SECURITY AND RELIABILITY COUNCIL

AGENDA

Meeting number: 52

Venue: Transpower, 22 Boulcott Street, Wellington. 8.00 am until 4.00 pm, Tuesday, 26 August 2025

Item	Description	Start time	Length (mins)	Paper Author	Cover paper	External presenters/ attendance
1	Attendance and apologies	8.00	5	n/a	Y	n/a
2	Changes to disclosure of interests *Please email any changes to the disclosures register at least two days prior to the meeting*			n/a		n/a
3	Members-only session	8.05	15	n/a		n/a
4	Minutes of previous meeting	8.20	10	n/a		
5	Correspondence			n/a		n/a
6	Action list and updates			Secretariat	Y	
7	Security of supply update	8.30	30			EA/SO combined presentation
8	Wrap-up discussion on SoS update	9.00	10			Potentially use the strategy session
	Risk and strategy					
9	Environmental scan, facilitated group discussion, and break-out sessions	9.10	170			Andy Knight (GIC) James Kilty (Transpower) Tracey Kai (ENA)
	Lunch	12.00pm	60			Catered (time includes 30min

Item	Description	Start time	Length (mins)	Paper Author	Cover paper	External presenters/ attendance
						Control room tour)
10a	Annual System Operator security of supply assessment (SOSA)	1.00	30	System Operator		System Operator / EA observer
10b	Contingent storage analysis concerns	1.30	15			System Operator
10c	Wrap on items #10a and 10b	1.45	10			
	Cyber-security					
11a	NCSC	1.55	15		N	Cyber presenters invited to stay
11b	Transpower	2.10	15			Cobus Nell
	Break	2.25	5			Short break
11c	Vector	2.30	15			Richard Timms, James Tipping
11d	Group discussion (Tracey Kai to facilitate)	2.45	35			All cyber presenters invited to this discussion
11e	Wrap-up discussion on cyber	3.20	20			
12	The purpose and scope of next meeting's substantive papers and forward work programme	3.40	20	Secretariat	Y	
	Meeting finishes	4.00pm				

SECURITY AND RELIABILITY COUNCIL

MINUTES

Meeting number: 51

Venue: Rūnanga, Electricity Authority, Level 7, AON Centre, 1 Willis Street, Wellington
Time and date: 9.00am until 4.00pm, 29 May 2025

Members Present

- Hon Heather Roy (Chair)
- Ben Gerritsen
- Chris Ewers
- Nanette Moreau
- Karen Frew (via Teams)
- Allan Miller
- Rebecca Larking (via Teams)
- David Binnie
- Steve Duggan
- Andre Botha (via Teams)

In attendance

Name	Title	Agenda item # attended
Electricity Authority (Authority):		
Sarah Gillies	Chief Executive	All items excluding #3, #11, #12
Hayden Glass	GM, Wholesale and Supply	All Items excluding #3 to #6, #10a to #10d
James Blake-Palmer	Senior Analyst, Policy (Secretariat), Electricity Authority	All items excluding #3
Chris Otton	Manager, Market Policy Operations	All items excluding #1 to #7
Viktoria Nordstrom	Manager, Market Intelligence (Acting) Electricity Authority	#8
	Other:	
Rebecca Osborne	Head of Market Services, Transpower	#9
Oliver Wilson	Market Analyst, Transpower	#8
Matt Ritchie	Group Manager, Government Relations and Regulatory Affairs, Genesis Energy	#10a
Mark Hanes	Site Manager, Huntly, Genesis	#10a
Reg Soepnel	Chief Engineer, Genesis	#10a
James Flanery	Head of Strategy, Contact Energy	#10b
Chris Abbott	Chief Corporate Affairs Officer, Contact Energy	#10b
Robert Ochtman-Corfe	Engineering Authority, Contact Energy	#10b
Miliana Belhout	Senior Strategic Analyst, Contact Energy	#10b

Name	Title	Agenda item # attended
Mark Utley	Head of Excellence, Contact Energy	#10b
Tania Palmer	GM, Generation, Meridian Energy	#10c
Brent Wilson	Engineering Authority, Meridian Energy	#10c
Mat Bayliss	Head of Generation Strategy, Meridian Energy	#10c

The meeting opened at 9.00am, James Blake-Palmer joined the meeting at 9.00am.

1. Attendance and apologies

1.1. The Chair welcomed members to the 51st meeting of the Security and Reliability Council (SRC). A quorum was established.

1.2. The Chair noted Rebecca Larking, Andre Botha and Karen Frew attended remotely.

2. Changes to disclosure of interests

2.1. The Chair reviewed the interests register.

2.2. The secretariat noted a change to Chris Ewers' interests and noted the interests of new members, David Binnie and Steve Duggan.

2.3. There were no further changes disclosed. The Chair approved members to act despite those declared interests.

James Blake-Palmer left the meeting at 9.05am.

3. Members-only session

3.1. The members discussed their priorities for the meeting.

Sarah Gillies and James Blake-Palmer joined the meeting at 9:31am.

4. Minutes of previous meeting

4.1. Members discussed the minutes of the 27 February 2025 SRC meeting.

4.2. The minutes were accepted as a true and accurate record.

Nanette Moreau moved. All members approved.

5. Correspondence

5.1. The Chair noted the SRC's letter of 21 March sent to the Authority, the Authority's letter of reply dated 5 May.

5.2. The Chair noted feedback that the bullet point layout was well received.

5.3. Member comments included:

a) Interest in further update and discussion about the Energy Competition Task Force at the August meeting

b) Contingent storage – a complex issue, with the Security Of Supply Forecasting and Information Policy (SOSFIP) review underway

c) The difficulty in getting a counterfactual perspective on contingent storage and interest in hearing the system operator's perspective, at the August meeting and providing feedback on the scope of the system operator's review, possibly as an SRC subgroup,

d) Concerns raised by system operator about the need for workable controls and triggers and, longer-term, any changes becoming operational,

e) Concerns if clarity leads to participants pricing contingent storage into their offers and the impact on future years of accessing contingent storage

f) Concerns about the buffer component (designed to address differing lake levels) being used to decide whether or not to trigger contingent storage access. A member considered the issue of changing consents needs to be seen separately from the control aspects

g) Concerns about the need to mobilise crews to, for example, reinforce lake edges with rocks as it lowers, when the notice period for contingent storage is so short

h) Major Electricity User's Group's (MEUG's) letter calling for, among other things, a single agency to be responsible for security of supply was noted

Action 1: The secretariat to share with members, information about the scope of the system operator's SOSFIP review and ask system operator to present briefly on this at the August meeting, hosted by Transpower

6. (Agenda item #6) Action list and updates

6.1. The Chair noted the ongoing and completed actions in the table, which were taken as read.

7. (Agenda item #7) Risk radar

7.1. The Chair noted the inclusion of the risk radar versions in the meeting pack is to support members' consideration of the risks facing the sector and prioritise the SRC's work.

7.2. The Chair proposed a desired outcome from the SRC's August risk and strategy session could be to land a robust risk radar, with support from an external facilitator. All members agreed.

7.3. The Chair led an around-the-table discussion on the risks impacting the sector over the short, medium and long term. Members and those present noted and discussed the following short-term, longer-term and persistent risks:

a) Winter energy security and the ongoing risk of contingency failure of a single asset and concern about multiple contingencies.

b) Shoulder months pre and post winter becoming of greater concern

c) Degradation of after diversity maximum demand (ADMD) as distributed energy resources (such as batteries) respond to time of use (TOU) signals and new and higher demand peaks emerge

d) Availability and pricing of gas for electricity generation and increase in gas transmission charges impacting both major and smaller gas users

e) Tree regulations reform taking too long and questions as to the effectiveness of measures to date

f) Cascading of risks, for example dry year + reduced wind and gas availability

g) Loss of diversity at the distribution level, even with modelling showing it is not impacting the low voltage network yet

h) High cost of network upgrades, impacted by lack of appetite for overhead wire upgrades, which are generally less expensive to install than underground

i) Requests for 700+MW of new load over the next 10-15 years, driven, for example, by data centres, increasing peaks

j) The costs of network upgrades impacting vulnerable consumers

k) A low-carbon approach impacting investment incentives

l) Cyber security, with increased sophistication and use in conflict regions

m) Members discussed the risk radar and noted the following changes:

   i. regarding the *Commerce Commission regulations* point, change the priority to green

   ii. regarding the *insufficient collaboration* point, change the priority to amber

   iii. regarding the *inadequate AUFLS* point, change the priority to green

7.4. Members discussed including the system operator in the SRC's risk radar item at future meetings – all approved.

Action 2: The secretariat to invite representatives from the system operator to the risk radar discussion at the SRC's August meeting.

Viktoria Nordstrom, Rebecca Osborne and Oliver Wilson joined the meeting at 10.50am

8. (Agenda item #8) Winter 2025

8.1. The Chair welcomed presenters and introduced this item, noting from the next meeting onward, this will be referred to as the *security of supply update*.

8.2. Presenters noted this is an evolving Authority and system operator presentation, covering physical assets and wider market considerations.

8.3. The presentation and points of discussion noted:

a) The current hydro situation, with record low inflows

b) reduced demand response and aggregated DER is due to incentives and market functions

c) The evolving use of TCC and its 23 May closure, substituted by the Stratford peakers

d) Seasonal increase in wind generation

e) Publication of the May energy security outlook

f) The recent gas agreements reached between Methanex, Contact and Meridian

g) The increasing capacity considerations in ‘shoulder months’ not just winter

h) Lessons from the last year include the need to communicate with New Zealanders at certain times to ensure messaging around any need to monitor usage is received and actionable

i) The aim to let the market resolve issues through current mechanisms, reducing the need for intervention where possible

j) Increase in retailers providing flexibility through hot water and smart meter management

k) Cascade effect is the biggest concern

l) The ‘Tekapo shadow constraint’ is a complex issue where there are unintended consequences between consents and water allocation, which are not easily resolvable through the ‘blunt instrument’ of contingent lake level storage access

Action 3: The secretariat to obtain the updated presentation slides and circulate to members

Viktoria Nordstrom, Rebecca Osborne and Oliver Wilson left at 11.36am

9. (Agenda item #9) Wrap-up discussion on the Winter 2025 presentation

9.1. The Chair led a Wrap-up discussion with members on item #9, including areas of concern and points to note in the letter of advice.

Hayden Glass left the meeting at 11.54am

Matt Ritchie, Mark Hanes and Reg Soepnel joined the meeting at 11.55am

10. (Agenda item #10a) Generation asset management and aging plant - Genesis

10.1. The Chair introduced the theme for the meeting and welcomed presenters from Genesis, who attended remotely.

10.2. The presentation and points of discussion noted:

a) Many hydro assets are aging, with a wide variation in age and changes in operating regime causing challenges for ongoing maintenance. This is being met by more condition and prediction monitoring/modelling, and, for example, replacement of water lines and seismic upgrades

b) Thermal assets provide additional challenges in predicting future operations and maintenance, for example the need for greater weed control management in lakes. In Huntly’s case, this has been built into the station’s design through splitting of systems

c) A focus for Genesis between 2018 and 2022 was investment in staff and training resources to ensure sufficient personal to operate all assets at once, if required

d) Flexible coal contracts and changes in operational support have helped to support changing generation profiles

e) In response to member questions about the impact of increased cycling on unit 5, presenters noted this has increased to approximately 100 per year, designed to cope with 250.

f) Genesis' critical spares programme, for which lead times and outage planning are critical, has enabled maintenance of some assets out ten years and some to 2040

g) In response to member concerns about peaking capacity where slow start thermal is not operating, presenters noted they are working with Mitsubishi on enhancements to unit 5 and are members of the Mitsubishi User's Group, for collaboration, for example, on turbines and transformers

h) A move to more condition and prediction monitoring focus is on open access, regulatory clarity, accelerating high-value ideas and deepening market understanding. This could include providing specific Code support, trial scoping, use of a pilot observer to connect findings to Authority workstreams and potential use of regulatory exemptions

i) In response to a member question about circuit breaker resilience, presenters noted they have a long capex programme capex (looking 10 years out) targeting high-risk areas, for example those operating below 40%

j) In response to a member question about how they plan for single points of failure where carrying spares is impractical, presenters noted an example of procuring replacement parts with additional functions such as voltage capability

Matt Ritchie, Mark Hanes and Reg Soepnel left the meeting at 12.33pm

The meeting broke for lunch at 12.34 and recommenced at 1.06pm

James Flanery, Chris Abbott, Robert Ochtman-Corfe, Miliana Belhout and Mark Utley joined the meeting at 1.06pm

11. (Agenda item #10b) Generation asset management and aging plant – Contact

11.1. The Chair welcomed presenters from Contact Energy to the meeting.

11.2. The presentation and points of discussion noted:

a) Contact is in the process of finalising its strategy for the next five years, focusing on security and reliability, affordability and growing electricity demand to support decarbonisation (including 2.3Bn investment in geothermal, solar, wind and batteries, with a commitment to net zero carbon by 2035.

b) With the volatility of renewable resources there is a need to keep things in balance, using, for example shifts in consumer demand and a diversified portfolio of assets

c) TCC is a very useful, but not very flexible asset, as it works best as baseload and does not like constant switching. Following a 2-3 year overhaul, it is near end-of-life. With limited gas, it is also increasingly difficult to place in the market. Contact has no ability to further extend the life of TCC and it will be retired at the end of 2025

d) There are many data forecasts, which can be confusing, especially where, for example, NZGB assumptions may not align

e) Contact wants to build more, but the consenting process is an issue. Access to additional 2m of Hawea storage would be good. Another consideration is ‘minimum flow’ requirements and the need for ‘big river feel’ around Roxburgh

f) In response to a question about how carbon price volatility impacts, presenters noted they’ve entered into a forestry scheme and invested further in peaker availability in the future absence of TCC

g) Geothermal regulation is based around oil and gas regulation but applying to geothermal pipelines and kit is problematic (it sets the bar too high) and expensive. A specific set of regulations would be beneficial

James Flanery, Chris Abbott, Robert Ochtman-Corfe, Miliana Belhout and Mark Utley left the meeting at 1.53pm

Tania Palmer, Brent Wilson and May Baylis joined the meeting at 1.54pm

12. (Agenda item #10c) Generation asset management and aging plant – Meridian

12.1. The Chair welcomed presenters from Meridian Energy to the meeting.

12.2. The presentation and points of discussion noted:

a) Meridian’s asset management approach, including dam safety reviews and its concerns about Manapouri transformers not lasting as initially anticipated, leading to tens of millions being spent on re-risking

b) Asset management is one aspect of security of supply, with fuel sources being a critical issue. Strategies for this include discussions with the *Guardians of Lakes Manapouri and Te Anau*, around a separate tranche of availability below current levels

c) Meridian also has a strong focus on clean energy, for example the building of seven assets in seven years, including a joint venture with Nova Energy. For these types of investment, Meridian and partners need confidence in return on investment (ROI)

d) Meridian has 680MW of consented projects (approx. $1Bn) and $3Bn in new assets; with a commitment to a net zero carbon target by 2050

e) Meridian is focused on maximising flexibility in its current and new assets and progressing wholesale and retail options, for example with NZAS and others

f) Meridian is using its assets to support peaking and firming, as that's what is needed in the system, but this involves using the plant differently and not necessarily what it was designed for

g) Meridian is concerned about gas availability and information about that, concluding gas is 'on the way out'.

Tania Palmer, Brent Wilson and May Baylis left the meeting at 2.43pm

13. (Agenda item #10d) Wrap-up on items #10a, #10b and #10c

13.1. The Chair led a Wrap-up discussion with members on items, #10a, #10b and #10c, including areas of concern and points to note in the letter of advice.

14. (Agenda items #11 and # 12 – purpose and scope of next meeting's papers and forward work programme

14.1. Members considered and discussed potential items for their Q3 and Q4 meetings for 2025:

a) **Q3 – Annual risk and strategy session**. Proposed as a facilitated session, with an environmental scan from a range of presenters, suggestions included system operator, ENA, MEUG and GIC. A two-three-hour session, including focus on layout and content of the risk radar, and a 'So What' discussion.

b) Annual system operator security of supply assessment (SOSA), with a presentation from Transpower staff and discussion to test approach and assumptions and inform next year's assessment

c) Cyber security, with input from DPMC, the National Cyber Security Centre (NCSC), and overseas perspectives, for example the Russian invasion of Ukraine,

d) Winter (Energy and Capacity update) – a combined presentation from the Authority's monitoring team and system operator on current state, with up-to-date information

e) Control room visit during the meeting, which for August is being hosted by Transpower

f) Annual engagement with the Authority Board (the day before) where topics could include security and reliability top concerns and discussion about the new approach to supporting the SRC's work

g) **Q4** – Annual review of system operator performance; and

h) Demand-side management or other themes/topics as arising from the SRC's risk and strategy session

i) Update and discussion about the Energy Competition Task Force

j) Update from Transpower on the SOSFIP review

k) The Commerce Commission's role in supporting security and reliability of supply

The meeting ended at 3:45pm

ELECTRICITY AUTHORITY TE MANA HIKO

1 July 2025

Hon Heather Roy
Chair
Security and Reliability Council (SRC)

By email: heatherjroy@gmail.com

Dear Heather,

Re: SRC advice from its 29 May meeting

Thank you for your letter of 6 June 2025. The Electricity Authority Te Mana Hiko (Authority) Board considered the SRC's advice at its 17 June 2025 meeting. This response reflects that consideration.

Energy and capacity challenges for winter 2025 and beyond

The Authority strongly supports the SRC's approach of having a joint Security of Supply update from Authority staff and the System Operator. This combined view of security of supply risks will help ensure we collectively are focusing on the most critical issues and should allow the SRC to draw out points of difference between the view of the Authority and that of the System Operator.

- **Tekapo shadow constraint** - We agree that certainty and clarity around the impacts and management of the Tekapo shadow constraint would benefit the market as a whole.

  We are engaging with the System Operator on the SOSFIP review (where the shadow constraint, among other issues, is being considered). Authority staff will also seek regular updates on the progress of the discussions we understand that the System Operator is facilitating between Genesis and Environment Canterbury. It may be that the most efficient way to resolve this issue is via the resource consent system.

- **Develop a vision for the medium and long-term role of consumer DER to manage peak demand and capacity issues** - We recently released our green paper on decentralisation which discusses the emergence of small scale, widespread DER resources and how they will impact the power system and market. We plan to use this green paper as the foundation for discussions on what a more decentralised electricity system could look like, and what steps might be needed to get there. The outcome of this consultation will shape our vision and work programme for DER.

- **Consider issues and potential solutions for the reliance on slow-start thermal plant during high hydro storage/inflow conditions** - The power system's reliance on slow-start thermal plant to back up wind generation in times of high hydro storage or inflows is a concern. We acknowledge industry is responding through products such as the Huntly firming options and the Heads of Agreement discussions. It is also positive to see the recently announced collaboration around the strategic energy reserve centred on the Huntly power station.

For our part, we are looking at enhancements to existing ancillary services to provide additional incentives for resources to be committed during periods of high risk. We are aiming to consult on options in early 2026. We are also engaging at a Board level with GIC on collaboration opportunities to support security of supply.

- **System Operator concerns about contingent storage use** – We understand you have asked the System Operator to outline its concerns at your August meeting. We welcome SRC's continued attention on the issues around contingent storage.

Asset management and ageing plant

- **Asset management practices** – It is reassuring generators demonstrate good asset management practices. Given the increasingly important role of smaller generators in supporting regional resilience, we encourage the SRC to include their perspectives for the fullest understanding of the issues and differing views.

- **Asset connection assessment requirements** – We are engaging with the System Operator to ensure its asset connection assessment requirements are proportionate to the risk being managed, and the timeframes for progressing connection requests supports development. In particular, the Authority's Future Security and Resilience team is engaged with the System Operator as it develops its connection assessment information requirements and is working with the Common Quality technical group to ensure the information requirements are reasonable and justifiable.

The SRC's next meeting

We welcome the SRC's plan to look at Transpower's annual Security of Supply Assessment (SOSA) and to explore the System Operator's contingent storage access concerns at its next meeting.

We also look forward to meeting your new members at our Board / SRC engagement in August and the opportunity to discuss how the new approach to supporting the SRC's work is going.

Thanks again for your letter. The SRC plays an important role in contributing to and testing the Authority's work.

Yours sincerely,

Anna Kominik
Chair
Electricity Authority Te Mana Hiko

SECURITY AND RELIABILITY COUNCIL

6 June 2025

Anna Kominik
Electricity Authority Chair
Electricity Authority
PO Box 10041
Wellington 6143

Dear Anna,

Advice from 29 May 2025 SRC

The Security and Reliability Council (SRC) provides the Electricity Authority Te Mana Hiko (Authority) with independent advice on the performance of the electricity system and the system operator, and reliability of supply issues.

At the May SRC meeting

The focus of the May SRC meeting was for the SRC to gain an understanding of generator's asset management practices with a particular focus on maintaining ageing plant.

As part of the asset management theme, the SRC received presentations from and spoke with:

- Genesis Energy
- Contact Energy and
- Meridian Energy

The SRC also received a joint briefing from the Authority and the System Operator on the security of supply outlook for winter 2025.

Winter 2025 outlook

Following the February update on energy and *capacity challenges for winter 2025 and beyond* the SRC requested a joint update from the Authority and the system operator on the security of supply situation heading into winter 2025.

- Members congratulated the Authority on the publication of thermal fuel information, particularly regarding contracted gas availability.
- The SRC observed the security of supply situation is largely unchanged year to year – the power system relies on asset reliability and availability to provide resilience. This is a growing concern as those assets age.
- Earlier action on gas supply arrangements by participants this year was acknowledged and taken as a sign that industry had learned from last year and taken prompt action.
- Industry participants still consider there to be uncertainty on the access conditions to contingent storage. Noting that later in the day the SRC heard from three

gentailers that they have engaged with relevant consenting authorities to review their operating and contingent storage settings.

- The SRC looks forward to receiving the final report on the annual pan-industry exercise, noting that early feedback on the event has been positive.
- The System Operator noted the increased peak capacity risk is being seen in shoulder seasons in addition to the historical winter capacity issues. This concern was also raised by SRC members during a future risks discussion

Advice

- The SRC recommends the Authority work with the system operator and Genesis to understand the timelines for resolving the “Tekapo shadow constraint” issue
- The Authority should have a vision for the medium and long-term role of consumer DER to manage peak demand and capacity issues.
- The SRC encourages the Authority to consider issues and potential solutions for the reliance on slow start thermal plant during high hydro storage/inflow conditions.
- The SRC would appreciate further insight on the System operator’s concerns regarding contingent storage use.

Asset management and ageing plant

There were several common themes through the three presentations as well as some points specific to individual companies.

Common themes

- It was positive to see companies considering critical spares and thinking differently about how they use their assets. This included the purchase of dual use transformers to provide spares redundancy across multiple assets and sharing assets across organisations.
- All three generators demonstrated good asset management practices.
- A strong pipeline of future investment was presented, each tailored to the risk perception and appetite of the individual organisations. Sovereign risk for long duration asset investments were raised as a concern.
- The investment pipeline is predominantly in new wind and solar developments, with some large-scale battery storage also under development. No participants discussed future plans to invest in new thermal capacity. There was a common theme of enhancing existing assets as the lowest cost way of delivering additional capacity. Though issues working through the System Operator’s connections standards process was raised.
- Outage windows for maintenance are extending the security risk into shoulder seasons. There was also acknowledgement of the workforce capability issues that are increasing with these ageing assets.
- Concerns were raised with the System Operator’s perception of asset owner’s motives regarding access to contingent storage which identifies as a barrier to progress. All three generators highlighted their concerns regarding social licence to

operate in this regard and the need for a common understanding of the decision-making framework was required.

Genesis

- Huntly station is the only large-scale dry year reserve and capacity flex plant remaining.
- Industry has started to realise the importance of Huntly and discussions on the investment necessary to keep it running are underway, noting that market signals alone are no longer strong or consistent enough to keep the third Rankine unit in market.

Contact

- Recent Geothermal development was intended to displace TCC, there is no viable option to retain TCC past winter 2025.
- Concerns raised that oil and gas standard regarding pipework were being applied unnecessarily strictly to geothermal pipework.

Meridian

- The SRC took comfort from Meridian's long-term view of asset maintenance and upgrade work
- Meridian's approach of getting the maximum from existing assets is positive for addressing the need for uncreased renewable generation at lowest cost

Advice

- EA should engage with the SO to ensure that asset connection assessment requirements are proportionate to the risk being managed and that the timeframes for progressing connection requests supports development.

The SRC's next meeting

The SRC's Q3 (August 2025) agenda is still being finalised. The following themes are being considered:

a. Cyber risk – invite NCSC, Transpower and ENA – what concerns them at a holistic level and cyber specifically

b. System Operator contingent storage analysis and concerns presentation

Yours sincerely,

Hon Heather Roy
Chair of the SRC

cc: SRC members, Chris Otton and James Blake-Palmer (Authority)

ELECTRICITY AUTHORITY TE MANA HIKO

1 July 2025

Hon Heather Roy
Chair
Security and Reliability Council (SRC)

By email: heatherjroy@gmail.com

Dear Heather,

Re: SRC advice from its 29 May meeting

Thank you for your letter of 6 June 2025. The Electricity Authority Te Mana Hiko (Authority) Board considered the SRC's advice at its 17 June 2025 meeting. This response reflects that consideration.

Energy and capacity challenges for winter 2025 and beyond

The Authority strongly supports the SRC's approach of having a joint Security of Supply update from Authority staff and the System Operator. This combined view of security of supply risks will help ensure we collectively are focusing on the most critical issues and should allow the SRC to draw out points of difference between the view of the Authority and that of the System Operator.

- **Tekapo shadow constraint** - We agree that certainty and clarity around the impacts and management of the Tekapo shadow constraint would benefit the market as a whole.

  We are engaging with the System Operator on the SOSFIP review (where the shadow constraint, among other issues, is being considered). Authority staff will also seek regular updates on the progress of the discussions we understand that the System Operator is facilitating between Genesis and Environment Canterbury. It may be that the most efficient way to resolve this issue is via the resource consent system.

- **Develop a vision for the medium and long-term role of consumer DER to manage peak demand and capacity issues** - We recently released our green paper on decentralisation which discusses the emergence of small scale, widespread DER resources and how they will impact the power system and market. We plan to use this green paper as the foundation for discussions on what a more decentralised electricity system could look like, and what steps might be needed to get there. The outcome of this consultation will shape our vision and work programme for DER.

- **Consider issues and potential solutions for the reliance on slow-start thermal plant during high hydro storage/inflow conditions** - The power system's reliance on slow-start thermal plant to back up wind generation in times of high hydro storage or inflows is a concern. We acknowledge industry is responding through products such as the Huntly firming options and the Heads of Agreement discussions. It is also positive to see the recently announced collaboration around the strategic energy reserve centred on the Huntly power station.

For our part, we are looking at enhancements to existing ancillary services to provide additional incentives for resources to be committed during periods of high risk. We are aiming to consult on options in early 2026. We are also engaging at a Board level with GIC on collaboration opportunities to support security of supply.

- **System Operator concerns about contingent storage use** – We understand you have asked the System Operator to outline its concerns at your August meeting. We welcome SRC's continued attention on the issues around contingent storage.

Asset management and ageing plant

- **Asset management practices** – It is reassuring generators demonstrate good asset management practices. Given the increasingly important role of smaller generators in supporting regional resilience, we encourage the SRC to include their perspectives for the fullest understanding of the issues and differing views.

- **Asset connection assessment requirements** – We are engaging with the System Operator to ensure its asset connection assessment requirements are proportionate to the risk being managed, and the timeframes for progressing connection requests supports development. In particular, the Authority's Future Security and Resilience team is engaged with the System Operator as it develops its connection assessment information requirements and is working with the Common Quality technical group to ensure the information requirements are reasonable and justifiable.

The SRC's next meeting

We welcome the SRC's plan to look at Transpower's annual Security of Supply Assessment (SOSA) and to explore the System Operator's contingent storage access concerns at its next meeting.

We also look forward to meeting your new members at our Board / SRC engagement in August and the opportunity to discuss how the new approach to supporting the SRC's work is going.

Thanks again for your letter. The SRC plays an important role in contributing to and testing the Authority's work.

Yours sincerely,

Anna Kominik
Chair
Electricity Authority Te Mana Hiko

SECURITY AND RELIABILITY COUNCIL

ACTION LIST

The following are the current SRC actions for completion.

Action	Date for completion	Status
The secretariat to share with members, information about the scope of the system operator's SOSFIP review and ask system operator to present briefly on this at the August meeting, hosted by Transpower	August	**Completed.** SO to provide update at August meeting
The secretariat to invite representatives from the system operator to the risk radar discussion at the SRC's August meeting.	August	**Completed.** SO representative to attend SRC
The secretariat to obtain the updated presentation slides and circulate to members	August	**Completed.** Circulated after May meeting.

1. Updates

This section provides information on matters that do not warrant a dedicated agenda item but are relevant to security and reliability and/or discussed by SRC.

1.1 From the Authority

1.1.1 This section sets out information about other Authority workstreams, of interest or relevant to the SRC's functions. Members are encouraged to familiarize themselves with the Authority's workstreams to support their advice to the Authority Board.

Authority News and Projects

1.1.2 This link is to the Authority's news page, where Market Brief and other announcements are directed to, for further information: https://www.ea.govt.nz/news/.

1.1.3 This link is to the Authority's projects page, where each project has its own sub-page, including any consultation or decision papers: https://www.ea.govt.nz/projects/all/.

Industry Exercise 2025

1.1.4 This year's industry exercise was held on 9 April 2025, using an extreme dry winter scenario to build industry-wide capability for an extended electricity supply shortage resulting in the need for rolling outages.

1.1.5 On 12 August the Authority published insights and recommendations, the media release is available here and the report here.

Security standards Assumptions Document (SSAD) review

1.1.6 Work has started on reviewing the security standards and the accompanying SSAD. The Authority will release a consultation paper before the end of 2025.

SRC member thoughts on this section

1.1.7 Members should already receive our newsletter (Market Brief) notices and have access to Energy News articles, where this information is often included. For those who do not, please use this link to sign up to receive our weekly newsletter via email.

1.2 Winter developments

1.2.1 The joint EA-SO security of supply update outlines the situation for winter 2025 and looks ahead to next year.

1.3 Security of Supply Assessment (SOSA)

1.3.1 Transpower, as system operator is responsible for publishing the medium-term security of supply assessment (SOSA) annually. As the system operator notes, "*its purpose is to inform risk management and investment decisions by generators, other market participants, and investors. It forms part of New Zealand's electricity security of supply framework. The system operator performs other security of supply-related functions described in the Security of Supply Forecasting and Information Policy (SOSFIP) and the Emergency Management Policy (EMP).*"

1.3.2 A copy of the final report is available here. The SO will provide an overview of the final 2025 SOSA to SRC at the August meeting.

1.4 Energy Transition Framework

1.4.1 A group of major energy companies has joined together to support energy system management, especially costs and reliability.

1.4.2 In its recently released paper, the Energy Transition Framework is described as representing:

> "*the energy sector joining together to create a shared approach to transforming and decarbonising Aotearoa New Zealand's energy system. This Framework establishes a structure for Government and the energy sector to collaborate on the shared challenges in transitioning the energy system. This Framework is an enduring document that will enable collaboration for as long as needed*"

1.4.3 We mention this initiative, as the SRC, in previous advice, has noted the need for an overall strategy for the sector. Members may wish to consider whether the *framework* achieves this and whether the SRC has advice for the Authority in relation to it.

1.4.4 Please use this link to access further information about the Energy Transition Framework.

1.5 Huntly strategic reserve

1.6 Earlier in August Genesis Energy announced it had reached agreements with Contact, Meridian and Mercury to establish a strategic energy reserve at Huntly providing 150 megawatts of thermal cover for the next decade.

1.7 Genesis says the agreement, which is subject to Commerce Commission approval, ensures 720MW of Rankine capacity (3 Rankine units) remains available for another decade.

1.8 The agreement will support a solid fuel reserve of 600kt for dry winters and low inflows. The stockpile will be coal initially but may transition to biomass as this becomes available.

1.9 More information in this Energy News article.

1.10 System operator security of supply updates

1.10.1 Please use this link to access the system operator's quarterly Security of Supply Outlook. They note "*this document brings together a range of information that we provide on a regular basis to industry into one document to help more clearly articulate security of supply risks into 2025 for industry and other stakeholders.*"

1.10.2 The outlook draws from the Electricity Risk Curves (ERCs), New Zealand Generation Balance (NZGB) and the annual Security of Supply Assessment (SOSA), which members are familiar with. This brief quarterly report is recommended reading for members, covering both energy and capacity over a 12-month horizon.

1.10.3 Please use this link to access the latest security of supply information from the system operator: https://www.transpower.co.nz/system-operator/about-system-operator/security-supply-and-capacity

1.10.4 If members have concerns, or require further information, about the system operator security of supply updates, they can raise these with the secretariat.

1.10.5 This link is to the NIWA's seasonal climate outlook and associated commentary. A new edition is issued each month for the three months ahead. Scroll down and click on the latest issue: https://niwa.co.nz/climate/seasonal-climate-outlook

1.11 System operator weekly market movements

1.11.1 Link to Transpower's Market Operations Weekly Report | Transpower.

1.11.2 In this report the system operator provides an overview and update on security of supply (energy and capacity), generation breakdown and risk curves, amongst other information.

1.11.3 The secretariat recommends members sign up to receive these regularly via email and note any security or reliability risk patterns or trends, for further discussion.

1.12 New Zealand Generation Balance - NZGB

1.12.1 At members' request, a link to the latest review for each meeting. To review the latest NZGB, please use the following link: Customer Portal - NZGB (transpower.co.nz).

1.12.2 Reminder: change in NZGB monitoring that came into effect on 1 August, including improved load forecasting and better modelling of peak demand periods to aid in outage coordination. For further information, please use this link to access Transpower's NZGB information session video (click on the 2024 down-arrow link for the dropdown to access the video and slide pack).

1.13 Scheduled generation outages

1.13.1 As part of its work monitoring scheduled outages, the Authority publishes a report via its Electricity Management Information (EMI) portal – Scheduled Generation Outages.

1.14 Load Duration Curves

1.14.1 At the SRC's request these are available via the Authority's Electricity Market Information (EMI) portal: https://www.emi.ea.govt.nz/Wholesale/Reports/KPGKJ1?_si=v|3,s|mdo

1.14.2 If members have further feedback or suggestions about the data and how it is presented, they can raise these through the secretariat.

The SRC may wish to consider the following questions.

Q1. What further information, if any, does the SRC wish to have provided to it by the secretariat in the updates section?

Q2. Does the SRC have a preference for how information in this paper is presented?

Q3. What advice, if any, does the SRC wish to provide to the Authority?

Security of supply update

SRC 26 August 2025

ELECTRICITY AUTHORITY
TE MANA HIKO

Current Situation

- **Hydro storage has been decreasing**: 89% of mean and 54% nominally full as of 11 August
- Taupō 73% full as of 11 August
- **Tiwai** demand increasing since mid-June, restoration almost complete.
- **Methanex** running since 1 July.
- **Demand increasing towards winter peak, relying on slow start thermal for peak periods.**
- **Contact secured more gas from October 2025.**

Increasing demand and decreasing hydro storage have driven prices up from late July:

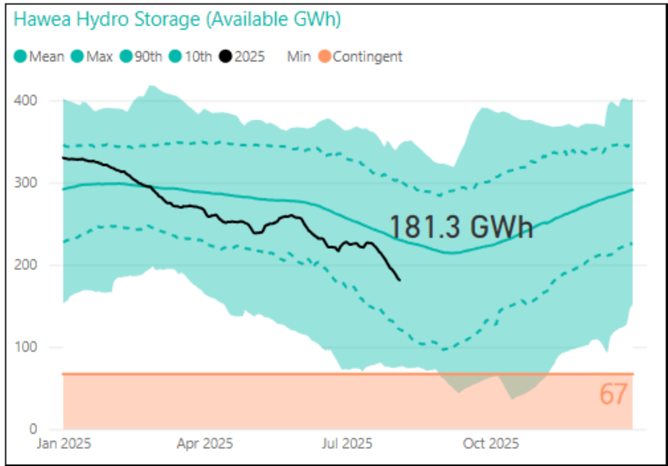
- Average spot price last week was $154/MWh, compared to $105/MWh during July.
- June/September 2026 winter future prices are ~$230/MWh at Benmore and ~$250 at Ōtāhuhu, compared to ~$207/MWh and ~$235/MWh at start of July.

