

Meeting Date: 24 October 2024

## SECURITY STANDARDS ASSUMPTIONS DOCUMENT (SSAD) REVIEW

SECURITY  
AND  
RELIABILITY  
COUNCIL

This paper introduces a presentation from the Authority's operations policy team on preliminary work to inform a review of the SSAD, a document underpinning the system operator's annual security of supply assessment.

**Note:** This paper has been prepared for the purpose of the Security and Reliability Council (SRC). Content should not be interpreted as representing the views or policy of the Electricity Authority except where specifically noted.

# Security Standards Assumptions Document (SSAD) review

## 1. Introduction

- 1.2. This paper introduces a presentation from the Authority's policy operations team on the background to the SSAD and preliminary work ahead of next year's review.
- 1.3. At its August 2024 meeting, the SRC received the annual presentation from the system operator on its security of supply assessment (SOSA), looking ahead over a ten-year horizon. Members raised a number of issues over the SOSA, including some of the assumptions underpinning the base case and sensitivities the system operator uses in its analysis.
- 1.4. Members agreed, they would like more information about the SSAD to support their advice to the Authority.

## 2. Member concerns

- 1.5. Examples of member concerns were:

- The potential for the SSAD review to paint an even bleaker picture of capacity issues
- The potential for sensitivities to become the reference (base) case
- The level of data available to the system operator to inform its analysis
- How solar is treated in the assumptions
- Inclusion of generation assets, when there is ongoing concern over availability of fuel to support their use

- 1.5.1. The impact of increased South Island demand on North Island security of supply

- The current version of the SSAD had been in place since 2012

- 1.6. The SRC asked the secretariat to include this item in the October agenda, to enable members to better understand the background and operation of the SSAD and the approach the Authority is considering for its review. The Authority is looking to undertake a fundamental review of the SSAD. The SRC's feedback will help inform and refine the Authority's work.

## 1.7. Review of SSAD

- 1.8. The SSAD was last reviewed in 2017 and considered fit-for-purpose at that time. With myriad changes across the sector since, for example increasing levels of intermittent generation, concerns over fuel sources and retirement of thermal generation assets, there is now evidence to indicate a review is needed to support ongoing security of supply.
- 1.9. However, irrespective of the standards, the power system continues to deliver high levels of security of supply with the existing resources in place:
  - 1.9.1. The level of shortages in recent years, for example, has been well below the level suggested by the standards.

- 1.9.2. There is flexibility in the standards, allowing the system operator to deviate from the assumptions specified, if the system operator considers there are good reasons to use different assumptions.
- 1.9.3. For areas not covered by the standards (for example many of the assumptions required to calculate the Winter Capacity Margin and the Winter Energy Margin are not set out in the standards). The system operator is expected to make its own informed assumptions in these areas.
- 1.10. The system operator has given feedback on the Authority's proposed approach, as set out in the paper for this item.
- 1.11. Authority staff from the policy - operations team will present the material and be available for questions.
- 1.12. SRC members are encouraged to consider additional areas of focus or methodology, ask questions, and provide feedback. Slide 16 of the presentation gives further guidance for areas where the SRC's advice is sought.
- 1.13. The information paper is included as **Appendix A** to this paper and the presentation is included as **Appendix B**.

## 2. Questions for the SRC to consider

The SRC is asked to consider the following questions.

- Q1. What advice, if any, does the SRC wish to provide the Authority on their overall approach to a review of the security standards and the assumptions document?
- Q2. Does the SRC consider that the analysis of intangible factors should be included in the SSAD? If so, how?
- Q3. Which sensitivities does the SRC consider to be important to test in the SSAD? (Including those which may not have previously been considered).
- Q4. How does the SRC consider the standards could be reported and calculated?

### **3. Appendix A: SSAD paper**

### **4. Appendix B: SSAD presentation**

# **Security standards and assumptions**

Information paper

24 October 2024

## 1. Purpose

- 1.1. The purpose of this information paper is to provide background and context on the security of supply standards and the Security Standards Assumptions Document (SSAD). The Electricity Authority Te Mana Hiko (Authority) plans to undertake a review of the accuracy and appropriateness of the standards and SSAD in 2025.
- 1.2. We seek early feedback from the Security and Reliability Council (SRC) to help inform our scope and proposed approach for the review. We seek the following from the SRC:
  - (a) feedback on our proposed approach
  - (b) any insights from the SRC on:
    - (i) inclusion of analysis of intangible factors
    - (i) issues not previously considered
    - (i) how the standards could be reported and calculated.

