Security and Reliability Council

Managing security of supply risks

Secretariat report to the SRC

1 November 2011

Note: This paper has been prepared by the secretariat for the SRC. Content should not be interpreted as representing the views or policy of the Electricity Authority.

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1 Recommendations

1.1.1 It is recommended that the Security and Reliability Council:

a) **direct** the Secretariat to prepare a paper on behalf of the Security and Reliability Council, making recommendations to the Electricity Authority on the adequacy of the existing security of supply policy framework and monitoring tools.

2 Rationale

2.1.1 The second limb of the Authority's objective is to promote reliable supply. The Authority interprets this as a requirement to exercise its functions in a way that, for the long-term benefit of consumers, "*encourages industry participants to efficiently develop and operate the electricity system to manage security and reliability in ways that minimise total costs whilst being robust to adverse events*".

2.1.2 The Security of Supply framework is a key part of fulfilling this objective. Its purpose is to facilitate the management of security of supply risks that could emerge during an extended dry sequence or could be triggered by a sudden loss of generation or transmission capacity. This is accomplished by:

a) providing participants with high quality information about security of supply risks in order to assist their risk management decisions; and

b) providing for centralised emergency measures if security of supply risks increase to extreme levels.

2.1.3 The framework is implemented by the System Operator (SO), and consists of :

a) short-term monitoring (using tools such as the Hydro Risk Curves (HRCs) to monitor the risk of running out of energy or capacity over a time frame of weeks to months);

b) longer-term monitoring (using tools such as the Winter Energy Margin (WEM) and Winter Capacity Margin (WEM), as published in the Annual Security Assessment (ASA)); and

c) emergency management (using measures including Official Conservation Campaigns (OCC) – recently Codified and extended to include customer compensation – and rolling outages).

2.1.4 This paper raises a series of questions for the Security and Reliability Council (SRC) about the adequacy of the tools and policy. These include:

<u>Short-term monitoring</u>

i) do industry participants use the HRCs as part of their risk assessment processes?

ii) is the SRC confident in the current HRC framework as a reasonable measure of the short-term risk of extended energy shortage?

iii) in the past, confidential information has influenced the HRCs in a manner that has not been transparent to all parties. What should the disclosure requirements be in relation to information that affects the HRCs (and other security of supply tools)?

<u>Longer-term monitoring</u>

iv) is the SRC confident in the WEM and WCM as reasonable measures of longer-term security of supply?

v) are there other possible sources of risk (e.g. summer capacity adequacy) that should be covered by the security of supply framework and are not currently?

Emergency planning

vi) is the SRC confident that the existing security of supply policy framework is adequate for responding to emerging and actual risks?

vii) are industry participants clear on the roles and responsibilities of all parties in the event of an extended energy or capacity shortage (caused by a "dry year" and/or some emergency event), including provision of information about security of supply, communication of potential emergency measures, and initiation, implementation and conclusion of emergency measures? and

viii) should "readiness exercises" be regularly undertaken to test the industry's ability to manage energy shortage risks?

3 Next steps

3.1.1 The Secretariat will provide a draft paper to the next meeting of the SRC.

4 Introduction

Short-term monitoring

4.1.1 The Electricity Authority Board (Board) has expressed some concerns about aspects of the short-term monitoring framework and the use of HRCs. The Board has recently been provided with advice explaining how the HRC framework has come about and suggesting that some amendments could be considered to improve the HRC framework. It is therefore timely for the SRC to provide input into the direction of that work.

4.1.2 The concerns centre around stakeholders receiving up-to-date and accurate assessments of security risks which allow them to manage their own risks more effectively.

Longer-term monitoring

4.1.3 The SO must soon publish an ASA including projected WEM and WCM, assessing energy and capacity adequacy over the next few years.

4.1.4 The Authority's workplan includes projects to:

a) review the winter capacity and winter energy standards in Part 7 of the Electricity Industry Participation Code (Code) in order to reflect the expanded HVDC transmission; and

b) consider the need for a new summer capacity standard or standards.

4.1.5 It is therefore timely for the SRC to provide input into the direction of that work.

Emergency management

4.1.6 The SO recently submitted a revised draft Emergency Management Policy (EMP) to the Board for approval. The Authority is required to approve (or decline to approve) the EMP promptly. The Board is currently considering the draft EMP.

4.1.7 The revised draft EMP does not specify how an industry response will be coordinated in the event of an extended emergency (i.e. a dry year, or other medium-term potential or actual shortage of energy and/or capacity).

4.1.8 The revised draft EMP also provides relatively little information on how the SO would implement its policy – for example:

a) what additional security information the SO would provide in the lead up to an event;

b) how the SO would prepare, implement and monitor the effectiveness of a conservation campaign; and

c) roles and responsibilities at the SO in the lead up to, and during, an extended emergency.

4.1.9 The Authority would be interested to hear whether the SRC considers there is adequate clarity about the roles and responsibilities of all parties in the event of an extended emergency.

4.1.10 In a submission on the draft EMP, Meridian Energy recently suggested that it would be useful to carry out "readiness exercises" to test the ability of the industry to respond to an extended emergency. The Authority would be interested to hear any SRC views on whether such exercises should be contemplated.