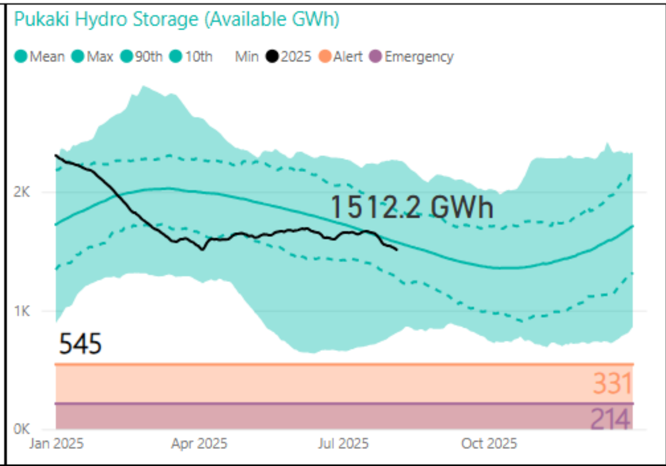
TRANSPOWER

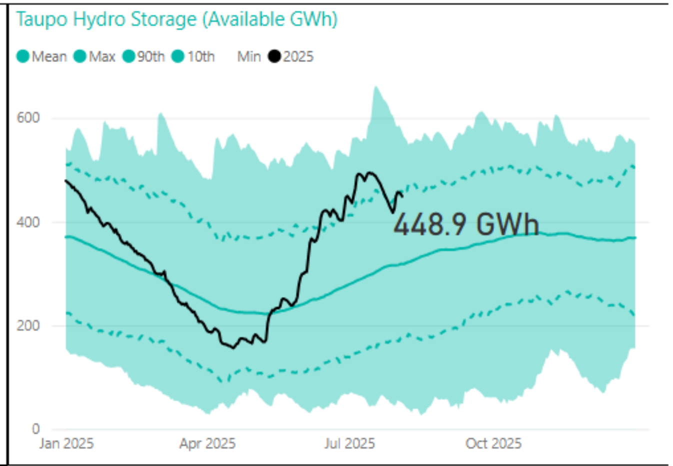
System Operator update

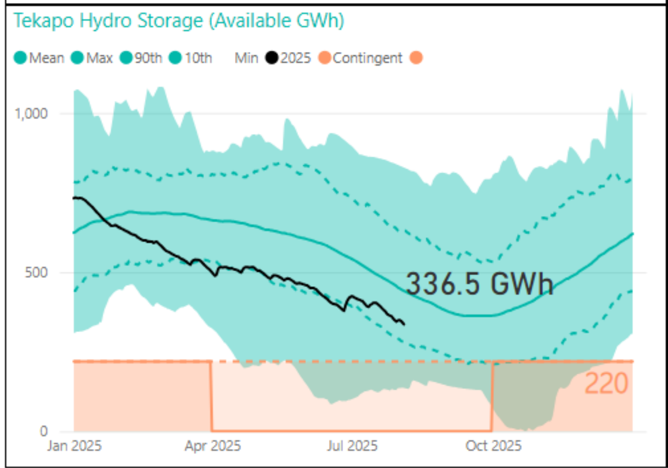
IN-CONFIDENCE: ORGANISATION

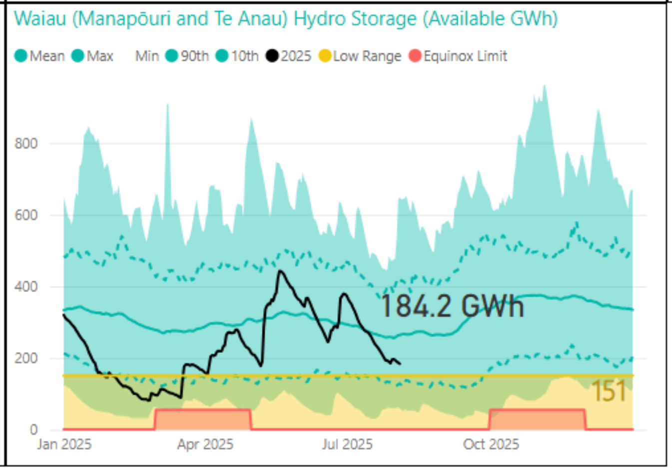
Hydro storage by scheme







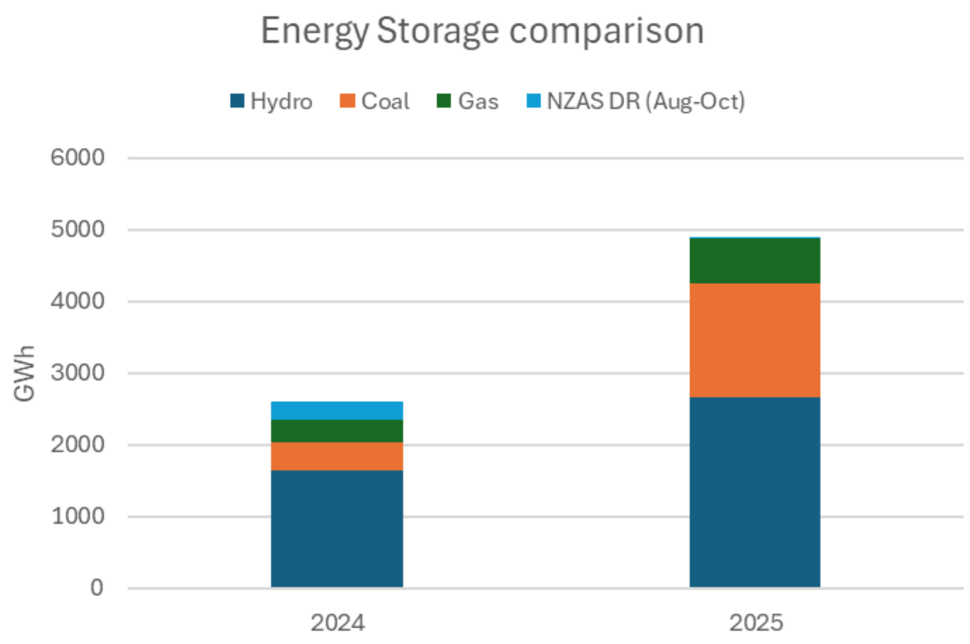




Lake	Current (%) avg
nz_controlled	94
si_controlled	88
hawea	79
pukaki	96
manapouri	75
te_anau	67
tekapo	76
taupo	141

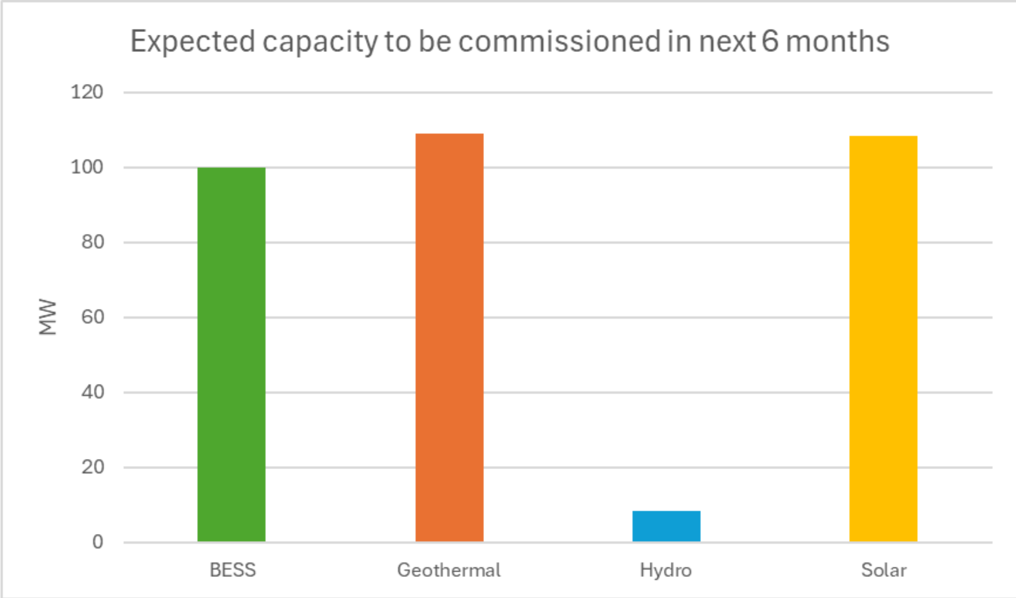
Combined market response

- Better fuel position for winter than same time last year
- Inflows + market response
  - Methanex shut-down for ~6 weeks
  - Additional coal orders
  - NZAS-Meridian 50 MW DR activated (call ended – now being restored



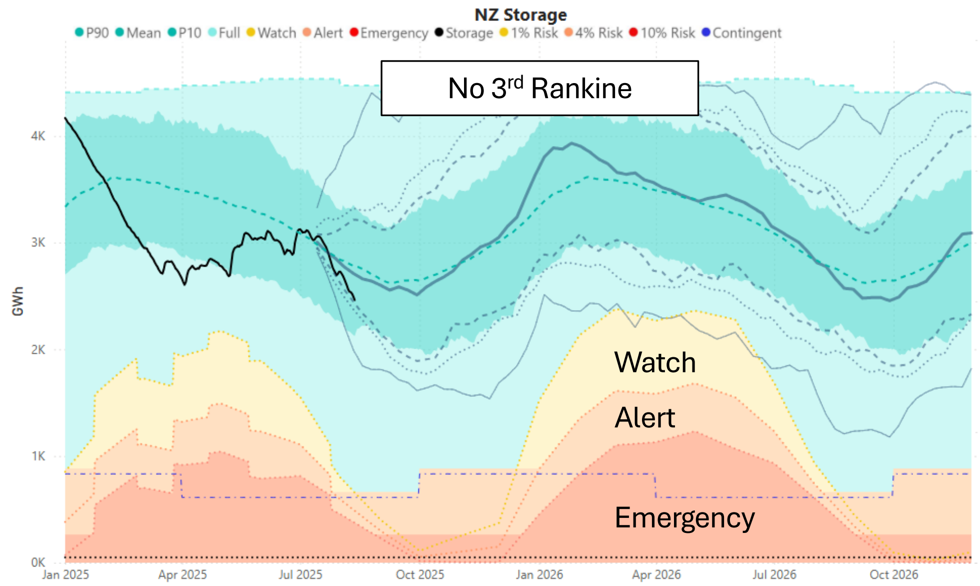
New supply commissioning - limited winter 2025 support

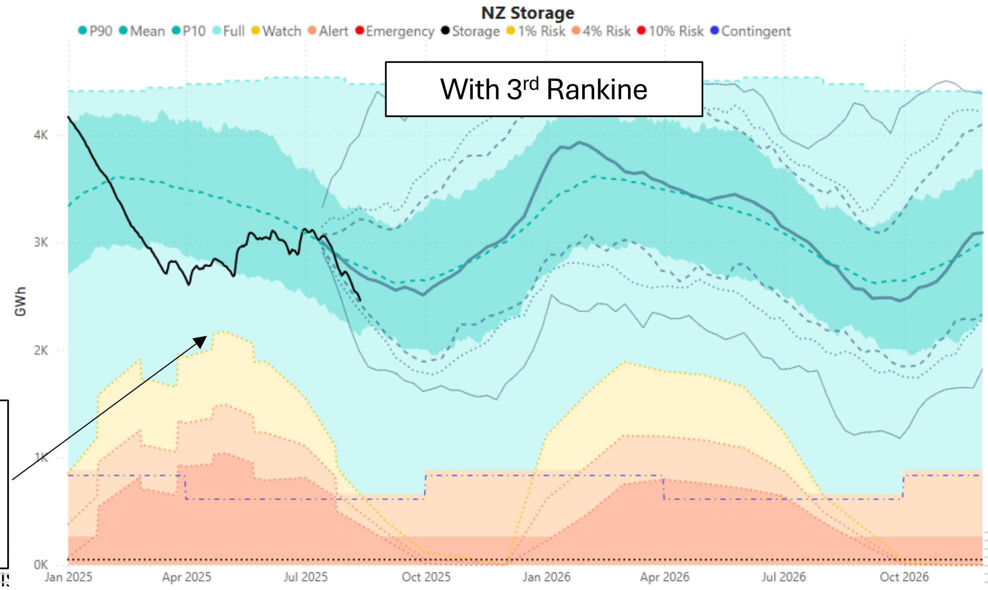
- Additional supply expected to come online – end winter to EOY
- 100 MW Glenbrook battery – will help manage capacity risks
- 108 MW (~215 GWh annual energy) of solar – limited support for energy and capacity
- 109 MW (~860 GWh annual energy) of geothermal after winter



Energy Security Outlook

- Current storage is falling at ~90th percentile SST
- Fuel position in 2025 is healthier than same time in 2024
- Increased energy risks in 2026 if no 3rd Rankine (and can access coal)
- 5 SSTs cross NZ Watch in 2026
- Agreement signed to support 3rd Rankine + fuel reserve (~600kT)
  - Subject to ComCom review

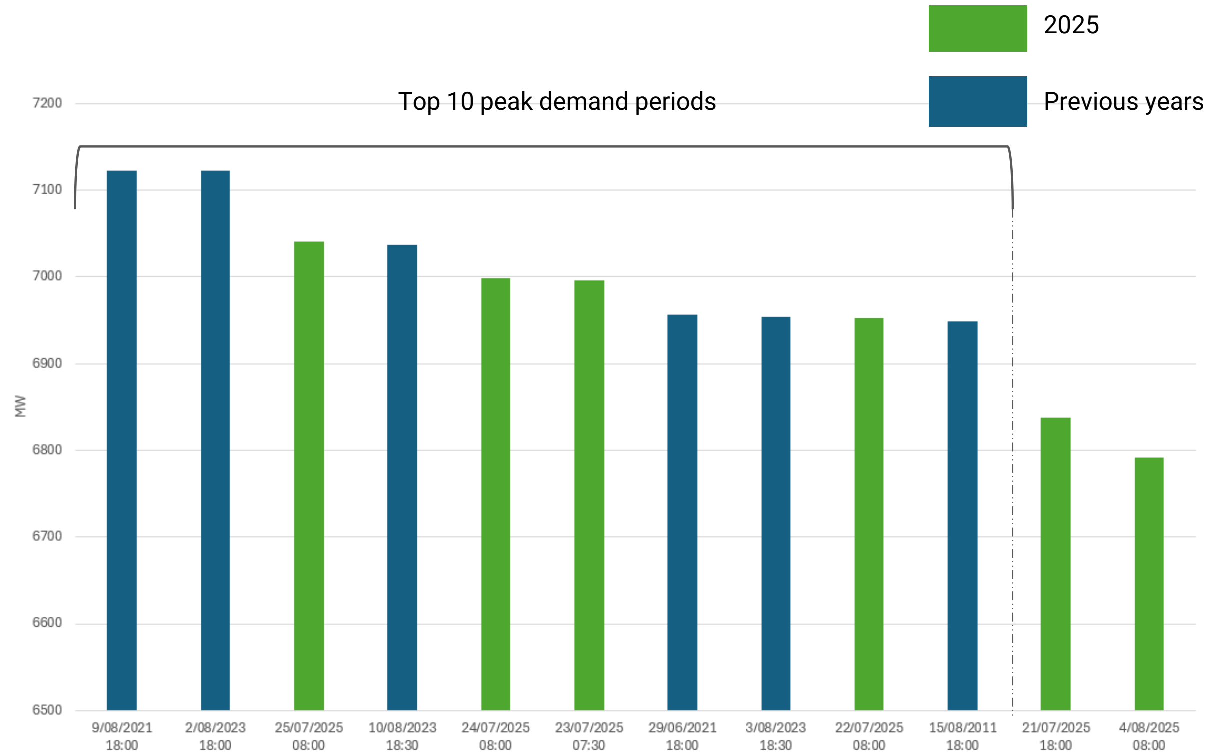


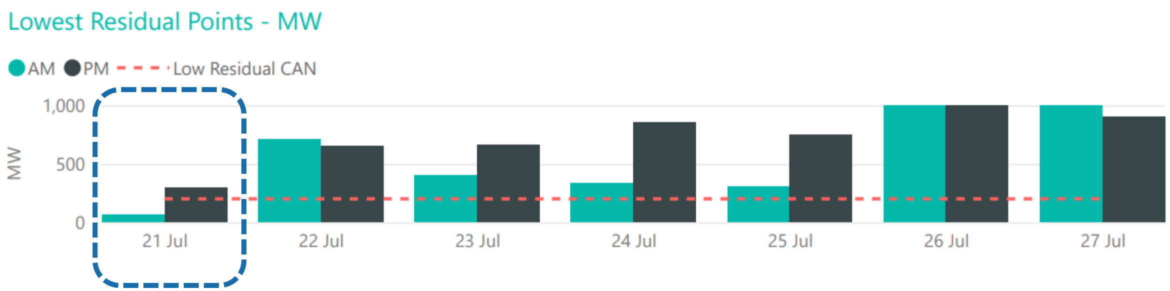


Get changes in risk curves when inputs change – such as coal, gas and plant availability

Peak demand

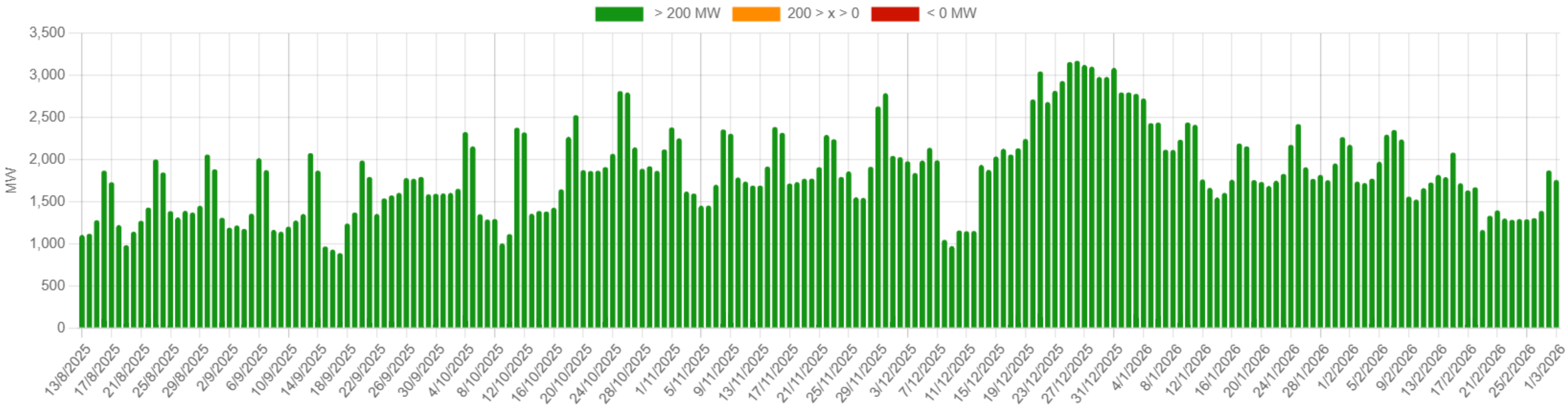
- Four of top 10 peaks happened during cold snap in July
- Tight capacity dependent on load and generation availability
- 21 July had residual less than 200 MW in real-time
  - Low IG
  - Low thermal commitment
  - Reduced plant availability near real-time
- 200 MW residual to cater for intra-trading period variability





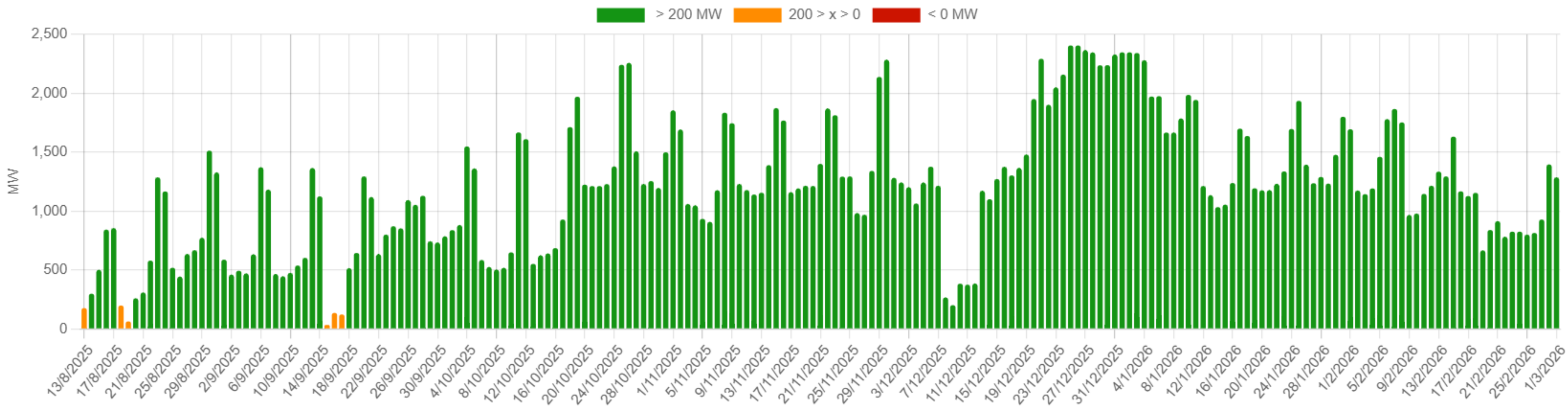
NZGB update: Base capacity and high demand

- NZGB looks at national generation capacity available to meet demand
- Capacity not on outage is offered into the market
- N-1 margins are looking healthy out to early 2026



NZGB update: Colder weather and Firm capacity

- Impact of downside risks
- Colder weather = higher demand (P99)
- Some slower start market resources not committed to the market
- Increased risks in winter (Aug/Sep)



IN-CONFIDENCE: ORGANISATION

Key take-aways: Winter 2025 and 2026

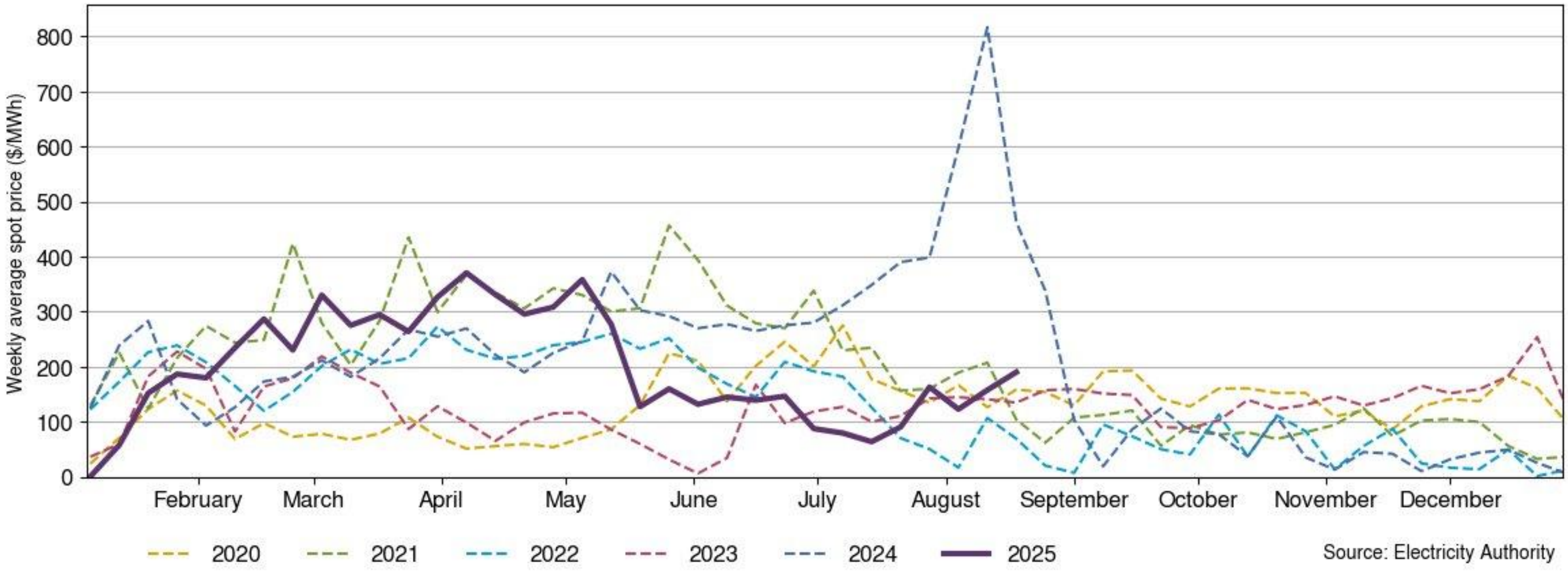
- Winter 2025:
  - Market response has helped reduce risks
  - Continued focus on hydro storage management and ensuring sufficient thermal fuel and generation availability - support a response in the event of low inflows over the rest of winter and into spring (e.g. late spring inflows) and/or unplanned, extended plant outages.
  - As hydro increases, there are times when the system will be relying on slow start thermal units to meet high peak demand – particularly during cold snaps combined with low wind generation.

- Winter 2026:
  - Three Rankines + Fuel - Subject to ComCom review
  - Plant availability (existing and new build)

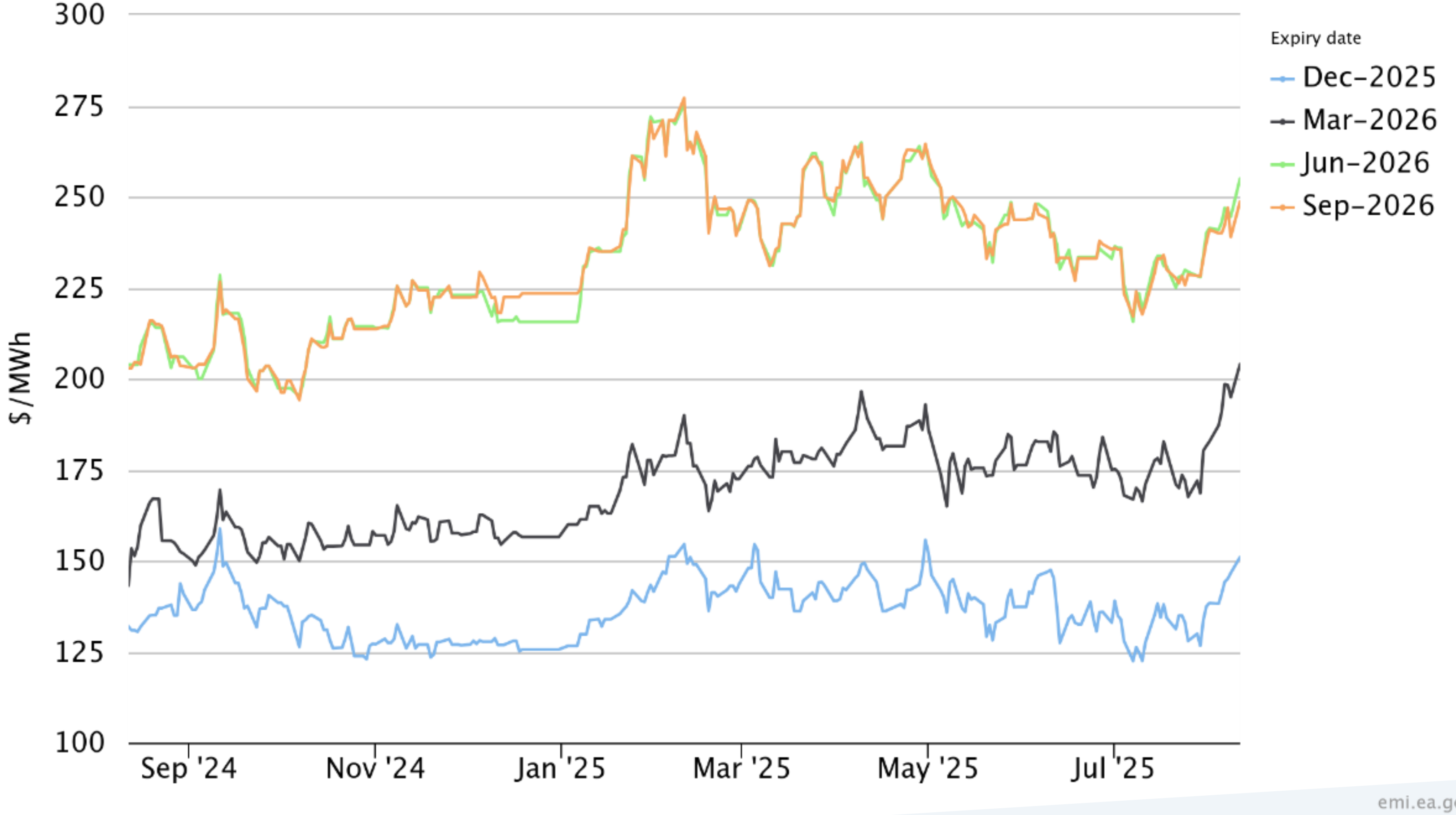
SO winter 2025 initiatives

- Low Residual Situation consultation - Completed
- Clarifying contingent storage access arrangements - Completed
- Working with the Authority on industry exercises - Completed
- Implementing new scarcity prices settings which took effect on 17 April - Completed
- Supporting the Authority with the Intermittent Generation forecasting arrangements – Completed
- Engaging with generators to understand operational constraints at low lake levels – Ongoing
- Continuing to implement the new SOROP – In progress
- SOSFIP review - In progress

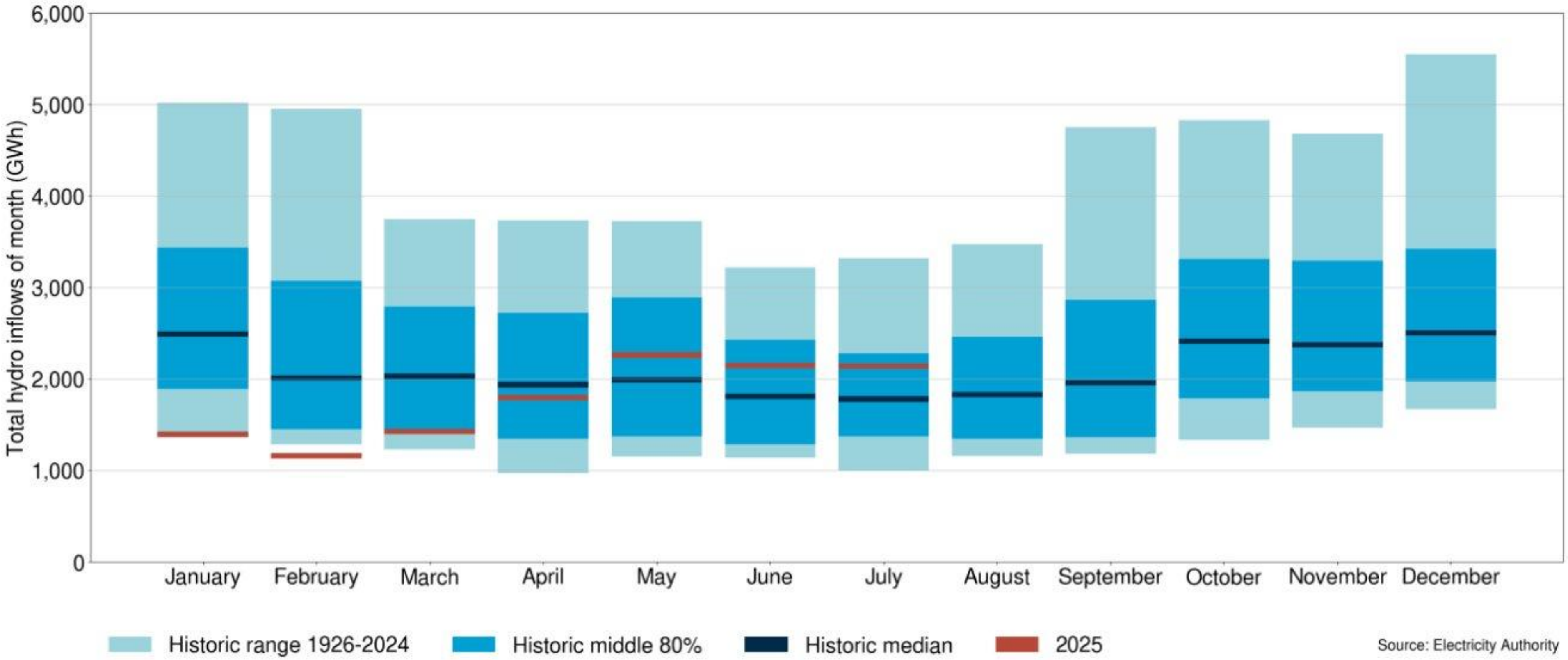
Prices fell during high inflows, but increased with demand following school holidays



Winter 2026 Forward prices have dropped from their peak in February(Ōtāhuhu)