## 2. There is an established framework for assessing security of supply

### The Code specifies three security of supply standards

- 2.1. The capacity and energy standards, and the corresponding winter capacity and energy margins, are key parts of the policy framework for the monitoring of security of supply.<sup>1</sup> The standards provide a reference measure of the surplus capacity and energy required to provide an efficient security level.
- 2.2. There are currently three security standards specified in clause 7.3(2) of the Code. The standards are:
  - (a) New Zealand winter energy margin (NZ-WEM): 14-16%
  - (b) South Island winter energy margin (SI-WEM): 25.5-30%
  - (c) North Island winter capacity margin (NI-WCM): 630-780MW
- 2.3. The winter energy margin (WEM) security of supply standards are used to assess whether there will be an efficient level of reserve generation and south-flowing transmission capacity to manage extended dry sequences.
- 2.4. The winter capacity margin (WCM) security of supply standard is used to assess whether there will be an efficient level of peaking generation and north-flowing transmission capacity to meet peak demand.<sup>2</sup>

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<sup>1</sup> Other key parts of the policy framework for the monitoring of security of supply include the Electricity Industry Participation Code 2010, Emergency management policy, Security of supply forecasting and information policy, System operator rolling outage plan, Security of supply assumptions document.

<sup>2</sup> There is no South Island winter capacity margin because the South Island generally has ample capacity to meet peak demand.

- 2.5. The standards are determined using models that calculate the total costs of reserve generation and the costs of shortage across a range of reserve generation levels. The standards depend on:
- (a) the calculation methodology
  - (b) input assumptions.

### **The system operator produces an annual security of supply assessment to calculate the margins and evaluate against the security of supply standards**

- 2.6. The system operator is responsible for publishing an annual security of supply assessment. This is known as the Security of Supply Assessment (SOSA).
- 2.7. The SOSA contains detailed supply and demand modelling to calculate the WEM and WCM against a range of future scenarios. This analysis extends at least five years and enables interested parties to assess whether the electricity market is expected to meet the security of supply standards. The system operator currently publishes the forecast margins for the next 10 years in the SOSA.<sup>3</sup>

### **There are key assumptions that the system operator must use in the annual security of supply assessment**

- 2.8. The SSAD<sup>4</sup> sets out the key assumptions that the system operator must use when preparing the SOSA. The SSAD ensures that:
- (a) WCM and WEM are calculated in a way that is consistent with the derivation of the standards (to avoid an “apples and oranges” situation)
  - (b) sufficient information about the methodology and input assumptions is provided for the Authority and other stakeholders to have confidence that WCM and WEM are being calculated appropriately.
- 2.9. However, clause 7.3(2C) of the Code provides flexibility for the system operator to deviate from the assumptions specified in the SSAD if the system operator considers there are good reasons to use different assumptions. If the system operator uses different assumptions, they must provide a detailed explanation and show how the SOSA would differ if the SSAD assumptions had been used.
- 2.10. The SSAD sets out:
- (a) the formulae to be used to calculate WCM and WEM
  - (b) some key assumptions relating to generation, demand, and transmission
  - (c) the relationships between the levels of WEM and WCM and measures such as the expected amount of shortage or the cost-benefit of new generation investment
  - (d) the conditions under which the document will be updated.
- 2.11. Many of the assumptions required to calculate the WCM and WEM (eg, future generation investment) are not set out in the SSAD. The system operator is

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<sup>3</sup> [Security of Supply Annual Assessment | Transpower](#)

<sup>4</sup> The Authority may publish a SSAD under clause 7.3(2A).

expected to make its own informed assumptions in these areas and to publish these assumptions where permitted.

- 2.12. The system operator may also run ‘sensitivities’. This means they can adjust the assumptions to see how different scenarios could impact the security of supply. By exploring these different scenarios, the system operator can better understand the range of possible outcomes. This helps to plan for a secure electricity supply.
- 2.13. Table 1 provides a summary of the standards and how they are applied.

Winter Energy		Winter Capacity
Description	Availability of sufficient ‘fuel’ to supply demand over the winter period.	Ability of the power system to supply peak demand.
Standard	Reference measure – represented as the margin by which generation exceeds expected demand that optimally trades-off the cost of additional supply against the cost of unmet demand. The standards are defined in clause 7.3(2) of the Code.	
Actual margin	Actual measure – current and forecast levels for comparison with the standards. The actual margins are calculated by the system operator and published in its annual assessment of security of supply (SOSA). The SSAD sets out the assumptions that the system operator must use when preparing the SOSA.	

**Table 1: Summary of the security of supply standards and how they are applied**

### 3. We are reviewing the standards

- 3.1. Significant changes in New Zealand’s electricity generation fleet have occurred in recent years. A range of technologies have emerged that facilitate an increased role for consumers in the operation of the market.
- 3.2. In our 2024 decision paper on *Potential solutions for peak electricity capacity issues*, we committed to updating the market settings for security of supply.<sup>5</sup>
- 3.3. Our review seeks to ensure that our market settings are fit-for-purpose, reflect consumer expectations for security of supply, promote confidence in the electricity market and continue to provide robust signals for investment. The review will cover the standards, methodology and assumptions for assessing security of supply.