Omissions

4.1.11 The SRC may feel that there are other improvements to the security framework and/or other parts of the Code that could further enhance security of supply arrangements. In particular, whether there are other:

a) possible sources of risk to security of supply;

b) ways in which risks should be better managed; and/or

c) actions that should be taken to communicate risks and risk management tools to participants and the public.

5 Short-term monitoring

5.1 The status quo

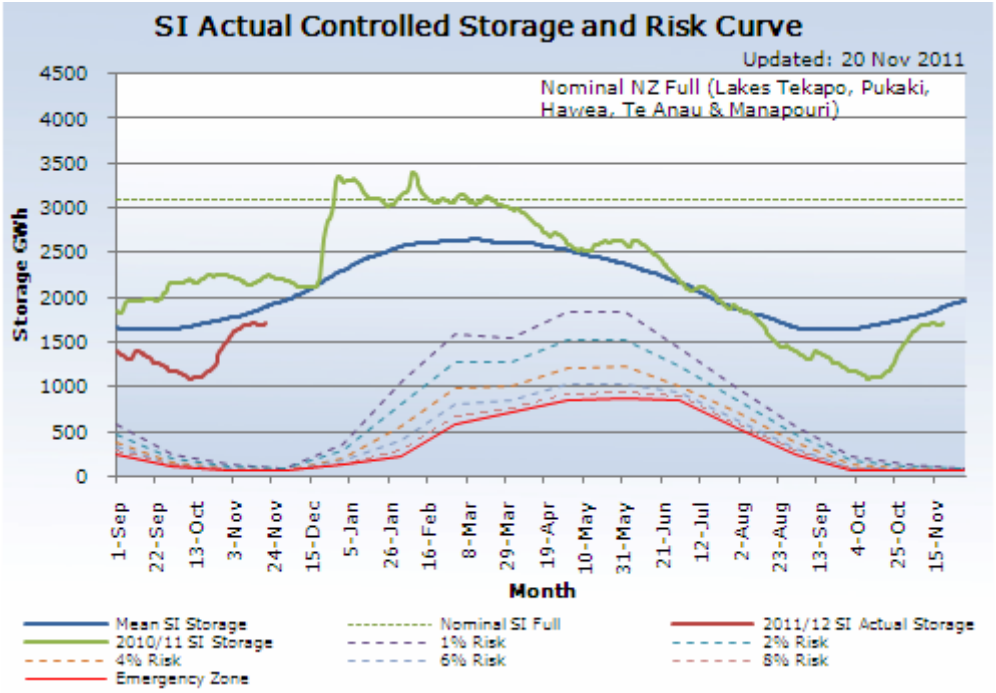
5.1.1 Responsibility for monitoring security of supply risks was transferred from the Electricity Commission (EC) to the SO on 1 November 2010. The Security of Supply Forecasting and Information Policy (SOSFIP, which is incorporated by reference into the Code, see Appendix A[1]) sets out that the SO will monitor short-term security of supply risks by publishing a weekly security of supply report, which must include:

a) a comparison of total storage in key hydro lakes with Hydro Risk Curves; and

b) various other data including (but not limited to) hydro inflows, thermal generation, demand, and inter-island transfers.

5.1.2 The Hydro Risk Curves (illustrated in Figure 1) are the primary instrument for monitoring the risk of running out of water as a result of dry conditions and/or some calamitous event(s).

Figure 1: Comparison of storage with Hydro Risk Curves



5.1.3 HRCs are produced for the South Island and for New Zealand as a whole. When total storage in major hydro lakes in the affected area falls to the X% HRC, the risk of running out of water in the following few months is assessed at X% - providing:

a) electricity demand is 2% below the expected forecast (in response to price); and

b) thermal generation runs as hard as possible (except at times or in locations where it cannot help to conserve water[2]).

[1] http://systemoperator.co.nz/sos-policy

[2] It is important to recognise that the assumption that thermal generation will run as required to conserve water is made for the purpose of developing a reference curve, rather than representing a genuine faith that the market will deliver this outcome.

5.1.4 Various other assumptions are made about generation and fuel availability, electricity demand, and transmission capability. These input assumptions are documented on the SO website[3], as is the methodology used to prepare the HRCs.[4]