Inflows improved in Q2

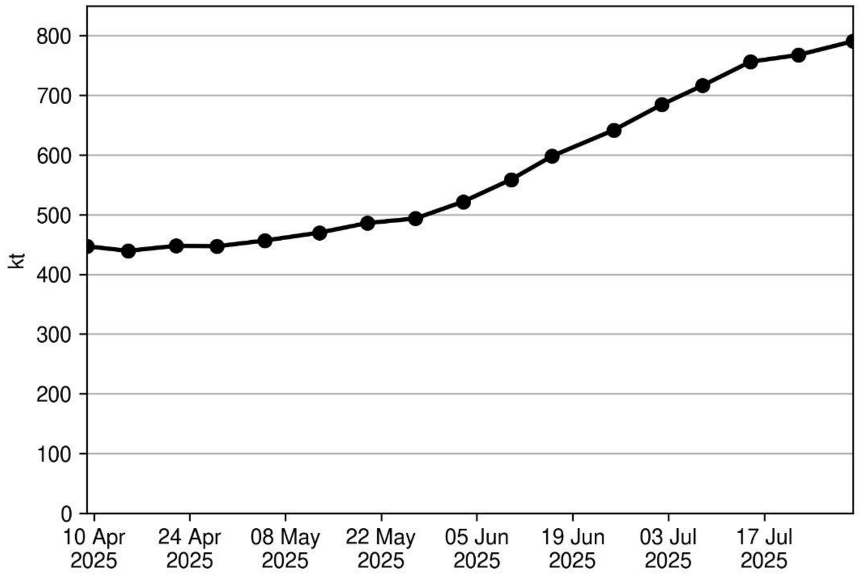


Source: Electricity Authority

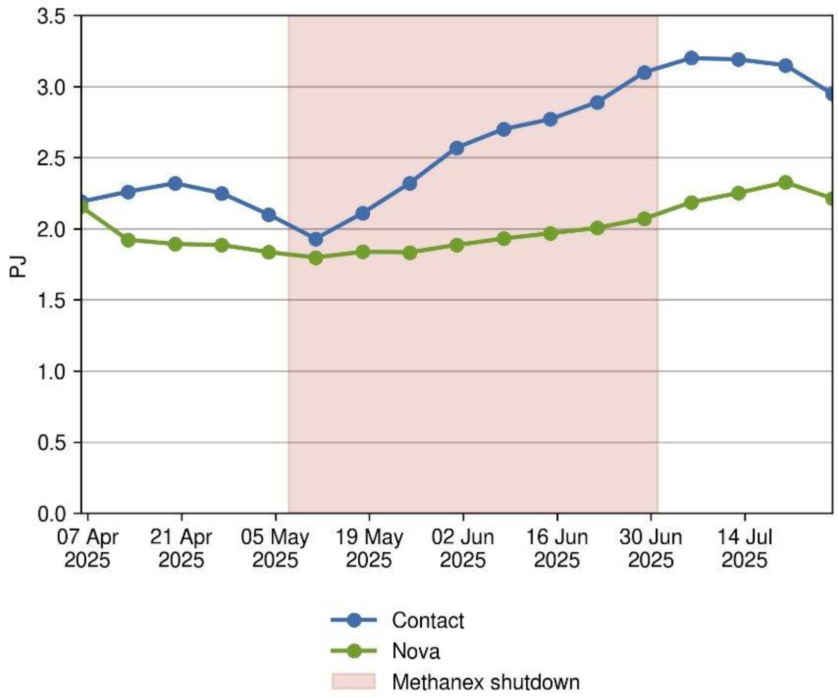
ELECTRICITY AUTHORITY TE MANA HIKO

Thermal fuel storage has improved

Coal

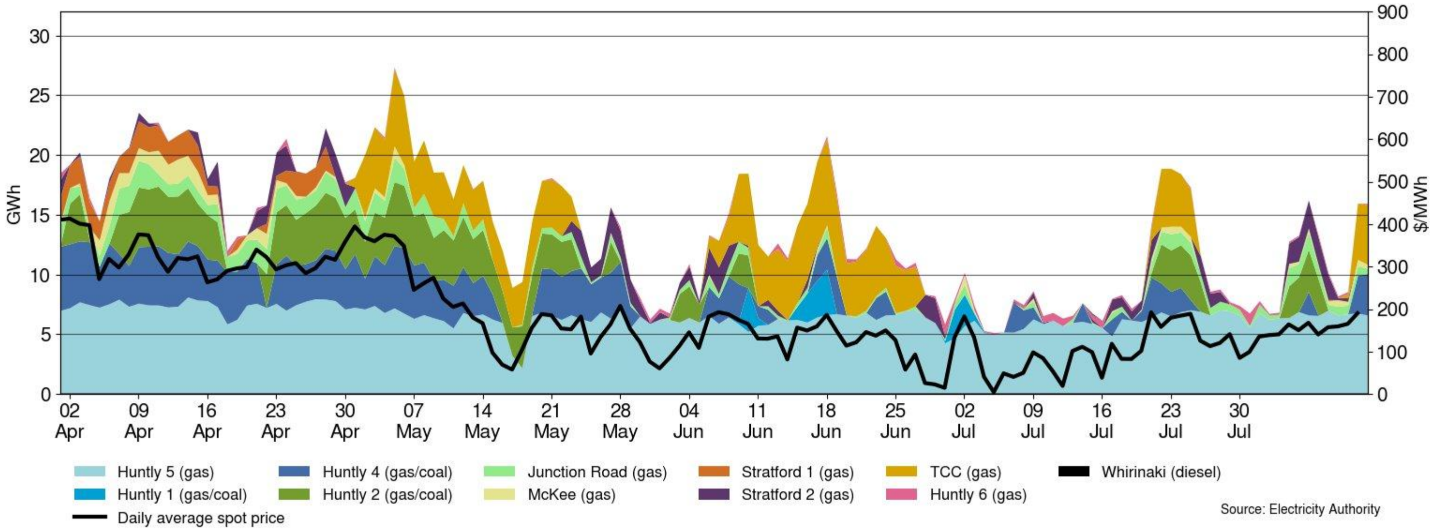


Ahuroa gas

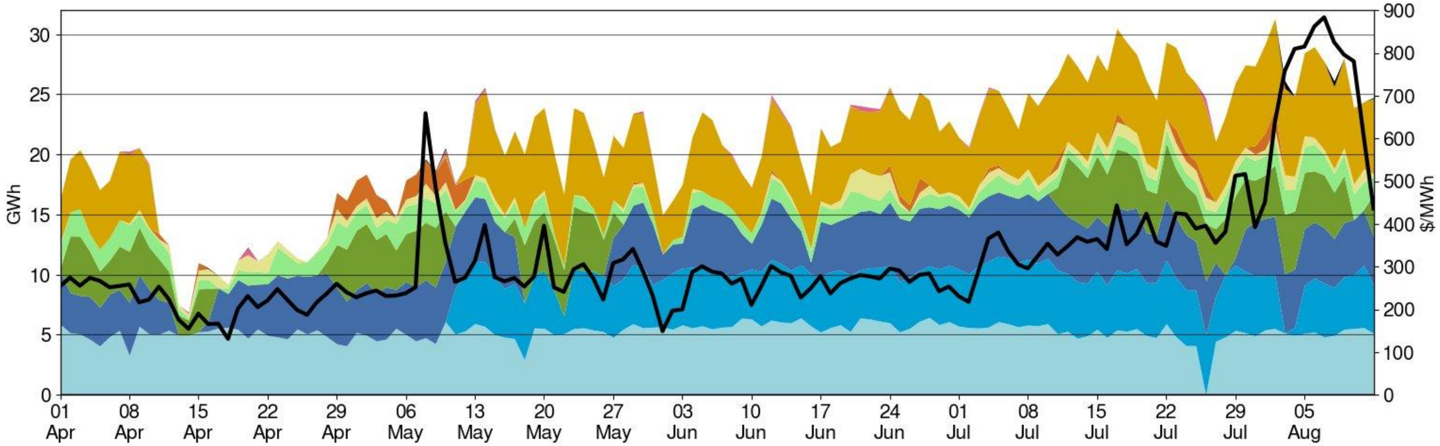


Thermal commitment has been lower than last winter

2025



2024

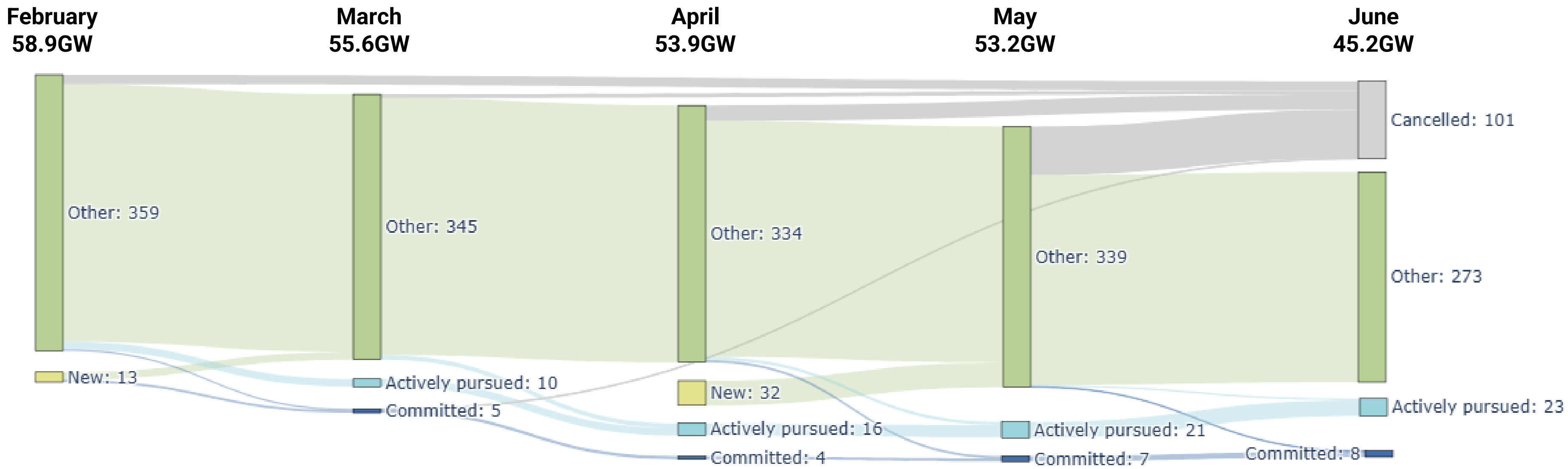


ELECTRICITY AUTHORITY TE MANA HIKO

17

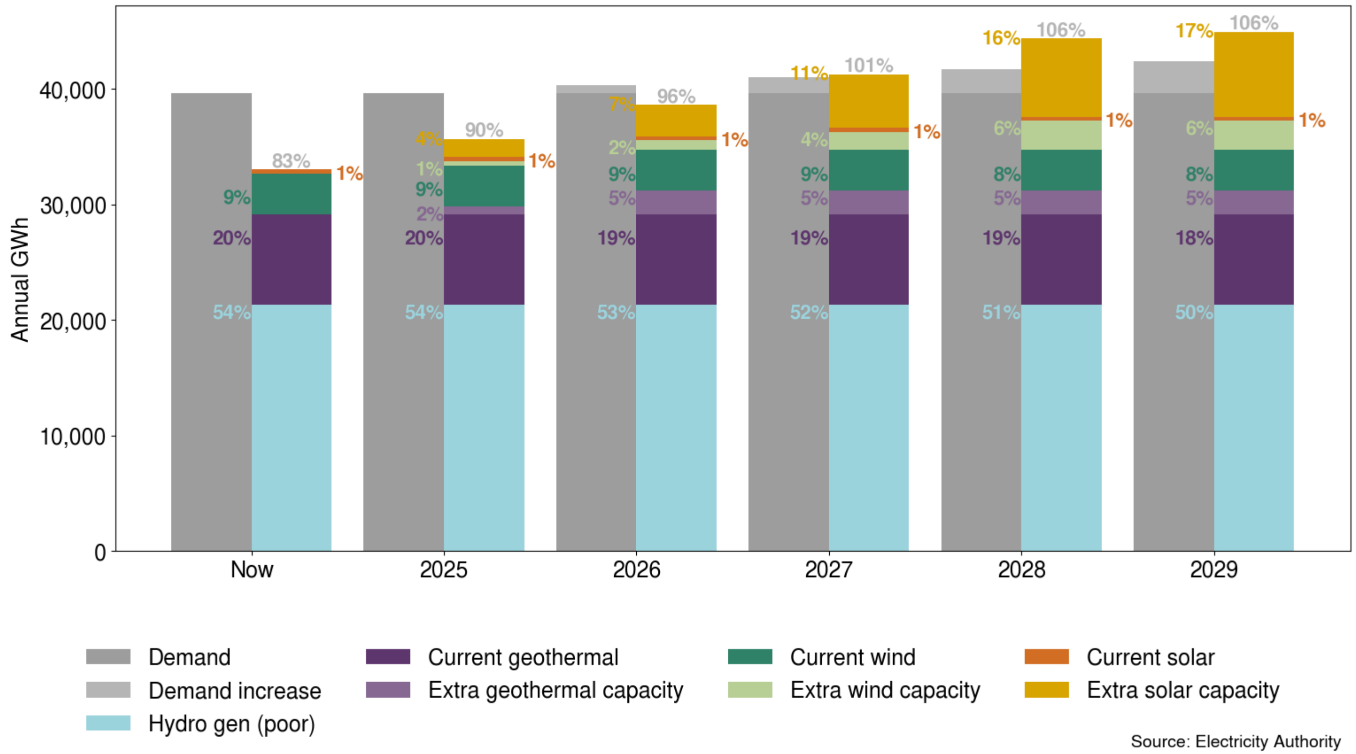
There are now 45.2GW of projects in the pipeline

More projects have advanced to later stages and initial enquiries have been filtered out



This is more than sufficient to meet expected demand growth (energy)

Graph shows demand growth vs expected generation growth (investigation phase onwards)



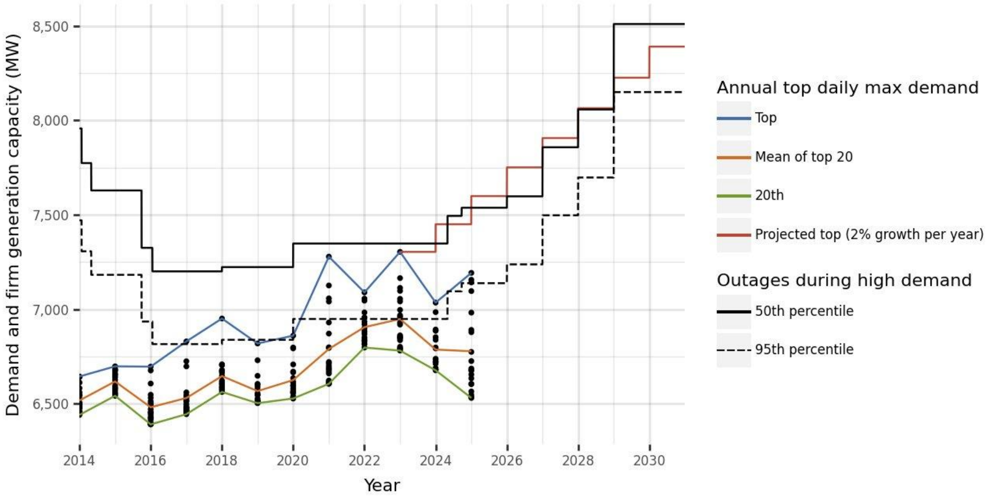
Source: Electricity Authority

1.7% demand increase per year

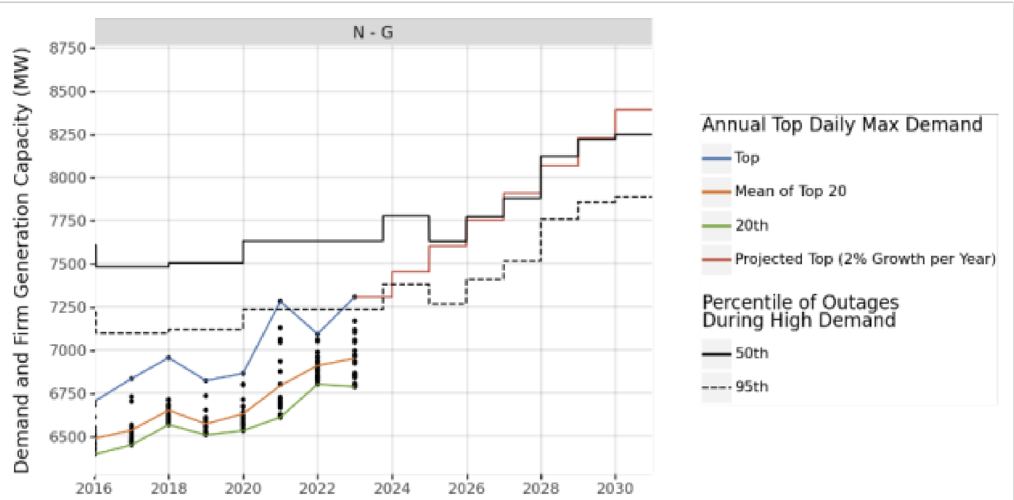
Renewable only (excludes thermal)

N-G Capacity (2% peak demand growth and batteries available whenever needed)

Now



Last year



Demand similar to 50th percentile capacity until 2028, then below for 2029-30

Capacity in later years improved since RMR

EA Near-term regulatory action underway

Energy risk management

Winter 2025

- **Ensuring generators are prepared for winter** (Generator contingent arrangements review)
- **Ensuring market resource information is collected and published** (Thermal fuel publication, reinforce system operator information gathering powers, support system operator minor ERC review)

Winter 2026+

- **Support system operator contingent storage buffer levels review** (SOSFIP part 6)
- **Ensure security of supply standards are up to date** (review of security standards and security standards assumptions document (SSAD))

Capacity risk management

Winter 2025

- **Reinforce market signals and information to commit resources when needed** (Scarcity pricing review, outage coordination improvements, system operator low residual review)
- **Risk management products are available** (Standardised flex products (Task force 1B))

Winter 2026+

- **Reinforce market signals to build and commit flexible resources** (Peak management ancillary service (MFK) review, Industrial consumer demand response rewards (Taskforce 2D, improve BESS participation))
- **Ensure security of supply standards are up to date** (security standards and SSAD review)

TRANSPOWER

Annual Security of Supply - 2025

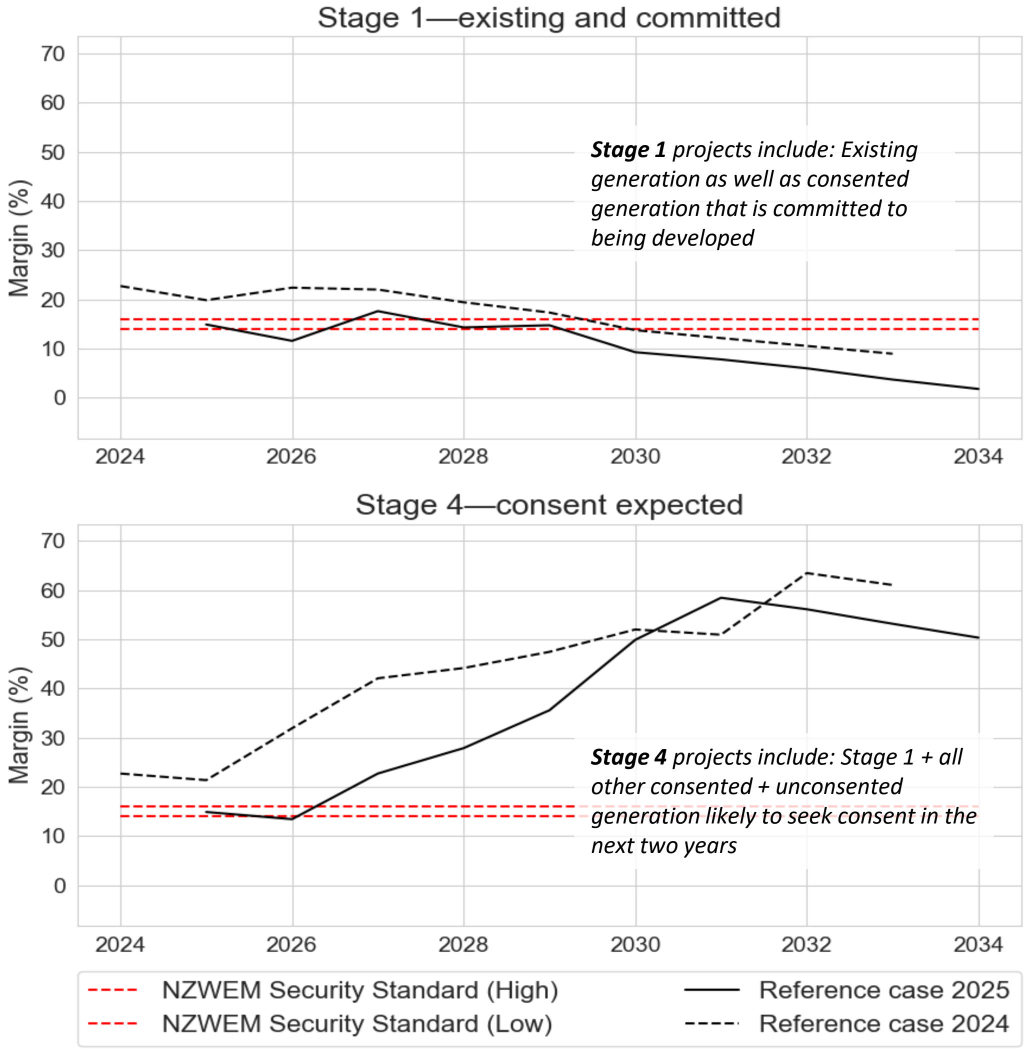
SRC

26-AUG-25

IN-CONFIDENCE: ORGANISATION

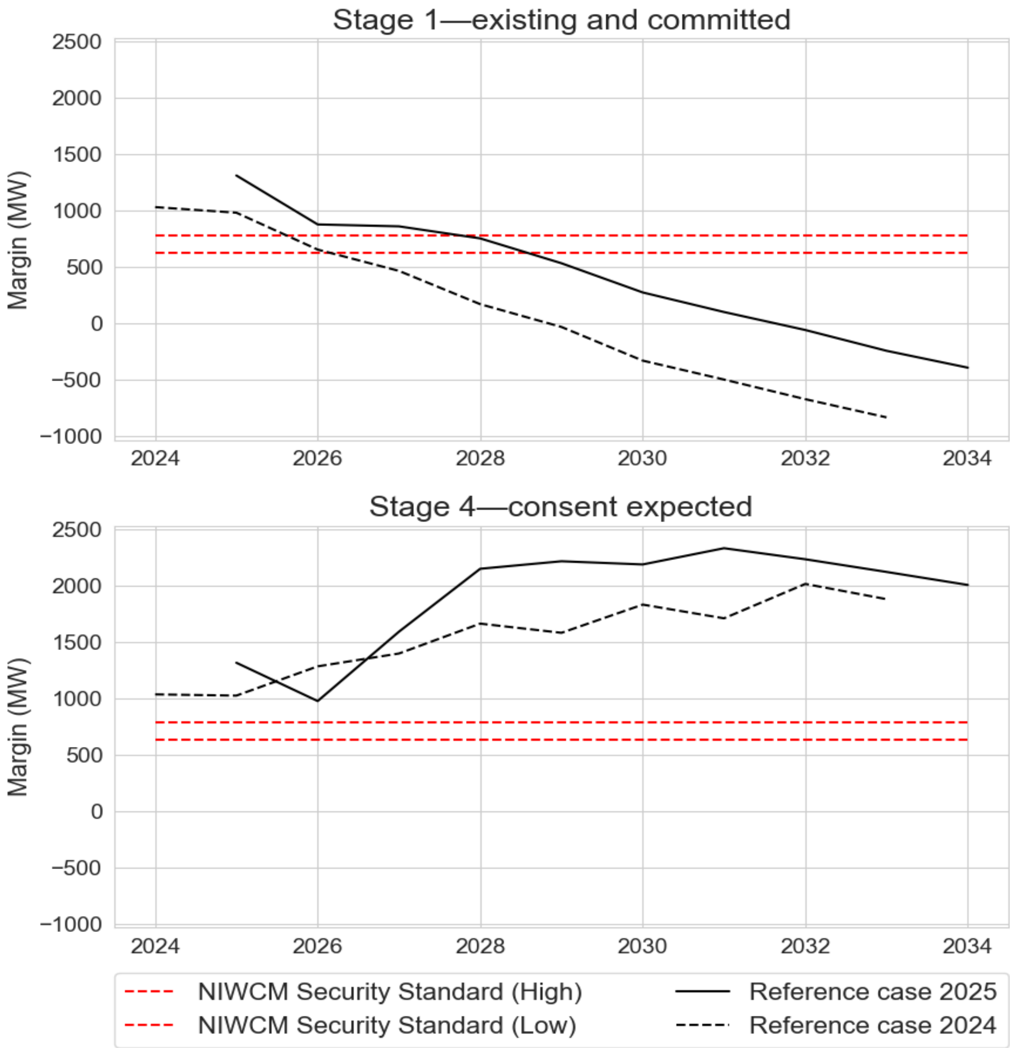
New Zealand WEM

- Crossing in 2026
- Largely the result of decline in gas forecasts
- Needs further investment (beyond consented generation) to maintain standards
- Some key sensitivities (uncertainties):
  - Future gas – the decline of existing wells and success of future drilling initiatives
  - Thermal generation availability – e.g. due to retirement of these units or unavailable to run due to lack of fuel.
  - Increased demand – increased electrification and new distribution-connected loads
- Even faster new generation build is needed if above sensitivities play out



NI Capacity Margin

- NI WCM drops below the margin in 2029
- Investment in peaking capacity will help: batteries (and to lesser extent wind and solar)
- Further investment (beyond consented generation) by 2033 to maintain above capacity standard
- Some downside risks on capacity margin:
  - Higher than expected peak demand growth
  - Slower than expected commissioning of new generation and batteries
  - Reduced availability of thermal generating plant

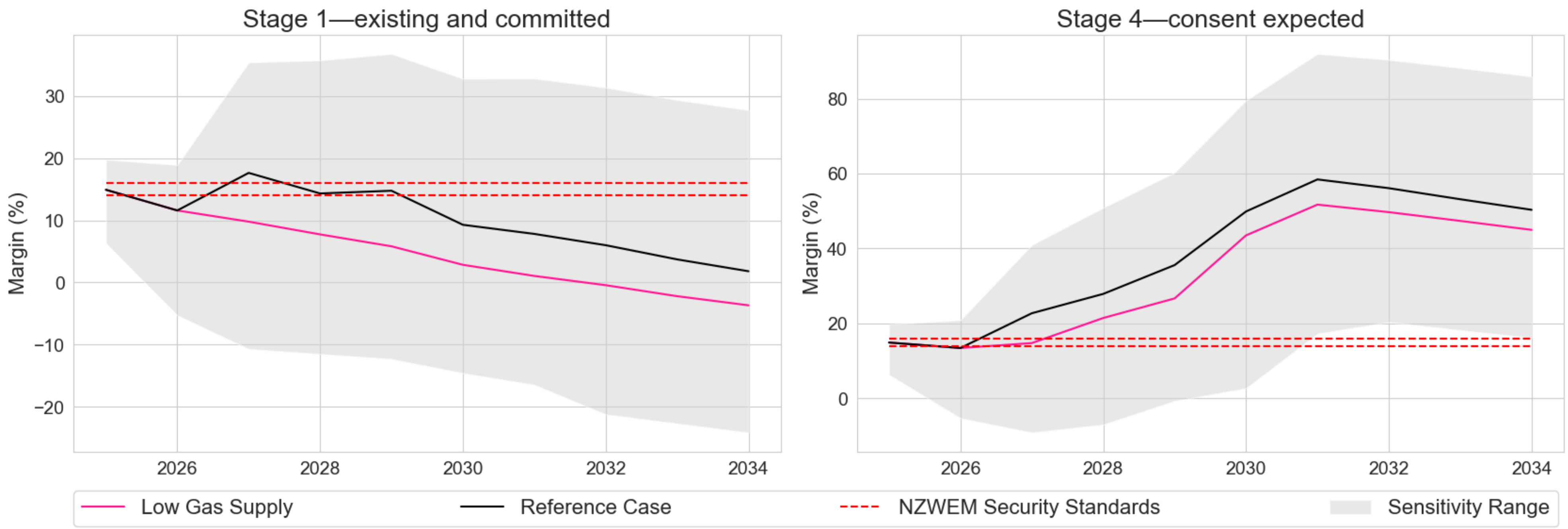


Key take-aways

- Key risk to the winter energy margins going forward is the availability of thermal backup generation (including availability of fuel)
  - Even faster build of new generation is needed to restore margins back up above the standards if less thermal back-up generation (e.g. Rankine retirement and/or faster decline in gas availability) or increased demand than forecast
- The SOSA analysis shows the winter capacity margin drops below the standard in 2029
  - Investment in firm, flexible resources (such as BESS, peaking generation and demand response) and to a lesser extent wind and solar will help increase the winter capacity margins.
- The supply pipeline is being developed and continues to expand which is positive
  - Delays will put strain on existing resources, impacting the ability to manage energy and capacity challenges and the affordability of electricity supply for consumers.
  - To reduce this risk, asset owners (including generators and grid and distribution network owners) should continue to accelerate new supply connecting to the grid, prioritising firm energy and firm, flexible capacity resources.

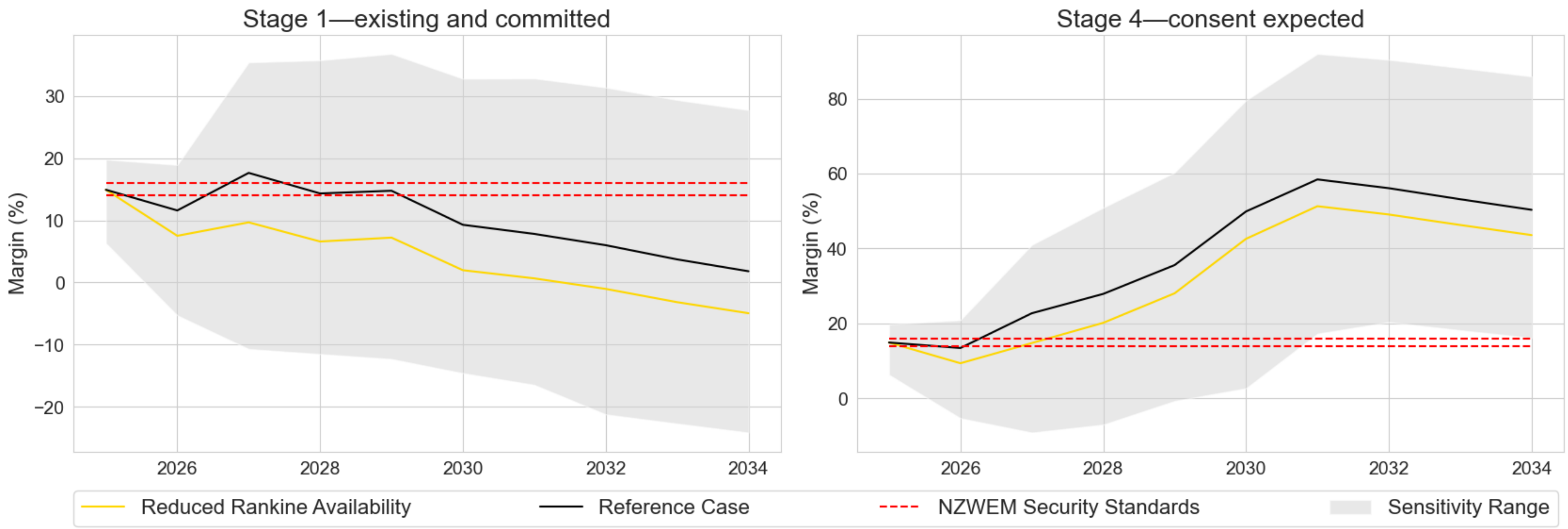
Further details

Low gas - Impact on energy margin



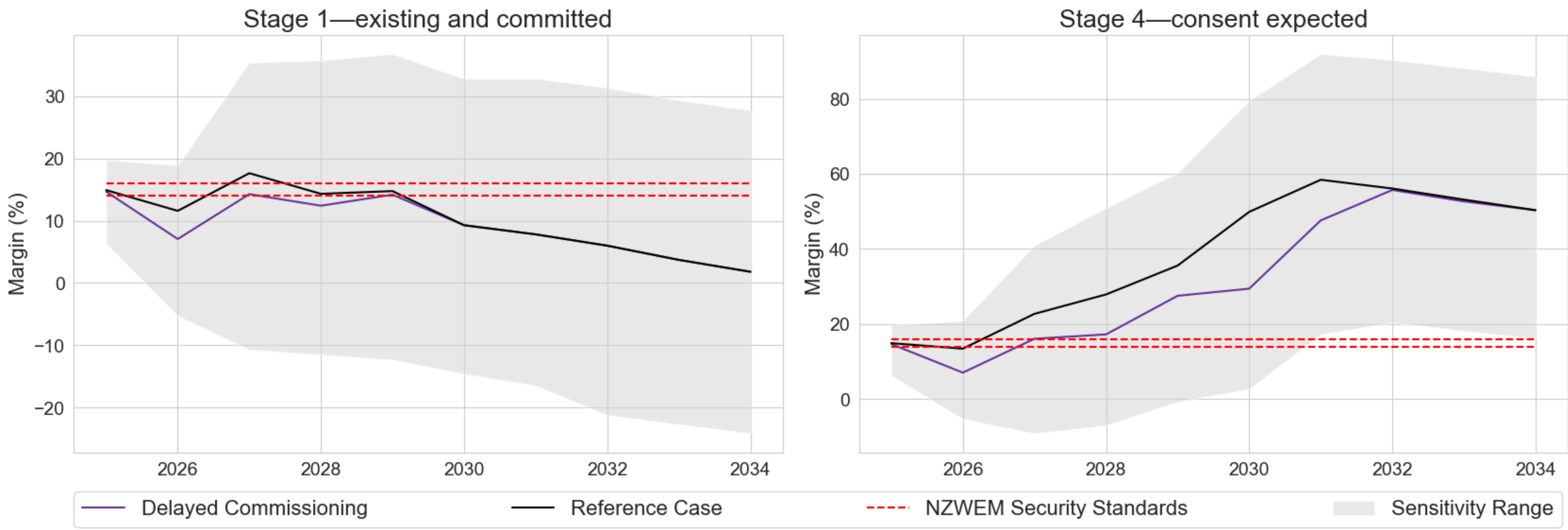
Gas supply post 2026 is limited to estimated 1P “proven” reserves. These are reserves which have at least a 90% probability of being produced.

Reduced Rankine - Impact on energy margin



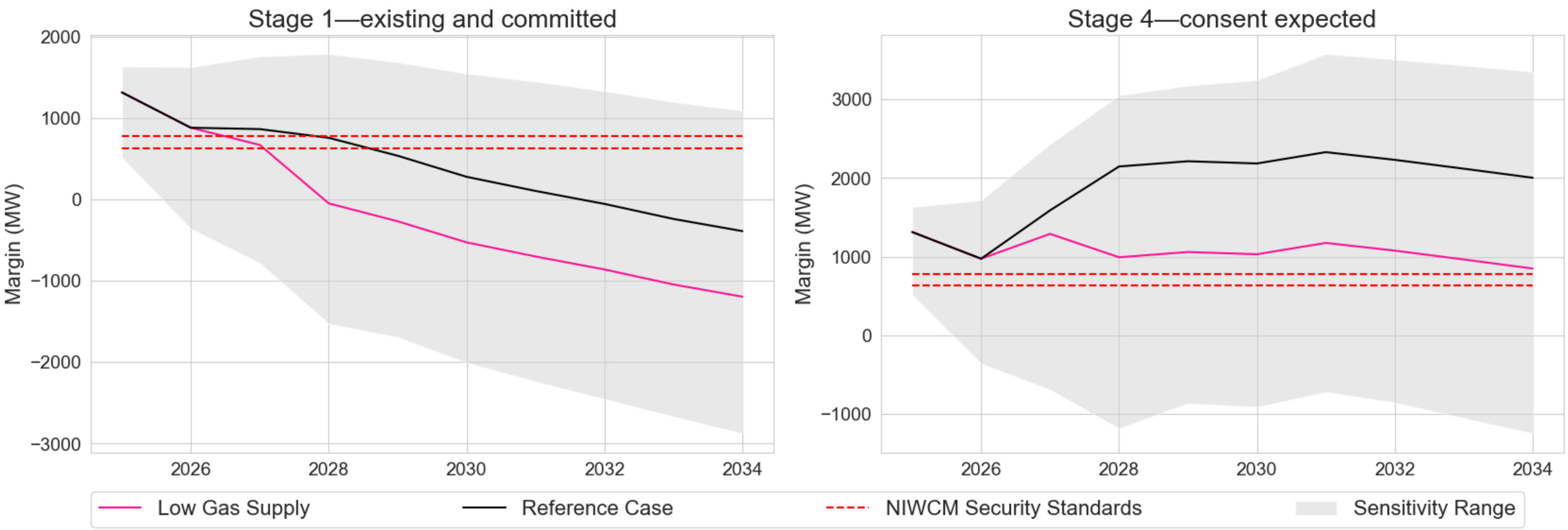
Assumes reference case but one Rankine generator is retired before winter 2026 and another is retired before winter 2027.

Delayed commissioning - Impact on energy margin



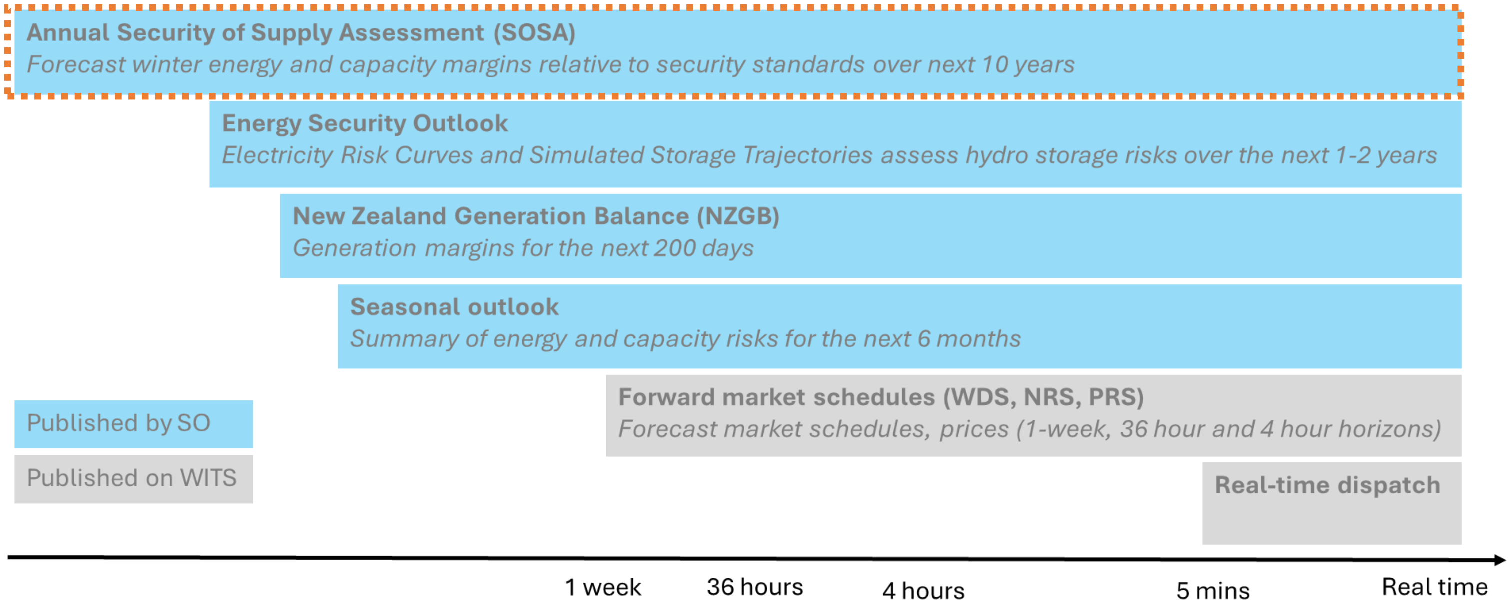
Assumes reference case but considers if new generation projects are delayed by a year.