#### **The current standards were published in 2012 and reviewed in 2017**

- 3.4. The Authority reviewed the standards in 2012 and amended the Code to include the revised standards. The Authority also published the first version of the SSAD.

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<sup>5</sup> Electricity Authority, *Potential solutions for peak electricity capacity issues*. 2024  
[Decision paper Potential solutions for peak electricity capacity issues.pdf](#)



- 3.5. The Authority last reviewed the standards and the SSAD in 2017. The assumptions and modelling for the 2017 review were independently reviewed by Concept Consulting group.
- 3.6. The Authority decided at the time not to make any changes to the standards or the SSAD. This was because the level of change suggested by the review was too small to justify amending the standards and the SSAD.
- 3.7. Given that no changes were made, the results of the review were published, but not the underlying modelling.

## 4. Recent industry feedback on the settings for security of supply highlight the importance of a review

### 2024 submissions on the Authority's *Potential solutions for peak electricity capacity issues* paper

- 4.1. In the Authority's consultation paper: *Potential solutions for peak electricity capacity issues*,<sup>6</sup> submitters provided feedback on the factors that they believe the Authority should consider when setting the standards for reliability. This included:
  - (a) changes to consumer behaviour and the uptake of distributed energy resources
  - (b) changes to society's tolerance for interruptions of electricity supply. Electricity is an essential service (a necessity) and not a preference
  - (c) the cost of interruptions to consumers and businesses and the wider costs of supply interruptions such as loss of confidence in the electricity system
  - (d) the importance of reliability to promote investment and the transition to greater electrification of the economy
  - (e) the ability to shed controllable load to manage security of supply risks
  - (f) other considerations relating to generation including profit margins and how to take the unit commitment problem into account.

### The system operator's feedback on the security settings

- 4.2. The system operator wrote to the Authority in November 2022 to recommend a review and update of the security standards and the SSAD.
- 4.3. The system operator noted that since the 2017 review, the expected future generation fleet has changed to:
  - (a) be heavily weighted towards intermittent generation, including offshore wind and grid connected solar farms
  - (b) include grid scale energy storage systems (such as batteries)
  - (c) include a greater level of distributed energy resources.

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<sup>6</sup> Electricity Authority, *Potential solutions for peak electricity capacity issues*. 2024 [Decision paper Potential solutions for peak electricity capacity issues.pdf](#)

- 4.4. The system operator's 2023 paper *Evolving security of supply assessment in New Zealand*<sup>7</sup> provides more detailed information on potential ways to improve the security of supply assessments. It categorises changes to the energy sector in the context of the security of supply standards into three themes, as summarised below in Table 2.

Changing risks	Changing economics	Changing expectations
<ul style="list-style-type: none"> <li>• Changing generation mix</li> <li>• Correlated risks<sup>8</sup></li> <li>• Operational constraints (such as unit commitment issues)</li> <li>• Substitutes for reduced thermal generation</li> <li>• Impact of real-time load variability</li> </ul>	<ul style="list-style-type: none"> <li>• Increasing reliance on electricity</li> <li>• Developments in battery storage and demand flexibility</li> <li>• Capturing multiple revenue streams</li> </ul>	<ul style="list-style-type: none"> <li>• Reputation, confidence, and information</li> </ul>

**Table 2: Energy sector changes: 2023 insights from the system operator**

- 4.5. Further industry feedback on the SOSA is available on the system operator's website.<sup>9</sup> The industry's feedback provides a range of suggestions and potential improvements for the security settings.

## 5. Approach to review the standards and SSAD

### The current process for recalculating the standards

- 5.1. The high-level process for recalculating the standards is currently as follows:
- (a) develop and run a model to estimate the optimum amount of generation capacity required
    - (i) the WEM uses a hydro-thermal scheduling model that explicitly takes account of the uncertain nature of hydro inflows<sup>10</sup>
    - (i) the WCM uses a new deterministic method to account for variability in supply and demand.<sup>11</sup> More detail is provided in paragraphs 5.10 to 5.12

<sup>7</sup> Transpower, *Evolving security of supply assessment in New Zealand*. 2023 [Evolving security of supply assessment in New Zealand \(transpower.co.nz\)](https://www.transpower.co.nz/assessments/evolving-security-of-supply-assessment-in-new-zealand)

<sup>8</sup> Increasing quantities of intermittent wind and solar generation could require greater consideration of correlated risks where weather can result in periods of calm, cloudy conditions causing a large drop in the output intermittent generation.

<sup>9</sup> [Security of Supply Annual Assessment | Transpower](#)

<sup>10</sup> The model is a New Zealand-specific version of the Dynamic Outer Approximation Sampling Algorithm (DOASA) developed for the New Zealand electricity system by Stochastic Optimization Ltd. The modelling and assumptions used in 2017 were independently reviewed by Concept Consulting Group.

