the Commission that a Security Watch Phase has commenced
Security Watch Phase	Phase in which the risk of shortage is deemed to be between 1% and 4%
Security of Supply Policy	The policy published by the Commission setting out how it intends meeting the Act requirements and GPS expectations for security of supply
Security Regulations	Electricity Governance (Security of Supply) Regulations, made under urgency for winter 2008
Supply Shortage Declaration	A declaration by the Commission, under the Electricity Governance (Security of Supply) Regulations 2008, that it considers the normal operation of the wholesale market is unlikely to facilitate a balance between supply and demand, and that, if planned outages are not implemented, unplanned outages are likely.
VoLL	The value of lost load
Winter Review	Review of 2008 Winter and the period leading into winter; Hunt, Isles and McKenna; December 2008

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1. Introduction

1.1 Background

- 1.1.1 The Commission seeks to ensure that electricity is produced and delivered in a reliable manner and that risks relating to security of supply are properly and efficiently managed. The Commission must put in place an Emergency Response Plan (ERP) that identifies and includes a range of measures to cover extreme contingencies. The GPS suggests that the measures should include conservation campaigns, and rolling outages in the event that blackouts are required to ensure a balance between supply and demand.
- 1.1.2 The ERP is intended to provide guidance to all stakeholders about how the Commission intends to respond in the build up to, and during, potential emergency security situations.
- 1.1.3 On 1 May 2009 the Commission published a revised ERP². This revised ERP replaces the Interim ERP that has been in place since 2005.
- 1.1.4 Note that the ERP and this explanatory paper use the terms **emergency security situation** and **emergency measures**. Wherever these terms are used they are referring to a heightened risk of potentially sustained energy shortages and the measures that might be put in place to reduce the risks. They are not referring to short-term grid emergencies.

1.2 Purpose of this paper

- 1.2.1 The purpose of this paper is to provide some background to the revised ERP and explain some particular features of the plan. In particular, this paper:
- (a) Explores the issues around developing an ERP;
 - (b) Considers how those issues sit within the framework of the Commission's approach to security of supply;
 - (c) Explains how emergency response planning fits within the Commission's Market Development Programme;
 - (d) Sets out the Commission's approach to managing emergencies;
 - (e) Discusses the range of possible emergency measures;
- 1.2.2 Issues which are not considered in this consultation paper include:

² <http://www.electricitycommission.govt.nz/pdfs/opdev/secsupply/policy/ERP-May09.pdf>

- (a) the status and operation of Whirinaki Power Station, as part of the Reserve Energy Scheme;
- (b) the allocation of Security of Supply and Reserve Energy costs incurred by the Commission; and
- (c) the content of the Commission's Security of Supply Outage Plan (**SOSOP**)

1.2.3 The first two issues are not considered in this paper because they are not directly concerned with emergency planning. The content of the SOSOP is relevant to security emergencies, but is considered separately because it relates specifically to the detailed implementation of one particular emergency measure (rolling outages). The Commission will publish the SOSOP in May 2009.

1.3 Winter Review

1.3.1 The period of very low hydro inflows over winter 2008 gave rise to a risk that a continuation of extremely low inflows and / or a critical plant failure could trigger a need for emergency measures. As a result, the Commission initiated work to investigate possible measures including the possibility of contracted demand response. In the event, emergency measures were not required and increased inflows restored hydro storage to more comfortable levels.

1.3.2 The experiences over winter 2008 and observations contained in the Winter Review suggested that the arrangements for emergency planning did not provide sufficient detail and clarity about the Commission's intentions during a security emergency. Accordingly, the Commission has undertaken further work on emergency response planning and the revised ERP is intended to address some of the deficiencies identified in the Winter Review. (See section 4.1.)

1.4 Market Development and Emergency Measures

1.4.1 The Commission has a Market Development Programme (MDP) in place to develop the existing electricity market arrangements. The MDP has been developed from the findings of the Market Design Review³ and is supplemented by the findings of the Winter Review. Some of the projects under the MDP are likely to have implications for the Commission's approach to security of supply and the need for emergency measures. (See section 4.2.)

1.4.2 The Commission also has a program of work in place to investigate specific emergency measures further, with a possible view to including them in the ERP at some future date.

³ <http://www.electricitycommission.govt.nz/consultation/MDROptions>

2. Policy Context

2.1 Duties and powers under the Act

2.1.1 The obligations of the Commission, in respect of security of supply, are set out in the Act and associated GPS. The Act and GPS in combination establish a responsibility for the Commission to manage the security of supply of electricity, and provide some guidance about how the Government expects the Commission to go about the task.

2.1.2 These obligations are set out in Appendix 1 and have some implications for emergency response planning. In particular, the Commission is required to:

- (a) Use reasonable endeavours to ensure security of supply while minimising distortions to the normal operation of the market;
- (b) Manage emergency conservation campaigns to lower the risk of supply shortages;
- (c) Have an Emergency Storage Guideline to trigger a range of emergency measures, including an emergency conservation campaign;
- (d) Establish an ERP that includes a range of measures to cover severe contingencies; and
- (e) Put in place arrangements to implement rolling outages during extreme events that would otherwise require blackouts.

2.2 GPS expectations

2.2.1 The GPS places a high priority on security of electricity supply, and the Act requires the Commission to give effect to the GPS. The GPS⁴ requires the Commission to use reasonable endeavours to ensure that the generation and transmission system is capable of maintaining a mean winter energy margin of 17 percent for New Zealand overall, and 30 percent for the South Island.

2.2.2 As part of meeting its security of supply objectives the Commission is required (amongst other things) to:⁵

- Work with stakeholders to identify industry contingencies, and develop strategies consistent with the operation of the electricity market to manage supply and demand during such contingencies;

⁴ See paragraph 55. The “winter energy margin” standard replaced the “1 in 60 dry year” standard contained in the 2006 GPS.

⁵ See in particular paragraphs 57, 58, 66, 74, and 75 of the May 2008 GPS.

- Develop a security of supply policy that specifies the steps that the Commission will take at various stages during a contingent event such as an extended dry sequence;
- Establish an emergency hydro storage guideline that would trigger a range of emergency response measures, including a conservation campaign;
- Establish an emergency response plan that identifies and includes a range of measures (including conservation campaigns) to cover contingencies more severe than those allowed for within the mean winter energy margin; and
- Put in place contingency arrangements to provide for the scheduling of outages, including rolling outages in the extreme event that blackouts are required to ensure a balance between supply and demand.

2.3 Commission initiatives relevant to Emergency Response Planning

2.3.1 As part of its Security of Supply work, the Commission has developed policies and procedures over recent years. Some of the key initiatives relevant to emergency response planning are:

- The Commission developed and published a Security of Supply Policy which outlines the way in which the Commission intends to monitor security, and procure and operate reserve energy. It also establishes an “emergency zone”, which is set at a level consistent with a 10% risk of shortage.
- During 2005 and 2006 the Commission developed and consulted on proposed regulations to implement rolling outages, and an associated Security of Supply Outage Plan (SOSOP).
- As part of a series of actions during winter 2008 (and drawing on the work in 2005/06), the Commission recommended to the Minister, under urgency, a cut-down set of regulations, the Security Regulations, that could be implemented immediately.
- Following a substantive review of reserve energy policies during 2007, the Commission developed a revised Security of Supply Policy which was published in October 2008.
- The Commission recommended to the Minister a revision of the regulations to implement rolling outages and prepared a draft revised SOSOP.