Low gas – Impact on NI-WCM



2025 Security of Supply Assessment Summary

- SOSA is one of our security of supply information publications
- Assesses three risks:
  - New Zealand winter energy (meeting national demand if lakes are low April to September) – NZ WEM
  - South Island winter energy (meeting SI demand if lakes are low April to September) – SI WEM
  - North Island winter capacity (meeting NI winter peak electricity need) – NI WCM



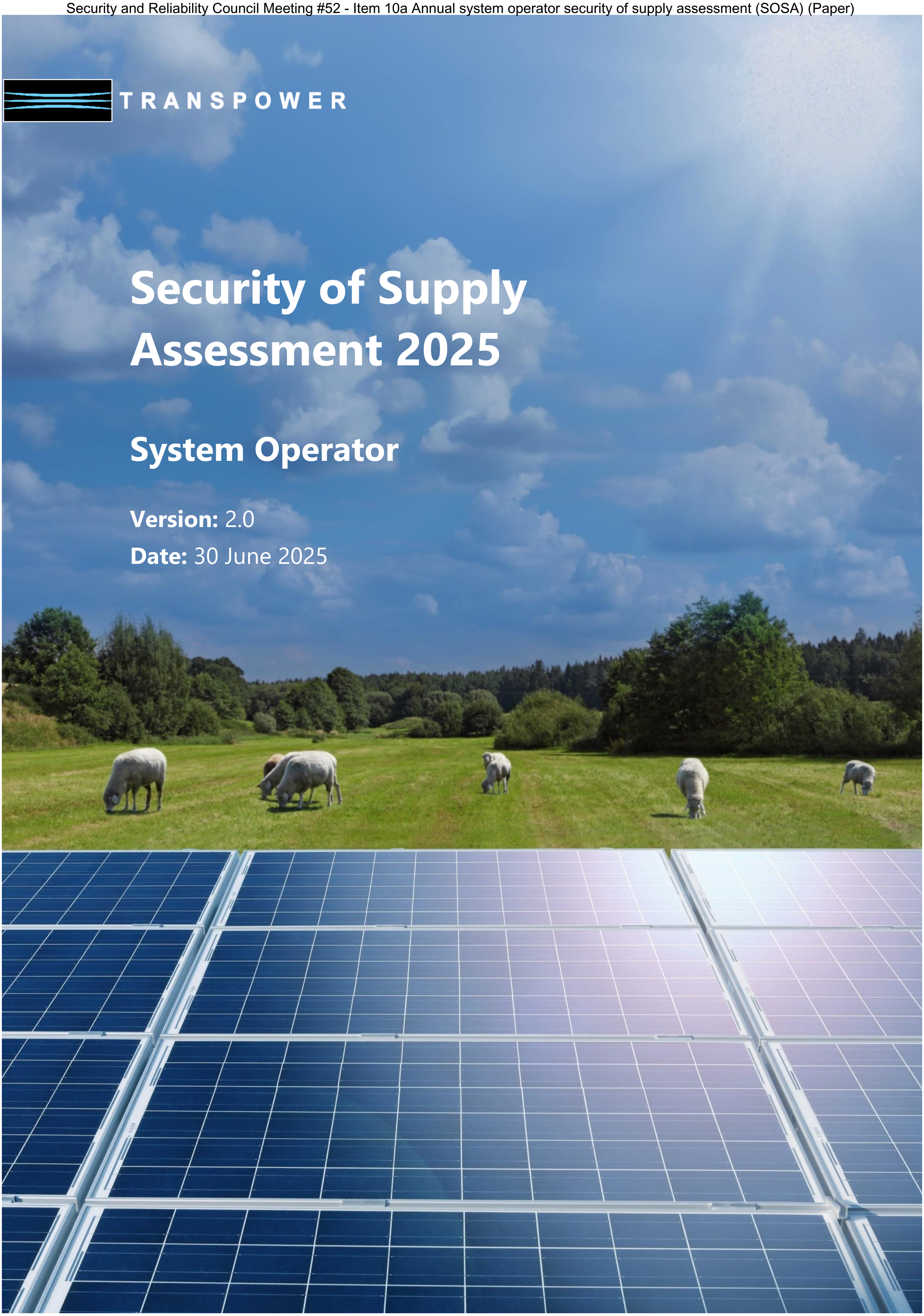
TRANSPOWER

Security of Supply Assessment 2025

System Operator

Version: 2.0

Date: 30 June 2025



Version	Date	Change
1.0	9 May 2025	Draft for consultation
2.0	30 June 2025	Final release

IMPORTANT

.

Contact Details

Address:	Transpower New Zealand Ltd 22 Boulcott Street PO Box 1021 Wellington New Zealand
Telephone:	+64 4 590 7000
Email:	system.operator@transpower.co.nz
Website:	http://www.transpower.co.nz

Contents

1 Executive Summary

The purpose of the Security of Supply Assessment (**SOSA**) is to inform risk management and investment decisions by market participants, policy makers, and other stakeholders.

Transpower, as the System Operator, publishes the SOSA annually. It provides a 10-year assessment (2025 to 2034) of the balance between supply and demand in the New Zealand electricity system.

This 2025 SOSA has been informed by two rounds of consultation. The first round sought feedback on the proposed reference case and sensitivities, and the second on a draft 2025 SOSA. The consultation documents and the submissions we received are published on our website.[1]

Three security of supply margins are evaluated,[2] the:

1. **New Zealand Winter Energy Margin (NZ-WEM)**; adequacy of generation to meet expected national electricity demand under extended dry periods across the winter months (April to September);
2. **South Island Winter Energy Margin (SI-WEM)**; adequacy of generation and north-to-south transmission capacity to meet expected South Island electricity demand under extended dry periods across the winter months (April to September); and
3. **North Island Winter Capacity Margin (NI-WCM)**; adequacy of generation and south-to-north transmission capacity to meet the highest winter demand peaks.

The SOSA analysis assesses these three security of supply margins against security standards set by the Electricity Authority (**Authority**). These security standards are specified in the Electricity Industry Participation Code (**Code**)[3] with further details provided in the Security Standards Assumptions Document (**SSAD**).[4] The current standards are:

1. NZ-WEM: 14-16%
2. SI-WEM: 25.5-30%
3. NI-WCM: 630-780 MW

1 In the final SOSA, we've updated the gas supply forecast based on updated information, reduced Rankine sensitivity to include the potential Rankine retirement in 2026 and shifted the Nova peaker to Stage 3 to reflect the increased uncertainty of this consented project. The net effect is a reduction in the margins relative to the draft which has brought forward some of the "crossing years". The overall conclusions and key-takeaways remain the same. A summary of these changes is provided in Appendix 7. A more detailed response to the feedback including elements we will consider in future SOSAs is included in our summary and response to feedback.

2 Further information on the margin assessment methodology is provided in Appendix 1.

3 Part 7, Clause 7.3(2)

4 Electricity Authority, Security Standards Assumptions Document

The purpose of the standards is to represent an efficient level of reliability[5] - that is, where the expected cost of shortage is equal to the expected cost of new generation. As an example, the national cost-benefit analysis conducted by the Authority when producing the NI-WCM security standards determined that up to 22 hours per annum of energy or reserve shortfall (because of capacity shortage) is economic before additional investment in peaking generation is warranted.

However, falling below the lower[6] point of a security standard does not equate to electricity shortage. Rather, it implies that investment in new generation would result in an efficient increase in reliability. It can also be interpreted as representing the risk of electricity shortage—the higher the actual margin observed, the less likely electricity shortage will be, all things being equal.

The analysis assesses the energy and capacity margins against the three security standards using the supply pipeline information provided by market participants. The analysis does not analyse or consider other aspects of future investment such as:

- the availability of transmission and distribution network capacity;
- the deliverability of planned new-build generation; or
- the commercial viability or market incentives required for resources to be developed.

More detailed System Operator security of supply forecasts that highlight shorter term timeframes and operational risk include the quarterly Security of Supply Outlook,[7] monthly Energy Security Outlook,[8] New Zealand Generation Balance,[9] System Security Forecast,[10] various market insight publications,[11] and the Weekly Market Report.[12, 13]

1.1 Changes to Key Inputs for the 2025 SOSA

There has been a decrease in the forecast gas available compared to that in the 2024 SOSA.[14] This is largely attributed to the observed decline in existing gas field production and

5 The range represents the fact that this efficient level should not be considered as a single number due to uncertainties in key assumptions when determining these standards.
6 The lower standard being 14% for NZ-WEM, 25.5% for SI-WEM and 630 MW for NI-WCM.
7 Quarterly Security of Supply Outlook | Transpower
8 Energy security outlook | Transpower
9 Customer Portal - NZGB
10 System Security Forecast | Transpower
11 Market insights | Transpower
12 Market Operations Weekly Report | Transpower
13 Table 8 in Appendix 6 provides a breakdown of the purpose of each report.
14 Security of Supply Assessment 2024

downgrades in gas field reserves. We've also revised our gas forecast approach this year to include an external gas forecast.[15]

There has been a decrease in the peak and energy demand forecasts compared to that reported in the 2024 SOSA. This is largely attributed to a reduction in industrial demand, downward revisions of step demand increases,[16] and modelling updates to better account for commercial rooftop solar.

The supply pipeline has increased compared to that reported in the 2024 SOSA. Existing installed generation capacity has increased by approximately 350 MW with new supply coming online. The quantity of committed projects has also increased, by approximately 1,500 MW. The more speculative part of the supply pipeline (these are projects that do not have consent as yet)[17] has increased in all analysis years for the 2025 SOSA compared to the 2024 SOSA. These movements indicate that the supply pipeline is being developed and continues to expand. However, with so much of the supply pipeline unconsented, there is risk that these projects could be delayed, deferred or dropped.

Mostly wind and solar in the generation pipeline. Over 85% of the unconsented pipeline is wind and solar with most of the rest being battery projects. Intermittent generation has a larger impact on increasing the energy margin than the capacity margin. This highlights the need for investment in flexible peaking capacity such as peaking generation, batteries and demand response to maintain the capacity margins above the standards.

1.2 Summary of 2025 Margin Analysis

New Zealand Winter Energy Margin (NZ-WEM): The reference case[18] falls below the lower security standard by next year (Winter 2026). This is much earlier than in the 2024 SOSA, which suggested the security standard would be met until 2030. This change is despite a reduction in the demand forecast and is mostly due to the reduction in expected gas supply.

The margin recovers above the security standards in 2027 due to expected generation build and a forecast recovery of gas production. When including all consented projects,[19] the margin falls below the security standards again in 2032, and just exceeds the lower security standard in 2031. The consented pipeline to 2031 contributes 4,400 GWh of winter energy. Commissioning this generation by the start of Winter 2031 would require building each year enough new generation to generate an annual output of around 1,500 GWh. This is almost

---

15 The 2024 SOSA reference case gas forecast approach used a combination of MBIE 2P and 2C gas forecasts (together with confidential gas producer forecasts and MBIE's gas reserves estimate) to inform the quantity of gas available for electricity. For the 2025 SOSA we have changed to also use a newly-available external forecast (Enerlytica) that more closely aligns with the gas production reductions observed recently.

16 These step demand loads are largely signalled by distributors, with additional modelling assumptions to estimate changes from new technologies as outlined in Section 2 of the 2025 SOSA Appendix document.

17 These are referred to as "Stage 4" projects. See Table 1 for further details.

18 Section 2.2 provides a definition of the reference case.

19 Including those requiring a reconsent or consent revision (pipeline stage 3 – see Table 1)

three times the annual output of the Harapaki wind farm, a rate of sustained generation build much greater than that achieved in recent years.

Given the uncertainty in future outcomes, a key part of the SOSA is the sensitivity analysis. Our analysis explores the impact of several variations to the reference case assumptions through sensitivities that reflect potential variations in demand, generation plant availability, thermal fuel supply, and the capability of the inter-island high voltage direct current link (**HVDC link**).

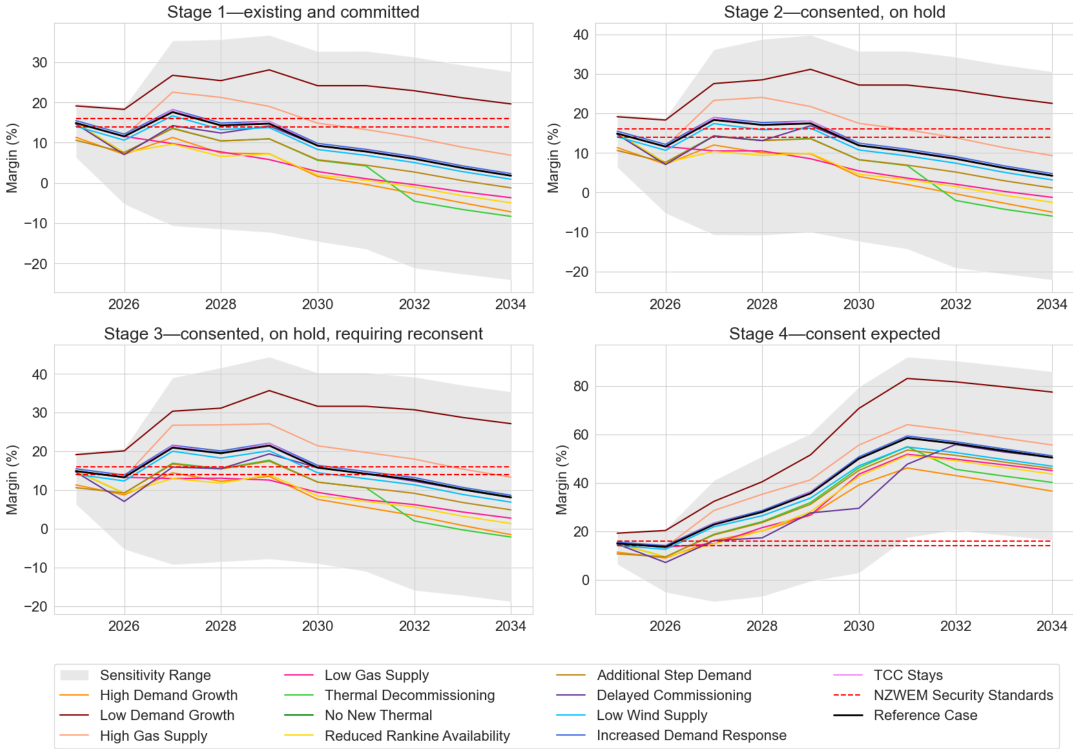
The NZ-WEM results for the reference case, and sensitivities analysis are shown in Figure 1 below. The key insights from the sensitivities analysis are:

1. The range of uncertainty in energy supply from thermal generation[20] is smaller than the range of uncertainty in energy contribution from new generation build. Even with the highest plausible energy contribution from thermal, we require a rapid and sustained build of new generation, exceeding the large amount currently consented, to maintain energy margins above the security standards over the full ten-year horizon.
2. The *Thermal Decommissioning* and *Reduced Rankine[21] Availability* sensitivities indicate that a lack of thermal plant or fuel availability could cause the NZ-WEM to remain below the security standards after 2026 (instead of recovering from 2027 as in the reference case). If these reductions in plant or fuel did occur, new generation would need to be built faster to remain above the security standards.
3. There is uncertainty around the future of gas supply. The *Low gas* supply sensitivity significantly restricts the ability of thermal generators to support the winter energy margin. To help restore the NZ-WEM above the security standard by 2027, rapid investment in consented and unconsented supply is needed.
4. If demand had been growing faster than the reference case, the NZ-WEM could be below the lower security standard for Winter 2025. Development of more projects than are currently consented would then be required to raise it back above the standard.

20 "Thermal generation" in this analysis refers exclusively to fossil-fuelled generation (diesel, natural gas, or coal). Our analysis does not currently explore future supply options that may utilise thermal generation technologies that are carbon zero in some form.

21 Three 240 MW dual gas- and coal-fuelled Rankine thermal generators located at Genesis Energy's Huntly power station. The *Reduced Rankine Availability* sensitivity includes the Genesis signalled retirement of one of the Rankine units in 2026.

Figure 1: New Zealand Winter Energy margins for the reference case and all sensitivities



South Island Winter Energy Margin (SI-WEM): The reference case falls below the lower security standard by 2030 with existing and committed generation, two years later than in the 2024 SOSA. This improvement is due to a lower demand forecast and an increase in South Island committed generation, with some major South Island projects having gained consents since 2024. The ability for the North Island supply to support the South Island is constrained by the north-to-south transfer capability, including the HVDC link.

With consented projects included (including those needing reconsents), the margins for the reference case drop below the lower security standard in 2033. Some unconsented projects in the pipeline will need to be built to stay above the security standards over the next 10 years.

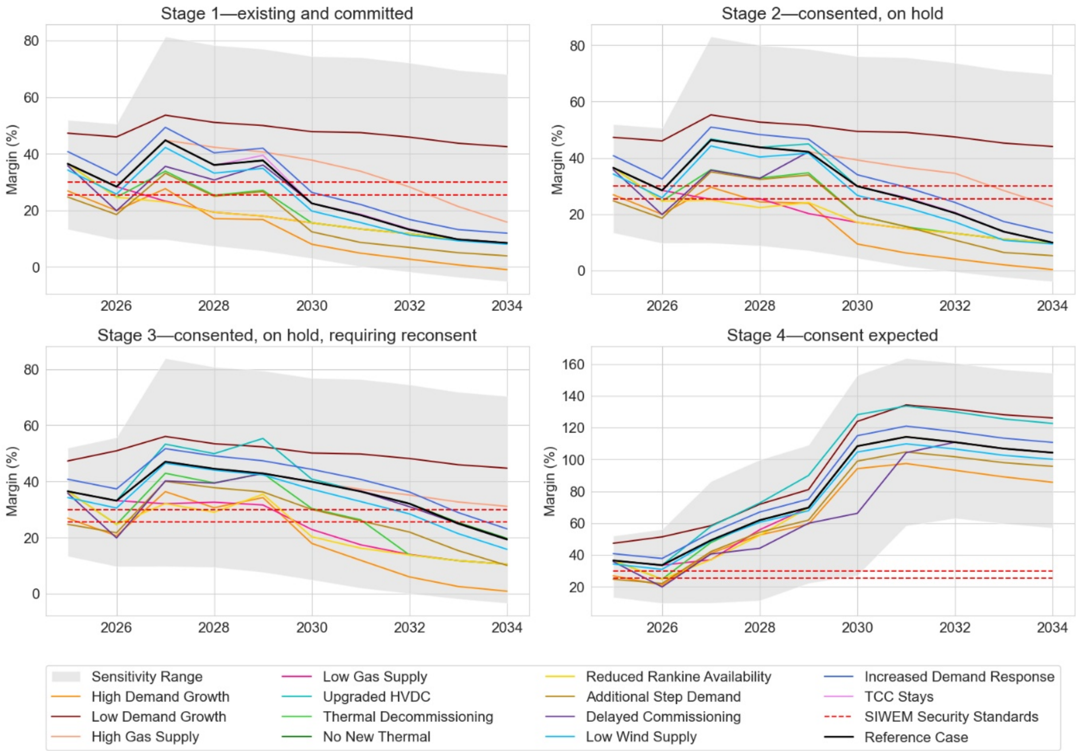
The SI-WEM results for the reference case, and sensitivities analysis are shown in Figure 2 below. The key insights from the sensitivities analysis are:

1. Higher than expected demand could require development of projects requiring a consent, consent revision or reconsent[22] as early as 2026.
2. There is a significant amount of committed wind and solar generation planned to be built by 2026. If this was delayed until 2027, the SI-WEM could drop below the lower security standard for Winter 2026 as shown in the *Delayed Commissioning* sensitivity.
3. A lower available gas supply could require development beyond the committed pipeline by 2027, and beyond the consented pipeline by 2030.

22 These are projects from pipeline stage 4 as shown in Table 1.

4. Increased North Island generation development would be needed to fully leverage increased north-to-south transfer capability to support the SI-WEM[23].

Figure 2: South Island Winter Energy margins for the reference case and all sensitivities



North Island Winter Capacity Margin (NI-WCM): The reference case falls below the lower security standard by 2029 when considering only existing and committed generation. This is two years later than in the 2024 SOSA, due to a reduction in the peak demand forecast and an increase in committed battery capacity. The need for flexible resources such as batteries was a key conclusion of the 2023 SOSA and 2024 SOSA and it is reassuring to see these projects moving closer to completion. It remains important that these projects are commissioned in a timely manner and that projects in the uncommitted and unconsented stages of the pipeline continue to progress.

Development of all consented projects on schedule could maintain the NI-WCM above the lower security standard up to 2029, without any development of unconsented projects. Beyond this time, additional projects which do not currently have consents or require reconsent will be required to maintain the NI-WCM above the lower security standard.

Of the consented and/or planned projects, those with the greatest potential contribution to the peak capacity margin are the battery, geothermal and gas peaking projects. Wind projects

---

[23] Further details of the proposed HVDC upgrade options by Transpower Grid Owner are here.

contribute less to capacity relative to their size, and solar projects even less[24]. Demand response is also an effective way to increase the capacity margin and can be developed quickly as it typically does not need to be consented and may not require material capital investment.[25]

The NI-WCM results for the reference case, and sensitivities analysis are shown in Figure 3 below. The key insights from the sensitivities analysis are:

1. Low thermal unit commitment,[26] combined with materially less wind generation than forecast, can still result in a risk of insufficient generation at peaks in years when the NI-WCM is above the upper security standard. This is shown by the *constrained operational capacity* sensitivity, which demonstrates the operational and market co-ordination challenge of integrating increased intermittent generation with slower start thermal plant.[27] These issues were explored in the System Operator's Winter Review papers.[28]
2. The *delayed commissioning* sensitivity causes the NI-WCM to cross the lower security standard in 2027 with only existing and committed generation, two years earlier than in the reference case. This serves to emphasise the pace of development required to keep up with the security standards given forecast peak demand growth.
3. The *high demand growth* sensitivity causes the NI-WCM to cross the lower security standard in 2028 with only existing and committed generation, one year earlier than the reference case.
4. The *increased demand response* sensitivity[29] delays the crossing of the lower security standard by one year to 2030. Given demand response does not require consenting and could enter the market within one or two years, this could be an effective means of quickly increasing the NI-WCM if required.

24 Wind generation's Winter Capacity Margin contribution is 25% of installed capacity and solar's is 5.4%. See Table 3 in Appendix 1 for further details. In the Constrained Operational Capacity sensitivity, we consider a scenario with lower contributions from wind and solar with contributions of 5% and 0% respectively.

25 For example, some retailers have successfully brought new flexible demand response capacity to market by offering innovative retail tariff structures.

26 "Unit commitment" refers to the process of deciding when and which generating units at each power station should start up in advance of the anticipated need when taking the technical constraints, potential costs and expected revenue into account. New Zealand's largest thermal units are slow-start units that require these "unit commitment" decisions to be made well in advance, including in response to forecasts for wind generation and demand.

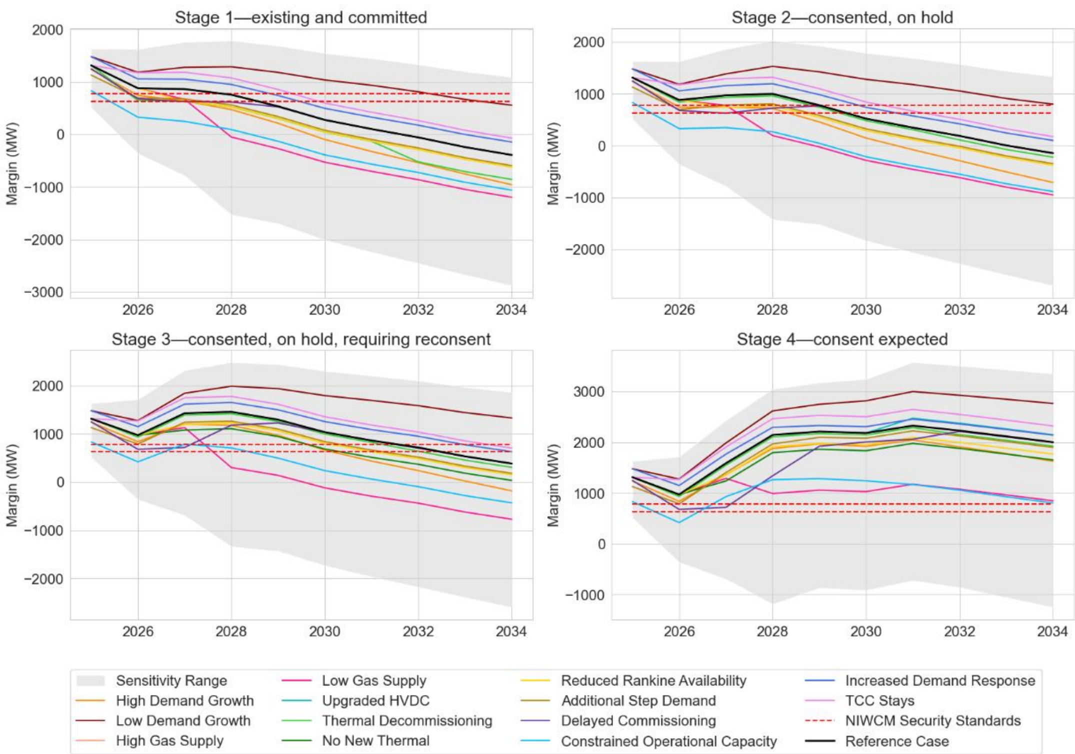
27 Note that due to the definitions of the margins and security standards, this sensitivity is not commensurable with the standards and should only be taken as an indication of the potential loss of capacity resulting from a low wind outcome and coordination issues.

28 See System Operator Winter 2023 Review and Security of Supply Review - Winter 2024

29 This is based on the average demand response provided by distribution companies during low residual conditions in Winter 2023 which was ~200 MW. 2023 is used because industrial demand reduction and high thermal unit commitment in Winter 2024, as a result of the low hydro situation, substantially reduced the pressure on capacity.

5. In the *reduced Rankine availability* sensitivity,[30] with existing and committed supply only, the NI-WCM drops below the lower security standard by 2027. This is two years earlier than in the reference case. Other sensitivities testing reduced thermal unit availability and gas supply also result in the margin dropping below the standards earlier, but to a lesser degree. Development of the consented pipeline could delay crossing the lower security standard in the *reduced Rankine availability* until 2031.

Figure 3: North Island Winter Capacity margins for the reference case and all sensitivities



1.3 What does this mean for industry?

Short-term (1-2 years):

- The downgrade in available gas and limited new supply that can be brought online in the short-term highlights the importance of heightened focus on maximising the availability and capability of existing assets. This means ensuring sufficient energy is available to respond to dry year risks through a combination of more conservative hydro storage management, contracting arrangements that enable thermal back-up fuel supply and generation, and longer-duration demand response.

30 In the *reduced Rankine availability* sensitivity, the available Rankine units provide dry year energy reserve only from 2027, so do not contribute to the capacity margin.

- Reduced thermal generation availability (e.g. Rankine retirement) will increase the risk of energy and capacity margins falling below the standards.
- The introduction of batteries will help manage peak capacity risks. Until enough new, firm, flexible resources come online we will need sufficient commitment of existing generation (including slower-start thermals) and demand response to reduce capacity risks.
- Asset owners (including generators, grid and distribution network owners) should accelerate supply connections generally and should work with the Authority and MBIE to consider prioritising firm energy and firm, flexible capacity resources.

Longer-term (> 2 years):

- The increased electrification of the economy requires investment in new generation, batteries, and demand response to come online at a rapid rate to ensure the energy and capacity margins are above the standards.
- This risk is exacerbated by the risk of an accelerated reduction in gas supply available for electricity generation (whether due to a fall in total gas availability or gas being used by industrials) and means the industry should consider alternatives that can ensure security margins are maintained.
- Delay in these new resources entering the market will put strain on existing resources, impacting the ability to manage energy and capacity challenges and the affordability of electricity supply for consumers. To reduce this risk, asset owners (including generators and grid and distribution network owners) should continue to accelerate new supply connecting to the grid, prioritising firm energy and firm, flexible capacity resources.

2 Methodology, Reference Case and Sensitivities

2.1 Methodology

2.1.1 Winter Margins

This assessment provides a 10-year view of the balance between supply and demand in the New Zealand electricity system. It forecasts:

- the Winter Energy Margins for New Zealand (NZ-WEM) and the South Island (SI-WEM). These are winter energy supply, in gigawatt-hours (GWh), divided by winter energy demand, in GWh. The margins are expressed as a percentage of total demand; and
- the North Island Winter Capacity Margin (NI-WCM)[31]. This is the sum of North Island supply capacity, less the expected peak demand, plus surplus South Island supply capacity able to be sent via the HVDC link to the North Island. The margin is expressed as a megawatt (MW) value.

Winter is defined as the period from April to the end of October for the NI-WCM, and April to the end of September for the NZ-WEM and SI-WEM.

The NZ-WEM and SI-WEM assess whether it is likely there will be an adequate level of supply and, in the case of the South Island, HVDC south transmission capacity, to meet expected electricity demand during the winter. The NI-WCM assesses whether it is likely there will be adequate supply and HVDC north transmission capacity to meet North Island winter peak demand.

In the context of this assessment the term *supply* includes grid connected generation, embedded generation, hydro storage and batteries.

2.1.2 Security Standards

The Authority defines security standards as part of its responsibility to ensure that the regulatory environment promotes an efficient level of reliability. The standards represent an efficient level of reliability—that is, where the expected cost of shortage is equal to the expected cost of new generation.

The current security standards specified in the Code[32] with further details provided in the Security Standards Assumptions Document (SSAD)[33] are:

- a NZ-WEM of 14–16%;

31 Note that our analysis does not make allowances for spinning reserve—that is, the peak demand is not increased by the quantity of reserves required. This means the subsequent margin represents excess supply prior to the provisioning of reserves.

32 Part 7, Clause 7.3(2)

33 Electricity Authority, Security Standards Assumptions Document

- a SI-WEM of 25.5–30%; and
- a NI-WCM of 630-780 MW.[34]

Falling below the lower[35] security standards does not equate to electricity shortage. Rather, it implies that investment in new generation would result in an efficient increase in reliability. It can also be interpreted as representing the likelihood of electricity shortage—the higher the actual margin observed the less likely electricity shortage will be all things being equal.

2.1.3 Our Assessment

Our assessment evaluates the capacity and energy margins and compares these against the Authority's security standards. We do this for both existing generation and the pipeline of new supply projects that could be potentially built. The objectives of the assessment are to understand:

- when, and under what circumstances, the capacity and energy margins will fall below security standards if no new supply projects are built (other than those already committed); and
- whether the pipeline of new supply projects is adequate to maintain security standards assuming a stable investment environment and adequate market incentives.

While our analysis identifies when a project *could* be developed, we do not attempt to forecast *if* or *when* new supply projects will be developed. Our assessment considers a reference case, plausible sensitivities and plausible sensitivity combinations.

2.1.4 Consultation Outcomes

As part of the SOSA process, we complete two rounds of consultation. The first round is to seek feedback on the proposed reference case and sensitivities. Published on our webpage are the four submissions we received this year along with our response to the feedback.

The second consultation is on a draft SOSA before it is finalised in June. Published on our webpage is the 2025 draft SOSA along with five submissions we received. We have taken the feedback on board in producing the final SOSA.

Changes made to the final SOSA include:

- updating the gas supply forecast based on updated information
- updating the *reduced Rankine availability* sensitivity to include the potential Rankine retirement in 2026
- shifting the Nova peaker to our stage 3 development category to reflect the increased uncertainty of this consented project

The net effect of these updates is a reduction in the margins relative to the draft SOSA which has brought forward some of the "crossing years". The overall conclusions and key-takeaways

34 The ranges represent the fact that this efficient level should not be considered as a single number due to uncertainties in key assumptions when determining these standards.

35 The lower standard being 14% for NZ-WEM, 25.5% for SI-WEM and 630 MW for NI-WCM.

remain the same. A summary of these changes is provided in Appendix 7 with a more detailed response to the feedback including elements we will consider in future SOSAs is included in our summary and response to feedback available on our website.

2.2 Reference Case

We have used a single reference scenario known as the reference case for the future New Zealand electricity system that represents the resources potentially available to the power system over the 10-year assessment horizon. The reference case represents what the market could develop; not necessarily what it will develop. In making this representation, we used a fixed set of assumptions, and then adjusted these using several key variables, or sensitivities, to test a range of plausible deviations from the reference case and the impact these have on the future capacity and energy margins.

In the reference case we assume existing generation and industrial demand will not change unless decommissioning is publicly committed to. The reference case assumes a medium demand forecast and that during the 10-year assessment horizon Tiwai remains, the Taranaki Combined Cycle (**TCC**) generator is assumed to exit before Winter 2026 as announced by Contact Energy,[36] investment in the upstream gas sector continues with an average level of success and the HVDC link is not upgraded.

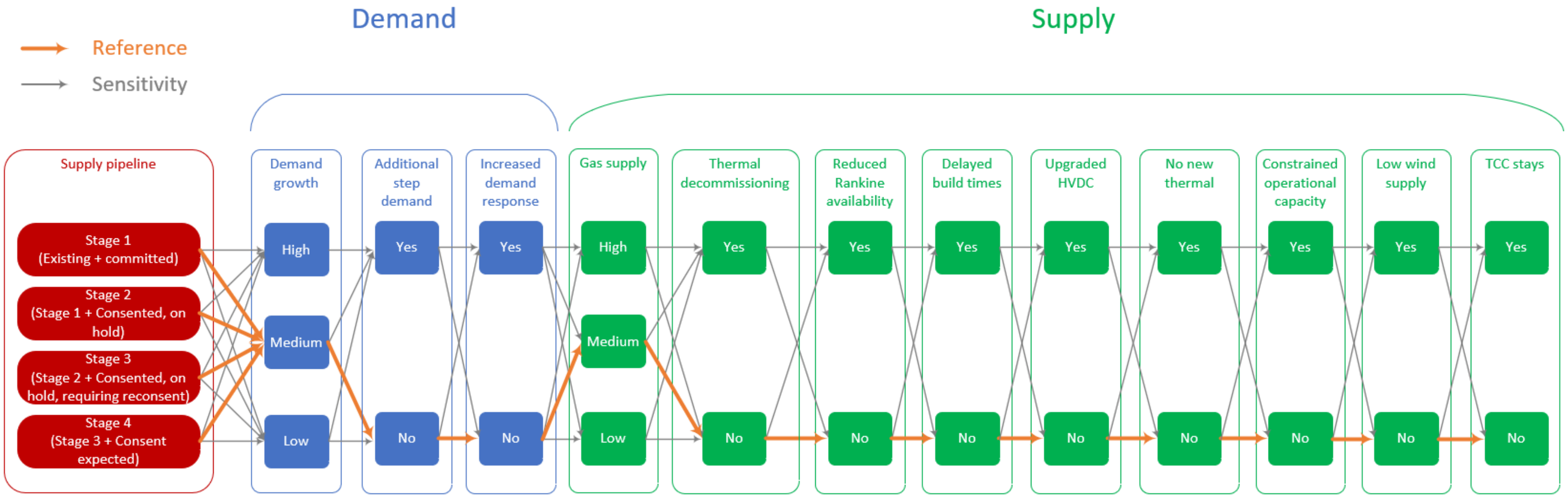
Sensitivities discussed further in Section 2.3 explore the variations on some of the key inputs used in the model. These reflect uncertainty in the market, gas availability and changing perceptions of how the future might unfold. Considering different plausible combinations of key variables allows us to explore and understand the impact these have on the future capacity and energy margins. Figure 4 below provides an illustration of the combinations of sensitivities[37].

Stakeholders are invited, and may be better placed, to make their own decisions as to which sensitivities should have more weighting than others.

36 See announcement by Contact on 8 November 2024 (here).

37 The Genesis announced retirement of a Rankine unit in 2026 is reflected as part of the *reduced Rankine availability* sensitivity. There is increased uncertainty around this with a heads-of agreement and discussions underway to keep this unit in service (here).

Figure 4: Assessed supply pipeline stages and sensitivities



The orange arrows represent the combination of key variables that make up the reference case. The grey arrows represent the potential combinations of sensitivities.

2.2.1 Detailed Reference Case Assumptions

We have used the following key assumptions for the reference case.

2.2.1.1 Demand Growth

Our reference case focuses on a *medium* rate of acceleration of electrification across the economy and growth of distributed energy resources.[38] To achieve this, transport electrification (electric vehicles), process heat electrification[39], solar photo voltaic (**PV**) and small-scale batteries are specifically modelled in this scenario.[40]

An underlying level of demand growth is expected within the existing sectors of the economy. It includes the impact of expected population and economic growth, ongoing electricity efficiency gains (including from urban densification), and ongoing sectoral changes in energy intensity and demand in line with recent trends.

Figure 5 shows the winter energy and peak[41] demand forecasts. They include the demand forecasts used in the 2024 SOSA to show the change in energy and peak demand this year compared to last year.

The medium and low forecasts for New Zealand's winter energy demand in this year's SOSA have generally decreased compared to last year's projections. The high forecast for NZ winter energy demand shows a decrease from 2025 to 2031 but then exceeds last year's forecast from 2031 to 2034. A decrease is also observed in the forecasts for North Island peak demand, as well as South Island winter energy and peak demand. These changes are attributed to decreases in customer-notified step loads, expected and observed industrial demand reductions, and an increased allocation of commercial rooftop solar due to revised methodology.