<sup>11</sup> In 2008 and 2012 the WCM standard was calculated using a model that used a Monte Carlo simulation and the randomised application of generation data for the different technology types. The new approach is expected to be superior as it is no longer dependent on the choice of random data that was applied.

- (b) consider various sensitivities
- (c) form a decision as to the appropriate standards (taking into account the results from the modelling).

## **Our review will use updated analysis based on the 2017 review and will be informed by recent stakeholder feedback**

- 5.2. Our review will update the analysis from the 2017 review and use stakeholder feedback to inform this refresh. This will inform any potential changes to the standards, the methodology and the SSAD. We will consult on any proposed changes.

## **Our proposed approach consists of six areas to review**

### **Data and assumptions**

- 5.3. We intend to do a complete refresh of the analysis from 2017. This will involve using the same methodology as the 2017 review with up-to-date data and assumptions for:
- (a) supply factors
    - (i) changes to the generation fleet, costs, and outage rates, including modelling of new grid connected technologies such as battery energy storage systems (BESS) and solar generation
    - (i) changes to the modelling of contingent hydro storage<sup>12</sup>
  - (b) demand factors
    - (i) changes to the value of lost load (VoLL)<sup>13</sup>
    - (i) changes to reflect demand response and distributed energy resources<sup>14</sup>
  - (c) transmission factors.

### **Methodology to include new technologies**

- 5.4. We will update the methodology and SSAD to specify how to model new grid connected technologies such as BESS and solar generation.

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<sup>12</sup> For the WEM. Not including available contingent storage tends to understate the capability of the power system and results in a higher standard.

<sup>13</sup> The Authority has prioritised a review of VoLL in 2025 following the July 2024 Northland tower collapse. This review will be carried out independently of the SSAD review. Our Northland review indicated that an extensive review of the factors influencing VoLL and their impact on the VoLL price is required. This would influence how VoLL values are incorporated into the SSAD analysis.

<sup>14</sup> A wide range of new consumer technologies have emerged that we expect will impact both energy and capacity. For example, solar photovoltaic and battery technology could impact energy and capacity respectively.

## Assumptions for source of additional generation

- 5.5. We will also review the assumptions around the source of additional generation for both the WEM and the WCM. Both margins currently assume thermal generation as the next source of additional generation.<sup>15</sup>
- 5.6. Given the changing generation mix, it may be more appropriate to assume alternative sources of additional generation. For example, intermittent generation may be more appropriate for the WEM. BESS or demand response may be more appropriate for the WCM.
- 5.7. We are comfortable with this assumption of thermal generation being the next source of generation in the interim. This is because modelling is not intended to select the most appropriate source of reserve supply. Instead, it aims to provide guidance on the level of supply risk and potential investment requirements. The market arrangements should create pressure that the lowest overall cost technology is applied.

## Sensitivity analysis

- 5.8. The current methodology considers various sensitivities to test whether the standards are set at an appropriate level. Examples of current sensitivities include changes to demand, changes to VoLL, changes to the HVDC transfer limit, changes to hydro assumptions and changes to generation assumptions.
- 5.9. We propose to include new sensitivities to incorporate some of the feedback from stakeholders and the system operator. New sensitivities could include sensitivities for correlated risks and the impact of real-time load variability.

## Methodology for the WCM

- 5.10. The 2017 review used a new methodology to calculate the WCM. The modelling of instantaneous reserves (IR) was separated out from the modelling of energy to allow for more dynamic modelling rather than using fixed assumptions for IR.
- 5.11. The new methodology also extended demand analysis from the top 200 to the top 500 peak trading periods. This was done to more accurately represent the distribution of output by wind generation.
- 5.12. We propose to use the new methodology for the latest update. This methodology should also allow for more dynamic modelling of controllable load.
- 5.13. We also propose to extend the period for capacity analysis to include the whole year. The current analysis defines winter daytime to mean the period from 1 April to 31 October, between 7am and 10pm. The power system is increasingly experiencing capacity issues outside of the winter period.

## Process improvements

- 5.14. We will consider options to improve the process to ensure the existing standards and process are fit-for-purpose for the transition. Options include:

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<sup>15</sup> Open cycle gas turbine (OCGT) for the WEM and diesel-fuelled reciprocating engine for the WCM.

- (a) request the system operator to recalculate the standards<sup>16</sup> as well as the actual margins themselves on an annual basis (or other, more regular frequency)
- (b) the continued evolution and development of the system operator's scenario and sensitivity analysis
- (c) consider how to include more information and commentary on the size, duration, frequency and timing of potential shortfall events.