3. Emergency Response Planning

3.1 Interim Emergency Response Plan

3.1.1 The Commission published an ERP, titled Interim Emergency Response Plan, in April 2005. The Interim ERP applied over the period from April 2005 to April 2009.

3.1.2 The Interim ERP set out a number of issues, a number of possible emergency measures, and a possible project structure to cope with an emergency situation. It is essentially a series of recommendations about what the Commission needs to do to develop a more detailed approach to emergency planning.

3.1.3 The Interim ERP recommended that the Commission:

- Established a temporary emergency response structure incorporating a Project Manager, a Project Team, a Steering Group, and an Executive Advisory Group;
- Confirmed the nature of events to be covered by the ERP;
- Established Security Normal, Security Alert and Security Emergency phases to guide decision making;
- Focused on voluntary conservation campaigns wherever practical, with extended water heating cuts and rolling outages as last-resort measures; and
- Tasked the Project Manager with undertaking the work necessary to establish the detail of an ERP incorporating a range of emergency measures.

3.1.4 The Interim ERP lacked detail and remained a general guide to how the Commission expects to respond during a security emergency, rather than a detailed description about the steps the Commission would take during a security emergency. The lack of detail in the Interim ERP caused some concern among participants during the winter of 2008 and uncertainty about what actions the Commission would take as storage fell.

3.1.5 The Interim ERP envisaged three phases of emergency response comprising:

- **A Security Normal Phase** – No particular security concerns exist. The Commission monitors and publishes regular forecasts of security levels in the form of Hydro Risk Curves;
- **A Security Alert Phase** – An energy shortage event is possible. The Commission communicates with stakeholders, intensifies monitoring activity, and activates an emergency response structure;

- **A Security Emergency Phase** – An emergency situation is declared. The Commission will communicate further with stakeholders and oversee the implementation of a range of emergency measures designed to ameliorate the effects of the emergency situation.

3.1.6 Under the Interim ERP, the set of emergency measures that the Commission would consider in a Security Emergency Phase comprised a conservation campaign (calls for savings through public/media relations and advertising campaigns), possible extended water heating cuts and, as a last resort, rolling outages.

3.2 Security of Supply Policy

3.2.1 The Commission published a revised Security of Supply Policy in September 2008. The revised policy was developed following a detailed review of security of supply policy over the period November 2006 to November 2007 which culminated in a series of recommendations to the Minister of Energy. The revised policy is summarized in Appendix 2 and the key points in the context of emergency planning are that the Commission will:

- (a) Focus on ensuring quality analysis and information is provided, as a mechanism for managing security of supply risks;
- (b) Monitor and publish forecasts of security of supply in the long-term;
- (c) Procure Reserve Energy and/or Reserve Capacity if forecasts of security margins fall below prescribed levels;
- (d) Monitor hydro storage relative to hydro risk curves in order to assess short-term security of supply risks;
- (e) Dispatch Reserve Energy if market prices rise higher than price triggers or if hydro storage falls below particular guidelines; and
- (f) Initiate a series of emergency measures if hydro storage falls below an emergency storage guideline corresponding to a 10% risk of future blackouts.

3.2.2 Because this policy was published in September 2008, it did not apply during the 2008 winter. The previous version of the policy that applied during the 2008 winter adopted a similar overall approach, but had less specific trigger points for procuring Reserve Energy, did not include Reserve Capacity, and hydro storage was monitored relative to a "minzone" rather than hydro risk curves.

3.2.3 The policy sets out a security standard expressed in terms of "winter energy margin" (the margin between forecast capacity to supply in a mean hydro year

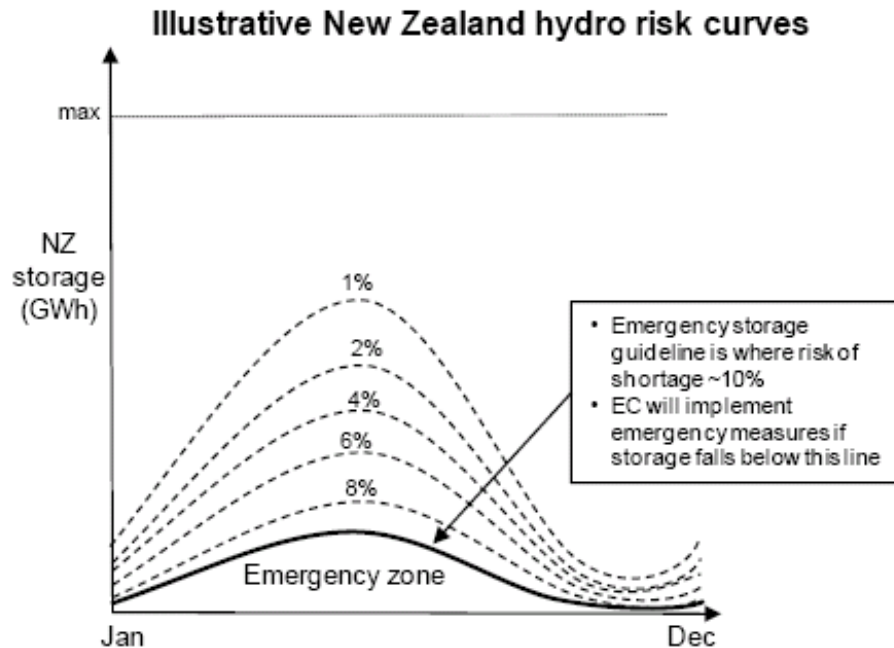
and forecast demand⁶). Amongst other things the policy describes how the Commission will establish the winter energy and capacity margins, monitor security, assess the need for reserve energy or capacity, and manage emergencies.

⁶ This replaced the previous security standard which was expressed in terms of a “1 in 60 dry year” standard.

3.3 Approach to Security of Supply

- 3.3.1 The key to the Security of Supply Policy is a focus on monitoring security of supply and publishing information about security of supply risks. Inherent in this approach is an expectation that electricity market participants are best-placed to manage security risks and that the Commission should limit its activities to “last-resort” measures which maximise the opportunity for market participants to manage security risks and minimise any distortion of the incentives on market participants.
- 3.3.2 Consistent with this approach the Commission forecasts security of supply capability in the **long-term** and publishes its view on Winter Energy and Capacity Margins. This provides market participants and other stakeholders with an opportunity to consider the Commission’s analysis and respond to any forecast of tightening margins. The Commission will maximise the opportunity for participants to deliver new capacity and will only procure Reserve Energy or Reserve Capacity if market participants are clearly failing to deliver. The trigger levels for procurement published in the Security of Supply Policy provide a clear indication to market participants about the point at which the Commission will intervene.
- 3.3.3 The Commission also monitors security of supply in the **short-term** and publishes regular updates of hydro storage relative to Hydro Risk Curves indicating the risk of possible future shortages of supply. This provides market participants with an opportunity to consider the Commission’s analysis and respond with short-term measures to security of supply risks as they arise. The trigger levels for the dispatch of Reserve Energy or capacity that are published in the Security of Supply Policy provide a clear indication to market participants about the point at which the Commission will intervene.
- 3.3.4 The Hydro Risk Curves reflect the risk of future electricity shortages taking into account the range of likely inflows to hydro catchments, and are updated whenever something happens that is likely to cause a material change to the curves.
- 3.3.5 The published Hydro Risk Curves indicate 1%, 2%, 4%, 6%, 8% and 10% risk of electricity shortages⁷. The risk curves take the form illustrated in the following chart.