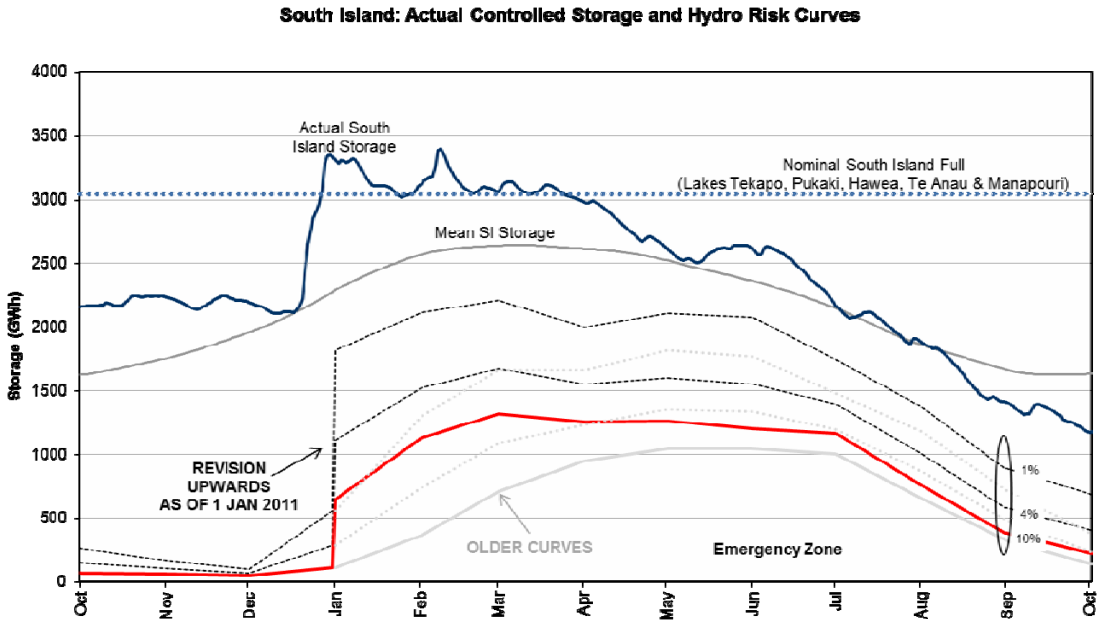
5.1.5 Energylink (an external provider) prepares the HRCs for the SO, using the Emarket model. The model accounts for variability in hydro inflows, but is otherwise deterministic (i.e. does not include other sources of uncertainty). The HRCs are updated occasionally – at present, whenever something happens that changes the curves by at least 200 GWh.[5]

5.1.6 The use of hydro storage profiles to monitor short-term security of supply risks has a long tradition in New Zealand. The HRCs were developed to succeed the "minzone" which had been used to monitor security risks since the 1980s.

5.1.7 The HRCs are generally intended to provide information to a wide range of market participants about security risks so that they can plan and manage their own risks accordingly. However the 10% HRC has a particular function specified in Part 9 of the Code – if hydro storage falls below the 10% HRC, an Official Conservation Campaign is triggered.[6]

5.1.8 It is also possible for events other than falling hydro storage to cause the security risk level to rise. For example, the HRCs were revised in January 2011 in response to several factors combining to increase security risks. Figure 2 illustrates the effect of these changes.

Figure 2: January 2011 HRC change



[3] http://systemoperator.co.nz/f3933,60504519/hydro-risk-curve-input-assumptions-sep-2011.pdf

[4] http://systemoperator.co.nz/f3933,60083041/HRC_methodology_explanation_October_2011_web.pdf

[5] http://systemoperator.co.nz/f3933,60083041/HRC_methodology_explanation_October_2011_web.pdf

[6] The Authority has also linked the interim offer strategy for Whirinaki Power Station to the HRCs.

5.1.9 The magnitude of the change to the HRCs in January 2011, the timing of the change, and the lack of transparency surrounding the information that lead to the change, appeared to cause some concerns amongst market participants.

5.1.10 The Authority undertook a review[7] of the circumstances that developed in November-December 2010 and lead up to the HRC change in January 2011, primarily to address whether there were reasonable grounds for spot prices to increase as rapidly as they did, and to the level they did. Although the Authority concluded that the market responded appropriately to the higher spot prices, it also observed that there were lessons to be learned, particularly with regard to the adequacy of information provided to market participants regarding emerging supply risks.

5.2 Current developments

5.2.1 The Authority is currently considering the role and adequacy of the HRCs, including the issues in Table 3 overleaf.

5.3 Advice sought from SRC

5.3.1 Feedback is sought from the SRC on the short-term monitoring framework – including, but not limited to, the following questions:

a) do industry participants use the HRCs as part of their risk assessment processes?

b) is the SRC confident in the current HRC framework as a reasonable measure of the short-term risk of extended energy shortage?

c) in the past, confidential information has influenced the HRCs in a manner that has not been transparent to all parties. What should the disclosure requirements be in relation to information that affects the HRCs (and other security of supply tools)?

[7] *Wholesale Electricity Prices: December 2010*; Electricity Authority 28 January 2011