## **We seek feedback from SRC on our proposed review approach and insights on three questions**

- 5.15. We seek feedback from the SRC on the overall approach to our review, set out in the six areas above.
- 5.16. Additionally, three questions we seek any insight from the SRC are:
  - (a) whether and how to include analysis of intangible factors, such as loss of confidence in the electricity market
  - (b) which sensitivities you consider are important to test including those which may not have previously been considered, such as generator profit margins or physical constraints such as unit commitment<sup>17</sup>
  - (c) how the standards could be reported and calculated.

## **6. Next steps**

- 6.1. We plan to undertake a review of the standards and SSAD in 2025, with an aim to update the security standards and SSAD in 2026.
- 6.2. The approach outlined in this report, taking into account feedback from the SRC, will form the scope of the review. the review will be carried out by an independent consultancy. This will ensure that the review is completed as quickly as possible while providing independent assurance of the results.
- 6.3. The system operator will then be able to redevelop their security of supply assessments, taking into account the revised SSAD. This will likely result in revised SOSA assessments for winter 2027 and beyond.
- 6.4. The Authority recognises that near-term changes to some security of supply settings are needed. We are moving quickly to implement initiatives to support security of supply for winter 2025. In addition to updating the security standards and the SSAD, we are also:

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<sup>16</sup> Based on the methodology prescribed by the Authority.

<sup>17</sup> The following factors are currently excluded from WCM modelling: unserved energy from an extended contingent event or catastrophic event, generation unit commitment and other market behaviours, planned generation outages, shortages of fuel or water, fast instantaneous reserve requirements, frequency keeping requirements, ramping constraint on thermal plant, AC transmission outages and constraints

- (a) updating scarcity pricing settings to better reflect consumer expectations and improve price signals for investment
  - (b) improving market information by strengthening the rules for thermal fuel contract disclosure
  - (c) enhancing outage information and coordination by developing and consulting on potential improvements to the outage coordination process
  - (d) improving the accuracy of intermittent generation forecasts to support resource coordination and price signals.
- 6.5. We will keep SRC updated on the progress of this review of the standards and SSAD.

# Security standards and assumptions

# What to expect in this session

## This presentation

- Background on the security standards and the assumptions document
- The Authority's early thoughts on an approach to update the standards and the SSAD
- Feedback from the system operator on our proposed areas for review

25min

## Discussion session

- Discussion and your feedback on the proposed approach to update the standards and the SSAD

20min



# What are the security standards?



# What are the security standards?

There are 3 security standards specified in the Code (Clause 7.3(2))

The standards identify the efficient level of energy and capacity over winter

The standards represent efficient reliability by balancing the cost of shortages with the cost of new generation