---

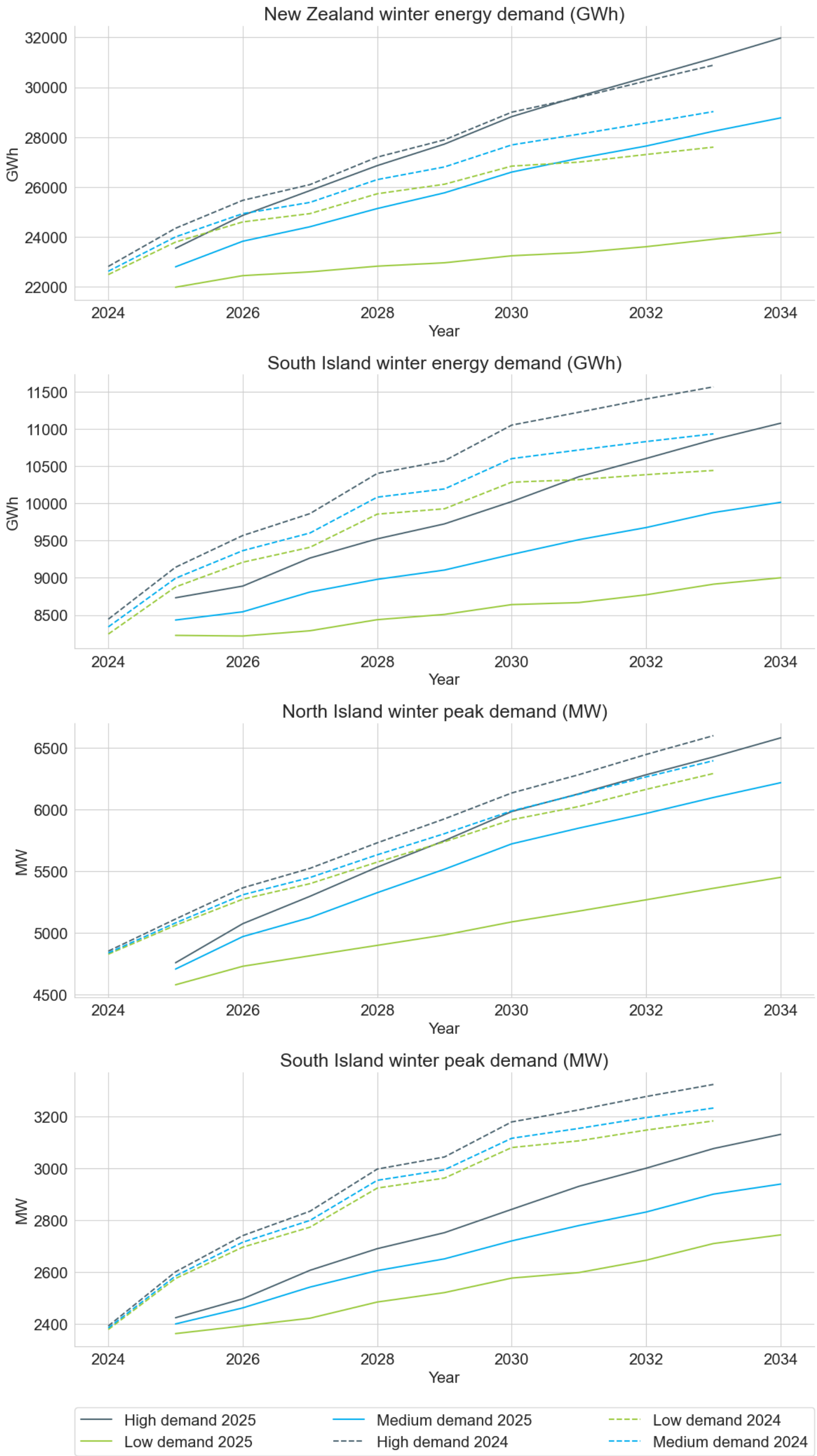
38 Distributed energy resources provide energy and capacity at a household level, offsetting grid demand. For this reason, the expected rate of uptake is modelled in the demand forecast rather than as a supply sensitivity.

39 This includes announced electrification projects at Whareroa and Edgecumbe sites announced by Fonterra earlier this year. The corresponding decrease in cogeneration at these sites as a result of these projects is accounted for in our reference case supply assumptions.

40 Appendix 2 sets out the demand forecast modelling process.

41 While the NI-WCM is measured against the North Island winter peak demand forecast, the South Island winter peak demand forecast is used as part of this calculation as it impacts the HVDC transfer.

Figure 5: New Zealand winter energy, North Island winter peak and South Island winter peak demand forecasts compared to the 2024 Security of Supply Assessment forecasts



2.2.1.2 Tiwai Smelter Load

The reference case includes the Tiwai smelter load over the 10-year assessment horizon. In May 2024 New Zealand Aluminium Smelters (**NZAS**) signed an electricity supply deal to keep the Tiwai smelter in operation for the next 20 years. This included a demand response agreement which we are modelling in the reference case. The new long-term conditional contracts between Tiwai and several generators increases the likelihood of Tiwai operation over the 10-year assessment horizon, hence we have removed the Tiwai exit related sensitivity which was included in recent SOSAs.

2.2.1.3 HVDC Capacity

Based on currently approved projects, the reference case assumes that the peak HVDC capacity will not increase throughout the period of analysis (2025–2034).[42] The capacity of the HVDC will be as described in the Authority's "Security Standards Assumptions Document". We explore the impact of increased HVDC capacity as a sensitivity[43].

2.2.1.4 Supply Pipeline Stages

As in previous SOSAs, the supply pipeline is based on information provided by market participants on a confidential basis. The reference case is analysed across the four supply pipeline stages shown in Table 1.

Table 1: Supply pipeline stages

Stage	Short description	Long description
Stage 1	Existing and committed	Existing, consented and committed to being developed[44]
Stage 2	Stage 1 + consented, on hold	Includes: • existing, consented and committed to being developed • consented and on hold/awaiting market conditions to change
Stage 3	Stage 2 + consented, on hold, requiring reconsent	Includes: • existing, consented and committed to being developed • consented and on hold/awaiting market conditions to change • consented and on hold/awaiting market conditions to change—consent revision or reconsenting will be required

42 The future static synchronous compensator (STATCOM) and other equipment at Haywards will increase the amount of time the HVDC can operate closer to its full capacity, but will not increase the maximum transfer capacity as modelled by the South Island contribution curve given in the Security Standards Assumptions Document.

43 Transpower (Grid Owner) has recently announced its proposed options for the upgrade of the HVDC (here). In this sensitivity we assume increased Southward transfer (from 2027) and an increase in Northward transfer capability from 2031.

44 These are projects that are consented and underway or proceeding.

Stage	Short description	Long description
Stage 4	Stage 3 + consent expected	Includes: • existing, consented and committed to being developed • consented and on hold/awaiting market conditions to change • consented and on hold/awaiting market conditions to change—consent revision, or reconsenting will be required • not consented, but likely to seek a consent in the next two years

We assume existing generation remains available unless decommissioning is publicly committed to.

Figure 6 shows the contribution of the supply pipeline stages for both energy and capacity. New supply project timings are based on commissioning dates provided by market participants, and if a date has not been provided, we have used an estimated earliest potential build date.[45] Figure 6 should not be interpreted as a forecast of new generation build.

The four subplots in Figure 6 (left side) showing generation in *Stage 3 – Consented, on hold, requiring reconsent* capture potential winter energy and capacity capability from existing and committed generation, as well as supply projects which are consented or require reconsent. The existing and committed generation is shown in the grey bars and the pipeline of new supply projects that are consented but on hold or requiring reconsent are shown in the other colours. Here we see a range of technologies being considered under Stage 3 including geothermal, thermal, wind, solar and battery with the majority of these expected in the North Island.

The four subplots in Figure 6 (right side) showing generation in *Stage 4 – Consent expected* capture the potential winter energy and capacity capability also including unconsented supply projects (where consent is likely to be sought within the next two years).

The large increase in installed capacity for winter energy and capacity margins in Stage 4 (compared to Stage 3) indicates the significant interest in new supply resources (majority in the South Island) beyond those already consented.[46] The additional unconsented projects under Stage 4 include solar, wind (onshore) as well as batteries. Given these projects are not yet consented, they have a higher degree of uncertainty.

The reason for including the supply pipeline of South Island winter capacity in Figure 6, is this capacity less South Island peak demand contributes to the calculation of the NI-WCM but is limited by the HVDC capability.

---

45 Table 6 within Appendix 3 defines earliest build dates.

46 This observation is supported by Transpower in its role as Grid Owner; the Grid Owner has seen a large increase in customer enquiries from both generation and demand, as highlighted in Transpower's New Connection Enquiries Dashboard.

Differences between this year's supply pipeline and last year's include the removal of offshore wind projects initially planned for installation in 2032, and a significant increase in solar and battery projects signalled for later years, particularly 2030.

Figure 6: Contributions of supply pipeline to the New Zealand Winter Energy, South Island Winter Energy and North Island Winter Capacity margins

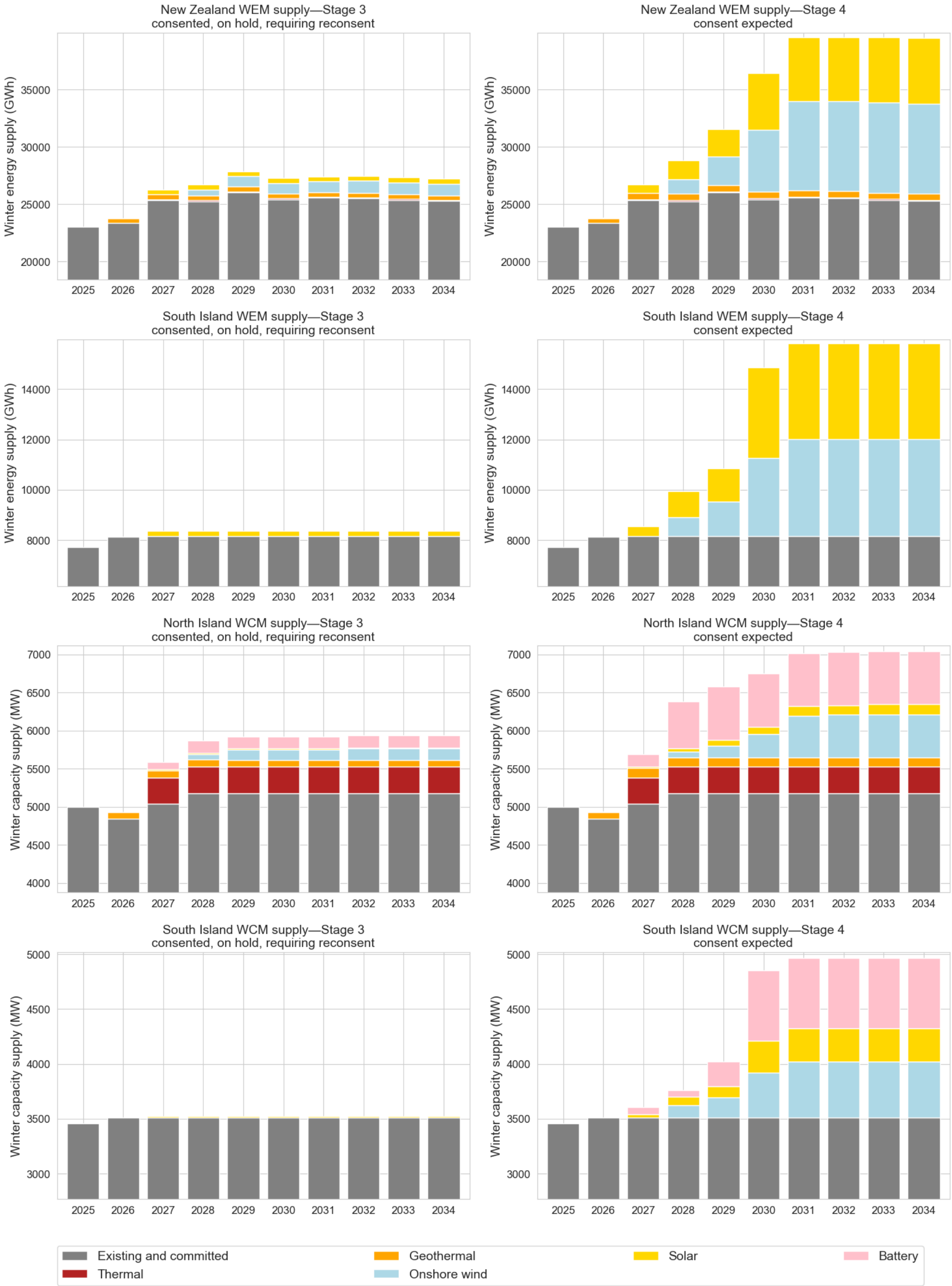


Figure 7 compares the supply pipeline in the 2025 SOSA with that in the 2024 SOSA in terms of contribution to energy and capacity supply. This covers existing, committed, and new supply projects (Stages 1 to 4).

The data shows that the contribution of the existing and committed pipeline to energy and capacity supply is lower in the 2025 SOSA compared to the 2024 SOSA. However, the contribution to South Island energy supply is higher in the 2025 SOSA. Since 2024, there has been a net increase of ~350 MW installed capacity of existing generation and a ~1,500 MW increase in the committed pipeline. These are positive developments, as committed supply projects have the highest certainty of being delivered, indicating progress in pipeline development.

Despite an increase in overall signalled installed capacity from 2024, there is a decrease in contribution to energy and capacity supply in some years compared to last year as discussed below:

a) Existing and committed NZ energy supply has decreased. For 2025, this is due to a combination of reduced gas supply and delayed projects. For 2026 and beyond, it is almost entirely due to reduced gas supply.[47]

b) The uncommitted NZ energy supply pipeline has decreased significantly over the 2026-2029 period compared to last year. About half of this change is due to a reduction in gas supply, meaning gas projects in the pipeline cannot be fuelled without taking gas from existing gas generators. The other half is mostly due to delayed or cancelled wind and solar projects.

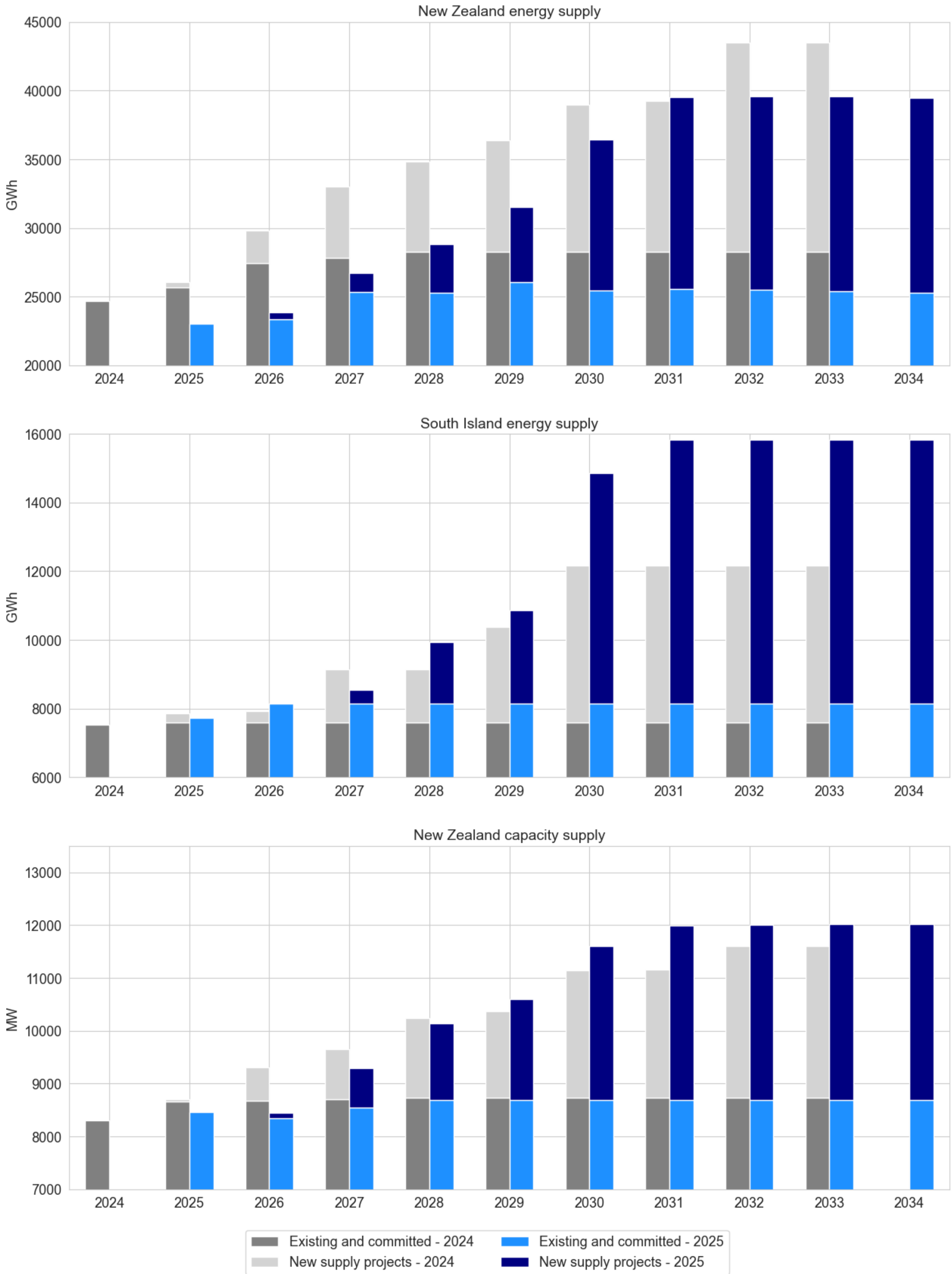
c) There has been an increase in investment signalled in the South Island with the South Island energy pipeline increasing compared to 2024 for most years in the 10-year assessment horizon. The new capacity in the pipeline has increased from ~4600 MW to ~9000 MW, creating a significant increase in the South Island energy supply with most of this being wind and solar.

d) Existing and committed NZ capacity supply has decreased for the period 2025-2027. This is mostly due to reductions in rated capacity for some existing units including the expected decommissioning of TCC's 330 MW of capacity. In 2028 and beyond, new projects in the committed pipeline offset these capacity reductions.

e) The New Zealand capacity supply pipeline has decreased in earlier years and increased in later years compared to 2024. This is due to the delay of projects in earlier years and an increase in pipeline projects in later years. Battery projects make up close to 2500 MW of capacity in this year's assessment compared to just over 1000 MW last year.

[47] See Appendix 4 for gas supply assumptions.

Figure 7: Winter energy and capacity supply in 2025 compared to 2024



2.2.1.5 Gas Supply

For the reference case we have assessed gas availability for electricity generation by estimating a dry year gas supply margin for each year of the 10-year assessment horizon. Gas supply assumptions are based on confidential information from gas producers for 2025 to 2026, and a third-party forecast for later years. The dry year gas supply margins indicate that we expect gas supply constraints to limit dry year winter energy supply from gas generators in all assessment years.[48]

The level of gas production over the assessment window is a key uncertainty affecting the security of supply margins, and particularly the energy margins. As such, we consider the impact of both a low gas supply sensitivity and a high gas supply sensitivity, as discussed in the next section. Together these can show the effect of the range of plausible gas supply outcomes.

2.2.1.6 Peak capacity factors (updated)

For thermal generation, wind generation, and hydro generation with controlled storage, we have used the peak capacity factors specified in the SSAD. For other generation types (cogeneration, geothermal, run-of-river hydro and solar), we have updated peak capacity factors for the 2025 SOSA based on observed generation during winter peaks. This includes an update to the solar peak capacity factor using wholesale market data from Winter 2024, which was the first winter in which there were solar farms offered in the New Zealand wholesale electricity market. We have also updated battery peak capacity factors as discussed in Appendix 3.

48 The reference case forecast for the next two years is based on gas producer forecasts. Thereafter the gas forecast is based on Enerlytica's mid-range forecast out to 2030 which is extrapolated out to 2034. Enerlytica's mid-range forecast assumes investment in upstream gas production continues with an average level of success. This differs from the 2024 SOSA reference case gas forecast approach, which used a combination of MBIE 2P and 2C gas forecasts (together with confidential gas producer forecasts and MBIE's gas reserves estimate) to inform the quantity of gas available for electricity. The newly-available external forecast from Enerlytica more closely aligns with the gas production reductions observed recently. Appendix 4 defines the process for determining the dry year gas supply margins.

2.3 Sensitivities

We have identified several key variables that we explore as sensitivities in our analysis. These sensitivities represent plausible variations from the reference case that could occur over the 10-year assessment horizon.

In addition to applying individual sensitivities to the reference case, we consider applying all plausible sensitivity combinations to the reference case to form a wider range of plausible futures. We have assessed the reference case and the sensitivities (and their feasible combinations) for different potential future generation[49] scenarios, which we refer to in the SOSA as supply pipeline stages.

Recent SOSAs have considered scenarios with reduced thermal generation in 2030 as a separate case study. In this year's SOSA we have modified this analysis by assessing the security margins for the final year of the assessment horizon (2034) instead of for 2030. This analysis makes up Section 4 of this report.

2.3.1 Supply Side Sensitivities

2.3.1.1 Thermal decommissioning

This sensitivity tests the potential impact of the decommissioning (or mothballing) of significant fossil-fuelled slow start thermal generation assets throughout the assessment horizon.

2.3.1.2 Reduced Rankine availability

We use this sensitivity to model the reduced availability of Rankine units for both the WCM and WEM. The drivers behind this reduction may be different for capacity compared to energy.

The sensitivity models a scenario where one of the three Rankine units is retired before winter 2026, as announced by Genesis Energy.[50] It also models the retirement of another Rankine unit before winter 2027, meaning that contribution to security margins from 2027 onwards would be from a single Rankine unit.

In addition to showing the effects of decommissioning these units, this sensitivity could also represent:

- In the case of capacity (NI-WCM), the unavailability of these slow-start units during short-term, unexpected supply shortages, unrelated to hydrology – for example if acting in a dry year reserve only role.
- In the case of energy (NZ-WEM and SI-WEM), a significant reduction in coal available to operate these units. Coal availability during winter is influenced by the initial coal stockpile size and constraints on the rate of coal imports.

---

49 This also includes batteries.

50 Genesis FY Q3 Performance Report - NZX. There is increased uncertainty around this with a Heads of Agreement underway to keep this unit in service (here)

2.3.1.3 Delayed build times

This sensitivity explores the impact of delaying the commissioning dates for all new generation by one year. This sensitivity is intended to cover a range of possible eventualities. For example, new generation may be delayed due to resource constraints, resource consent issues, or investment uncertainty.

2.3.1.4 HVDC Upgrade

Limits on HVDC transfer capacity can affect both the South Island's contribution to the NI-WCM and the North Island's contribution to the SI-WEM.

New South Island generation capacity and demand response may result in the upgrade of the HVDC link, including through the addition of a fourth cable. In this sensitivity we consider a potential upgrade to the HVDC link with the addition of a fourth cable. This is assumed to occur by 2031[51], and allows a greater contribution from the South Island to the NI-WCM.

An upgraded HVDC link would also allow greater southward energy transfer during a dry year, when the output of major South Island hydro generators would be reduced. Increased Southward transfer would also be dependent on the availability of sufficient reserves in the South Island and the removal of any AC transmission and voltage stability constraints restricting increased southward flow. In this sensitivity we also consider the future static synchronous compensator (STATCOM) and other equipment at Haywards. This is assumed to be completed by 2027[52], and allows a greater contribution from the Nort Island to the SI-WEM.

2.3.1.5 No new thermal

In this sensitivity we consider the impact if no new fossil-fuel generation is developed during the 10-year assessment horizon (2025-2034). This could be for a variety of reasons, including lack of available fuel.

2.3.1.6 Constrained operational capacity

This sensitivity explores the market co-ordination challenge of integrating increased intermittent generation with slower start thermal plant resulting in less flexibility. This challenge can at times lead to lower levels of capacity available over peak demand periods[53]. While the SOSA is not a short-term planning tool, this sensitivity gives an indication of how reduced flexibility can impact the North Island capacity margins. Additionally, under this sensitivity, we assume solar generation has a 0% contribution to the North Island capacity margin based on our analysis, which shows that solar generation contributes very little to

51 The grid owner has recently proposed options for the upgrade of the HVDC. This includes an option for the fourth cable by April 2031.

52 New high voltage equipment at Haywards | Transpower

53 These challenges are described further in System Operator 2022 Winter Review and System Operator Winter Outlook

evening peaks.[54] Of the 200 trading periods in 2024 with the highest demand[55], most of them were evening peaks.

2.3.1.7 Low wind supply

This sensitivity models a pessimistic estimate of wind generation output during the winter months. Wind generator capacity factors are reduced by 10% to account for lower-than-expected wind and variability in generation. The 10% reduction was chosen to represent a pessimistic scenario, which aligns with the 5th to 10th percentile of capacity factors. This means that the adjusted capacity factors are lower than 90-95% of expected outcomes, providing a conservative estimate to assess the impact on the NZ-WEM and SI-WEM.

2.3.1.8 Low gas supply

This sensitivity is intended to show a constrained case for domestic gas production over the coming decade. It reflects a future where capital investment in the upstream gas industry reduces, given potential reductions in gas demand and perceived uncertainties as to the transition away from carbon intensive fossil fuels.

In this sensitivity, we assume that gas supply post-2026 is limited to estimated 1P "proven" reserves. These are reserves which have at least a 90% probability of being produced based on geological, technological, and economic factors. We also assume that there is no investment to unlock contingent gas resources or to import natural gas. This is consistent with this sensitivity's underlying assumption of minimal levels of investment in upstream gas sector infrastructure.

2.3.1.9 High gas supply

This sensitivity is intended to explore the impact of additional gas availability for dry year electricity generation. The additional gas could come from increased production from existing fields, LNG imports, further reduction in industrial gas usage, or increased gas storage capacity (for example through the development of the Tariki Joint Venture).[56]

2.3.1.10 TCC stays

Contact previously announced the decommissioning of the TCC plant at the end of 2024[57], but they have announced a decision to keep TCC operational in 2025[58]. This sensitivity tests the impact of the TCC plant operating in the market over the full assessment horizon.

2.3.2 Demand Side Sensitivities

2.3.2.1 Demand growth

The demand growth sensitivities explore higher and lower rates of electricity demand growth compared to the reference case. Each of these will differ by varying the rates of acceleration of electrification across the economy and growth of distributed energy resources. To achieve

---

54 2025 SOSA Appendix document, Section 3.7

55 The metric used to set the NI-WCM is the "H100" or the average of the highest 200 trading periods of demand (SSAD page 4)

56 Strategy on track despite challenging year | Genesis NZ

57 Contact Energy Integrated Report 2024

58 Contact to keep TCC available in 2025

this, we have specifically modelled transport electrification (electric vehicles) and process heat electrification for each growth rate. We have also modelled different rates of solar PV and small-scale batteries, as they can offset growth in demand from the grid.[59]

2.3.2.2 Additional step demand

This sensitivity explores the potential impact of new industrial sources of demand, such as data centres, other new industries, or electrification of process heat demand. In this sensitivity we consider an additional 100 MW step of load in each island. This is to account for any additional electrification which is not accounted for in our reference case demand forecast.

2.3.2.3 Increased demand response

Demand response could play a larger role in managing peak loads going forward. This sensitivity explores the impact of increased uptake in demand response (100 MW in both the North and South Islands) on the NI-WCM. It also explores the impact of additional long-term demand response on the NZ-WEM and SI-WEM by decreasing the demand by 2.5% and 5% respectively[60].

[59] Appendix 2 defines the demand forecast modelling process.
[60] Further information on this sensitivity is included in the Appendix 5.

3 Results

3.1 Winter Energy Margin Results

3.1.1 New Zealand Winter Energy Margin Reference Case Results

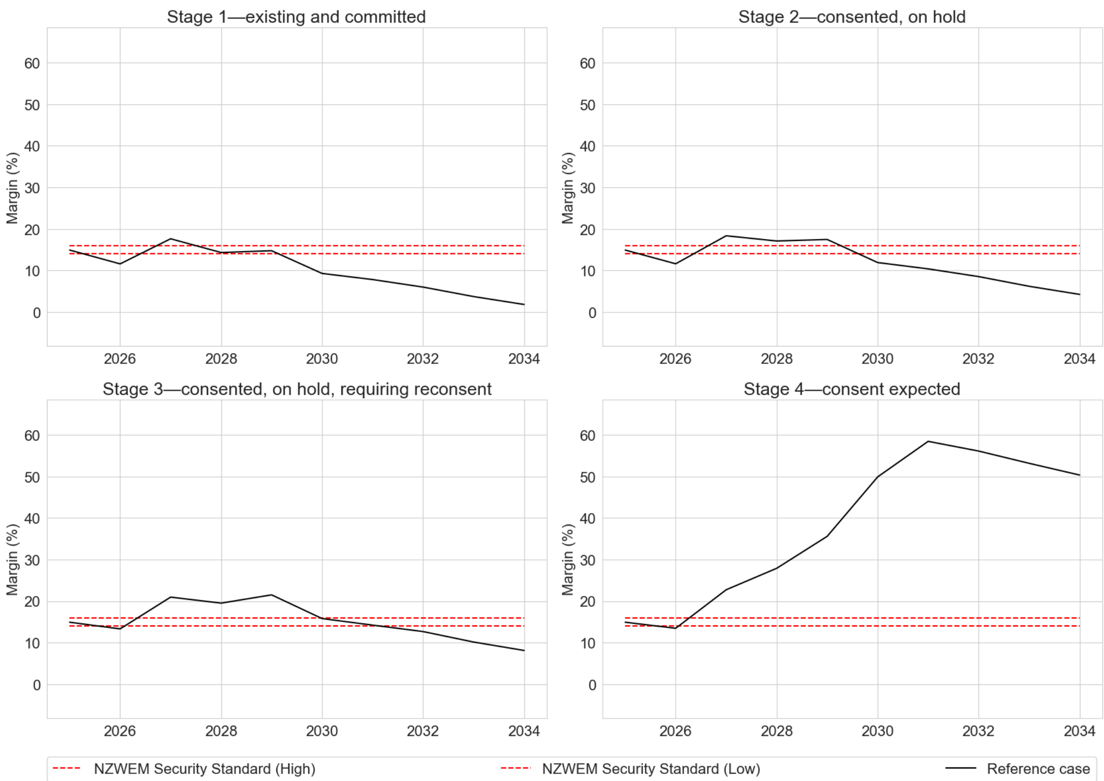
Figure 8 shows the NZ-WEM results for the reference case. This illustrates that:

The NZ-WEM declines and falls below the lower security standard in 2026;

To maintain the NZ-WEM above the lower security standard from 2027 through to 2031, in addition to existing generation, most of the consented, on-hold, and requiring reconsent supply projects (Stage 3) would need to be developed. However, even in Stage 3, the reference case drops below the lower security standard in 2032;

From 2027, there is a significant increase in the amount of unconsented generation in the pipeline (Stage 4). However, these projects have a higher degree of uncertainty in coming to market.

Figure 8: New Zealand Winter Energy Margin reference case results



3.1.2 New Zealand Winter Energy Margin Sensitivities

In this section we present the impact the sensitivities have on the reference case and discuss whether these impacts accelerate or delay the NZ-WEM crossing the lower security standard.

Figure 9 shows the impact of each of the sensitivities when applied independently to the reference case for each of the four supply pipeline stages. The grey shaded area defines the boundary for the best and worst case of the plausible sensitivity combinations (shown in Figure 4).[61] Applying each sensitivity independently from one another allows us to observe the magnitude of each sensitivity's impact on the NZ-WEM (relative to the reference case).

Figure 9: New Zealand Winter Energy margins for the reference case and all sensitivities

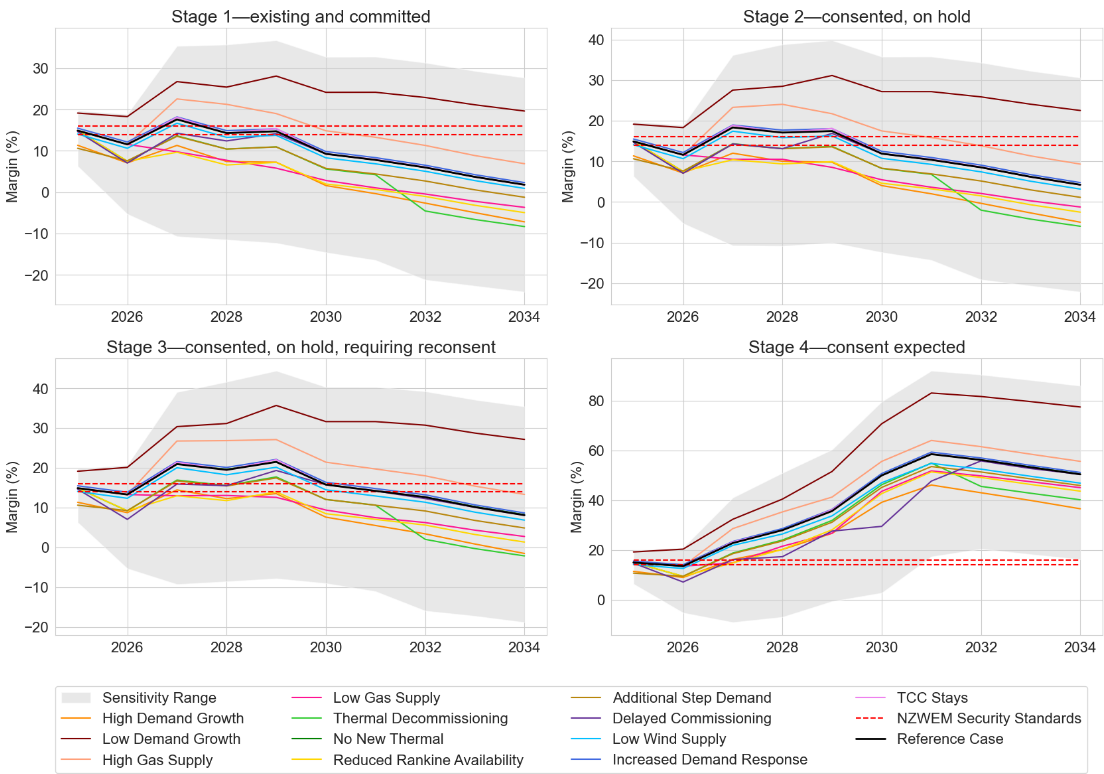


Table 2 presents the impact of each sensitivity on the reference case, showing the earliest crossing of the lower security standard for each sensitivity at each stage of the supply pipeline. The table uses a heatmap with colours ranging from red to orange to green for the years presented, where red cells indicate an earlier crossing of the lower security standard, and green cells indicate crossing the security standard in later years.

61 The boundary of the grey area provides an indication of the range of the potential outcomes where different combinations of sensitivities are assumed to occur. As would be expected, combinations of sensitivities that individually reduce the WEM or WCM would pull the margins even lower if considered together (such as higher demand and delayed commissioning and low gas supply). In the supplementary data workbook, we have provided the margins for all combinations of sensitivities so readers can explore the scenarios they consider most likely.

Table 2: NZ-WEM earliest crossing of the lower security standard for the reference case and sensitivities

Sensitivity	Stage 1	Stage 2	Stage 3	Stage 4
Reference case (NZ-WEM)	**2026**	**2026**	**2026**	**2026**
High demand growth	2025	2025	2025	2025
Low demand growth	>2034	>2034	>2034	>2034
High gas supply	2026	2026	2026	2026
Low gas supply	2026	2026	2026	2026
Thermal decommissioning	2026	2026	2026	2026
No new thermal	2026	2026	2026	2026
Reduced Rankine availability	2026	2026	2026	2026
Additional step demand	2025	2025	2025	2025
Delayed commissioning	2026	2026	2026	2026
Low wind supply	2026	2026	2026	2026
Increased demand response	2026	2026	2026	>2034
TCC stays	2026	2026	2026	2026

Almost all sensitivities cross the lower security standard in 2026 along with the reference case. The *high demand growth* and *additional step demand* sensitivities cross a year earlier, in 2025.

Beyond 2026 the *low gas supply*, *high demand growth*, *reduced Rankine availability* and *thermal decommissioning* sensitivities have the greatest impact on reducing the NZ-WEM. The figures above indicate that, unless sufficient unconsented generation (Stage 4) is developed, the reference case and most sensitivities fall below the lower security standard by 2032. Until a large amount of currently unconsented generation is built, we will rely on thermal generation to maintain the NZ-WEM above the lower security standard.

In contrast, the *low demand growth* and *high gas supply* sensitivities have the greatest impact on increasing the NZ-WEM. Under these sensitivities, if all Stage 3 generation supply is commissioned, we would maintain margins above the lower security standard until 2034, at which point the *high gas supply* sensitivity crosses the lower security standard.

These impacts are discussed further in Section 3.4.