⁷ The 10% risk of shortage is assessed by simulating expected supply and expected demand, while assuming that all available thermal plant will be running, and determining the probability that hydro storage will fall to zero, in the absence of any emergency measures implemented by the Commission.



- 3.3.6 The 10% risk curve is the Emergency Storage Guideline. If storage falls below the Emergency Storage Guideline the Commission will initiate a series of emergency measures set out in the ERP.
- 3.3.7 The Hydro Risk Curves and the Emergency Storage Guideline are published separately for New Zealand and the South Island. The current versions are available on the Commission website⁸.
- 3.3.8 The Commission intends to have a Dispatch Policy for each Reserve Energy and Reserve Capacity option (Whirinaki is the only current reserve option) which is intended to provide a clear indication to market participants about when Reserve Energy and/or Reserve Capacity options will be used. These dispatch policies may refer to the level of storage relative to the Hydro Risk Curves. For instance, the current Dispatch Policy for the Whirinaki Reserve Energy option specifies that the station is expected to operate if storage falls below the 4% Risk Curve, and that in these circumstances the Commission will consider reducing the offer price to ensure that it is dispatched⁹.

⁸ See links marked "Hydro Risk Curve and actual storage" at <http://www.electricitycommission.govt.nz/opdev/secsupply/>

⁹ The Commission will only take this action if it is satisfied that dispatching Whirinaki will not displace cheaper thermal generation capacity.

4. Market Development

4.1 Review of 2008 Winter

4.1.1 The Winter Review contained a number of recommendations relating to the management of “dry-year” emergencies, drawing on the nature of the event and observed participant behaviours leading up to and during the winter period.

4.1.2 The Winter Review recommendations directly related to managing emergency situations are:

- **Recommendation 1** - Reduce or remove the scope for participants to externalise the cost of their management decisions, and discontinue the reserve energy scheme or modify it to ensure costs are targeted as closely as possible to those who benefit from its use;
- **Recommendation 3** - Triggers and plans for emergency measures be pre-defined as far as practicable and published;
- **Recommendation 4** - The informal improvements to information provision adopted for winter 2008 be examined to determine whether any should be codified into existing arrangements or contingency plans;
- **Recommendation 6** – Consider whether there are any steps the Commission can take to provide more certainty around the terms of resource consent access to 'emergency' generation resources where consents make reference to the Commission.

4.1.3 Several elements of the Winter Review are now being addressed as part of the Commission's work programme.

4.1.4 Recommendation 1 is being addressed as part of the Market Development Programme (MDP, see section 4.2).

4.1.5 Recommendation 3 relates to the lack of specific detail available in the Interim ERP. It is suggested that the Commission should be as clear as possible about:

- (a) The nature of any actions it might take;
- (b) The trigger points and criteria it will consider in the lead up to any actions;
- (c) The process it would adopt if it were to procure any emergency resources; and
- (d) The mechanism it will use to recover the cost of any actions – noting that these should be targeted at beneficiaries of the actions as far as possible.

4.1.6 The revised ERP addresses points (a) through (c) by providing more detail.

- 4.1.7 Recommendation 4 is being addressed as part of the Market Development Programme (see section 4.2).
- 4.1.8 Recommendation 4 also raises an issue as to whether the Commission should assume a more active role in briefing stakeholders during a shortage situation. The revised ERP indicates how the Commission will fulfil this role, while acknowledging that this will be at the Chair's discretion.
- 4.1.9 Recommendation 6 relates to the Commission's position where it is named in a resource consent for access to 'emergency' generation resources. This issue is addressed in this paper at section 6.2.

4.2 The Market Development Programme

- 4.2.1 The Market Development Programme (MDP) is a high-priority Commission initiative which brings together and prioritises a group of projects intended to improve retail, wholesale, and ancillary service markets.
- 4.2.2 The MDP includes several projects which relate to the Winter Review's recommendations, or, more generally, to emergency management. In particular, the MDP includes the following projects:
 - (a) Scarcity pricing – this project aims to improve incentives on market participants during periods of scarcity, in particular to reduce the potential for suppliers to shift costs on to consumers in the form of physical curtailment.
 - (b) The future of Whirinaki and the Reserve Energy Scheme – this project considers how New Zealand's reserve energy and reserve capacity needs should be met. One aspect is considering the most appropriate future for Whirinaki Power Station.
 - (c) Security information - this project seeks to improve the information made available to stakeholders about security of supply. An early stage of this project is the creation of the Supplyline website.
- 4.2.3 Some of these projects may lead to changes in the ERP at some future point.

5. Approach to Emergencies

5.1 Emergency events

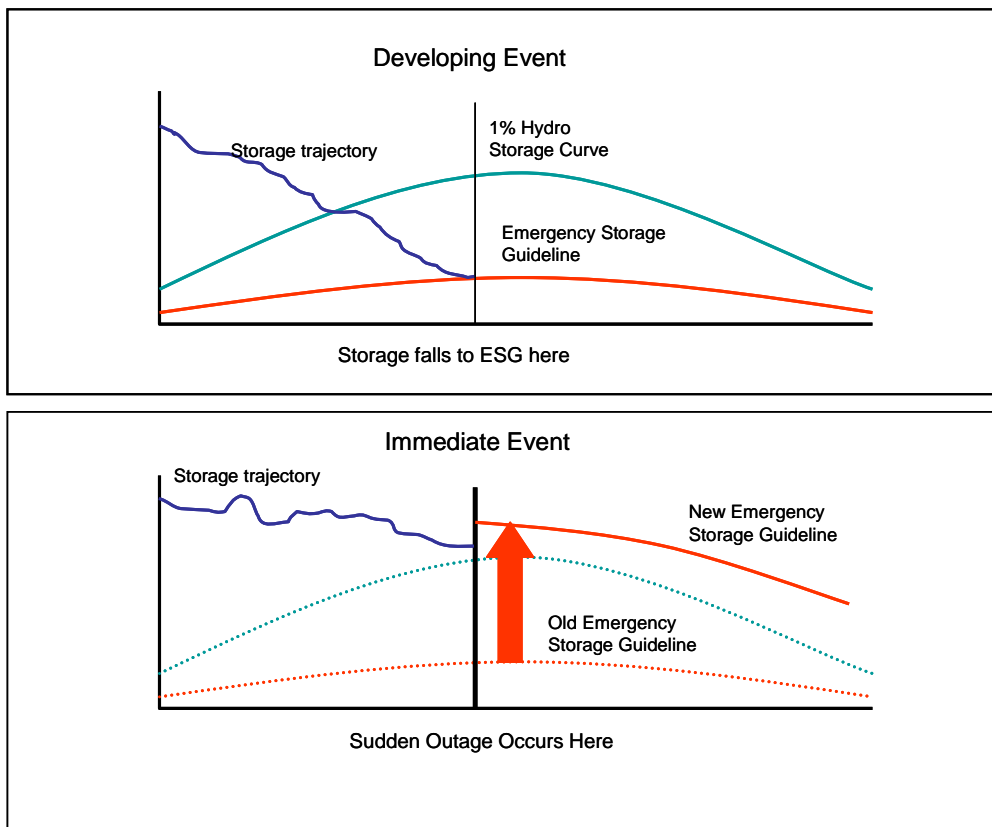
5.1.1 The ERP is not intended as a tool for managing short-term grid emergencies. (See section 3.2 of the ERP for a short discussion of how the System Operator manages these.) Rather, it focuses on ongoing, widespread shortages.