Table 3: Hydro Risk Curves – current developments

Issue	Context	Areas for possible improvement
Are the HRCs are the most appropriate tool for short-term monitoring of the risk of extended energy shortage?	Alternatives might include stochastic modelling or market-based models. It might also be possible to enhance the existing SRCs – for instance, by moving from a measure of lake storage to a more general measure that includes gas storage and snowpack.	
How often should the HRCs be updated?	More frequent updates would allow the HRCs to capture the most up-to-date information, though this would mean the curves would potentially "jump around" more than they have recently.	HRCs could be assessed more regularly, updated more frequently, and also updated whenever there is a change in assumptions that would change any one curve by (say) 100 GWh.
Is the SO is able to access accurate information from participants in a timely manner, sufficient to facilitate an accurate and current view of security risks?	May include information about gas contracts and storage, coal stockpiles, snowpack, planned generation outage, and any other information that might materially influence the ability to generate or transmit electricity.	It would be helpful if there was more clarity around expectations on participants to provide timely and accurate information to allow the SO to calculate the HRCs, and that some form of facilitated agreement with participants could be considered. This area is also under consideration by WAG.
What can be done to improve confidence that the HRCs are an accurate reflection of the current level of security risk?	It can be difficult for parties to have confidence in the HRCs, given that the Energylink model and some input assumptions are not published. Conversely, there may be a risk that pressure applied to the SO by stakeholders to explain changes to the HRCs could put the SO in a difficult position – ultimately, perhaps, leading to a degree of conservatism in updating the curves when material information is received.	It could improve confidence and understanding of the HRCs if they were published alongside sensitivity analysis addressing the possible impact of different assumptions and different market behaviours. It could improve confidence if more of the information required to derive the HRCs was able to be published (including some material that is currently subject to confidentiality). There may be merit in developing a simplified HRC model to and making it widely available to stakeholders.

6 Longer-term monitoring

6.1 The status quo

6.1.1 The SOSFIP sets out that the SO will monitor longer-term security of supply risks by publishing an Annual Security Assessment (ASA) by 31 January each year. The ASA must include:

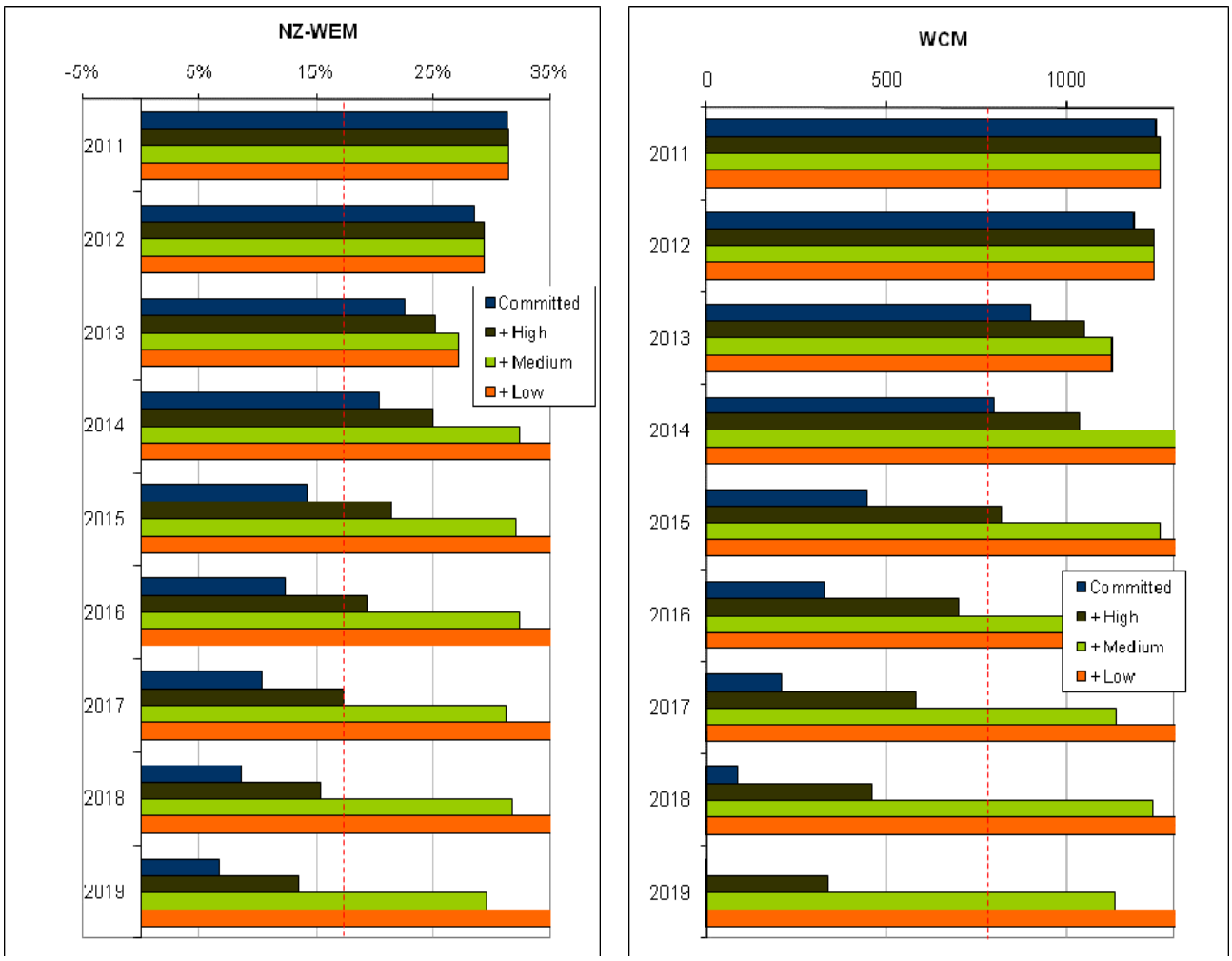
a) five-year forecasts of generation and demand;

b) an assessment of the Winter Energy Margin (WEM) against thresholds of 30% for the South Island and 17% for New Zealand as a whole; and

c) an assessment of the Winter Capacity Margin (WCM) against a threshold of 780 MW for the North Island.