The standards assume some level of energy and/or reserve shortfall

**What is the  
security standards  
assumptions  
document (SSAD)?**

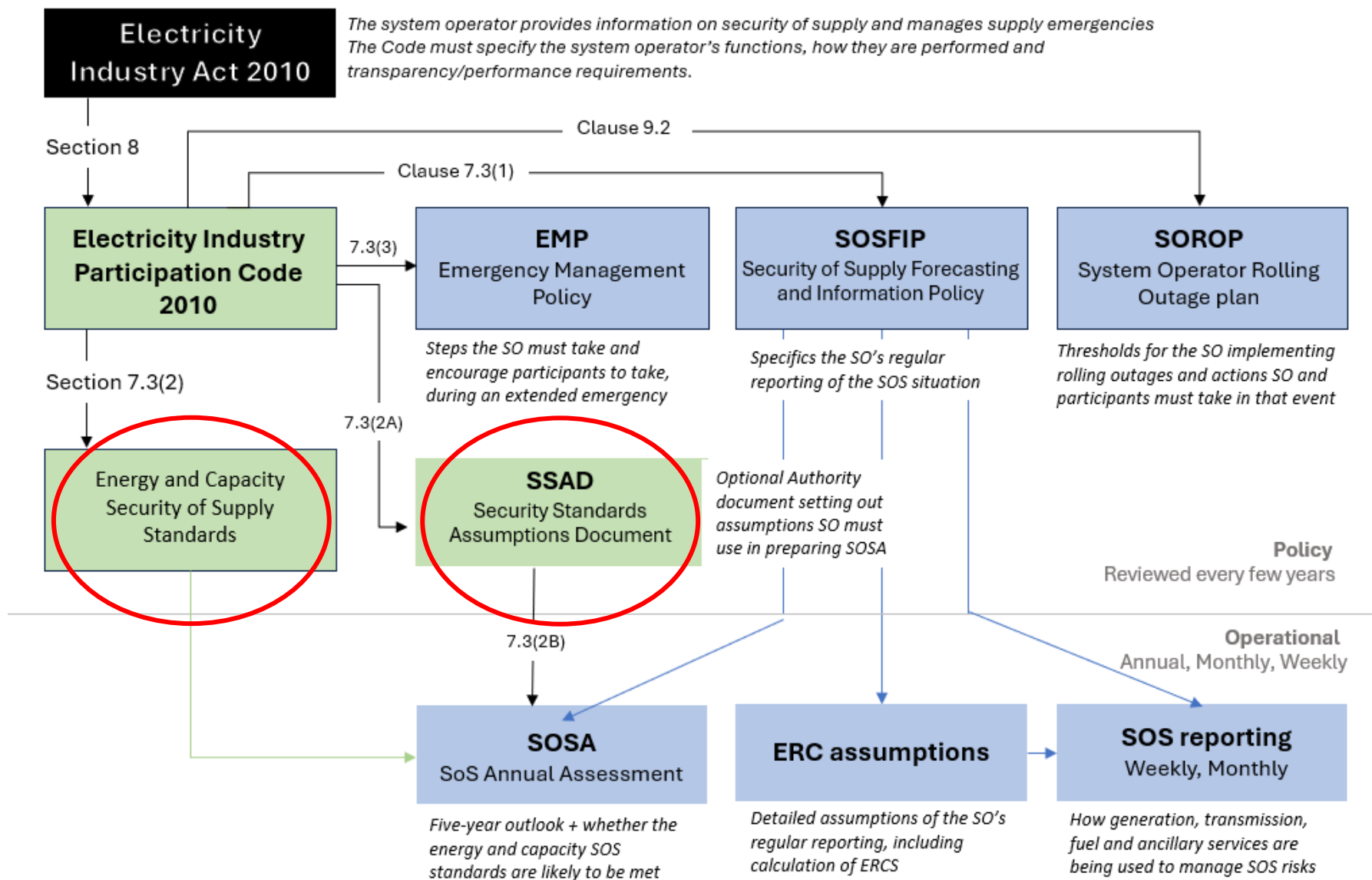


# What is the SSAD?

- The SSAD sets out:
  - formulae to calculate the margins
  - key assumptions
  - relationships between the margin levels and measures
- The settings in the SSAD inform the system operator's evaluation of security of supply margins



# Regulatory Framework for managing security of supply



## Summary of the standards and margins

	Winter energy security	Winter capacity security
Security types	<p>Ability to manage the risk of shortage of fuel (including water for hydro generation).</p> <p>Under stress in dry winters</p>	<p>Ability to supply peak demand (half-hourly basis)</p> <p>Under stress in winter peak demand periods when there are generation and/or transmission outages</p>
Standard	Identifies the optimal level of energy and capacity over winter	
Margin	<p>Actual measure for current and forecast levels of energy and capacity</p> <p>The margins are compared against the standards to ensure there is efficient reliability</p>	

# Margins and standards

	Margin	Acronym	Purpose of the margin	What the standard assesses	Standard
Energy	New Zealand winter energy margin	NZ-WEM	Ensures there is enough electricity over time	Efficient level of reserve generation and south-flowing transmission capacity to manage extended dry periods	14 -16%
	South Island - winter energy margin	SI-WEM			25.5 – 30%
Capacity	North Island - winter capacity margin	NI-WCM	Ensures there is enough electricity at any moment (during peaks)	Efficient level of peaking generation and north-flowing transmission capacity to meet peak demand	630 – 780MW

**How is the SSAD  
connected to the  
annual security of  
supply assessment  
(SOSA)?**





# How is the SSAD connected to the SOSA?

The system operator calculates the margins for standards comparison in their SOSA

The system operator must publish forecast margins for at least the next 5 years (but currently publish it for the next 10 years)

Key assumptions from SSAD must be used

The system operator can deviate from the SSAD if they think its justified (haven't done so before)

**Why do we need to  
update the  
standards and the  
SSAD?**



# Why do we need to update the standards and the SSAD?



fit for purpose market settings



correct investment incentives



Recommendation from the Authority's *Potential solutions for peak electricity capacity issues* decision paper (July 2024)



Last reviewed in 2017



# Our proposed approach to update the standards and SSAD

Based on:

- updated analysis from the 2017 review
- stakeholder feedback

## Overview: Proposed review areas for the standards and SSAD

(1) Data and assumptions

(2) Methodology to include new technologies

(3) Assumptions for source of additional generation

(4) Sensitivity analysis

(5) Methodology for the WCM

(6) Process improvements

# Your feedback

We seek your feedback on four important aspects

**1. Our proposed review approach**

**2. Whether and how to include analysis of intangible factors?**

e.g. loss of confidence in the electricity market

**3. Which sensitives are important to test? Including those which may not have been previously considered**

e.g. generator profit margins and physical constraints like unit commitment

**4. How could the standards be reported and calculated?**

# Proposed review areas for the standards and SSAD

Area	Explanation	Examples
(1) Data & assumptions	Supply factors	<ul style="list-style-type: none"><li>• changes to generation fleet, costs and outage rates (including modelling of new grid connected technology eg, BESS and solar generation)</li><li>• commissionings and decommissionings</li><li>• modelling of contingent hydro storage (WEM)*</li></ul>
	Demand factors	<ul style="list-style-type: none"><li>• changes to VoLL (potentially adjusting for inflation)</li><li>• demand response (e.g. Meridian's contract with Tiwai)</li><li>• distributed energy resources (widespread use of rooftop solar, domestic batteries)</li></ul>
	Transmission factors	<ul style="list-style-type: none"><li>• changes to HVDC loss factors and transfer capacity</li></ul>