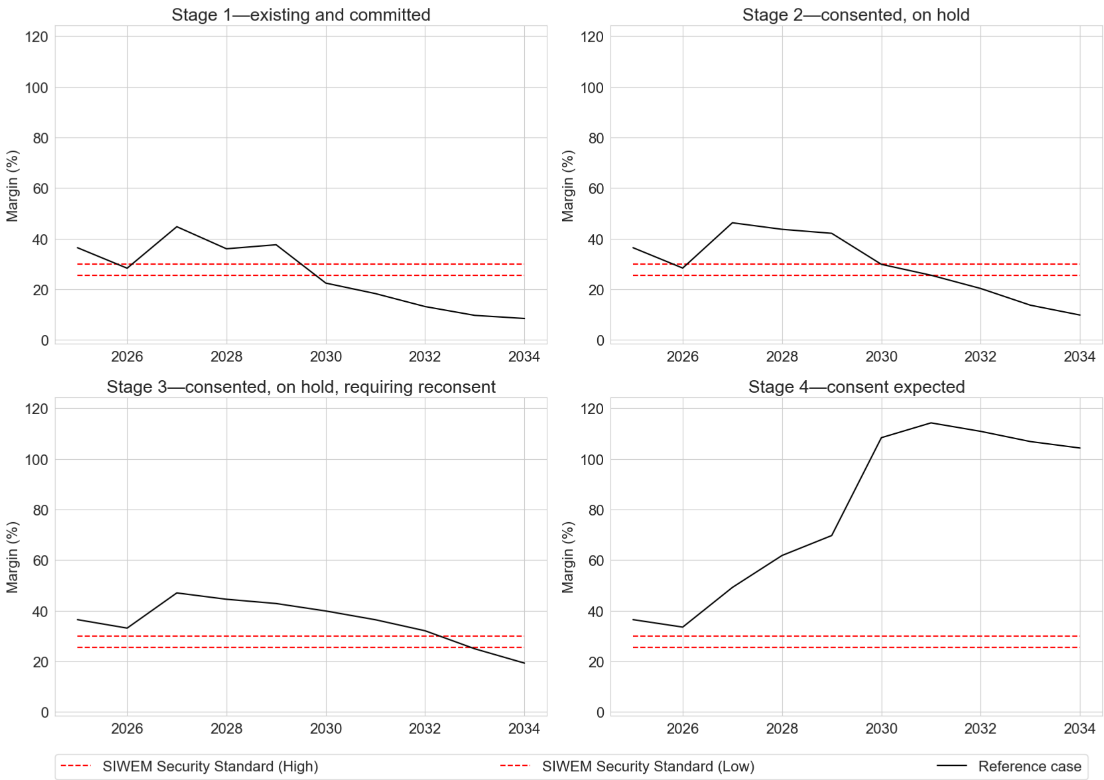
3.1.3 South Island Winter Energy Margin Reference Case Results

The SI-WEM results for the reference case are shown in Figure 10. This illustrates that:

1. the SI-WEM crosses the lower security standard later than the NZ-WEM under supply pipeline Stages 1-4;
2. with existing and committed generation (Stage 1) the SI-WEM declines and crosses the lower security standard in 2030; and
3. for the reference case to maintain the SI-WEM above the lower security standard throughout the assessment horizon, in addition to the existing and committed

generation, all the consented and some of the unconsented supply projects (Stage 4) need to be developed.

Figure 10: South Island Winter Energy Margin reference case results



3.1.4 South Island Winter Energy Margin Sensitivities

In this section we present the impact the sensitivities have on the reference case and discuss whether these impacts accelerate or delay the SI-WEM crossing the lower security standard.

Figure 11 shows the impact of each of the sensitivities when applied independently to the reference case for each of the four supply pipeline stages. The grey shaded area defines the boundary for the best and worst case of the plausible sensitivity combinations. Applying each sensitivity independently from one another allows us to observe the magnitude of each sensitivity's impact on the SI-WEM (relative to the reference case).

Figure 11: South Island Winter Energy Margins for the reference case and all sensitivities

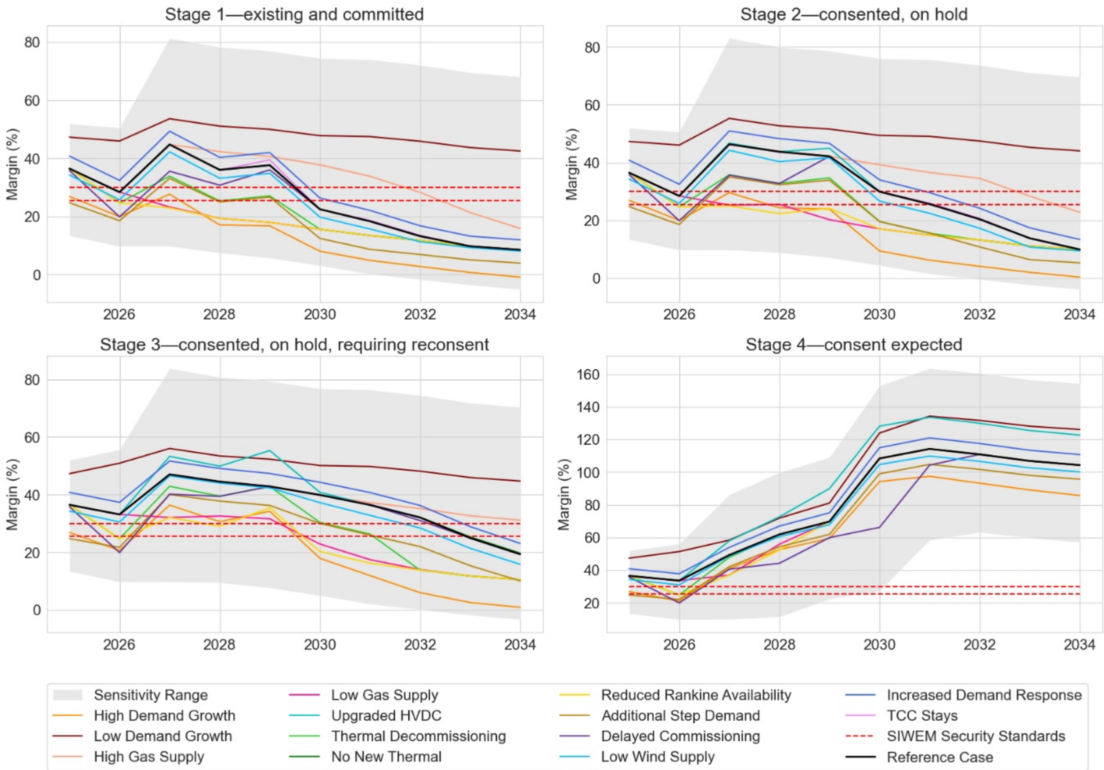


Table 3: SI-WEM earliest crossing of the lower security standard for the reference case and sensitivities

Sensitivity	Stage 1	Stage 2	Stage 3	Stage 4
Reference case (SI-WEM)	**2030**	**2032**	**2033**	**>2034**
High demand growth	2026	2026	2026	2026
Low demand growth	>2034	>2034	>2034	>2034
High gas supply	2033	2034	>2034	>2034
Low gas supply	2027	2027	2030	>2034
Upgraded HVDC	2030	2032	2033	>2034
Thermal decommissioning	2026	2026	2026	2026
No new thermal	2030	2032	2033	>2034
Reduced Rankine availability	2026	2026	2026	2026
Additional step demand	2025	2025	2025	2025
Delayed commissioning	2026	2026	2026	2026
Low wind supply	2030	2031	2033	>2034
Increased demand response	2031	2032	2034	>2034
TCC stays	2030	2032	2033	>2034

Reducing thermal generation capability to provide dry-year back-up has a substantial impact in accelerating this risk as shown in the *low gas supply*, *reduced Rankine availability*, and *thermal decommissioning* sensitivities.

The *high demand* and *additional step demand* sensitivities also cause the SI-WEM to cross the lower security standard earlier than the reference case. Under these sensitivities, even if consented and unconsented generation (Stage 4) came to market, the SI-WEM would still cross the lower security standard by 2025 under *additional step demand* and by 2026 under *high demand growth*. This generation investment needs to be increased and accelerated if these sensitivities materialised as shown by the *delayed commissioning* sensitivity in Figure 11 crossing the lower security standard in 2026 for Stage 4 generation.

In contrast, the *low demand, high gas supply, and increased demand response* sensitivities have the greatest impact on increasing the SI-WEM. These could also be proxies for the impact of varying quantities of South Island dry-year winter demand response, greater availability of gas in the market, and/or additional South Island generation on the SI-WEM.

Increasing north-south transfer capability as in the *upgraded HVDC* sensitivity can help reduce the amount of generation needed to manage dry-year risk in the South Island if there is sufficient surplus energy in the North Island.

The impacts of the various sensitivities on the SI-WEM show the reliance on thermal back up generation to manage dry year risks, until significant new renewable generation and South Island long-duration demand response comes to market.

These impacts are discussed further in Section 3.4.

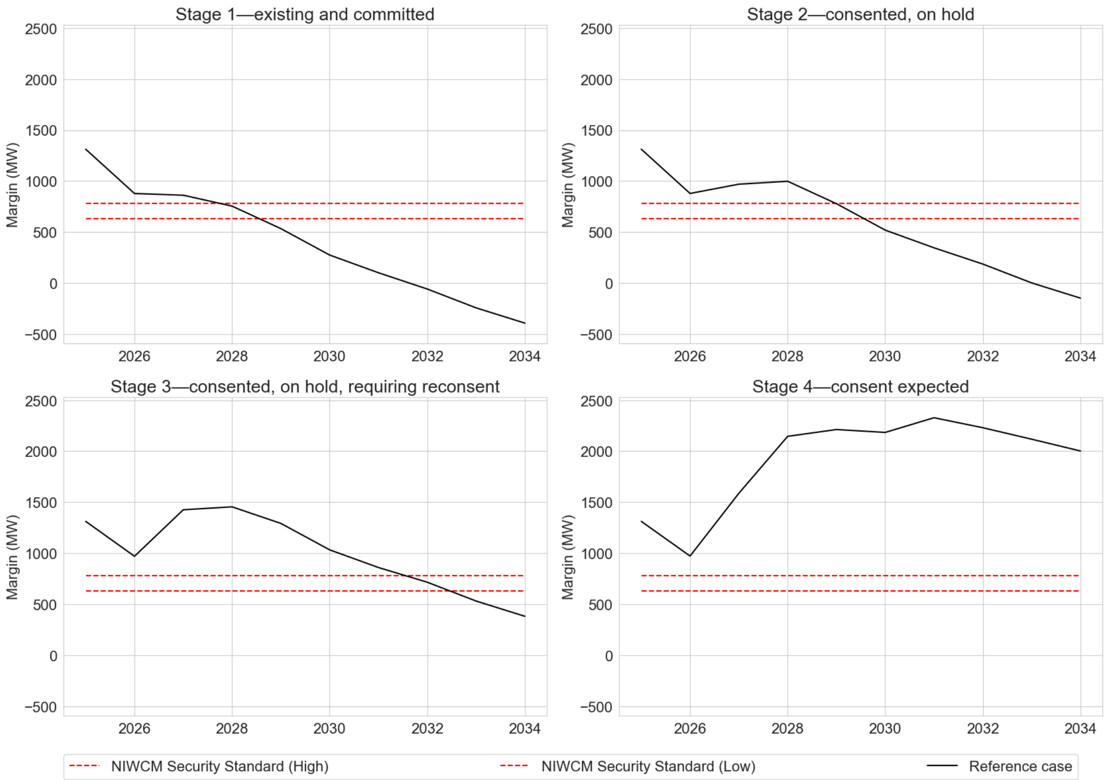
3.2 Winter Capacity Margin Results

3.2.1 North Island Winter Capacity Margin Reference Case Results

Figure 12 shows the NI-WCM results for the reference case. This illustrates that:

1. With existing and committed generation (Stage 1) the NI-WCM declines and crosses the lower security standard in 2029;
2. Consented and on hold projects (Stage 2) help keep the NI-WCM above the lower security standard until 2030, while consented, on-hold, and requiring reconsent projects (Stage 3) extend this period until 2033.
3. Additional unconsented projects (Stage 4) would be needed to maintain the NI-WCM above the lower security standard from 2032 for the remainder of the assessment horizon.

Figure 12: North Island Winter Capacity Margin reference case results



3.2.2 North Island Winter Capacity Margin Sensitivities

In this section we present the impact the sensitivities have on the reference case and whether these accelerate or delay the NI-WCM crossing the lower security standard.

Figure 13 shows the impact of each of the sensitivities when applied independently to the reference case for each of the four supply pipeline stages. The grey shaded area defines the boundary for the best and worst case of the plausible sensitivity combinations. Applying each sensitivity independently from one another allows us to observe the magnitude of each sensitivity's impact on the NI-WCM (relative to the reference case).

Figure 13: North Island Winter Capacity Margins for the reference case and all sensitivities

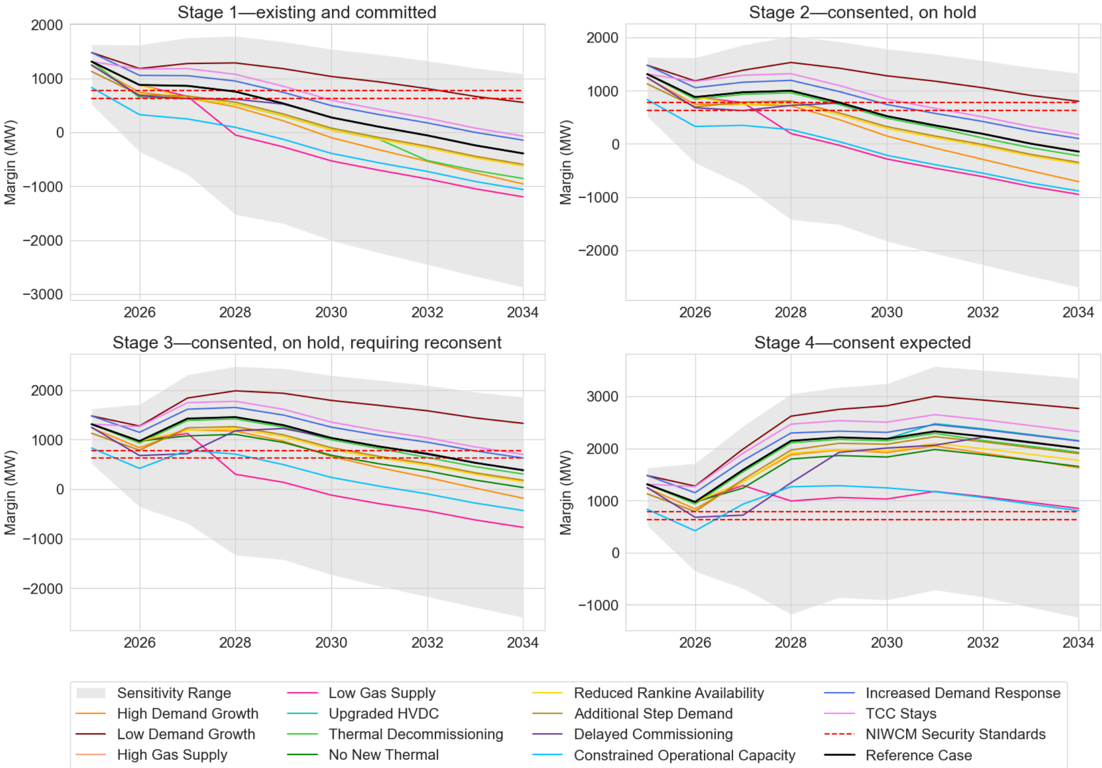


Table 4: NI-WCM earliest crossing of the lower security standard for the reference case and sensitivities

Sensitivity	Stage 1	Stage 2	Stage 3	Stage 4
Reference case (NI-WCM)	**2029**	**2030**	**2033**	**>2034**
High demand growth	2028	2029	2031	>2034
Low demand growth	2034	>2034	>2034	>2034
High gas supply	2029	2030	2033	>2034
Low gas supply	2028	2028	2028	>2034
Upgraded HVDC	2029	2030	2033	>2034
Thermal decommissioning	2027	2030	2033	>2034
No new thermal	2029	2030	2031	>2034
Reduced Rankine availability	2027	2029	2031	>2034
Additional step demand	2028	2029	2032	>2034
Delayed commissioning	2027	2027	2033	>2034
Constrained operational capacity	2026	2026	2026	2026
Increased demand response	2030	2031	2034	>2034
TCC stays	2030	2032	>2034	>2034

The *constrained operational capacity* sensitivity highlights the importance of adequate thermal commitment at times of low intermittent generation to manage capacity risks in our system with increasing intermittency if there is insufficient investment in flexible resources. This impact reduces under Stage 4 where more unconsented battery investment is signalled.

The *low gas supply* and *reduced Rankine availability* sensitivities substantially impact on pulling the NI-WCM down below the security standards. However the *low gas supply* sensitivity assumes (as in the reference case) significant continued industrial gas consumption. Gas peakers can provide peaking capacity while operating at a low overall capacity factor, so reallocation of some gas to power generation from other sectors could allow the gas peaking fleet to provide up to 430 MW of NI-WCM supply even in a scenario where gas supplies are low.

In contrast, the *low demand growth* and *TCC stays* sensitivities have the greatest impact on improving the NI-WCM, by reducing demand over peak periods and increasing thermal unit availability during peaks respectively. Development of projects beyond stage 2 is still required to maintain the NI-WCM above the lower security standard for the duration of the assessment horizon in the *TCC stays* sensitivity, and beyond stage 1 in the *low demand growth* sensitivity.

These impacts are discussed further in Section 3.4.

3.3 Comparison with the 2024 Security of Supply Assessment

Figure 14 shows the NZ-WEM reference case results cross the lower security standard four years earlier than in the 2024 SOSA, when considering only the existing and committed supply projects (Stage 1). This is primarily due to a decrease in gas availability relative to the level modelled in the 2024 SOSA.

When considering all the consented supply projects (Stages 2 and 3), we can see that for most of the assessment horizon the NZ-WEM reference case is lower than in the 2024 SOSA. This is due to a decrease in gas supply and consented supply projects from 2026 onwards which corresponds to this year's NZ-WEM dropping below last year's margin and below the standards at multiple points over the assessment horizon.

When considering the entire supply projects pipeline (Stage 4), the NZ-WEM reference case is lower than in the 2024 SOSA until 2031 before dropping back below by 2032. This is the result of a reduction in gas supply and a reduction in consent-expected projects from the supply pipeline in 2025-2029 (Figure 7), exceeding the drop in the demand forecast.

Figure 14: New Zealand Winter Energy Margin reference case comparison, 2024 and 2025

Figure 15 shows the SI-WEM reference case results cross the lower security standard two years later than in the 2024 SOSA, when considering only the existing and committed supply projects (Stage 1). This is primarily due to a decrease in the SI-WEM demand forecast and an increase to the existing and committed South Island supply pipeline, with the ability for the North Island supply to support the South Island constrained by the north-to-south transfer capability.

This shift remains consistent across all project pipeline stages, with the 2025 SOSA resulting in the SI-WEM crossing the lower security standard slightly later in each stage. Unconsented generation projects (Stage 4) have seen a significant increase in this year's SOSA, although these were not required in either the 2024 or 2025 SOSA to maintain the SI-WEM above the lower security standard.

Figure 15: South Island Winter Energy Margin reference case comparison 2024 and 2025

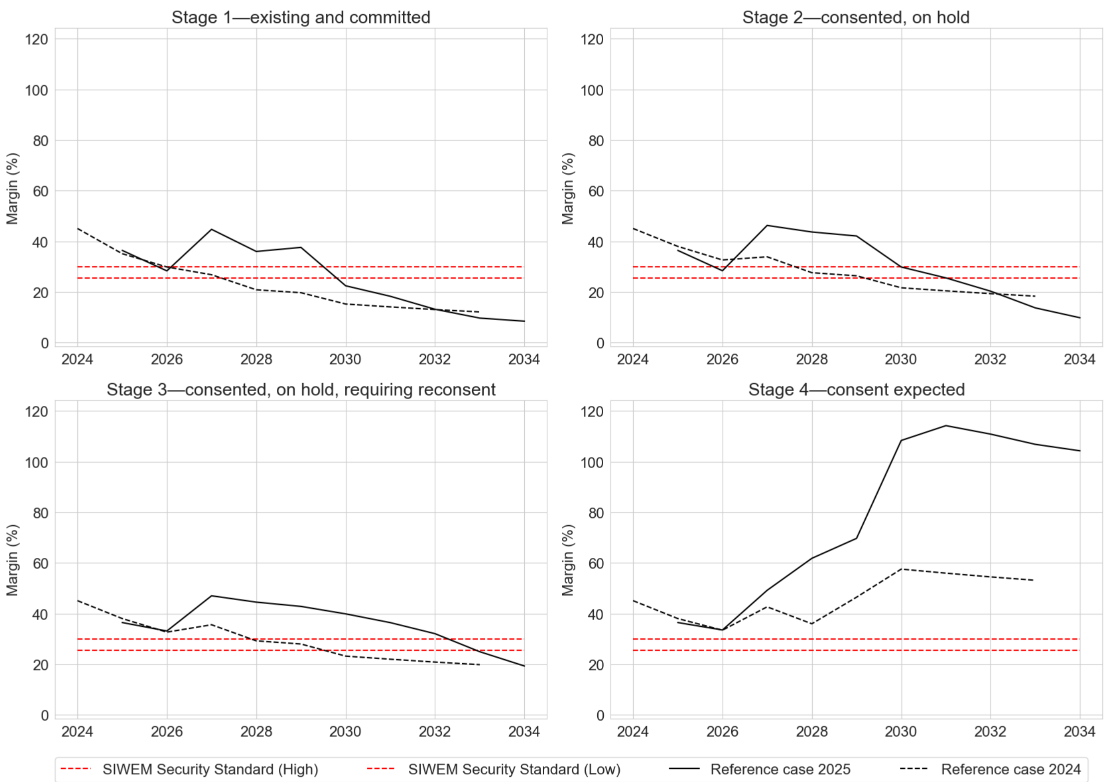
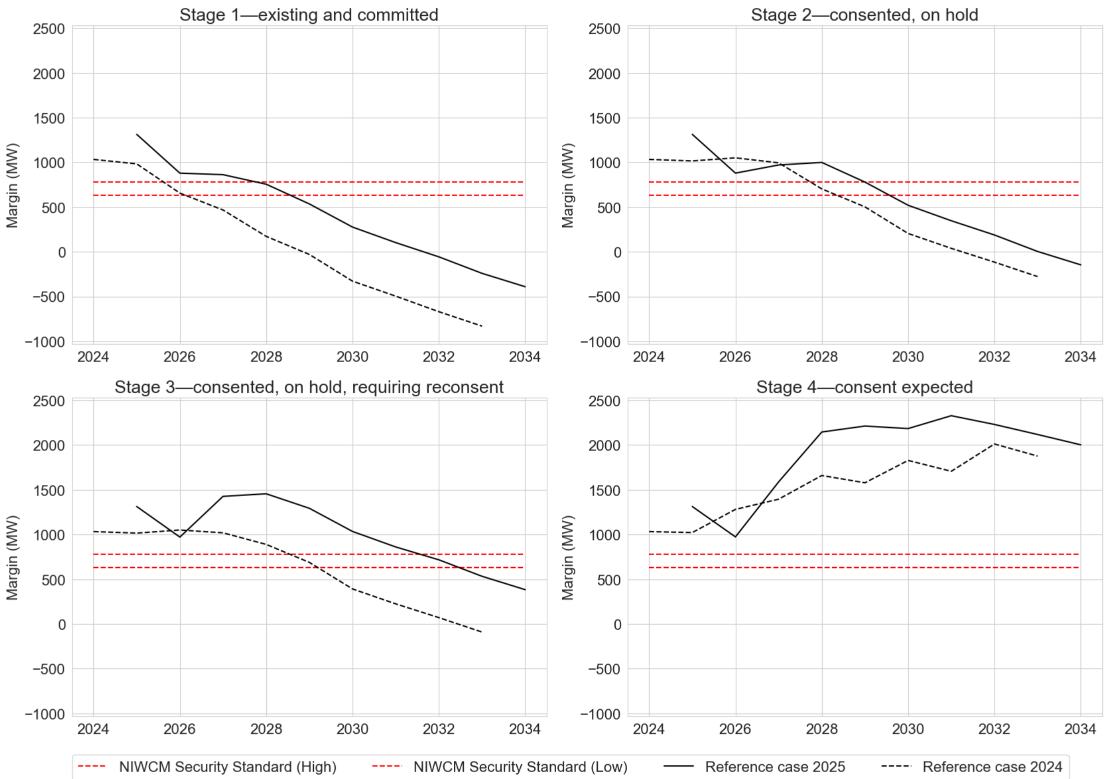


Figure 16 shows that the NI-WCM reference case results cross the lower security standard two years later than in the 2024 SOSA when considering only the existing and committed supply projects (Stage 1). This is primarily due to a decrease in the NI-WCM demand forecast and an increase in new battery projects from 2027 onwards. Initially, the NI-WCM for the 2025 SOSA declines in 2026 and falls below the 2024 SOSA's NI-WCM (in Stages 2-4) due to the signalled decommissioning of TCC and a decrease in the number of committed new supply projects, but it surpasses the 2024 SOSA's NI-WCM from 2028 onwards as the number of new projects increases which contribute significantly to capacity margins, such as batteries.

Figure 16: North Island Winter Capacity Margin reference case comparison, 2024 and 2025



3.4 Key Insights

3.4.1 Energy

3.4.1.1 Reduced gas availability requires earlier generation investment

Gas available for electricity generation has decreased in the 2025 SOSA reference case compared to 2024. Reduced gas availability adversely impacts the NZ-WEM and SI-WEM, increasing the risk of these margins falling below their respective lower security standards earlier, unless sufficient new generation resources in the supply pipeline come to market in time. While our-mid range gas supply forecast has reduced compared to 2024, there is still large uncertainty in future gas supply. To account for this future gas supply uncertainty, we include both high and low gas sensitivities. These sensitivities and the reference case represent a wide range of possible levels of gas availability for electricity generation over the assessment horizon.

Table 5, Figure 17, and Figure 18 illustrate the impact on the NZ-WEM and SI-WEM under two different sensitivities regarding gas availability for electricity generation:

- *Low gas supply:* gas supply is limited to estimated 1P reserves after 2026.
- *High gas supply:* additional gas is available for electricity generation after 2026, based on Enerlytica's high gas scenario forecast. This could represent more success in extraction from existing gas fields but also increased gas available for electricity through LNG, additional gas storage or reduced industrial gas usage.

In 2025 and 2026, both of these sensitivities use the same gas supply forecast (sourced from gas producers) as is used in the reference case.[62] With this gas supply forecast, the NZ-WEM crosses the lower security standard in 2026 for all stages of the supply pipeline (committed, on-hold, and unconsented generation).

Table 5: NZ-WEM and SI-WEM earliest crossing of the lower security standard for the reference case and gas availability sensitivities

Sensitivity	Stage 1	Stage 2	Stage 3	Stage 4
Reference case (NZ-WEM)	**2026**	**2026**	**2026**	**2026**
High gas supply	2026	2026	2026	2026
Low gas supply	2026	2026	2026	2026
Reference case (SI-WEM)	**2030**	**2032**	**2033**	**>2034**
High gas supply	2033	2034	>2034	>2034
Low gas supply	2027	2027	2030	>2034

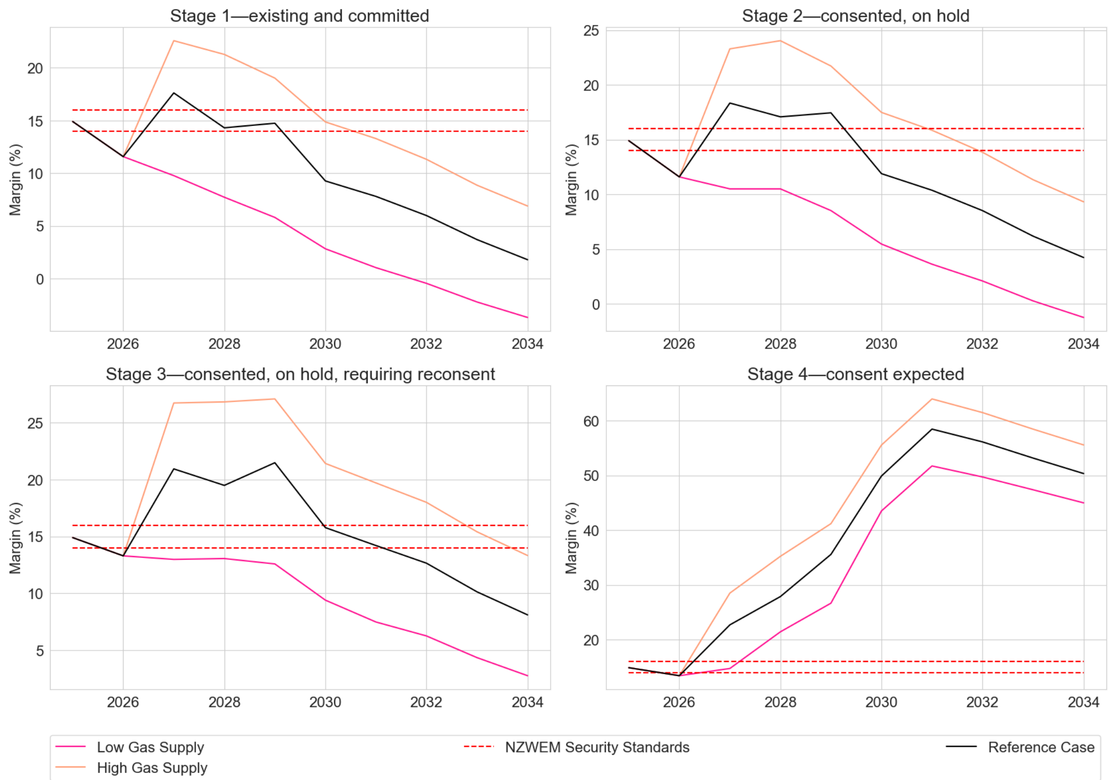
Under the *low gas supply* sensitivity, Figure 17 shows a noticeable decrease in the NZ-WEM and it crosses the lower security standard in 2026 (as it does under the reference case) when considering all stages of the supply pipeline. To increase the NZ-WEM above the lower security margin from 2026 onwards, supply projects from the unconsented pipeline (Stage 4)

[62] Further information on thermal fuel supply assumptions is provided in Appendix 4.

would need to be developed prior to 2027, at which point the requiring reconsent projects (Stage 3) of the supply pipeline would no longer be sufficient to maintain the NZ-WEM above the lower security margin.

Under the *high gas supply* sensitivity, the NZ-WEM still crosses the lower security standard in 2026 when considering committed, on-hold, and unconsented generation (Stages 1 to 4) due to significantly less gas being available in the reference case, but the margin increases significantly above the lower security standard from 2027 onwards when considering all stages of the supply pipeline.

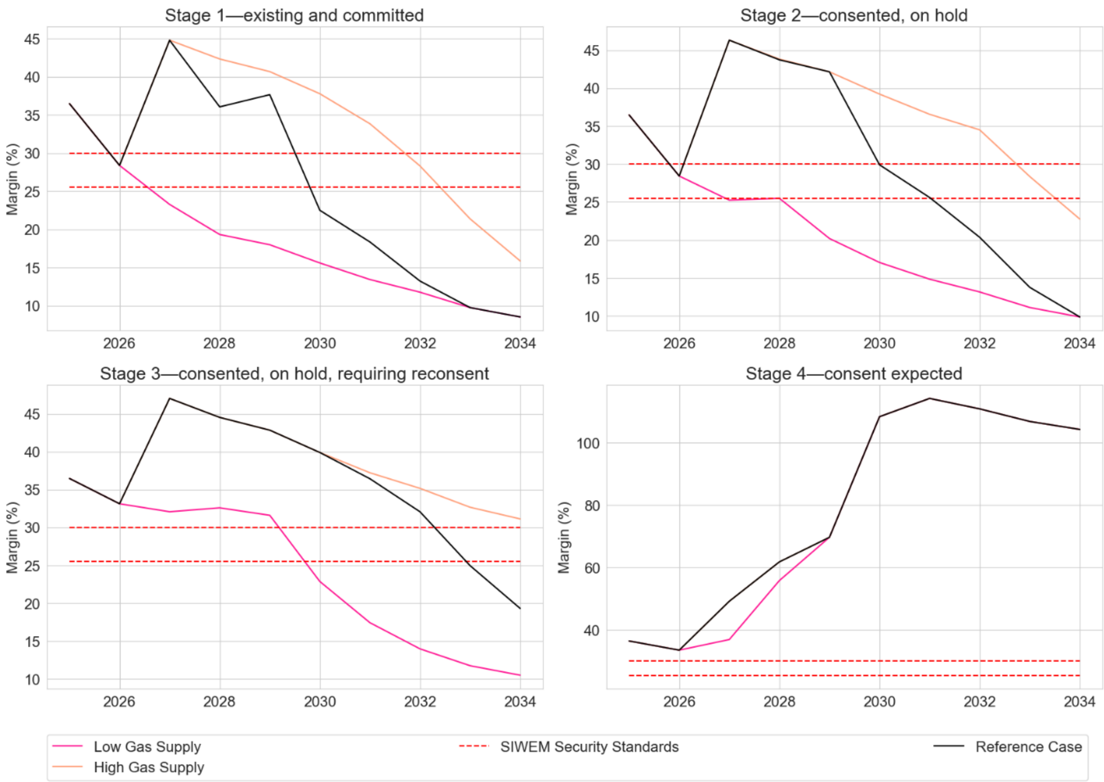
Figure 17: New Zealand Winter Energy Margins for the reference case and sensitivities that affect gas availability



Gas availability also impacts the SI-WEM, however with all thermal generation located in the North Island this depends on north-to-south transfer capability. The *low gas supply* sensitivity results in the SI-WEM crossing the lower security standard three years before the reference case, in 2027, for existing and committed generation (Stage 1). The *high gas supply* sensitivity results in the SI-WEM crossing the lower security standard three years later than in the reference case, in 2033, for Stage 1 generation.

The *low gas supply* sensitivity requires development of consented (from 2027) and some unconsented generation (from 2030) to maintain the SI-WEM above the lower security standard for the assessment duration.

Figure 18: South Island Winter Energy Margins for the reference case and sensitivities that affect gas availability



3.4.1.2 *Sufficient investment in new generation is required to reduce the thermal generation availability risk*

Fossil-fuelled thermal generation availability over the next 10 years can be impacted with potential decommissioning of existing thermal generation and/or no new thermal generation capability added to the system. In this section we explore the impacts on the NZ-WEM from these two reduced thermal generation availability sensitivities, a combination of both, and an increased thermal generation availability sensitivity namely:

- *thermal decommissioning*, in which some slow-start thermal generation is decommissioned in steps; and

- *no new thermal*, in which no new fossil fuelled generation is developed.
- *TCC stays*, in which the TCC plant remains in the market.

Table 6 and Figure 19 show the impact of these sensitivities on the NZ-WEM. Stage 1 of the supply pipeline does not contain any new thermal generation projects, so the thermal decommissioning sensitivity has no effect on stage 1.

Table 6: NZ-WEM and SI-WEM earliest crossing of the lower security standard for the reference case and thermal unit availability sensitivities

Sensitivity	Stage 1	Stage 2	Stage 3	Stage 4
Reference case (NZ-WEM)	**2026**	**2026**	**2026**	**2026**
Thermal decommissioning	2026	2026	2026	2026
No new thermal	2026	2026	2026	2026
Decommissioning + No new thermal	2026	2026	2026	2026
TCC stays	2026	2026	2026	2026
Reduced Rankine availability	2026	2026	2026	2026
Reference case (SI-WEM)	**2030**	**2032**	**2033**	**>2034**
Thermal decommissioning	2026	2026	2026	2026
No new thermal	2030	2032	2033	>2034
Decommissioning + No new thermal	2026	2026	2026	2026
TCC stays	2030	2032	2033	>2034
Reduced Rankine availability	2026	2026	2026	2026

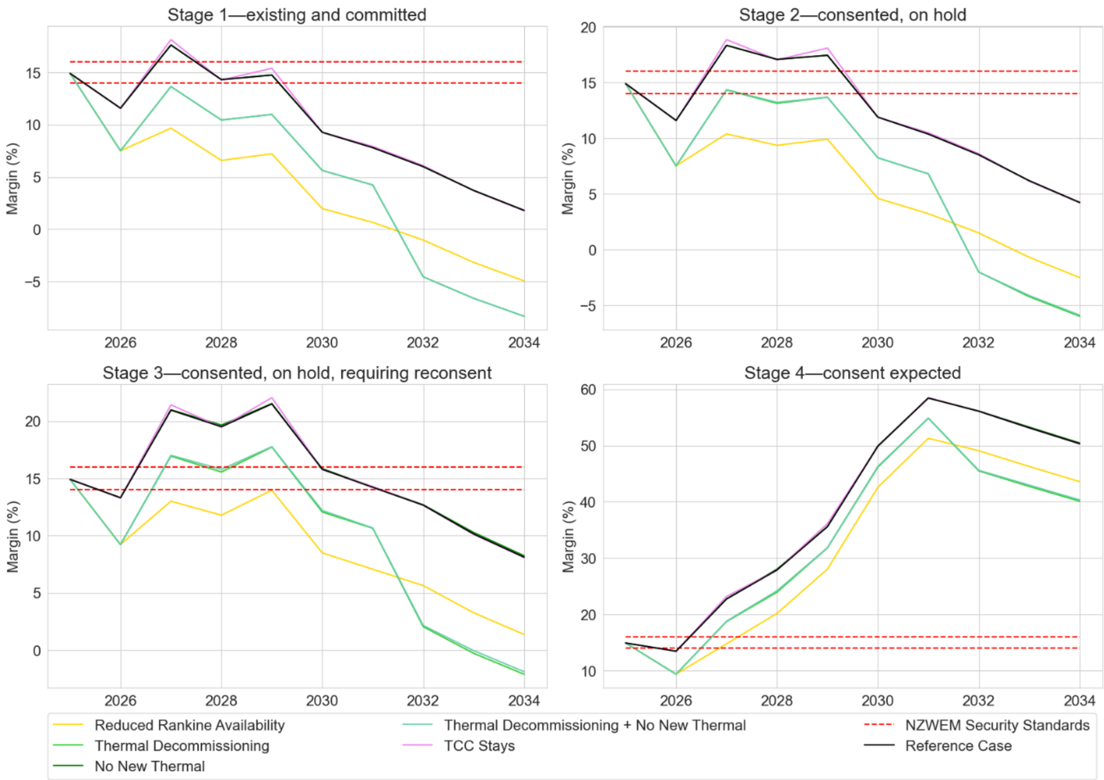
In the reference case and all thermal unit availability sensitivities, the NZ-WEM crosses the lower security standard in 2026 across all consented and unconsented stages of the current supply pipeline. However the *thermal decommissioning* sensitivity reduces the NZ-WEM significantly below the reference case. This sensitivity requires the development of new generation beyond stage 1 by 2027, beyond stage 2 by 2028, and beyond stage 3 by 2030 to remain above the lower security standard in these years. This highlights the risk of thermal generation exiting before sufficient new generation comes online.