6.1.2 First introduced in 2008, these metrics were used by the EC in 2008, 2009 and 2010 and by the SO in the ASA 2011 (published this January).[8] The base case assessments of national WEM and North Island WCM from the ASA 2011 are reproduced in Figure 4.

Figure 4: Base Case ASA 2011 (red dashed lines indicate security thresholds)



[8] http://systemoperator.co.nz/sos-reporting

6.1.3 These charts illustrate that, based on current and committed capacity, it was expected that WEM and WCM thresholds would be exceeded for the period out to 2014, and could be exceeded for subsequent years if enough planned/potential generation was built. A range of sensitivities were also included in the ASA, indicating that:

a) even in the more conservative sensitivity scenarios, WEM and WCM were still projected to be well above the security thresholds in 2011 and 2012;

b) from 2013, there were several possible factors which could lead to poor security, including:

i) high demand growth;

ii) the loss of Whirinaki generation; and

iii) low inflows;

c) for all sensitivity scenarios in all years, energy and capacity margins could be held above the security thresholds if sufficient new generation was built and operated.

6.1.4 The WEM and WCM thresholds and the requirement for an annual assessment against these thresholds are set out in Part 7 of the Code. The SOSFIP sets out how the WEM and the WCM are calculated.

6.1.5 The advantage of the WEM and WCM metrics is that they provide relatively simple and understandable measures of the ability of the system to manage two key sources of long-term supply risk. The WEM assessment tests whether there is sufficient generation and fuel to manage an extended dry sequence, while the WCM assessment tests whether there is sufficient generation capacity to supply winter peak demand.

6.1.6 Both thresholds were developed by exploring the economic trade-off between the cost of reserve capacity and the cost of shortfalls in supply, while taking into account a wide range of uncertainties including demand and inflow uncertainties, the possibility of generation and transmission outages, and intermittent supply from some power stations. They are therefore an assessment of the optimum reserve margin from an economic perspective. History shows that the market has delivered enough reserve capacity to exceed the WEM and WCM thresholds.

6.1.7 Detailed background information on the determination of the WEM[9] and WCM[10] thresholds is available. Originally:

a) the WEM thresholds of 30% and 17% were motivated as points where the EC should consider procuring additional reserve energy (because, if WEM fell below this level, the economic cost of non-supply during dry years was estimated to be greater than the cost of building additional thermal peaking plant); and

b) the WCM threshold of 780 MW was motivated as the point where the EC should consider procuring additional reserve capacity (because, if WCM fell below this level, the economic cost of non-supply at peak time was estimated to be greater than the cost of building additional thermal peaking plant).

[9] http://www.ea.govt.nz/our-work/consultations/security-of-supply/review-of-reserve-energy-policy/

[10] http://www.ea.govt.nz/document/2230/download/industry/ec-archive/security-of-supply/security-of-supply-policies-archive/

6.1.8 The option for centralised procurement of reserve energy or capacity no longer exists (it has been removed from the Code), but the metrics have been retained as useful benchmarks to assist stakeholders in assessing the long-term security of supply outlook.

6.2 Current developments

6.2.1 The SO is currently undertaking analysis towards the ASA 2012 and is expected to publish a draft for consultation sometime in the coming weeks (draft findings will be presented to the SRC at this meeting).

6.2.2 When the WEM and WCM measures were first introduced, it was recommended that they be reviewed after five years because the configuration of generation and transmission would likely have changed significantly. The ASA 2012 will be the fifth assessment to use these metrics. The Authority considers there is a need to review (and potentially update) the thresholds because:

a) the generation mix has changed since 2008 and is expected to continue to change; and

b) Pole 3 commissioning will change inter-island transmission capacity substantially.

These changes may impact on the trade-off between the cost of supply shortfalls and the cost of reserve generation, and hence the WEM and WCM thresholds. The EA workplan includes a project to review the thresholds and, if there is a material change, consider updating Part 7 of the Code.[11]

6.2.3 In 2010, the Security Advisory Group (SAG) discussed concerns about the adequacy of generation capacity during summer, noting that:

a) summer peak demand is growing (faster than winter peak demand in some areas);

b) both generation and transmission outages are typically scheduled over summer months;

c) there is the potential for increasing difficulty in meeting summer peak demand; and

d) there is vulnerability to asset failures.

6.2.4 The SAG recommended that the EC should establish some form of metric(s) of summer generation capacity, taking planned outages and other constraints on generation into account. While it was not clear that any specific threshold could be set, the EC could at least provide multi-year projections of summer generation capacity and maintain a watching brief.

6.2.5 Development of a summer generation capacity measure remains on the Authority's workplan. There is some conceptual work to be done (in particular, clearly defining the risk that is being assessed, identifying the geographical area(s) that should be covered and the data sources that should be taken into account).