5.1.2 There is a spectrum of events that could lead the Commission to determine that emergency measures are required. Two key categories of events that, in general terms, typify each end of the spectrum are:

Developing Events – Events that evolve over time – for example as the result of a period of unseasonably low inflows to hydro catchments; and

Immediate Events – Events that occur with little or no warning - example as a result of a transmission or major power station failure.

5.1.3 These types of event are illustrated in the following figure, which contrasts the two categories and the likely sequence of events.



- 5.1.4 This highlights that the ERP needs to contemplate the sequence of emergency measures that might be appropriate for different types of security emergencies and that planning to implement emergency measures needs to provide for both category events. It is also important to recognise that, in practice, a security of supply emergency could have elements of either type of event, or progress from one to the other during the course of an emergency.
- 5.1.5 The first example illustrated in the table is for a Developing Event that involves low inflows to hydro catchments resulting in storage falling through the hydro risk curves and ultimately below the Emergency Storage Guideline. This illustrates how a dry-year emergency would take some time to unfold and there would be opportunities to prepare emergency measures in advance of their requirement.
- 5.1.6 In contrast, the second example illustrates an Immediate Event such as a major gas supply failure. If such a failure impacted upon multiple generating sites it could require immediate action in order to balance supply and demand. In practice the system operator has responsibility for real-time coordination and would likely implement load-shedding under the Grid Emergency provisions of part C of the Rules. If the gas supply failure was expected to be of significant duration, then the Commission may need to implement rolling outages under the Security of Supply Regulations in order to achieve targeted savings in an endeavour to reduce the impact upon the economy.
- 5.1.7 Planning to implement rolling outages in accordance with this plan needs to provide for both types of event and the ERP includes a sequence of emergency measures to cover both category of events. However, it is important to understand that, in practice, a security of supply situation could have elements of either event, or progress from one to the other during the course of a declaration period.

5.2 Security Phases

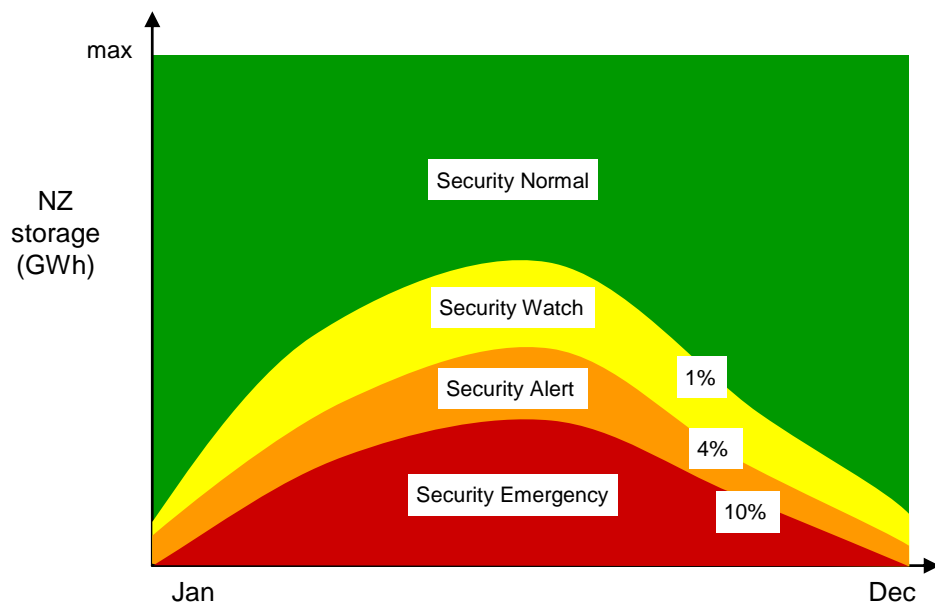
5.2.1 A key consideration for the Commission is the role it should take during the development of a security of supply emergency and the role it expects the system operator and other participants to take. The three phases identified in the Interim ERP have been supplemented by a “Security Watch” phase and more definition has been provided about the transitions between phases, and the actions that can be expected in each phase. The following table outlines, in general terms, roles for the Commission and participants that are consistent with the Commission’s approach to security of supply, during each of the phases.

Phase	Role of Commission	Role of Participants
Security Normal	Monitor and publish assessments of security risk	Operate normally in the market
Security Watch	Monitor more closely, and publish assessments of security risk more frequently Communicate security risks	Operate normally in the market Monitor and manage security risks on a commercial basis Coordinate with other participants as appropriate Communicate with stakeholders
Security Alert	Monitor more closely and publish assessments of security risk more frequently Prepare for possible emergency measures Communicate security risks and possible emergency measures	Operate normally in the market Monitor and manage security risks on a commercial basis Prepare for possible emergency responses and implement as appropriate Coordinate with other participants as appropriate Communicate with stakeholders
Security Emergency	Declare a security emergency Communicate security risks and the sequence of emergency measures that will be taken Initiate emergency measures as necessary	Monitor and manage security risks on a commercial basis Implement and participate in emergency responses as appropriate Coordinate with other participants as appropriate Communicate with stakeholders

5.2.2 During a Developing Event (low hydro inflows and declining storage), the Commission will trigger:

- The Security Watch Phase when storage falls below the 1% Hydro Risk Curve;
- The Security Alert Phase when storage falls below the 4% Hydro Risk Curve; and
- The Security Emergency Phase when storage falls below the Emergency Storage Guideline (10% Hydro Risk Curve).

5.2.3 These transitions for a Developing Event are illustrated in the following figure:



5.2.4 If an Immediate Event occurs (suddenly or with little warning) this could trigger any of the Security Watch Phase, the Security Alert Phase, or the Security Emergency Phase, depending upon the severity of the event and the current supply/demand situation. In most cases, the Commission will promptly re-evaluate the Hydro Risk Curves and the Emergency Storage Guideline following the event in order to determine the level of security risk. In some circumstances the Commission may determine the level of security risk and trigger a security phase by some other means.

5.2.5 Security risks within the New Zealand system are sometimes localised, rather than national. An example is during dry period in the South Island, when southward transmission constraints limit the extent to which North Island thermal plant can be operated to conserve hydro storage. In this situation the security risk in the South Island can be higher than in the North Island. Accordingly, the Security Watch Phase, Security Alert Phase or Security Emergency Phase could

be triggered based on the risk of shortages within a specific region, even when the risk is low elsewhere.

5.2.6 During the winter of 2008 it was clear that hydro storage fell to sufficiently low levels to consider that a Security Alert Phase had been reached. However, there were suggestions that there was a lack of clarity during this phase about the role of the Commission and the expected role of participants.

5.2.7 It is therefore useful to consider what approach the Commission should take and what the role of participants should be, during a developing security situation.

5.3 The role of the Commission during a developing security situation

5.3.1 The Commission has considered the role that is most appropriate for it during a developing security situation and the experience during the winter of 2008 has provided some useful insights. In reaching a view on the most appropriate role for the Commission, it has been necessary to balance the conflicting requirements included in the Act and GPS.

5.3.2 On the one hand, the Commission must make “*reasonable endeavours*” to ensure security of supply. In order to satisfy this obligation, some proponents suggest that the Commission needs to be active early in the process (i.e. well before storage falls below the Emergency Storage Guideline) putting in place emergency measures to be implemented later, and that the Commission needs to have a sequence of “levers” to “pull” as soon as storage falls below the Emergency Storage Guideline.