The impact of the announced retirement of a Rankine unit next year is seen in Figure 19 for 2026. Under the *reduced Rankine availability* sensitivity, the NZ-WEM shows a significant decline in 2026, falling well below the lower security standard. When considering all consented projects in the supply pipeline (Stages 1 to 3), the *reduced Rankine availability* sensitivity, which models the scenario of a Rankine exiting in 2026 and a single operational Rankine unit from 2027 onwards, indicates the NZ-WEM would remain below the security standard throughout the entire assessment horizon.

The *TCC stays* sensitivity aligns closely with the reference case as TCC does not contribute significantly to energy margins in the model. There is limited gas available for its generation and the gas that is available can be reallocated to gas peaking generation.

Similarly, the effect of the *no new thermal* sensitivity (both when combined with the reference case and when combined with the *thermal decommissioning* sensitivity) is to slightly increase the NZ-WEM. A small amount of gas is assumed to be allocated to new thermal plant for peaking purposes instead of being allocated to combined-cycle plant. This means it is burned with lower efficiency and provides slightly less energy.

Figure 19: New Zealand Winter Energy Margins for the reference case and sensitivities that affect thermal unit availability



The impact of the reduced thermal unit availability sensitivities on the SI-WEM can be seen in Figure 11 and Table 6 as they further reduce the SI-WEM below the security standards. These sensitivities cause the SI-WEM to drop below the lower security standard in 2026 in all pipeline stages. The *thermal decommissioning* sensitivity recovers above the standard in 2027 in stage 1, but this requires development of generation beyond stage 2 in the *reduced Rankine availability* sensitivity. Unconsented generation development is needed from 2030 to maintain the margins above the standards under these sensitivities.

3.4.1.3 Investment in additional demand response, generation and transmission capability required to reduce dry-year risks under high demand growth

There is a need for investment to reduce New Zealand energy risks under high demand growth scenarios. Due to the increase in future generation pipeline projects which contribute to South Island energy supply, the dry-year energy risk is more apparent under the NZ-WEM than the SI-WEM in this year's SOSA. However, South Island dry-year energy risks persist with limited north-to-south transfer. Under the demand sensitivities, the NZ-WEM could cross the lower security standard as early as 2025 and the SI-WEM could cross the lower security standard as early as 2026.

Table 7, Figure 20, and Figure 21 show the impact of the different demand side sensitivities on the NZ-WEM and SI-WEM:

- demand growth, a high and low demand growth rate;
- additional step demand, a 100 MW step in each island;
- increased demand response, a reduction in demand of 2.5% in the NZ-WEM and 5% in the SI-WEM

Table 7: NZ-WEM and SI-WEM earliest crossing of the lower security standard for the reference case and demand sensitivities

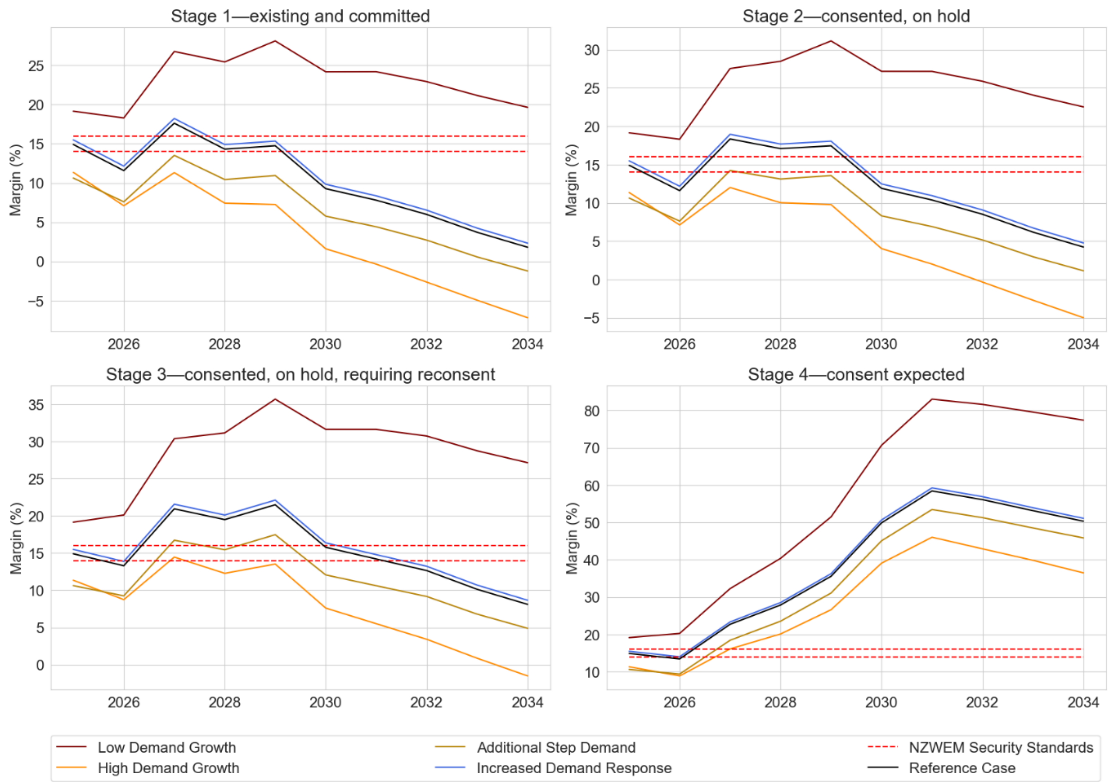
Sensitivity	Stage 1	Stage 2	Stage 3	Stage 4
Reference case (NZ-WEM)	**2026**	**2026**	**2026**	**2026**
High demand	2025	2025	2025	2025
Low demand	>2034	>2034	>2034	>2034
Additional step demand	2025	2025	2025	2025
Increased demand response	2026	2026	2026	>2034
Reference case (SI-WEM)	**2030**	**2032**	**2033**	**>2034**
High demand	2026	2026	2026	2026
Low demand	>2034	>2034	>2034	>2034
Additional step demand	2025	2025	2025	2025
Increased demand response	2031	2032	2034	>2034

The NZ-WEM is adversely affected by the *additional step demand* and *high demand growth* sensitivities. Under both sensitivities, unconsented projects (Stage 4) in the supply pipeline would be required to bring the NZ-WEM above the lower security standard during the assessment period.

Under the low demand growth sensitivity, the NZ-WEM stays well above the lower security standard for the entire assessment period. This indicates that existing and committed (Stage 1) projects in the supply pipeline are adequate, even if consented and on-hold (Stage 2) projects were not brought online under this sensitivity.

The increased demand response sensitivity closely aligns with the NZ-WEM reference case, crossing the lower security standard in 2026 when considering only consented projects in the supply pipeline (Stages 1 to 3). Unconsented supply projects (Stage 4) would be required to maintain the NZ-WEM above the lower security standard for the remainder of the assessment horizon under the increased demand response sensitivity.

Figure 20: New Zealand Winter Energy Margins for the reference case and demand sensitivities

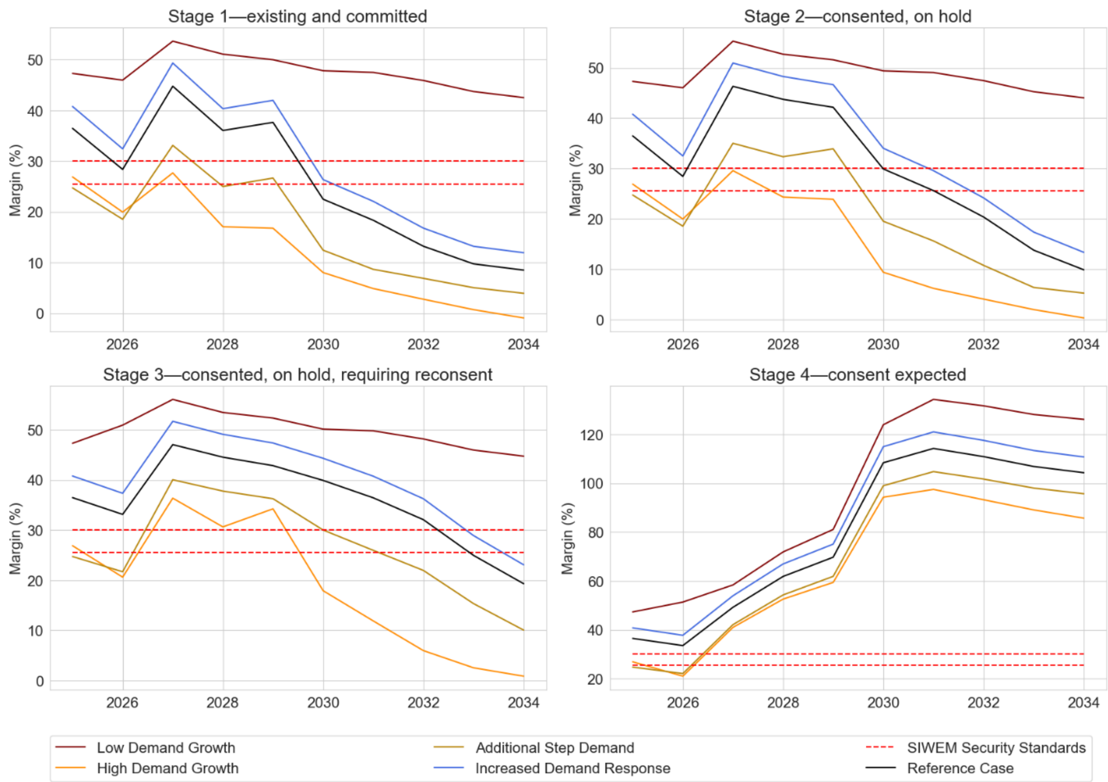


[Figure 21](#) shows that under the *high demand growth* and *additional step demand* sensitivities, the SI-WEM could cross the lower security standard four years earlier and five years earlier, respectively, than in the reference case. This means that more projects, beyond the unconsented projects currently in Stage 4, would need to be brought online by 2026 under the *high demand growth* sensitivity and by 2025 under the *additional step demand* sensitivity to keep the SI-WEM above the lower security standard.

Similarly to the NZ-WEM, the SI-WEM remains well above the lower security standard for the duration of the assessment horizon when considering existing and committed supply projects under the *low demand growth* sensitivity.

The *increased demand response* sensitivity delays the SI-WEM crossing the lower security standard when considering existing and committed supply projects (Stage 1) by one year compared to the reference case, crossing it in 2031 instead of 2030.

Figure 21: South Island Winter Energy Margins for the reference case and demand sensitivities



3.4.2 Capacity

3.4.2.1 Need for flexible peaking resources alongside intermittent generation

The intermittency of generation resources in the supply pipeline reduces the pipeline's contribution to capacity margins. However, when this is supplemented by batteries or demand response it helps maintain NI-WCM above the security standards.

Table 8 compares the years that the reference case crosses the lower security standard for the NZ-WEM and NI-WCM when considering each of the supply pipeline stages.

- For existing and committed supply projects (Stage 1), the reference case for the NI-WCM crosses the lower security standard three years after the NZ-WEM.
- For the consented projects pipeline (Stage 3), the reference case for the NI-WCM crosses the lower security standard seven years later than the NZ-WEM.
- For the unconsented projects pipeline (Stage 4), the reference case for the NI-WCM remains above the lower security standard for the duration of the assessment horizon, while the reference case for the NZ-WEM crosses the lower security standard in 2026.

The NI-WCM considers the supply pipeline of South Island winter capacity (shown in Figure 6) and subtracts South Island peak demand to calculate a South Island capacity surplus that can be used to support the North Island (limited by HVDC transfer capability). While national contribution to winter supply has decreased in earlier years of the analysis relative to the

2024 SOSA, as shown in Figure 7, South Island winter capacity supply has increased in earlier and later years. Figure 5 also indicates a significant decrease in the forecast of both North and South Island peak demand. These two factors have resulted in the NI-WCM crossing the lower security standard later than the NZ-WEM across all pipeline stages.

Additionally, there has been an increase in the number of future battery projects in this year's supply pipeline compared to last year. This indicates that the investment in flexible peaking resources, such as batteries[63] coming to market, alongside the significant increase in generation projects, is beneficial in keeping the NI-WCM above the security standards.

Table 8: Comparison of years in which the New Zealand Winter Energy Margin and North Island Winter Capacity Margin cross the lower security margins

Reference case margin	Stage 1	Stage 2	Stage 3	Stage 4
New Zealand Winter Energy (NZ-WEM)	2026	2026	2026	2026
North Island Winter Capacity (NI-WCM)	2029	2030	2033	>2034

3.4.2.2 Demand response can help mitigate near-term demand uncertainty risks and delay investments in supply

Demand response over peak periods can help delay the need for investment in supply. Some demand response capability can come to market quicker than supply-side options meaning these can be a viable short-term option. Table 9 and Figure 22 show that based on our current assessment, unconsented supply side resources are needed to maintain the NI-WCM above the lower security standard.

Table 9: North Island Winter Capacity Margin earliest crossing of the lower security standard for the reference case and demand side sensitivities

Sensitivity	Stage 1	Stage 2	Stage 3	Stage 4
Reference case (NI-WCM)	**2029**	**2030**	**2033**	**>2034**
High demand	2028	2029	2031	>2034
Low demand	2034	>2034	>2034	>2034
Additional step demand	2028	2029	2032	>2034
Increased demand response	2030	2031	2034	>2034

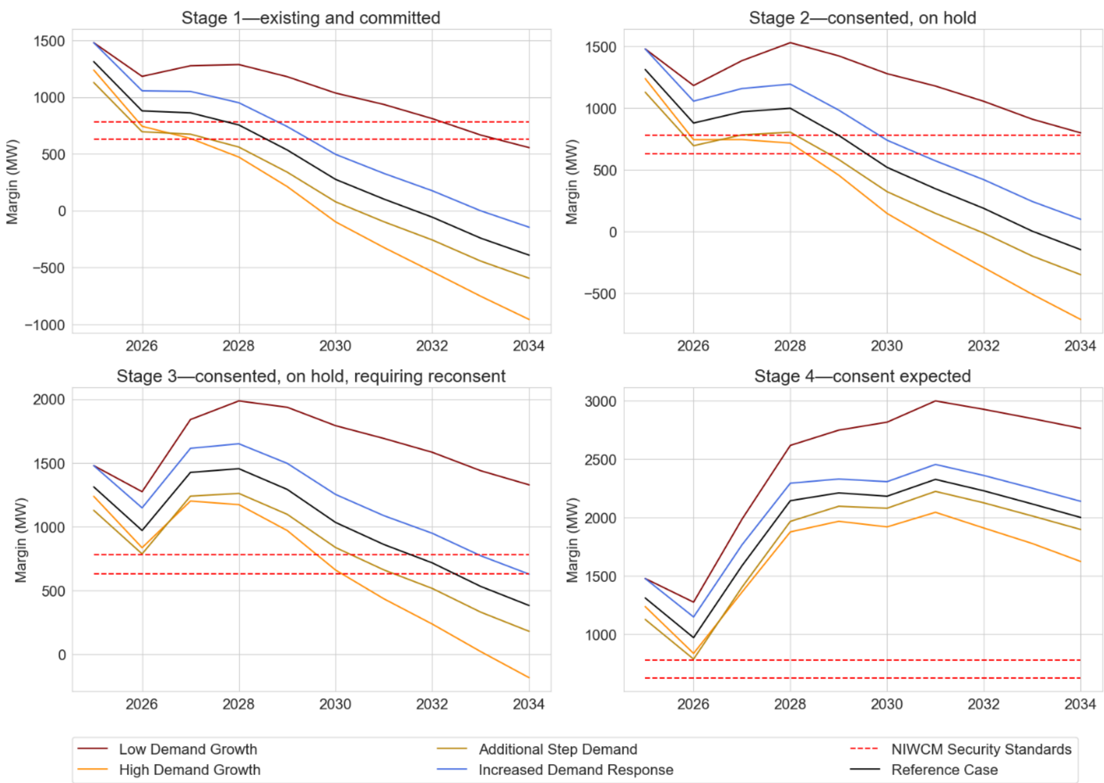
Figure 22 shows the *increased demand response* sensitivity delays the crossing of the lower security standard by one year when considering the existing and committed pipeline. This

63 Grid-scale batteries are a new resource type in the New Zealand Electricity Market. The intra-day offering incentives and multi-year investment incentives for batteries in the New Zealand market will be better understood over time, and regulations for the commissioning and market participation of batteries may change. Battery offer behaviour, including their supporting of demand peaks will be important in meeting the future capacity margins.

provides us a proxy for the impacts of 200 MW of demand response over peak periods on the NI-WCM.

Uncertainty in the rate of demand growth (including the *additional step demand* sensitivity) in the short-term can impact the NI-WCM dropping below the standards. As an example, the *additional step demand* sensitivity resulted in the NI-WCM crossing the security standard in 2028 although it is very close to crossing it in 2026 and 2027. Additional demand response that can come to market quickly can help mitigate these short-term capacity risks.

Figure 22: North Island Winter Capacity Margin crossing of the lower security standard for the reference case and demand sensitivities



3.4.2.3 Constrained operational capacity risk requires further development of flexible resources

Integrating a mix of slow start thermal generation and intermittent renewable generation will keep the NI-WCM below the security standards during specific operational conditions for the coming decade regardless of whether expected investment is developed. With development of the entire unconsented pipeline (Stage 4), the NI-WCM still drops below the lower security standard in 2026 and almost drops below at the end of the assessment horizon under this sensitivity as shown in Figure 13 and Table 10. Additional flexible resources are required, particularly in the near term to increase the NI-WCM above the security standards. Some of these flexible resources such as demand response or batteries can come to market relatively quickly compared to traditional peaking generation options.

Table 10: North Island Winter Capacity Margin earliest crossing of the lower security standard for the reference case and constrained operational capacity sensitivity

Sensitivity	Stage 1	Stage 2	Stage 3	Stage 4
Reference case (NI-WCM)	**2029**	**2030**	**2033**	**>2034**
Constrained operational capacity	2026	2026	2026	2026

3.4.2.4 Sufficient early investment in flexible resources is needed to manage risks of thermal retirement and reduced thermal investment

If significant thermal generation assets are decommissioned and no new thermal generation is built, the NI-WCM could cross the lower security standards in 2026, when considering the existing and committed supply pipeline (Stage 1). Development of unconsented projects (Stage 4) is needed to increase the NI-WCM above the lower standard prior to 2030 as consented projects will no longer be sufficient.

Table 11 identifies the years in which the NI-WCM crosses the lower security standard for the reference case and reduced thermal unit availability sensitivities, for each supply pipeline stage.

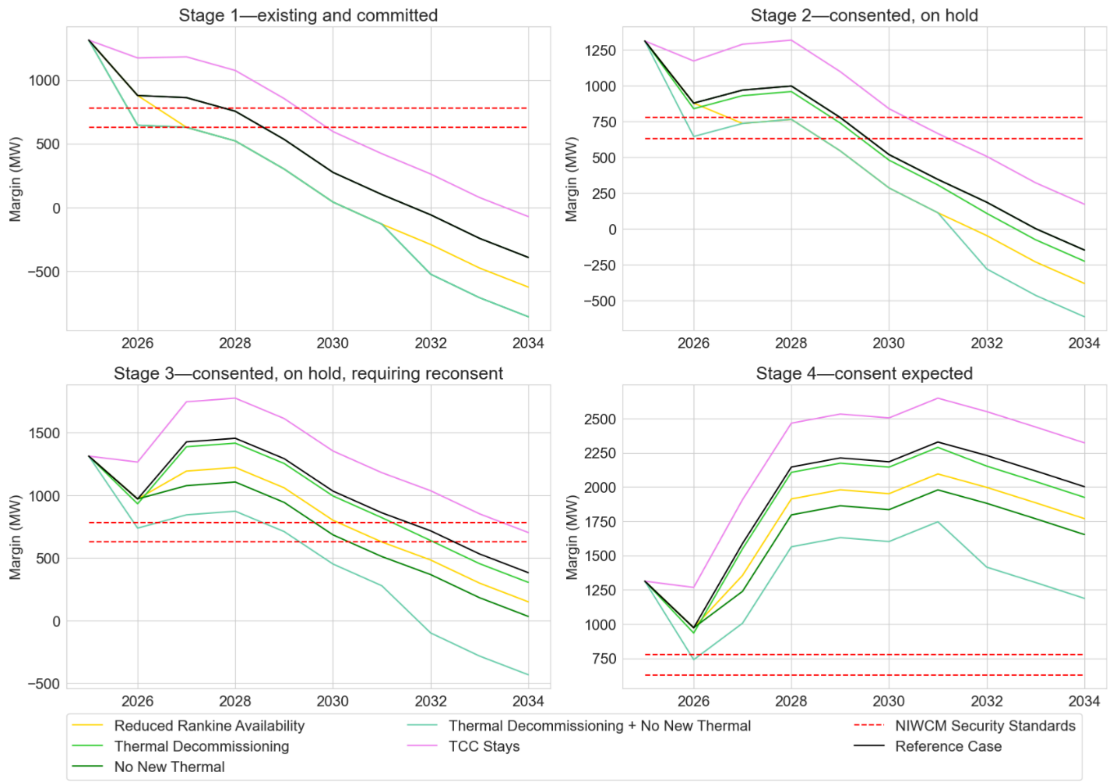
Table 11 : North Island Winter Capacity Margin earliest crossing of the lower security standard for the reference case and reduced thermal unit availability sensitivities

Sensitivity	Stage 1	Stage 2	Stage 3	Stage 4
Reference case (NI-WCM)	**2029**	**2030**	**2033**	**>2034**
Thermal decommissioning	2027	2030	2033	>2034
No new thermal	2029	2030	2031	>2034
Reduced Rankine availability	2027	2029	2031	>2034
TCC stays	2030	2032	>2034	>2034
Thermal decommissioning and no new thermal	2026	2026	2030	>2034

Figure 23 shows under the *thermal decommissioning* sensitivity the NI-WCM crosses the lower security standard in 2027, two years earlier than in the reference case, for existing and committed generation (Stage 1). The sensitivity assumes that by this point about 600 MW of thermal generation has been decommissioned, including TCC.

Development of both consented and unconsented resources (Stage 4) is essential to keep the NI-WCM above the lower security standard across sensitivities that reduce thermal unit availability. Under the TCC stays sensitivity, if all consented generation (Stage 3) from the supply pipeline was brought to market, The NI-WCM would remain above the lower security standard throughout the entire assessment horizon. This highlights the significant contribution of the TCC plant to the NI-WCM, which was not as evident in the WEM sensitivities. This reiterates the need for investment in sufficient flexible resources such as peaking generation, batteries, or additional demand response.

Figure 23: North Island Winter Capacity Margins for the reference case and sensitivities that affect thermal unit availability



3.4.2.5 Gas supply essential to maintain security over peak demand periods unless additional flexible resource capability is developed

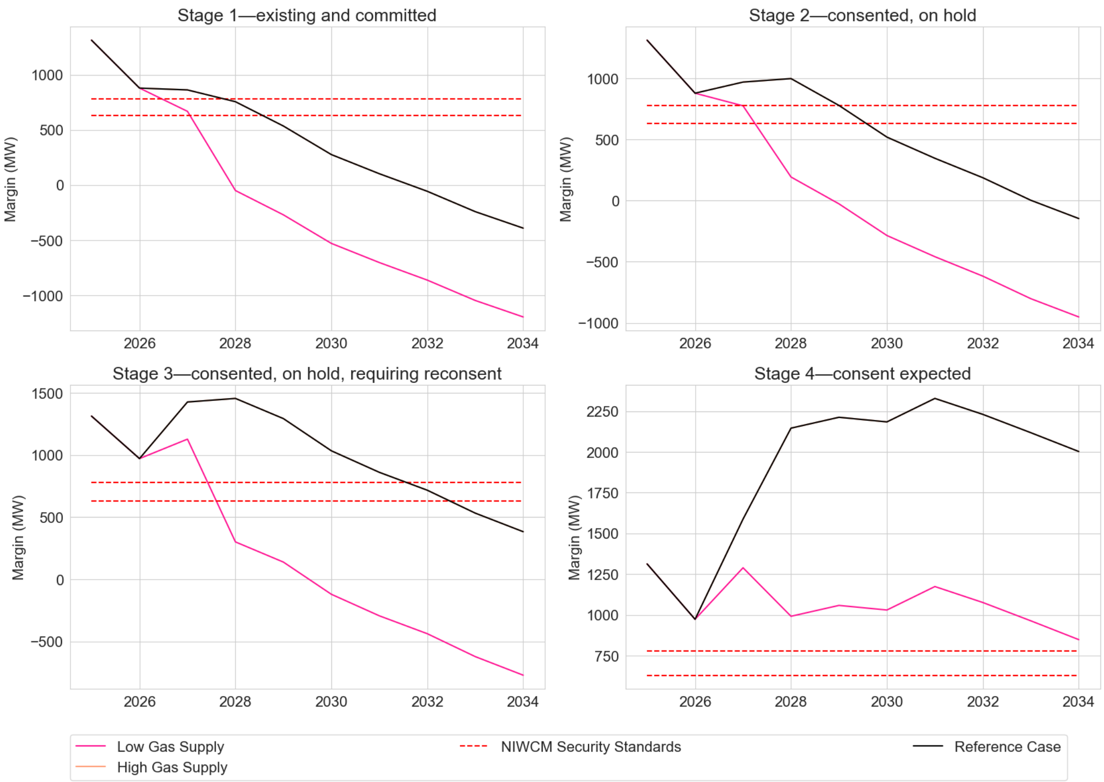
Table 12 and Figure 24 show the sharp decline in the NI-WCM if there is insufficient gas to operate thermal generation, even for peaking, under the reduced gas availability sensitivity. Although the development of consented resources would increase the NI-WCM, the current consented supply pipeline (Stage 3) lacks sufficient resources to offset the reduction in gas-fired generation and maintain the NI-WCM above the lower security standard throughout the assessment horizon. Therefore, unconsented (Stage 4) projects would need to be delivered by 2028 to minimise the impact of reduced gas availability for peaking generation.

Table 12: North Island Winter Capacity Margin earliest crossing of the lower security standard for the reference case and reduced gas availability sensitivities

Sensitivity	Stage 1	Stage 2	Stage 3	Stage 4
Reference case (NI-WCM)	**2029**	**2030**	**2033**	**>2034**
Low gas	2028	2028	2028	>2034

The *low gas supply* sensitivity shows that with the existing and committed pipeline, the NI-WCM could drop below the lower security standard as early as 2028. Under this sensitivity, additional flexible resources need to be developed to sustain the NI-WCM above the lower security standard. In the absence of such investment, sufficient gas supply is needed to ensure gas-fired peaking generation is available to generate over peak load periods. Reallocation of some gas to power generation from other sectors could allow the gas peaking fleet to continue providing up to 430 MW of NI-WCM supply in stages 1 and 2 or 780 MW in stages 3 and 4. The amount of gas required for these plants to provide reliable peak supply is lower than for combined-cycle plant.

Figure 24: North Island Winter Capacity Margins for the reference case and sensitivities that reduce gas availability



4 Maintaining Security Margins with Greater Proportions of Renewable Generation

4.1 Overview and Summary

In this section we look at a range of thermal generation scenarios together with the 2034 renewable supply pipeline, and the impact this has on the NZ-WEM and NI-WCM. Our approach is to investigate five thermal generation scenarios, which consider progressively smaller amounts of thermal generation. For each of these scenarios we estimate the contribution from renewable generation and other technologies that would be required to maintain the NZ-WEM and NI-WCM above the security standards.

This analysis is exclusively focused on security of supply and so it assesses physical generation capability only. It is important to note that we have not investigated economic or technical issues outside of this brief.[64] Consistent with the margin forecasts we present in Section 3, we do not attempt to forecast or otherwise determine the likelihood of whether any of these scenarios could occur.

Using the full unconsented (Stage 4[65]) supply pipeline there are indications that:

- there are sufficient potential renewable supply projects to provide the additional energy required to maintain the NZ-WEM above the security standards with all thermal generation decommissioned;
- there are sufficient potential renewable supply projects to provide the additional capacity required to maintain the NI-WCM above the lower security standard with all Rankine and closed cycle gas turbine (CCGT) units decommissioned ("THM3" scenario in Table 13); and
- there are insufficient potential renewable supply projects to provide the additional capacity required to maintain the NI-WCM at the lower security standard if all Rankines, CCGTs and gas peakers are decommissioned (scenarios "THM4" and "NoTHM" in Table 13).

[64] As an example, with more low short-run marginal cost (SRMC) intermittent renewable generation coming online, average wholesale spot prices may fall and price volatility is likely to increase. This could dampen future revenue expectation of new projects and impact investment decisions. These revenue adequacy effects were not considered in this assessment of the modelled supply pipeline. Technical issues are those related to the impacts on power system voltage, frequency and power quality with the introduction of large amounts of inverter-based intermittent generation. These technical issues are being considered as part of the Authority's Future Security and Resilience project.

[65] Note Stage 4 includes Stages 1-3 as well as projects for which consents are expected.

The majority of the renewable supply pipeline is intermittent generation (wind and solar). Due to their shorter-term intermittency, these resources have a greater contribution to the winter energy margin compared to the winter capacity margin. This indicates greater capacity risks compared to energy risks under three thermal generation scenarios with the new supply pipeline.

To bring this renewable supply pipeline to market would require a significant increase in the pace of development, including consenting, construction, and regulatory development.[66] Development of additional flexible resources such as batteries, demand response, non-generation reserve and upgrades to increase the HVDC northward capacity, beyond what is currently reflected in the pipeline, could contribute to improving the NI-WCM by 2034. Once again, these are physical security of supply assessments only, and (consistent with the role of the SOSA) do not consider economic or other technical issues.

4.2 Thermal Generation Scenarios

We have developed five thermal generation scenarios, set out in Table 13 below. These scenarios consider progressively less thermal generation than current levels.

These thermal generation scenarios should not be interpreted as indicating a potential or likely pathway to higher proportions of renewable generation. It is possible that the pathway to higher proportions of renewable generation will involve step changes in thermal generation that vary from the thermal generation scenarios that this analysis considers.

Table 13: Thermal generation scenarios

Scenario	Description
THM1 One Rankine unit (dry year support only), one closed cycle gas turbine (CCGT) remains	One Huntly Rankine unit remains for dry year support, while two are decommissioned. We assume that this Rankine unit will not contribute to winter capacity margins. One CCGT remains at Huntly, which contributes to both energy and capacity margins; the other CCGT at Stratford (TCC) is decommissioned. All other remaining thermal generation is available to contribute to winter energy and capacity security margins.
THM2 No Rankine units, one CCGT remains	All Huntly Rankine units are decommissioned. Note this scenario has the same contribution to the NI-WCM as the THM1 scenario. This is because, even though

66 Grid-scale batteries and hybrid intermittent/battery plants are examples of areas of active regulatory development which could help support the supply pipeline. Technical considerations also need to be taken into account to ensure reliable operation of the power system with significant amounts of inverter-based intermittent generation.

Scenario	Description
	THM1 has one Huntly Rankine unit in service, it does not contribute to the NI-WCM. The CCGT at Huntly continues to contribute to winter energy and capacity security margins, the other CCGT at Stratford (TCC) is decommissioned. All other remaining thermal generation is available to contribute to winter energy and capacity security margins.
THM3 No Rankine or CCGT units	The CCGT and all Rankine units at Huntly are decommissioned, the other CCGT at Stratford (TCC) is decommissioned. All other remaining thermal generation is available to contribute to winter energy and capacity security margins.
THM4 Whirinaki and co-generation	Only gas co-generators and the Whirinaki diesel generator remain.
NoTHM No thermal, including Whirinaki and co-generation	There is no gas, coal or diesel thermal generation.

Figure 25 shows the winter energy contribution from thermal generation expected in 2034, both with existing thermal generation and under the five thermal generation scenarios, accounting for expected gas supply constraints[67]. The energy contribution impact of the decommissioning of Huntly unit 5 (THM2 to THM3) is mitigated by these gas constraints because gas that would have fuelled it is able to be reallocated to other (less efficient) units, allowing them to run at a higher capacity factor. Due to its planned decommissioning, TCC is not counted towards existing generation.

67 Gas supply modelling is discussed in Appendix 4.

Figure 25: Thermal scenarios' contribution to winter energy margins

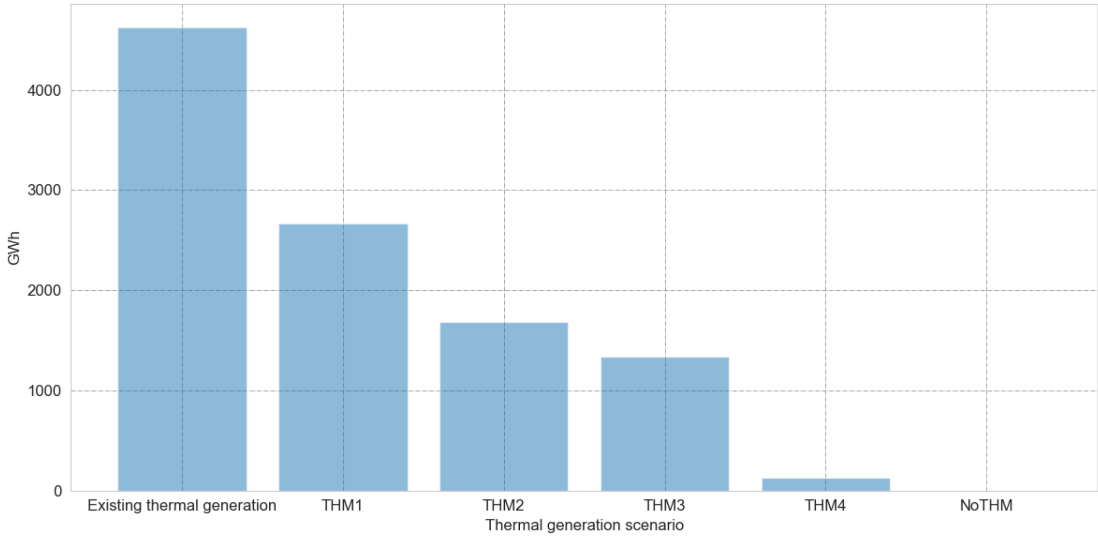
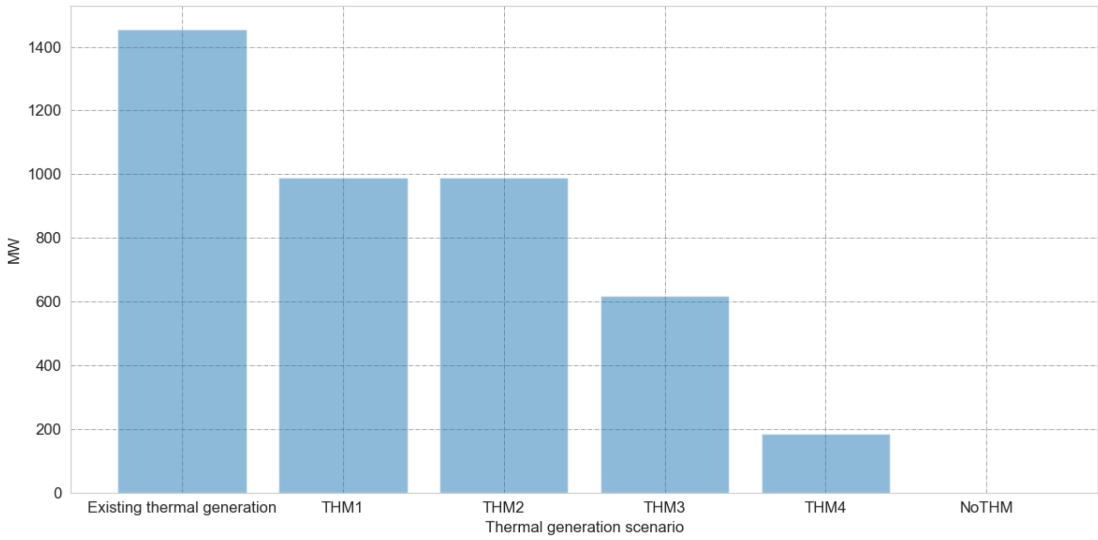


Figure 26 shows the winter capacity contribution from thermal generation expected in 2034, with existing thermal generation (not including TCC) and under the five thermal generation scenarios. Based on our reference case gas supply forecast, we do not expect the winter capacity contribution to be limited by gas availability.