\* Feedback from system operator on slide 20



## Proposed review areas for the standards and SSAD cont. 1

Area	Explanation	Examples
(2) Methodology to include new technologies	Specify how to model new grid connected technologies	<ul style="list-style-type: none"><li>include BESS and solar generation (BESS not currently considered and solar only included as 'other generation')</li></ul>
(3) Assumptions for source of additional generation	Reassess what the additional source of generation is likely to be (thermal is currently assumed for both margins)	<ul style="list-style-type: none"><li>more appropriate sources could be:<ul style="list-style-type: none"><li>intermittent generation for WEM</li><li>BESS or demand response for WCM</li></ul></li></ul>
(4) Sensitivity analysis	Include new sensitivities	<ul style="list-style-type: none"><li>sensitivities for correlated risks and the impact of real-time load variability</li><li>sensitivities to test whether standards are set at appropriate level</li></ul>



## Proposed review areas for the standards and SSAD cont. 2

Area	Explanation	Examples
(5) Methodology for the WCM	Use new methodology used in the 2017 review	<ul style="list-style-type: none"> <li>• separating instantaneous reserve modelling from energy modelling to be more dynamic</li> <li>• extending demand analysis from the top 200 to the top 500 peak trading periods to accurately represent the distribution of output by wind generation</li> </ul>
	Reassess analysis period	<ul style="list-style-type: none"> <li>• extending the period for analysis to include the whole year (currently references 1 Apr to 31 Oct)</li> </ul>
(6) Process improvements		<ul style="list-style-type: none"> <li>• system operator could recalculate the standards (and margins) annually - Authority to provide the methodology for calculating both*</li> <li>• Continued development of system operator's scenario and sensitivity analysis</li> <li>• Include more information on potential shortfall events e.g. size, duration, frequency and timing*</li> </ul>

\* Feedback from system operator on slide 20

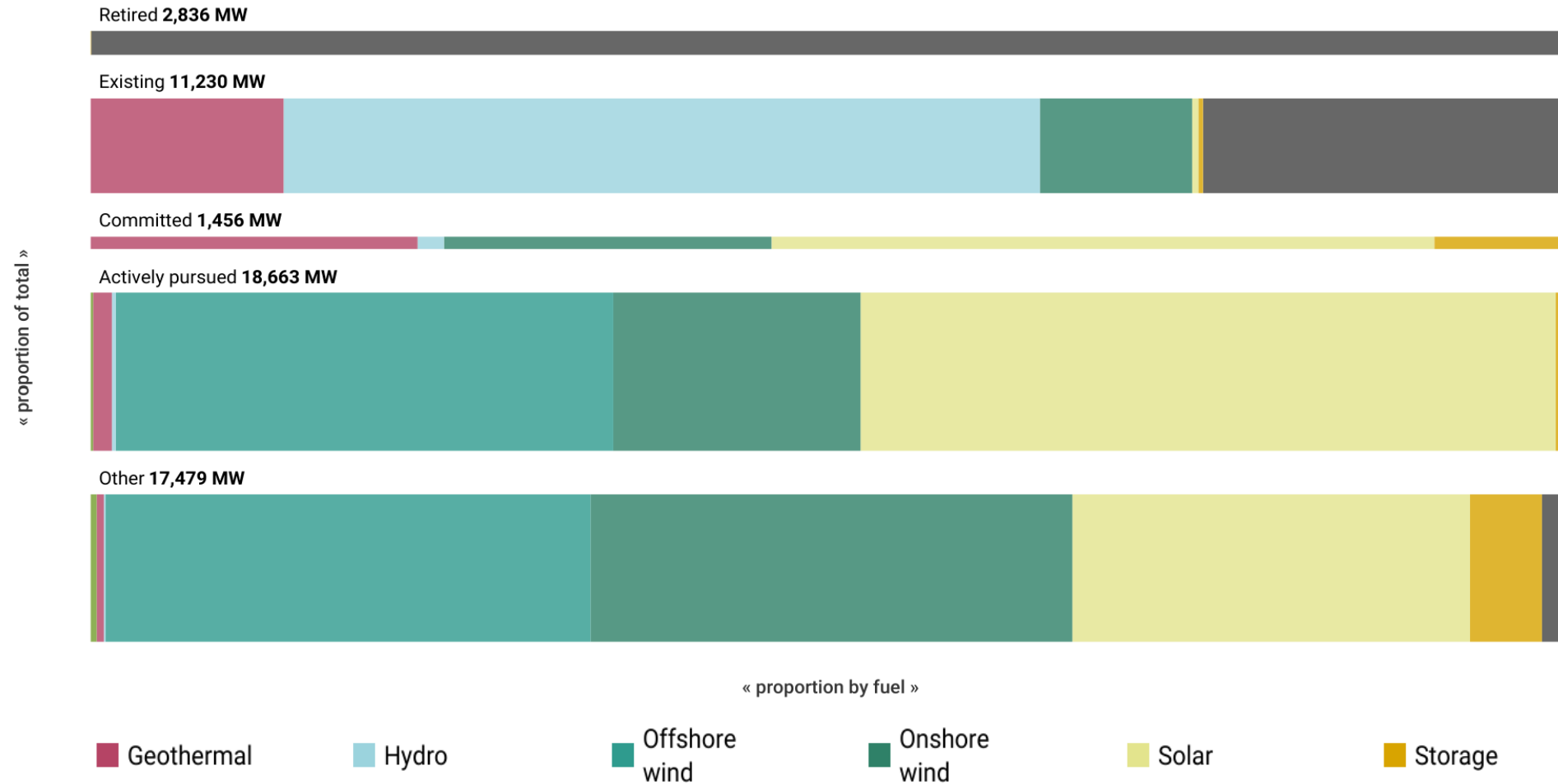
# Feedback from the system operator on the proposed review areas