6.3 Advice sought from SRC

6.3.1 Feedback is sought from the SRC on the longer-term monitoring framework – including, but not limited to, the following questions:

a) is the SRC confident in WEM and WCM as reasonable measures of longer-term security of supply?

b) are there other possible sources of risk (e.g. summer capacity adequacy) that should be covered by the security of supply framework and are not currently?

[11] The project is currently identified as a 'priority two' project for completion in the 2012/13 financial year.

7 Emergency planning

7.1 The status quo

7.1.1 Operational responsibility for managing security of supply risks (as opposed to responsibility for administering the Code so as to support security and reliability) was transferred from the EC to the SO on 1 November 2010.

7.1.2 The Emergency Management Policy (EMP)[12] is incorporated by reference into the Code (the existing security of supply policy framework is described in Appendix A). It sets out the steps that the SO must take, and encourage participants to take, during an extended emergency such as a long period of low inflows to key hydro lakes, or in response to a sudden emergency such as a major generation or transmission outage that is expected to extend over a long period.

7.1.3 The EMP does not govern the management of short-term emergencies, which are handled under the grid emergency provisions included in Part 8 of the Code.

7.1.4 The current EMP sets out that the primary role in providing security of supply lies with participants, who are incentivised to do so by the market rules, but that there remains a role for the SO in:

a) monitoring security levels (at all times, and more closely, when the level of security risk increases);

b) providing information about security risks and possible emergency measures to participants and other stakeholders;

c) coordinating an industry response; and

d) if necessary, implementing two emergency measures – official conservation campaigns (OCC) and (as a last resort) rolling outages.

7.1.5 The SO Rolling Outage plan (SOROP)[13] is also incorporated by reference into the Code (as described in Appendix A). It sets out a framework for lines companies and major direct-connect consumers to prepare their own Participant Rolling Outage Plans (PROPs), and states how the SO will manage and direct rolling outages if these become necessary.

7.2 Current initiatives

7.2.1 At time of writing, the current EMP is an interim plan that was published by the EC shortly before the transition of responsibilities to the SO. The Code required the SO to submit a revised draft EMP to the Authority for approval by 1 November 2011.

7.2.2 The SO has prepared a revised draft EMP, sought comment from stakeholders, amended the draft EMP accordingly, and submitted a revised draft EMP[14] to the Authority for approval. Under the Code, the Authority must, as soon as practicable, either approve or decline to approve the draft EMP. The Board will consider this decision on 7 December.

[12] http://systemoperator.co.nz/sos-policy

[13] http://systemoperator.co.nz/emergency-management

[14] http://systemoperator.co.nz/f5331,62196837/Draft_EMP_31_Oct_11.pdf

7.2.3 The revised draft EMP:

a) is clearer than the current EMP, better reflects the new allocation of responsibilities, and is consistent with new provisions for OCCs in Part 9 of the Code;

b) is more focused on what will happen when an actual emergency occurs, excluding some issues relating to monitoring security of supply when hydro storage is low, but not low enough to trigger an emergency; and

c) better reflects the expectation that participants will take actions in response to declining hydro storage.

7.2.4 A possible concern is that the revised draft no longer sets out (as the current EMP does) that the SO will *"establish industry participant groups to coordinate industry initiatives... to assist in the coordination of communications, gathering and dissemination of information, and coordinate resources to mitigate the effect of the extended emergency"*.

7.2.5 Transpower carried out such a coordination role during the 2008 dry winter (despite not being required to do so) but the revised draft no longer includes these functions.

7.2.6 The SO has suggested that this change is consistent with changes in the policy framework, with the responsibility for managing security of supply having largely shifted from the EC to market participants, and the SO now responsible for providing information on security of supply risks and (if necessary) undertaking its Code-defined role in implementing emergency measures.

7.2.7 Another possible concern is that the revised draft EMP does not provide a great deal of information on how the SO would implement the EMP. In particular, there is no information about:

a) how the SO will interact with the Authority during an extended emergency;

b) when the SO would commence preparation of a conservation campaign;

c) how the SO would implement a conservation campaign;

d) how the SO would monitor the effectiveness of a conservation campaign; and

e) roles and responsibilities at the SO in the lead up to, and during, an extended emergency.

7.2.8 It may be better if such information was available, because:

a) the SO would have a contingency plan that could be followed in an emergency (particularly important if the emergency came about suddenly and without warning – e.g. as a result of an equipment failure at a major generating plant); and

b) participants would have a clearer picture of how the SO plans to act and could better manage their own risks within this context.

7.2.9 The SO prefers not to specify this information in the EMP, since it sees it as a policy document rather than an operational plan, and any planning detail would need to be closely coordinated with other SO contingency plans. This seems reasonable, but as a corollary it might be appropriate and useful for the SO to prepare, publish and maintain a detailed operational plan.

7.2.10 In a submission on the draft EMP, Meridian Energy recommended that the SO "*consider a role play or stress test of the EMP to improve learning and development of the implications and roles for all participants*". There have been no such exercises in the past, but presumably they could be

implemented (possibly with some difficulty). The Authority would appreciate any comment from this SRC on the issue.