5.3.3 On the other hand, the Commission must also “*minimise distortions to the normal operation of the electricity market*”. In order to satisfy this obligation, other proponents suggest¹⁰ that the Commission needs to limit its role to ensuring good information is available on security of supply risks and restrain any emergency interventions to measures that would be implemented only as a “last resort”, and only when it becomes apparent that the measures put in place by participants are likely to be insufficient. In support of this approach, it is suggested that the prospect of the Commission intervening with emergency measures dilutes the incentives for participants to implement measures themselves.

¹⁰ For example, some participants responding to the November 2008 consultation paper on rolling outages have suggested that the Commission should revoke the rolling outage regulations and allow participants to manage security of supply even in an extreme emergency – this approach implies that the Commission should have no role during an emergency other than providing information on security of supply risks.

- 5.3.4 Thus there is a spectrum of options that the Commission could adopt for an ERP, ranging from one extreme of “command and control” from an early point in the process, incorporating a range of emergency measures to be implemented in a series of well-defined steps, to another extreme of “hands-off” to the extent that managing security of supply is entirely the domain of participants until it is necessary to implement rolling outages.
- 5.3.5 The Winter Review also highlights this issue by indicating that the Commission should avoid diluting participant incentives to manage security risks and reduce opportunities for cost shifting, but at the same time, be clearer about what it is going to do in an emergency and when it is going to do it. While acknowledging that uncertainty about when the Commission will act and what it might do to encourage participants to manage their own risks, the Winter Review points to a possible perverse effect of encouraging greater reliance on Commission actions in an emergency.
- 5.3.6 The Commission has concluded that, consistent with its overall approach to managing security of supply, it should:
- Monitor and publish information on short-term security of supply risks during a developing security situation, and provide industry participants with the opportunity to prepare and implement emergency measures;
 - Coordinate public communications with industry participants in order to provide clear messages about security risks and possible emergency measures;
 - Limit the range of emergency measures that the Commission will implement to a small number of pre-defined measures to be implemented only if industry participant measures are likely to be insufficient;
 - Implement these measures only when a Security Emergency Phase has been reached (although it would be necessary to *prepare* to implement them in the Security Alert Phase or even earlier); and
 - More clearly define the steps that it will take and the points at which it will take those steps, including the points at which it will commence preparation of particular emergency measures.

5.4 Responding to different Emergency Events

5.4.1 The response to emergency events will differ depending upon the nature of the event. The following tables illustrate how the sequence of responses will be different for category A and Category B events.

Developing Event (evolves over time)
<p>The Commission will declare a Security Watch when hydro storage falls to the 1% Hydro Risk Curve and:</p> <ul style="list-style-type: none"> • Convene the Operational Steering Group¹¹ • Make a public announcement that storage has declined to a point that there is a slightly elevated level of risk to security of supply, that a close watch will be maintained on inflows and storage, and that consumers should adopt prudent measures to conserve energy without sacrificing productivity and comfort levels • Increase the frequency of monitoring and updating security of supply information • Initiate discussions with representative groups of industry participants in order to coordinate preparations and public communications
<p>The Commission will declare a Security Alert when hydro storage falls below the 4% Hydro Risk Curve and:</p> <ul style="list-style-type: none"> • Make a public announcement that storage has reached a low level and alert the public that, if storage continues to fall, some conservation measures may be necessary • Provide further information to stakeholders, at the discretion of the Chair; • Maintain the frequency of monitoring and updating security of supply information • Initiate discussions with representative groups of industry participants in order to coordinate the preparation of possible emergency measures and public communications • Initiate a tender for short-term contracted demand response (see section 6.4) if the Commission considers that industry participants have not put in place sufficient arrangements • Initiate a process to prepare a public conservation campaign (see section 6.4) if preparation is not already underway by industry participants • If generation is not being offered in such a way as to conserve hydro storage in at-risk areas, consider offering Whirinaki reserve generation at a price below RETP¹²

¹¹ See section 7.1.1

¹² RETP is the Reserve Energy Trigger Price for Whirinaki

Developing Event (evolves over time)
<p>The Commission will declare a Security Emergency when hydro storage falls to the Emergency Storage Guideline and:</p> <ul style="list-style-type: none"> • Make a public announcement that storage has reached the Emergency Storage Guideline and alert the public that, if storage continues to fall, some emergency measures will be necessary • Initiate a public conservation campaign if this is not already in place • Trigger demand response contracts in accordance with the Dispatch policy established for each contract • Initiate rolling outages if storage falls to a point where the Commission considers that the future risk of shortages has risen to 50%
<p>When the situation eases and storage rises:</p> <ul style="list-style-type: none"> • above the Emergency Storage Guideline the Commission will revert to a Security Alert condition • above the 4% Hydro Risk Curve the Commission will revert to a Security Watch condition • above the 1% Hydro Risk Curve the Commission will revert to a Security Normal condition

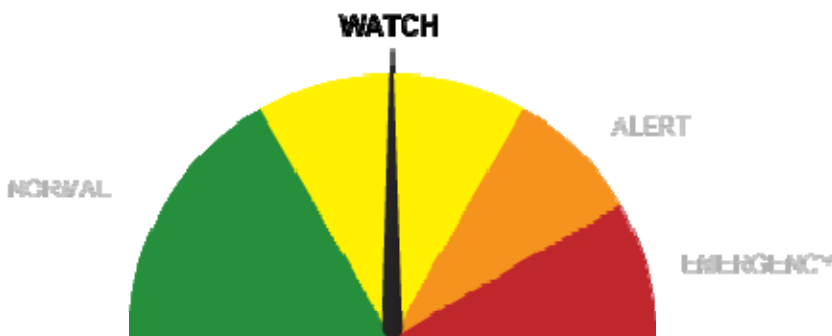
Immediate Event (sudden or no warning)
<p>Immediate demand reductions will be coordinated by the System Operator to the extent necessary and in accordance with the grid emergency provisions in Part C of the Rules</p>
<p>The Commission will, as soon as feasible, assess the nature of the event and reassess the Hydro Storage Curves and Emergency Storage Guideline taking into account the new supply and transmission circumstances and:</p> <ul style="list-style-type: none"> • If hydro storage is below the Emergency Storage Guideline the Commission will declare a Security Emergency and take the actions consistent with a Security Emergency • If hydro storage is below the 4% Hydro Risk Guideline the Commission will declare a Security Alert and take the actions consistent with a Security Alert • If hydro storage is below the 1% Hydro Risk Guideline the Commission will declare a Security Alert and take the actions consistent with a Security Watch
<p>When the condition causing the Immediate Event is rectified, the Commission will, as soon as feasible, reassess the Hydro Storage Curves and Emergency Storage Guideline taking into account the new supply and transmission circumstances</p> <p>The Commission will revert to a Security Alert, Security Watch or Security Normal condition, as appropriate</p>

5.5 Civil Defence Emergencies

- 5.5.1 Lifeline utilities (including lines companies and generators) have direct responsibility under s. 60 of the Civil Defence Emergency Management Act 2002 to ensure that they are able to function to the fullest possible extent, even though this may be at a reduced level, during and after a civil defence emergency.
- 5.5.2 Civil defence emergencies could have impacts on both supply and demand. In the event that a civil defence emergency impacts within cities and towns it is likely that demand for electricity will fall and the focus will be on restoring supply to critical consumers, rather than managing limited supply using the emergency measures included in the ERP. Most civil defence emergencies are likely to be of this nature.
- 5.5.3 In the event that a civil defence emergency impacts on power stations and there is insufficient supply to meet consumer demand, the emergency measures included in the ERP could potentially play a useful role.
- 5.5.4 To the extent that a natural disaster produces circumstances covered by the ERP, the Commission intends to act in accordance with the ERP. The Commission will provide the final version of the ERP to the Ministry of Civil Defence and Emergency Management when it is completed.