Area	Feedback
<b>(1) Data &amp; assumptions</b> Changes to the modelling of contingent hydro storage	There needs to be sufficient disincentive to use contingent storage ahead of market resources. Otherwise, the use of contingent hydro storage would be considered ahead of building lower cost market resources.
<b>(6) Process improvements</b> System operator to recalculate the standards and margins annually	The system operator would seek funding for any additional work involved (eg, preparing data and sensitivities for the standards).
<b>(6) Process improvements</b> Inclusion of more information and commentary on the size, duration, frequency and timing of potential shortfall events	<p>Agreed this should be included given little visibility of the extent of potential issues under the security standards, which are based on averages.</p> <p>Questioned if this information could also be used to inform the standards to provide a standard that limits size/duration of unserved energy. Noted this may have funding implications.</p>

# Reference slides



# Investment pipeline – responses from 2023 investment survey



# Terminology – Relationship between standard, margin and the SSAD

A standard is a threshold expressed in terms of a metric (or in this case a margin).

For example, a sign that says “Children must be at least 130 cm tall to use this slide” sets the standard at 130 cm. The metric is the child’s height in centimeters.

Term	Meaning
Standard	Identifies the optimal level of energy and capacity over winter.
Margin	Actual measure for current and forecast levels. The margins are compared against the standards to ensure there is efficient reliability.
SSAD	Allows for consistent calculation between the margins and the standards by defining some key assumptions.

## How to interpret the metrics against the standards: Energy margin

NZ-WEM Standard	Scenario/actual	Meaning
14-16%	12% (below standard)	Inefficiently low level of investment. The cost of increasing supply is justified by the savings from reduced shortage costs during long periods of low inflows.
	15% (within standard)	Efficient level of investment.
	18% (above standard)	Inefficiently high level of investment. The cost of increasing supply is not justified when compared against the cost of shortage during extended dry periods. Note: it might still be efficient for other reasons.



## How to interpret the metrics against the standards: Capacity margin

NI-WCM Standard	Scenario/actual	Meaning
630 – 780 MW	600 MW (below standard)	Inefficiently low level of investment. The cost of increasing supply would be more than justified by the savings from reduced shortage costs during times of insufficient capacity.
	700 MW (within standard)	Efficient level of investment.
	800 MW (above standard)	Inefficiently high level of investment. Supply costs would outweigh the cost of shortage at times of insufficient capacity. Note: it might still be efficient for other reasons.

# Roles and responsibilities

The Electricity Industry Act 2010 requires:

- **Transpower** – as the system operator, to provide information and short to medium-term forecasting on all aspects of security of supply, and to manage supply emergencies
- **Electricity Authority** – as the body responsible for the Code, to specify the system operator's functions and how they are to be performed and reported on.
- **Security and Reliability Council** – to provide independent advice to the Electricity Authority on the performance of the electricity system, the performance of the system operator, and reliability of supply issues.



# Resources

## Electricity Authority:

- [Security standards assumptions document \(2012\)](#)
- [Potential solutions for peak electricity capacity issues – Decision paper \(2024\)](#)

## Transpower:

- [Evolving security of supply assessment in New Zealand \(2023\)](#)
- [Security of Supply Annual Assessments \(2017-2024\)](#)
- [Value of lost load study \(2018\)](#)



Thank you