7.2.11 The Code requires the SO to revise the EMP again, by 1 November 2012, to cover the SO's role in the management of gas transmission or supply failures.

7.3 Advice sought from SRC

7.3.1 Feedback is sought from the SRC on the emergency management framework – including, but not limited to, the following issues:

a) is the SRC confident that the existing security of supply policy framework is adequate for responding to emerging and actual risks?

b) are industry participants clear on the roles and responsibilities of all parties in the event of an extended energy or capacity shortage, including:

   i) provision of information about security of supply;

   ii) communication of potential emergency measures; and

   iii) initiation, implementation and conclusion of emergency measures?

c) should "readiness exercises" be regularly undertaken to test the industry's ability to manage energy shortage risks?

Appendix A – Security of Supply framework

A.1 Introduction

A.1.1 The purpose of the Security of Supply framework is to facilitate the management of security of supply risks that could emerge during an extended dry sequence or could be triggered by a sudden loss of generation or transmission capacity.

A.1.2 This is accomplished by:

a) providing participants with high quality information about security of supply risks in order to assist their risk management decisions; and

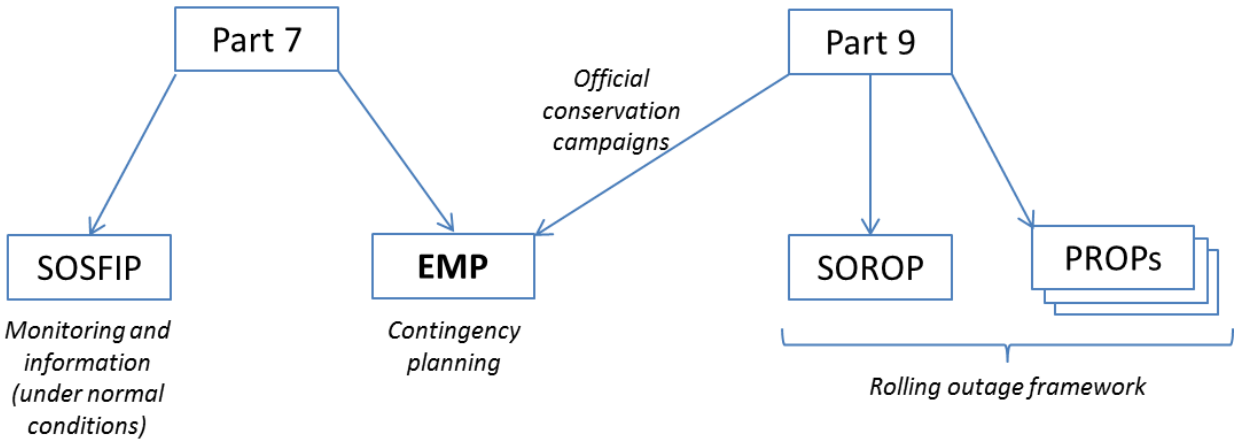
b) providing for centralised emergency measures (such as official conservation campaigns and rolling outages) if security of supply risks increase to extreme levels.

A.1.3 Energy policy in New Zealand places the emphasis on competition and markets to deliver good outcomes for consumers, and a secure and reliable supply of electricity to meet consumer expectations. Accordingly, the focus of security of supply regulation has been to ensure that participants have access to quality information and good incentives to manage security of supply risks. The initiatives to introduce customer compensation payments during conservation campaigns and to introduce administered prices reflecting scarcity values reflect this approach.

A.1.4 However, it is acknowledged that under extreme circumstances the reliance on market participants and incentives to manage security of supply risks may not be adequate to ensure the best outcomes. Therefore the framework also provides for centralised emergency measures to be implemented if the level of security risk is high enough.

A.1.5 The key sections of the Code are Part 7 (dealing with the obligations and functions of the SO) and Part 9 (dealing with the management and coordination of planned outages during emergencies). There are several other documents that play a key role in the management of security of supply. These documents and how they link into the Code is illustrated in Figure 5 and described in the following sections.

Figure 5: Security of Supply Framework



A.1.6 The Authority is responsible for the Code framework governing security of supply and emergency measures, while the System Operator (SO) is responsible for creating policies and plans and

implementing the framework. Previously both roles were combined responsibilities of the Electricity Commission (EC).

A.1.7 The SO is required by Part 7 of the Code to prepare and publish a Security of Supply Forecasting and Information Policy (SOSFIP) which includes requirements for the SO to:

a) prepare publish an annual security of supply assessment (ASA) covering the next 5 years; and

b) prepare and publish information on short-term security of supply risks.

A.1.8 The ASA must contain detailed supply and demand forecasts sufficient to assess whether the Winter Energy Margin (17% for NZ and 30% for SI) and the Winter Capacity Margin (78MW for NI) are likely to be exceeded over the 5-year forecasting period.

A.2 The SOSFIP

A.2.1 The SOSFIP is incorporated by reference as part of the Code and the current version of the SOSFIP was drafted by EC as part of the transition to the new arrangements governing security of supply in November 2010.

A.2.2 The SOSFIP sets out more detail about the information that must be included in the ASA and how the Winter Energy Margin and Winter Capacity Margin are determined.