5.6 The Riskmeter

- 5.6.1 The Commission has considered the role of the Riskmeter and concluded that the meter should be adapted to line up with the security phases outlined in the ERP.
- 5.6.2 Accordingly, the Riskmeter has been adapted to appear as illustrated in the following figure:



6. Emergency Measures

- 6.1.1 A range of emergency measures were discussed in the Consultation Paper issued by the Commission in 2004¹³ as part of the process of developing the Interim ERP. Measures that could be instigated above and below the Emergency Storage Guideline were considered.
- 6.1.2 The discussion of emergency measures in this section summarises the points made in the 2004 paper and provides an update where further work has been completed. It is useful to consider the range of possible measures so as to inform a discussion about the approach that the Commission should take during a security of supply emergency and, in particular, the most appropriate roles for the Commission and for industry participants.
- 6.1.3 Emergency measures can be allocated into three categories based on their position in the supply chain; supply measures, transmission / system operation measures, and demand-side measures.

6.2 Supply Measures

- 6.2.1 There are several supply-side options that could be considered as emergency measures as described briefly in the following table.

Measure	Description
Back-up generators	Using generators on consumer premises that are intended for short-term back-up supply
Emergency generator procurement	Procuring portable generator units that can be installed and operated within short timeframes
Emergency fuel reserves	Gaining access to additional lake storage or thermal fuel supplies
Directing generators	Directing generators to make power station capacity available

Back-up generators

- 6.2.2 Small-scale backup generators are typically located within distribution networks scattered across the country. They are often located in commercial and industrial situations, and usually with a limited fuel supply to cover operation only for a short period to cover short-term supply failures. There are likely to be a number

¹³ The paper “Developing Emergency Security of Supply Provisions” (Nov 2004) was consulted on. <http://www.electricitycommission.govt.nz/consultation/riskmgmt>

of resource consent and commercial issues involved in bringing these supply sources to bear in the market during an emergency.

- 6.2.3 The Commission considers that industry participants are best-placed to arrange for access to back-up generators during a security emergency because of the resource consent and commercial issues involved in making them available. However, there may be a role for the Commission in facilitating access to the market for these generators.
- 6.2.4 Further work is required to assess the amount of back-up generation that may be available and the issues involved in contacting and operating the plant. The Commission proposes to undertake this work and make the information available to participants. In the mean-time, the Commission does not propose to include access to back-up generators an emergency measure.

Emergency generator procurement

- 6.2.5 Preliminary work has been undertaken by the Commission to establish the likely costs and logistical issues around accessing portable generators from overseas and operating them at the distribution level, effectively as an embedded generator. Based on that analysis, there are no obvious or significant logistical barriers to industry participants accessing these options.
- 6.2.6 The Commission's preference is for industry participants, rather than the Commission, to investigate and arrange for emergency generator procurement. The Commission considers that industry participants are best-placed to address the issues and face the costs of emergency procurement.

Access to emergency fuel reserves

- 6.2.7 Accessing emergency fuel reserves is an option available principally for hydro or thermal generation:
- **Hydro:** This could involve relaxing limits on storage or release levels. For example, during the 1992 hydro shortage, additional storage was made available from several sources¹⁴, with the main contributors being the Benmore and Hawea storage lakes.
 - **Thermal:** This could involve relaxing resource consent conditions on emission limits (or any other factors limiting thermal output) during a specified emergency, or requiring a participant to maintain special coal stockpiles or oil reserves.

¹⁴ Emergency storage capability is 145GWh at Benmore, 31GWh at Tekapo, 12.5GWh at Cobb, 187GWh at Hawea, and 29GWh at Waikaremoana .

- 6.2.8 Cogeneration plant and geothermal power stations should face appropriate incentives during security of supply emergencies to maximise supply. Options to increase output from these sources are unlikely to be material.
- 6.2.9 The ability for resource consent limits to be bypassed would need to be addressed on a case by case basis, with options ranging from activating clauses in existing consents, through applying for new consents, to creating new legislation.
- 6.2.10 The Commission considers that industry participants should have appropriate incentives, and are best-placed, to investigate the merits of accessing additional fuel reserves.
- 6.2.11 The Winter Review noted that where the Commission is named in a resource consent, it needs to consider clarifying and communicating its position on how it will fulfil its role. The Commission is currently aware of two such consents. One relates to the minimum operating level at Lake Tekapo¹⁵; it refers to the Commission's "*determination that reserve generation capacity (such as Whirinaki Power Station) is required to generate*" and to the Minzone. The other relates to the minimum control level at Lake Hawea¹⁶, and also refers to the Commission's determination that reserve generation capacity should generate.
- 6.2.12 The Commission's comment on these consents is that:
- (a) the Commission's dispatch policy for Reserve Energy has been made public and will be updated if it changes or if new Reserve Energy or Reserve Capacity options are procured; and
 - (b) the Commission no longer intends to publish the Minzone (since it has been replaced by the Hydro Risk Curve framework).
- 6.2.13 Although the Commission prefers not to take an active role in future resource consents, it does have an interest in ensuring that, to the extent that a resource consent nominates a role for the Commission (and/or triggers access to additional hydro storage or fuel), that those provisions are clear and relevant. This outcome could be well served by consulting with the Commission when considering how such provisions in resource consents might be drafted.

Directing participants

- 6.2.14 An extreme supply-side emergency measure could be to suspend the wholesale market and direct the operations of generator participants. This could be

¹⁵ <http://www.electricitycommission.govt.nz/pdfs/opdev/modelling/pdfsmodelling/pdfscds/hydro/OPUS-report-Mar09.pdf>, p. 17

¹⁶ <http://www.electricitycommission.govt.nz/pdfs/opdev/modelling/pdfsmodelling/pdfscds/hydro/OPUS-report-Mar09.pdf>, p. 25

considered in any circumstance where the dispatch of plant according to market-based offers will not provide adequate security of supply.

- 6.2.15 The power to suspend the market and direct participants is provided for in the Australian NEM to cover emergency security of supply situations. In the event that the power is exercised, an expert is appointed to determine ex-ante what spot market price should apply during the period of suspension.
- 6.2.16 Directing participants in this manner is not possible in New Zealand under existing rules or regulations. Section 172 D (2) (a) of the Act provides powers to make regulations requiring electricity generators to hold or provide for reserve fuels, but does not provide similar powers to make regulations to direct participants to make generation available to the market.
- 6.2.17 The views of industry participants on this issue have tended to reflect a view that such intervention is unnecessary and undesirable in the New Zealand situation.¹⁷

6.3 Transmission / System Operation Measures

6.3.1 There are several transmission or system operation options that could be considered as emergency measures as described briefly in the following table.

Measure	Description
Lowering transmission quality standards	Reconfiguring the grid to remove transmission constraints
Lowering system operation standards	Relaxing operating standards to make more generation available
Lowering voltage levels	Reducing consumer demand by lowering voltage levels across the transmission grid and distribution networks

Lowering transmission quality standards

6.3.2 It may be desirable, in some circumstances, to lower transmission quality standards during a security of supply emergency. For example, in order to make generation in one region available to another region, it may be sensible to reconfigure the transmission grid and accept a higher risk to short-term security for a period. In other words, there may be circumstances where it more sensible to accept a possible risk of short-term outages in order to reduce the risk of long-term shortages.

¹⁷ The Australian NEM tends to be capacity constrained, and emergency powers to direct participants is most likely to apply to short periods of time and only to meet peak electricity demands.

- 6.3.3 During previous periods with extreme low hydro inflows Transpower (as grid owner) has worked with other industry participants to consider means of making additional supply available, including the possibility of reconfiguring parts of the transmission grid. The Commission considers that this approach is appropriate and it may not be necessary to incorporate such arrangements within the ERP.
- 6.3.4 However, the Commission proposes to work closely with Transpower to consider the best way of ensuring that such measures can be taken when appropriate. If that work suggests incorporating particular measures in the ERP the Commission intends to consult with participants about those arrangements.

Lowering system operation standards

- 6.3.5 It may be desirable, in some circumstances, to increase short-term system operation risks to maximise energy supply under emergency circumstances. For example, it may be sensible to accept a higher risk of automatic load-shedding in order to free up generation reserves or interruptible load for energy supply purposes.
- 6.3.6 During previous periods with extreme low hydro inflows the System Operator has worked with other industry participants to consider means of making additional supply available, including the possibility of relaxing system operation standards¹⁸. The Commission considers that this approach is appropriate and it may not be necessary to incorporate such arrangements within the ERP.
- 6.3.7 However, the Commission proposes to work closely with the System Operator to consider the best way of ensuring that such measures can be taken when appropriate. If that work suggests incorporating particular measures in the ERP the Commission intends to consult with participants about those arrangements.

Lowering voltage levels

- 6.3.8 This option involves lowering voltage levels at which consumers receive supply (commonly referred to as “brown-outs”) in order to reduce overall energy consumption. Brown-outs are used in some jurisdictions to manage security of supply emergencies without cutting off supply, although this is typically to cope with short-term capacity constraints rather than long-term energy shortages.
- 6.3.9 Brown-outs can be implemented at a national grid level by lowering voltage levels at grid exit points, or at a regional level by distributors lowering voltage levels on local feeders. There is some risk of damage to equipment or equipment being

¹⁸ Transpower established a dry-year planning group which initiated a number of initiatives to maximise storage. For the 2008 winter these included changing the SI under-frequency target and various network splits.

shut down automatically when voltages are lowered, so any measures to lower system voltages would need to be carefully managed.

- 6.3.10 Lowering voltage levels is mandated in some other jurisdictions (the United States for example) and used for managing short-term demand emergencies. Short-term savings of up to 2% for a 4% voltage reduction have been reported, but the effectiveness of this measure is system-specific and there is uncertainty about longer-term energy savings.
- 6.3.11 In order to assess the viability of this option for New Zealand, the Commission proposes to investigate the technical feasibility and likely level of savings from lowering voltage levels, in collaboration with distributors and Transpower.

6.4 Demand-side Measures

- 6.4.1 There are several demand-side options that could be considered as emergency measures as described briefly in the following table.

Measure	Description
Contracted demand response	Contracting with consumers to reduce demand
Emergency conservation campaign	A public call for electricity savings
Extended hot-water heating cuts	Cutting hot water supplies for extended periods to save electricity
Rolling outages	Cutting supply to selected consumers on a “rolling” basis

Contracted demand response

- 6.4.2 Contracting for demand reductions is an option available to the Commission as part of the Reserve Energy arrangements. Typically, the Commission investigates, on an annual basis, whether Winter Energy Margins or Winter Capacity Margins are adequate to cover the following 2-5 years. If margins are insufficient, the Commission considers contracting for Reserve Energy or Reserve capacity. This could take the form of Reserve Generation or Reserve Demand (demand reduction contracts).
- 6.4.3 Contracting for demand reductions is also an option available to the Commission as a short-term measure for managing security of supply emergencies. This option was considered in winter 2008, providing the Commission with some recent experience with the issues involved in contracting for demand-reductions.

- 6.4.4 The Winter Review suggested that, if the Commission is to contract for demand response as an emergency measure, it should consider preparing a template agreement for demand response resources and better define the process by which demand resources will be procured.
- 6.4.5 The Commission agrees that, if it is to continue to maintain the option of short-term procurement of demand-side resources, then it should prepare a template agreement for short-term demand response resources and better define the process by which demand resources will be procured.
- 6.4.6 The Commission considers, however, that it is not the best-placed party to procure demand-side resources during shortage situations. The reasons are that:
- (a) the Commission may not face strong financial incentives to find the most economic solution;
 - (b) the Commission does not have ongoing retailer-customer relationships with demand-side providers;
 - (c) the Commission may lack people with the right skills and experience to negotiate with consumers for demand-side resources at short notice.
- 6.4.7 The Commission further considers that, if it includes contracted demand response as an emergency measure in the ERP, it will weaken the incentives for market participants who are exposed to high spot prices to procure demand-side resources during emergency security situations. The easier alternative is for participants to rely on the Commission to procure the emergency demand-side resources (especially if the cost of acquiring demand reduction contracts is spread across all market participants via the levy).
- 6.4.8 On the other hand, the Commission has concerns that the current market design may not provide sufficient incentives for participants to incur the costs of contracting for demand-side emergency resources. This is because they may not always face the same level of costs that consumers may face if there is a shortage of supply.
- 6.4.9 The Commission has concluded that, pending further work as part of the MDP, it should provide for the possibility that it will contract for demand response during emergencies. Accordingly, the Commission intends to develop a template agreement for, and take steps to define the process by which it will procure, demand response contracts.

Emergency conservation campaign

- 6.4.10 A conservation campaign involves encouraging voluntary reductions in demand through public communications. The GPS conveys an expectation that the

Commission will use a conservation campaign as a means to manage emergencies, if storage falls below the Emergency Storage Guideline.

- 6.4.11 In practice, conservation campaigns have typically been initiated through a collective approach organised and funded by industry participants, and implemented before storage falls below the Emergency Storage Guideline.
- 6.4.12 The Commission considers that it is appropriate for industry participants to organise and fund a public energy conservation campaign, and that it is prudent for such a campaign to be initiated during a Security Alert, if not earlier.
- 6.4.13 Further, the Commission has concluded that it should only implement a public energy conservation campaign if industry participants have failed to put a campaign in place by the time storage falls to the Emergency Storage Guideline.
- 6.4.14 The Commission will therefore commence preparations for an emergency conservation campaign when:
- (a) If a Security Alert has been declared and if industry participants are not in the process of preparing a campaign; or
 - (b) It considers that it is more likely than not that a Security Emergency will occur, and industry participants have not successfully implemented a campaign.
- 6.4.15 If a Security Emergency occurs and participants have not successfully implemented an emergency conservation campaign, then the Commission will:
- (a) Implement a campaign if it has prepared one; or
 - (b) Collaborate with industry participants to prepare and implement a campaign as quickly as possible, if it has not prepared one (this is most likely if the Security Emergency results from an Immediate Event).

Extended hot-water heating cuts

- 6.4.16 A feature of the New Zealand distribution network is that much of the water heating load is supplied by electricity and able to be controlled remotely. This feature is most commonly used for managing peak loads within distribution networks, to manage transmission charges, and to manage spot price risks. In these circumstances it primarily has the effect of shifting energy from peak to off-peak periods without materially reducing overall energy consumption.
- 6.4.17 Following submissions on the options for emergency management in 2004, an analysis of the merits of extended hot-water heating cuts was undertaken and released for consultation in 2005. The Commission estimated that the potential savings from water heating cuts was likely to be less than 2% of national electricity demand, and that to achieve this potential level of savings water

heating cuts would need to be very extended (of the order of 12 to 16 hours per day nationwide) and the effects would be uneven across society¹⁹.