A.2.3 The SOSFIP also indicates that the weekly security of supply report must provide a range of information on short-term security of supply risks, including a comparison between current hydro storage and Hydro Risk Curves (HRC) reflecting estimates of 1%, 2%, 4%, 6%, 8% and 10% risk of electricity shortages. The HRCs must also be updated whenever there is a change in supply, demand, or transmission that is likely to yield a material change to the curves.

A.2.4 The SOSFIP also indicates that the weekly security of supply report must include a risk meter that indicates the current security of supply situation, expressed as either, security normal, security watch, security alert, or security emergency.

A.3 The EMP

A.3.1 The SO is also required by Part 7 of the Code to prepare and publish an Emergency Management Policy (EMP) that sets out the steps that the SO must take, and encourage participants to take, during an extended emergency.

A.3.2 The EMP is also incorporated by reference as part of the Code and the current version of the EMP was drafted by EC as part of the transition to the new arrangements governing security of supply in November 2010.

A.3.3 The EMP currently sets out:

a) the distinction between managing extended emergencies (which are covered by the EMP) and other kinds of events (which are covered by other frameworks – for example, under Grid Emergency provisions);

b) the distinction between a Developing Event (which evolves over time – for example, as the result of a period of low inflows to hydro catchments);and an Immediate Event (which occurs with little or no warning – for example, as the result of a transmission or major power station failure) while noting that a real event might occur as a combination of the two;

c) the SO role in monitoring hydro storage;

d) the four Security Phases currently defined in the SOSFIP (Normal, Watch, Alert and Emergency);

e) the actions which will be taken by the SO in each security phase (which include information provision, analysis, and preparing or executing emergency measures);

f) the SO's expectations as to how other participants will act in each phase;

g) the SO's communication and coordination roles.

A.3.4 The SO must implement and comply with the EMP, unless departure from the EMP is necessary in order for the SO to act as a reasonable and prudent system operator. If the SO departs from the EMP, it must provide a report to the Authority.

A.3.5 The two emergency measures contemplated by the EMP are conservation campaigns and rolling outages.

A.3.6 The recent work undertaken by the Authority on official conservation campaigns has led to changes to Part 9 of the Code, which need to be reflected in the EMP. These include:

a) the conditions under which the SO must commence an official conservation campaign; and

b) the conditions under which the SO must end the campaign.

A.3.7 Conservation campaigns have been implemented in three of the last ten years (most recently during the dry winter of 2008), but are expected to be less frequent in future.

A.4 The SOROP and PROPs

A.4.1 Part 9 of the Code provides that the SO must prepare and publish a System Operator Rolling Outage Plan (SOROP) and that specified participants must prepare and publish Participant Rolling Outage Plans (PROPs). Part 9 also outlines that the SO may call for rolling outages under particular circumstances and that specified participants must comply with directions to implement PROPs.

A.4.2 PROPs are required to specify the actions that specified participants will take to achieve reductions in electricity consumption as directed by the SO. Specified participants that are currently required to prepare and publish PROPs include all electricity distribution businesses and all direct connected consumers.

A.4.3 The rolling outage framework has been in place since 2008 and rolling outages have never been implemented under the SOROP. Rolling outages are intended to provide a last resort measure that should occur extremely rarely and only under circumstances where the SO considers that if rolling outages are not implemented, unplanned outages are more likely than not.

A.5 The history of development of the EMP

A.5.1 The EC published an Interim Emergency Response Plan (ERP) in April 2005. The Interim ERP identified security issues, possible emergency measures, and a possible project team structure. Essentially it formed a series of recommendations about how the EC should develop a more detailed approach to emergency planning.

A.5.2 The Interim ERP was still in place during the dry winter of 2008, and was found wanting in several respects. The Review of 2008 Winter (Winter Review), commissioned by the EC, found that there had not been enough information about how the EC would act, and concluded that "it would be desirable to be as clear as possible about:

a) the nature of any actions [the EC] 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."

A.5.3 The Winter Review therefore recommended that "triggers and plans for any emergency measures be pre-defined as far as practicable, and that they should be published". It also recommended that "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".

A.5.4 The EC took this advice into account, and published a new ERP in May 2009, which sought to provide more detail about how the EC would act in an "emergency security situation" and how it expected participants to act.

A.5.5 As part of the transition to the Authority, the EC published a provisional EMP, which was incorporated into the Code by reference and is still in force. The provisional EMP was based on the May 2009 ERP. There were significant changes – among these, the new policy:

a) reflected new institutional responsibilities, with operational roles being carried out by the SO;

b) indicated that there was no longer a centralised role for procurement of reserve energy (apart from Whirinaki);

c) was consistent with Parts 7 and 9 of the Code, the SOSFIP and the SOROP; and

d) no longer covered organisational structure.

A.5.6 However key elements of the May 2009 ERP remained, including:

a) the concepts of an extended emergency and Developing and Immediate Events;

b) the four Security Phases (Normal, Watch, Alert and Emergency);

c) provision of additional security information during an emergency;

d) planning and execution of conservation campaigns and rolling outages under specified conditions; and communication roles.