- 6.4.18 The Commission concluded that, although the benefits of water heating cuts were likely to be limited, they should be retained as a possible emergency measure, to be implemented on a voluntary basis by participants as a last resort, and prior to any call for rolling outages. The Commission continues to hold the view that this is the most appropriate use of water heating cuts as an emergency measure.

Rolling outages

- 6.4.19 Rolling outages involve the Commission instructing distributors and selected direct connect consumers to cut load to meet savings targets. The Electricity Governance (Security of Supply) Regulations 2008 empower the Commission to make a Supply Shortage Declaration and direct rolling outages in a planned manner so as to avoid unplanned outages.
- 6.4.20 Rolling outages are intended as the very last resort and would only be implemented in circumstances where the Commission considers that, were rolling outages not put in place, it would be “more likely than not” that the system operator will, at some future time, need to instruct load-shedding under the grid emergency provisions of part C of the Rules.
- 6.4.21 The Commission has recently consulted with stakeholders on the arrangements for implementing rolling outages, considered submissions on the issues, and made a recommendation to the Minister of Energy and Resources to amend the regulations. The amendments have been approved and the new regulations took effect on 6 April.
- 6.4.22 As part of the arrangements, the Commission is required to prepare a Security of Supply Outage Plan (SOSOP) outlining how it intends to implement rolling outages, and designated participants (intended to be distributors and direct connected consumers) will be required to prepare plans to implement rolling outages within particular regions. The Commission expects to publish the SOSOP in May 2009 and to begin interacting with designated participants to move towards development and publication of Participant Outage Plans (POPs).
- 6.4.23 The Commission will call for designated participants to implement rolling outages as the last resort emergency measure when storage has fallen well below the Emergency Storage Guideline (10% risk of shortage) and when the risk of shortages has risen to the point whereby it is “more likely than not” that the system operator would otherwise need to instruct load-shedding.

¹⁹ See <http://www.electricitycommission.govt.nz/consultation/waterheat#h20>

7. Organisation and Communications

7.1 Emergency Response Structure

- 7.1.1 The Commission proposes to establish an emergency response organisation structure to oversee and implement emergency measures.
- 7.1.2 The organisational structure that will apply during a security of supply situation consists of:
- (a) an Operational Steering Group, consisting of the Commission Chair, General Manager, Security of Supply staff, and others as required (Communications staff, Finance staff, Directors); and
 - (b) a Project Manager, who will be appointed by the General Manager.
- 7.1.3 The Operational Steering Group will have overall responsibility for the Commission's emergency response strategy. It will:
- (a) determine when a new Security Phase has been entered (see section **Error! Reference source not found.**);
 - (b) assess security risks;
 - (c) liaise with industry representative groups; and
 - (d) approve implementation of emergency measures.
- 7.1.4 The Chair will take responsibility for national media communications and briefings to stakeholders on behalf of the Commission.
- 7.1.5 The ERP provides more information about specific roles and tasks.

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Appendix 1 Security of Supply and Emergency Planning Obligations

1. The obligations of the Commission, in respect of security of supply, are set out in the Electricity Act (1992) and associated Government Policy Statement (GPS). The Act and GPS in combination establish a responsibility for the Commission to manage the security of supply of electricity and provide some guidance about how the government expects the Commission to go about the task.
2. The functions of the Commission set out in the Act that relate to security of supply include the following:

Act reference	Functions of the Commission relating to security of supply
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 (<i>including those relating to security of supply</i>).
172O(1)(g)	To manage emergency conservation campaigns to avoid material risk of supply shortages.
172O(1)(a)	To formulate and make recommendations concerning electricity governance regulations and rules (<i>to give effect to the principal objectives and specific outcomes as they relate to security of supply</i>).

3. The Act also sets out the principle objectives of the Commission and specific outcomes that the Commission must seek to achieve. The specific outcomes include:

Act reference	Specific Outcomes the Commission must seek to achieve
172N(2)(b)	Risks (including price risks) relating to security of supply are properly and efficiently managed.

4. The functions and specific outcomes set out in the Act prescribe the Commission's legal obligations, define the Commission's powers to intervene in the market, and provide a framework within which security of supply policy and the GPS needs to be considered.
5. 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 and delivering the specific outcomes under the Act. The GPS contains a

section on security of supply. Particular paragraphs that relate to emergency security of supply measures include those in the following table:

GPS paragraph	Objectives and Outcomes the Commission must seek to give effect to
GPS66	“.....the Commission should have an emergency storage guideline that would trigger a range of emergency response measures, including a conservation campaign. The emergency storage guideline should be set on the basis that there is a significant probability that emergency blackouts may be required if other emergency response measures are not put in place.”
GPS74	“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 shortage. To manage such circumstances, the Commission should establish an emergency response plan that identifies and includes a range of measures to cover contingencies more severe than those allowed for within the mean winter energy margin. Such measures are to include conservation campaigns.”
GPS75	“The Commission is also expected to put in place contingency arrangements to provide for the scheduling of outages, including rolling outages in the extreme event that blackouts are required to ensure a balance between supply and demand.”

Appendix 2 Security of Supply Policy

Key Policy Elements	Description
Approach to Security of Supply	<ul style="list-style-type: none"> • The Commission will focus on providing information and analysis as a mechanism for managing security of supply risks. • Reserve Energy and/or Reserve Capacity will be procured, as a last-resort measure, if security margins fall below prescribed levels. • Reserve Energy/Capacity will be dispatched if market prices rise higher than price triggers determined for each reserve contract. • Reserve Energy will also be dispatched if hydro storage drops below particular guidelines.
Forecasting long-term security	<ul style="list-style-type: none"> • The Commission will publish ten-year forecasts of supply and demand including an assessment of the Winter Energy Margin and the Winter Capacity Margin. • New generation investment decisions will be recorded and monitored.
Winter Energy and capacity Margins	<ul style="list-style-type: none"> • The Commission will assess the need for Reserve Energy and Reserve Capacity each year by calculating Winter Energy Margins and Winter Capacity Margins over several years.
Procuring Reserve Energy and capacity	<ul style="list-style-type: none"> • The Commission will procure Reserve Energy if the Winter Energy Margin is forecast to fall below 17% for New Zealand as a whole, or below 30% for the South Island, over the next 3 years. • The Commission will procure Reserve Capacity if the Winter Capacity Margin is forecast to fall below 780 MW over the next 2 years. • Procurement will balance the costs, benefits and risks of Reserve Energy/Capacity and focus on options which maximise overall welfare.
Monitoring Hydro Storage	<ul style="list-style-type: none"> • The Commission will monitor hydro storage against hydro risk curves that reflect the risk of electricity shortages taking into account the range of likely inflows. • The risk curves will include an Emergency Storage Guideline corresponding to a 10% risk of electricity shortages.
Dispatching Reserve Energy	<ul style="list-style-type: none"> • The Commission will develop and publish a dispatch policy for each Reserve option. • A hydro storage guideline will be published reflecting the point at which it expects each Reserve Energy option to be dispatched.
Managing Emergencies	<ul style="list-style-type: none"> • If storage falls below the Emergency Storage Guideline the Commission will initiate a series of emergency measures as set out in the Emergency Response Plan.
Managing Conflicts	<ul style="list-style-type: none"> • The Commission will manage any conflicts of interest by avoiding any direct operational role and publishing information on any Reserve Energy arrangements.