Figure 26: Thermal scenarios' contribution to winter capacity margin



4.3 Security Margin Impacts

4.3.1 Winter Energy Margins

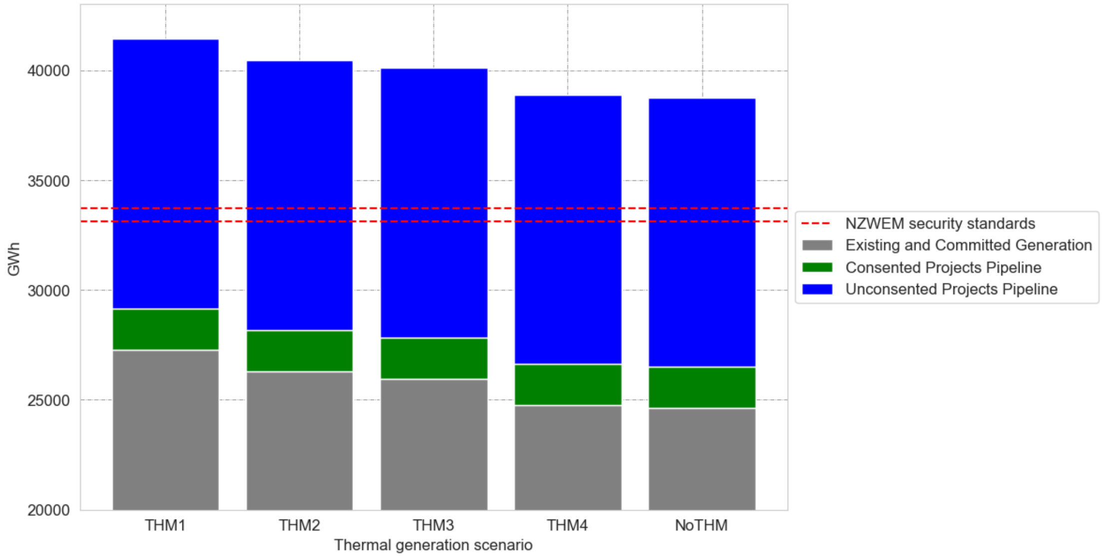
To displace the thermal generation in each of the scenarios, supply the increased level of demand expected by 2034, and maintain the NZ-WEM above the lower security margin, a significant contribution is required from projects additional to those in the consented renewable projects pipeline.

Figure 27 compares the energy required to maintain the NZ-WEM at the security standards to the energy contribution in each of the thermal generation scenarios and from the renewable supply pipeline in 2034. These contribution calculations use the reference case. The green bars show potential contributions from known consented renewable projects in the supply pipeline (Stages 2 and 3).[68] The blue bars show the potential contributions from known unconsented renewable projects (Stage 4). The red dotted lines show the amount of energy required to maintain the NZ-WEM above the security margins. This indicates that:

- The consented and unconsented projects pipeline is sufficient to maintain the NZ-WEM above the security standards in all thermal scenarios, including decommissioning of all thermal generation (NoTHM).
- For the NZ-WEM to be maintained above the lower security standard for any scenario, development of the unconsented renewable projects in the pipeline (Stage 4) are required.[69] The consented projects alone are not sufficient to maintain the NZ-WEM.
- The main uncertainty in maintaining the NZ-WEM to 2034 is generation build as projects needed to keep the NZ-WEM above the lower security standard are not yet consented. Uncertainties around thermal plant availability and thermal fuel availability are of secondary importance over this timeframe.

68 See Table 1 for a description of the project pipeline stages.
69 As noted previously, given these projects are currently unconsented, there is a higher level of uncertainty around their delivery.

Figure 27: Energy available to meet NZ-WEM upper and lower security standard in different thermal scenarios



4.3.2 Winter Capacity Margins

Figure 28 compares the capacity required to maintain the NI-WCM at the security standards to the capacity contribution in each of the thermal generation scenarios and from the renewable supply pipeline in 2034.[70]

The extent to which South Island generation can contribute to the NI-WCM is limited by the capacity of the HVDC. For our assessment of capacity margins, we assume that the South Island contribution to North Island peaks is at most 956 MW.[71]

The red dotted lines show the amount of capacity required to maintain the NI-WCM at the security margins. This indicates that:

- The consented and unconsented renewable projects pipeline is sufficient to provide the additional capacity required to maintain the NI-WCM at the lower security standard for thermal scenarios up to THM3 (i.e. decommissioning of the Rankines and both CCGTs, Huntly unit 5 and TCC); and
- The consented and unconsented renewable projects pipeline is insufficient to provide the additional capacity required to maintain the NI-WCM at the lower security standard for thermal scenarios THM4 and NoTHM (in which gas peaking units are also decommissioned).

The contribution of unconsented projects to the capacity margin is considerably lower than for the energy margin, given that most of this pipeline is wind and solar projects. About half

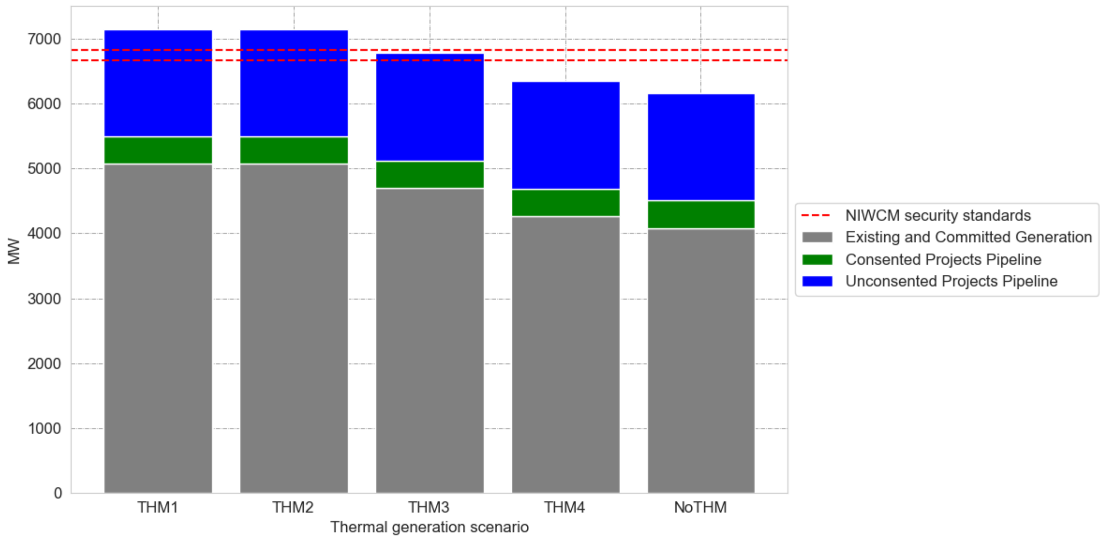
70 Note the THM1 scenario has the same contribution to the NI-WCM as the THM2 scenario. This is because even through THM1 has one Huntly Rankine unit in service (whereas the THM2 scenario has none), this unit does not contribute to the NI-WCM in the THM1 scenario.

71 This is without the HVDC fourth cable. See SSAD Table 1.

of the capacity contribution of unconsented projects is from batteries, with the other half from wind and solar.

To maintain the NI-WCM above the lower security standard under the different thermal scenarios, up to 514 MW of additional winter capacity resources are required beyond the unconsented pipeline. This indicates increased capacity risks under the reduced thermal generation scenarios unless additional peak capacity resources are planned to compensate for the reduced thermal generation capability.

Figure 28: Capacity available to meet NI-WCM upper and lower security standard in different thermal scenarios



TRANSPOWER

TRANSPOWER.CO.NZ

TRANSPOWER

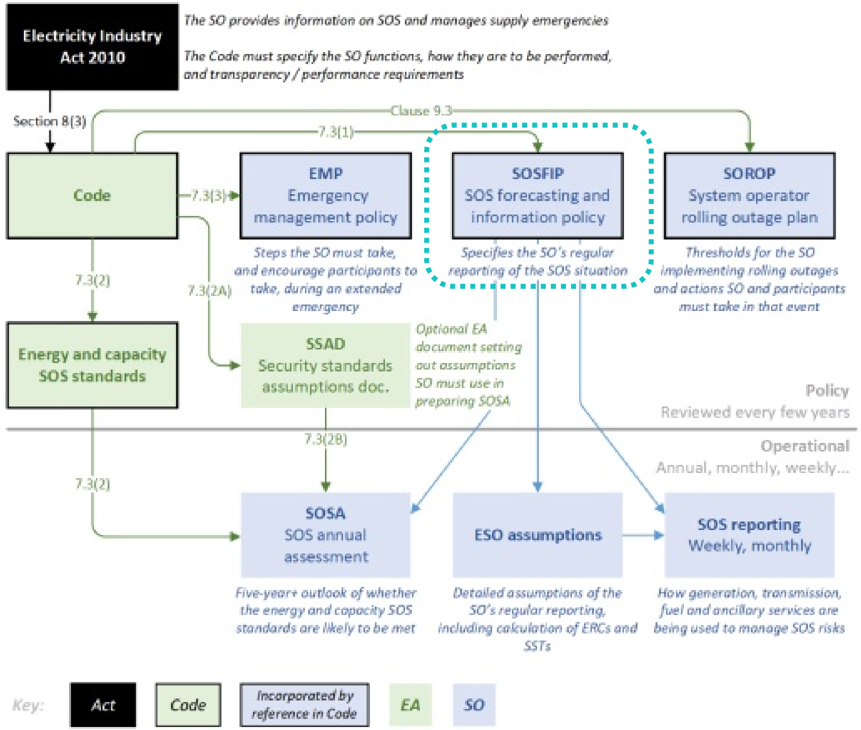
SOSFIP review update to Security & Reliability Council

26-AUG-25

IN-CONFIDENCE: ORGANISATION

Current SOSFIP framework

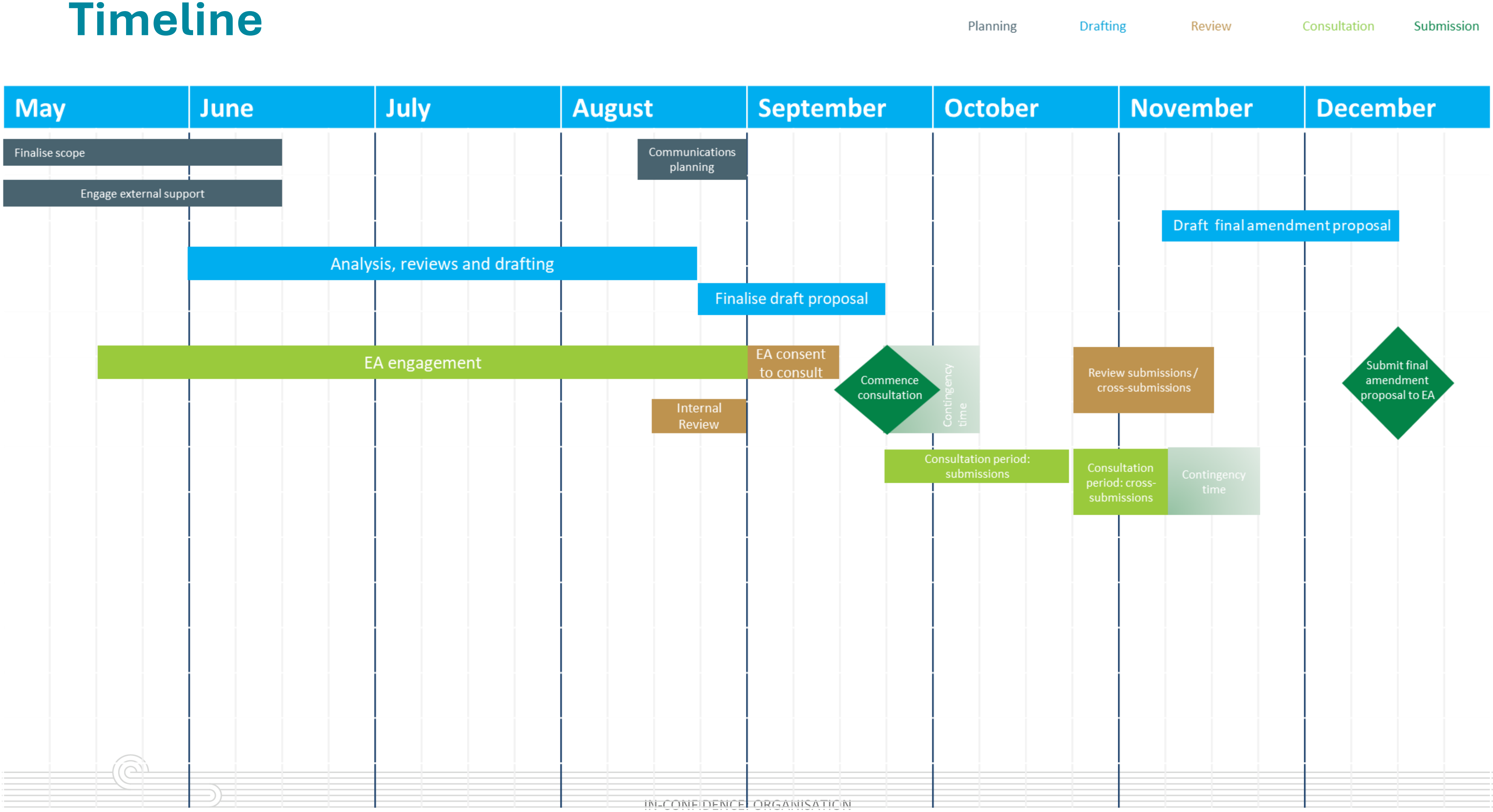
- SOSFIP provides the framework for our security of supply reporting and actions.
- Our review is to ensure the SOSFIP remains fit-for purpose, considers the role of contingent storage and other issues raised in the SOSFIP consultation
    - See next slide
- Our SOS reporting is largely information only (particularly the SOSA)
    - Is this still reasonable going forward? Does there need to be something that drives greater accountability for industry to meet the security margins?
    - Crossing ERCs does trigger actions:
        - Watch: Increased reporting by SO
        - Alert: Access to contingent storage
        - Emergency: Official conservation campaign (if forecast to remain below for at least 7 days)



SOSFIP review components

- Changes that need a SOSFIP update:
  - Considering physical capability and contract quantities in the ERCs and SSTs
  - Updating “Watch” curve calculation to ensure “Watch” status triggered ahead of “Alert”
  - Wider scenario assessments to consider higher impact-lower probability risks such as:
    - Major thermal fuel disruption, major plant outage (e.g. E3P or HVDC outage for extended periods)
  - Any changes to the default Contingent Storage Release Boundary buffer quantity
- Changes that don’t need a SOSFIP amendment:
  - Worst-case SST assumptions used for the estimated “time-to” Alert and Official Conservation Campaign measures
  - Increased alignment of energy and capacity risk assessments provided by the System Operator
- Progressing discussions beyond the current scope of the SOSFIP:
  - What are the strategic reserve options potentially available to the industry in the near and longer term?
  - Are there other actions or outcomes that could be contemplated to support security of supply? Eg. Should there be consequences if SOSA margins are breached?

Timeline


Planning
Drafting
Review
Consultation
Submission
May
June
July
August
September
October
November
December
Finalise scope
Engage external support
Communications planning
Draft final amendment proposal
Analysis, reviews and drafting
Finalise draft proposal
EA engagement
EA consent to consult
Commence consultation
Contingency time
Review submissions / cross-submissions
Submit final amendment proposal to EA
Internal Review
Consultation period: submissions
Consultation period: cross-submissions
Contingency time
IN-CONFIDENCE: ORGANISATION

Meeting Date: 26 August 2025

Wrap session – SOSA and SOSFIP

Security and Reliability Council

Members may wish to ask presenters:

SOSA
- What has changed since SOSA modelling was completed, for better / worse?
- To what extent do demand / supply forecasts account for 1st, 2nd, 3rd order impacts of rapidly declining gas reserves and production? i.e. gas-electricity conversion.
- Is gen-build, grid connection occurring fast enough, how exposed are we to another dry year?
- The SOSA is a public document, the 2025 SOSA was published 30 June

SOSFIP
- Is the SO thinking laterally with this review – how NZ can improve SOS through more creative use of stored energy?
- To what extent is the SO coordinating with the EA, MBIE / others so there is a

The Chair will conduct a Wrap session for agenda item #10a and 10b

Note: The Chair will lead this item, there is no additional material to review.

TRANSPOWER

Cyber Resilience of New Zealand

This document is a response to the Electricity Authority Security and Reliability Council’s invitation to present Transpower’s views on the sector’s approach to cyber security, focusing on potential gaps, differing levels of preparedness, and opportunities for collaboration. The SRC also expressed interest in broader cyber security issues, such as lessons from global events and Transpower's approach to risk mitigation and resilience.

Version: 1

Date: August 2025

Table of Contents

1.0 Introduction

In response to the Security and Reliability Council's (SRC's) request, this paper provides an overview of New Zealand's electricity sector, with emphasis on cybersecurity and resilience of its critical interconnections. As the national transmission and system operator, Transpower plays a central role within a complex network that includes major generators, distribution companies, and embedded generation.

This paper highlights the sector's strengths, weaknesses and systemic risks, examining key protocols, industry collaborations, and the ongoing challenges associated with securing interconnected Information Technology (IT) and Operational Technology (OT) systems. The analysis is designed to enhance the SRC's understanding of the sector vulnerabilities and support informed decision-making on areas to focus sector effort, particularly with regards to any future resilience legislation.

2.0 Background

The electricity sector in New Zealand consists of multiple businesses with different roles and levels of capability. There are twenty-nine distribution companies, with operations ranging from large urban networks to smaller rural systems. Their size and technical sophistication vary; some have extensive networks with automation, while others operate on a smaller scale with basic setups.

Electricity generation is dominated by five main firms, but smaller generators also contribute. Distributed and embedded generation, such as rooftop solar and industrial cogeneration, adds further complexity.

This diversity helps decentralise supply, but it potentially increases risk. Some smaller operators may not have robust cybersecurity measures, while larger organisations face complex threats due to their scale and connectivity. The interconnected nature of the sector means that a failure in one area may affect the wider system.

Transpower uses the Inter-Control Centre Communications Protocol (ICCP) for secure, real-time data exchange with industry partners. Telemetry links with external parties, such as generator and distributor control centres, are being migrated to this standard. The ICCP system transmits critical functions, including dispatch instructions, over secure channels.

Transpower also operates the TransGO telecommunications network, which connects substations and control centres for protection and SCADA communications. This private, fibre-optic network allows Transpower to monitor and control the grid, as well as operate the wholesale electricity market systems, without relying on public internet networks.

For support, Transpower uses established service providers. Major telecommunications firms like Spark, OneNZ and 2Degrees supply connectivity and managed security, while companies such as Datacom, NTT and DXC provide ICT services. Service providers such as Ventia support OT and protection systems. Many of these vendors work across the sector, making it easier to maintain consistent service and security practices, but also meaning a compromise of one provider could affect several networks.

2.1 Size Matters

In the context of infrastructure and system security, the threshold of 10 MW often appears as a guideline for criticality mainly because it triggers specific Code requirements. For example, a generation plant larger than 10 MW or an industrial load of that size would likely be subject to additional regulatory requirements in terms of cybersecurity and operational safeguards.

The rationale is that an incident at a facility of that scale (whether of cyber nature or due to physical failure) could have material impact on the system. In practice for New Zealand, this concept is being woven into emerging regulations: it parallels thresholds seen overseas. The North American NERC CIP contains "bright-line" criteria used to classify assets as high, medium, or low impact based on their importance to grid reliability. These criteria apply to generating unit, load shedding, special protection and other systems. As an example, generating units that produce more than 1500 MW are considered critical assets (high impact).

2.2 Industry Forums

The Control Systems Security Information Exchange (CSSIE) is an important forum for the electricity industry to coordinate on cybersecurity. It brings together cybersecurity professionals from across New Zealand's electricity sector to share information about threats, incidents, and effective practices.

For Transpower and the sector, CSSIE supports collective cyber defence. At quarterly meetings, representatives from Transpower, major generators, distributors, and government agencies like the National Cyber Security Centre (NCSC) exchange recent threat intelligence and discuss ways to respond. This helps utilities, regardless of size, alert each other to new attacks and share solutions, even if they normally compete.

CSSIE also has sub-groups that work on topics like incident response planning, input on new regulations, and security guidelines for distributed generation. It is involved in organising exercises such as GridEX, run by Transpower every two years, to test and improve response plans and cooperation across the sector.

2.3 Regulation

New Zealand is developing resilience regulations for critical infrastructure, with cyber security included as a key aspect. The Department of Prime Minister and Cabinet (DPMC) has sought feedback on a proposed regulatory framework similar to, but distinct from, Australia's Security of Critical Infrastructure (SOCI) Act. Transpower has participated in this consultation as its designation as grid owner/operator identifies it as nationally significant critical infrastructure.

At present, further progress is not being made; however, it is anticipated that the topic will be revisited in the future. Based on recent consultations, the proposed regulation appears to include several main elements:

- **Critical Asset Registration:** Organisations will need to identify and register their critical assets (in electricity, that means key generation sites, grid control systems, etc.) as part of a national inventory.
- **Risk Management Programme:** Entities must establish a cyber (and all-hazards) risk management program for those critical assets, covering identification of threats, implementation of security measures, and regular review.

- **Minimum Standards:** The regulation is expected to set baseline security requirements or standards that all critical infrastructure operators must meet. This could be high-level (like requiring adherence to a framework such as NIST CSF or Australian Signals Directorate (ASD) Essential Eight) or specific (like mandating multifactor authentication, network monitoring, incident response plans, etc.).
- **Information Sharing Obligations:** There will likely be duties to report certain cyber incidents to government promptly (mandatory incident reporting) and possibly to share cyber threat information with a central body. This improves collective awareness and allows government to aid.
- **Intervention Powers:** The government may reserve powers to step in during serious cyber emergencies – for example, the ability for a Minister or agency to direct an entity to take certain actions in response to a threat, or to deploy government technical assistance in a crisis.
- **Portfolio Responsibilities:** Clear assignment of roles in government for overseeing the resilience of each sector (so entities know who their regulator or point-of-contact is on these matters).

The SOCI Act in Australia has resulted in additional effort for electricity companies to document and lift cybersecurity controls. This effort should reduce operational risk and improve system resilience, safeguarding critical power infrastructure from cyber threats. However, compliance comes at a cost: utilities have had to invest (some heavily) in new controls, technology upgrades, and training, incurring ongoing expenses. If New Zealand enacts similar regulation, it should strengthen risk management and clarify security standards yet also introduce compliance burdens.

3.0 Transpower's Approach to Cyber Security

3.1 Risk Management

Transpower applies Bow-Tie risk modelling and Semi-Quantified Risk Analysis (SQRA) to systematically map threats, consequences, and controls across its ICT services. These models are refreshed in response to incidents, the completion of major projects, or significant changes in the threat landscape. Short-term issues and project-specific risks are tracked through risk-based action registers, ensuring they are managed or escalated as needed.

At the heart of Transpower's approach is a Three Lines of Defence model:

- Operational Management (First Line): Responsible for owning and executing daily risk controls, supported by established processes and regular reporting on risk exposure, incidents, and control effectiveness.
- Oversight Functions (Second Line): Oversee compliance monitoring and self-assessment, ensuring not only that controls are in place but that they are effective. Assurance reviews inform and update risk models, driving continuous improvement.
- Independent Audit (Third Line): Conducts objective validation of the risk framework's integrity, reporting directly to executive leadership and the Board.

Governance is closely integrated. The Operations Advisory Group (OAG) monitors the operational risk environment, while the IST Risk and Assurance Forum and a dedicated assurance role lead planning and compliance reviews.

Risk workshops, control self-assessments, and other assurance activities are conducted according to a published programme, ensuring risk levels remain within defined and acceptable boundaries.

Outcomes from assurance activities, incident analysis, and audit findings feed into a continuous improvement cycle, reinforcing both resilience and accountability throughout the organisation.

3.2 Width and Depth of Controls

Transpower's approach to cybersecurity is characterised by both the width and depth of its controls. This means that Transpower implements a spectrum of safeguards covering critical security domains—such as user access, malware defence, network protection, and data security—ensuring no area is left exposed. By combining coverage (width) with layered defences (depth), Transpower ensures its systems and data are protected from a wide array of cyber threats.

Some key controls are described below:

3.2.1 Segregation of OT

Segregation in industrial control networks is fundamental to protecting OT systems from broader enterprise IT environments. By establishing dedicated network layers, implementing robust firewalls, and enforcing strict boundaries, Transpower ensures that any breach in office or business networks cannot directly compromise critical grid or system operations. This approach is in line with leading industry standards and enables the application of targeted security controls, such as access restrictions, patch management, and incident response protocols, tailored to each segment.

Firewalls and intrusion detection systems define the boundaries between corporate IT and OT, enclosing sensitive systems inside a highly secured space known as Sanctum. Within this environment, substations remain isolated and can only be accessed remotely via jump hosts requiring authentication processes.

Market and SCADA systems are contained within their own distinct zones, which further restrict connectivity. Data flows are carefully managed—typically one-way—and pass through thorough inspection points to ensure integrity.

3.2.2 Resilience

Resilience, in the cyber context, is Transpower's ability to absorb, recover from, and adapt to disruptive events.

Key strategies for resilience include:

- **Redundancy and Backup Systems:** Transpower has implemented redundant infrastructure for all critical operations. Geographically separated duplicate control centres are maintained to ensure continuity in the event one becomes unavailable due to a cyber incident or other disruption. Substation devices are equipped with both primary and secondary systems, providing functional backup in case of failure. This physical redundancy is supported by strong cyber resilience practices—offline or securely segmented backups are maintained to mitigate the risk of malware infection affecting both primary and backup systems.
- **Isolation and Safe Mode Operation:** In the event of an extreme cyber threat, resilience planning includes the capability to isolate compromised network segments while maintaining overall system operation. Transpower follows established procedures for isolating systems and environments. The organisation prioritises the ability to operate in a safe, stable, albeit potentially degraded, mode. Manual intervention may be required, and operators regularly receive training in manual procedures to prepare for such scenarios.
- **Incident Response and Recovery Plans:** Transpower maintains comprehensive and regularly exercised incident response plans to ensure effective management of security incidents. In addition to containment strategies, the organisation emphasises recovery through business continuity plans (BCP) and disaster recovery (DR) capabilities for both IT and OT systems. Essential software and configuration data are backed up offline to enable restoration on clean platforms, if necessary, such as in the case of a ransomware attack. Testing ensures that these systems can be efficiently restored from backups.

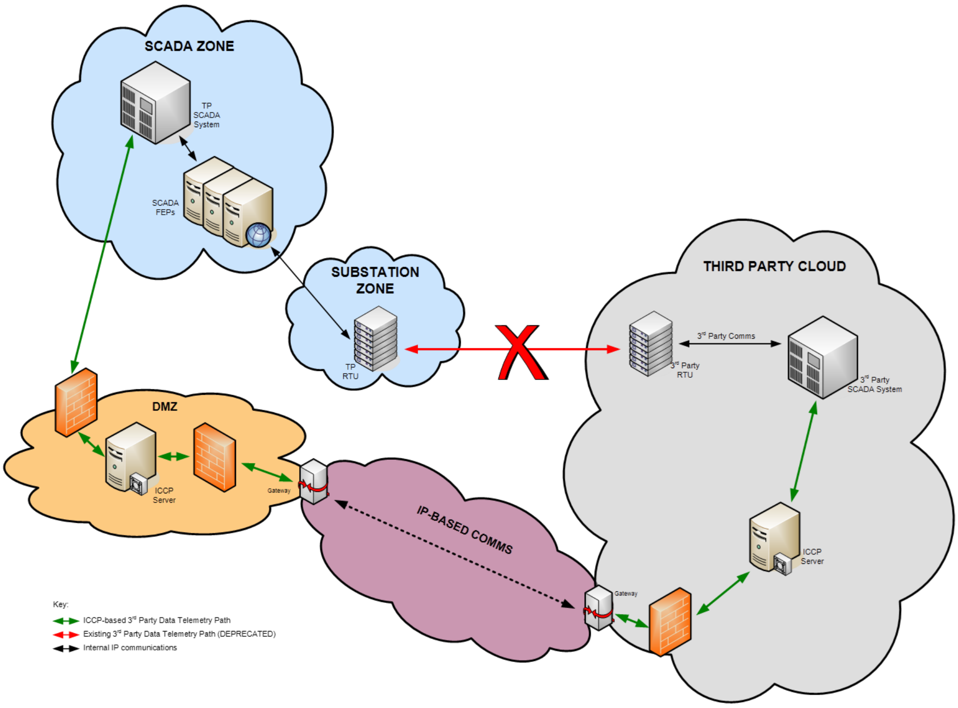
3.2.3 Framework

Transpower's cybersecurity program is designed around aligning to these internationally recognised frameworks, with a strong emphasis on the Center for Internet Security (CIS) Critical Security Controls. By tailoring the CIS Controls to our specific operational environment, Transpower ensures that security objectives are practical, effective, and aligned with both industry expectations and the requirements set out in the New Zealand Information Security Manual (NZISM). Additionally, Transpower maintains information handling practices by applying the Protective Security Requirements (PSR) classifications.

This framework-based approach enables Transpower to benchmark its security posture and adapt to emerging threats.

3.2.4 ICCP Boundary Protection

Transpower's ICCP connections serve as conduits for real-time data exchange with external partners, with safeguards to secure them. Each ICCP link terminates within a secure gateway inside a Demilitarized Zone (DMZ), where only filtered and authorized data can pass through. All communications are encrypted, and only authenticated control centres with approved digital certificates are permitted to connect.



4.0 Industry Assessment

While New Zealand hasn't experienced major cyber-induced outages, international incidents are increasing with the most recent being:

- **Attempted Ukraine Power Grid Sabotage (Apr 2022):** In April 2022, Russian state-sponsored hackers (Sandworm) targeted a high-voltage Ukrainian power utility with sophisticated *Industroyer2* malware, trying to trigger a mass blackout. The attack was detected and stopped, preventing any disruption to electricity supply.
- **Tata Power Ransomware Breach (Oct 2022):** In October 2022, Tata Power (a leading Indian utility serving over 12 million customers) was hit by a *Hive* ransomware attack that penetrated its IT network. The hackers leaked extensive sensitive data (employee IDs,

financial records, engineering files), but all critical systems were secured, and power generation/distribution was not interrupted by the cyber incident.

- **Hydro-Québec DDoS Attack (Apr 2023):** In April 2023, Canada's largest electricity producer Hydro-Québec suffered a cyberattack by a pro-Russian hacker group that temporarily knocked its website and mobile app offline. The outage was apparently a retaliation for Canada's support of Ukraine; importantly, the hit was limited to web services – no critical grid systems were breached and electricity delivery continued normally.
- **Denmark's Energy Sector "Hell Week" (May 2023):** During May 2023, Denmark endured its largest-ever cyberattack on critical infrastructure when 22 energy companies were breached over a few days via a firewall vulnerability. While the public experienced no blackouts, several power providers had to disconnect from the main grid and run in "island mode" to keep supply steady, as the coordinated attacks significantly disrupted their operations (though ultimately contained without long-term outages).
- **Electrica Power Company Attack (Dec 2024):** In December 2024, Electrica Group – a major Romanian electricity distributor serving ~3.8 million customers – announced it was battling a serious ransomware attack. The utility activated emergency cyber defences but confirmed that grid control (SCADA) systems were unharmed and electricity supply to consumers was not interrupted.

This section explores some of industry strengths, weaknesses and emerging threats.

4.1 Industry Strengths

- **Strong Security Posture at Major Utilities:** New Zealand's key electricity entities (e.g. Transpower, large generator-retailers and electricity distributers) have implemented robust, multi-layered defences. They maintain strict separation between corporate and critical operational networks and systems. Comprehensive monitoring tools are deployed (advanced endpoint protection and specialized OT anomaly detection sensors) to provide real-time visibility into threats. This hardening of core systems means the most critical infrastructure is comparatively well-protected.
- **High Levels of Collaboration and Sharing:** The industry benefits from a tight-knit collaboration culture. The Control Systems Security Information Exchange (CSSIE) enables sharing of threat intelligence, incident learnings, and best practices.
- **Proactive Exercises and Executive Support:** Corporate governance and executive leadership strongly support cyber security, recognising it as a top business risk and ensuring it receives proper funding and focus. Leading firms regularly conduct internal drills to enhance incident response and actively participate in national and international exercises like GridEx for shared learning and collaboration.

4.2 Industry Weaknesses

- **Fragmented Capabilities and "Weak Link" Risk**: Cyber security maturity is uneven across the electricity distribution companies and connected generators. The large companies operate sophisticated cyber programs, but many smaller utilities do not have dedicated security staff, funding, and expertise. In short, portions of the sector remain less mature, which adversaries could target.
- **Inconsistent Standards and Compliance Gaps**: New Zealand's electricity sector has not been governed by any mandatory cyber security regulations. The use of voluntary standards

mean adoption is not uniform – some organisations may not fully implement good practice baseline controls.

- **Supply Chain and Shared Systems Vulnerabilities**: Many operators rely on the same vendors, software, and service providers for critical systems. This creates a risk that a single supplier compromise could have cascading effects. For instance, a malicious software update from a common SCADA/ICS vendor or a breach at a contractor with access to multiple utilities could simultaneously expose several organisations.
- **Evolving Threat Landscape Outpacing Smaller Players**: Advanced persistent threats (predominantly state-sponsored hackers) are increasingly targeting critical infrastructure worldwide. New Zealand's power companies are not immune to these trends. Large organisations are investing to keep pace with sophisticated threats, but smaller entities can struggle to do so, given limited resources.
- **Levels of Preparedness:** Preparedness for incidents and ability to respond varies across the electricity sector. Some smaller electricity utilities in New Zealand lack the resources, staff, and regular training needed to effectively prepare for or respond to cyber incidents. To strengthen the resilience of the whole sector, it is important that every company—regardless of its size—develops consistent incident response plans, holds regular exercises, and establishes robust communication protocols between industry parties.

4.3 Emerging Threats

Cybersecurity risk in the electricity sector is no longer confined to firewalls and passwords. This section outlines three critical emerging areas of threat.

- **Supply Chain:** Sophisticated cyber adversaries increasingly bypass direct attacks by targeting third-party vendors, suppliers, and service providers with privileged access. Considering this sector, this can include manufacturers of operational equipment, software vendors supporting SCADA and corporate systems, and contractors with remote access for maintenance. A compromise at any point in this chain—whether through malicious code in a software update or stolen credentials—can serve as a gateway into critical infrastructure.
- **Geopolitics and State Actors:** Geopolitical tensions are reshaping the threat landscape for critical infrastructure, with state-sponsored cyber actors increasingly targeting electricity networks as part of broader strategic campaigns. Groups such as Volt Typhoon and Salt Typhoon, linked to the People's Republic of China, exemplify this shift—operating stealthily within energy and telecommunications systems to establish footholds for potential future disruption. Their tactics, which blend into normal network activity, make detection particularly challenging.
- **Personnel and Human Engineering Risk:** Personnel risk remains one of the most persistent and complex challenges in cybersecurity. Inadvertent errors and insider threats can undermine even the most robust technical controls. The rise of AI-assisted impersonation—through hyper-personalised phishing, voice deepfakes, and synthetic personas—has elevated the threat landscape. These techniques blur the line between legitimate and malicious communication, making user awareness and rapid reporting essential.

5.0 Regulation – Proposed Content

Taking into consideration the above, there are several areas we have identified as focus areas for proposed resilience regulation. These also apply the lessons from Australia's SOCI Act.

5.1 Critical Asset Register

Identifying system-wide critical assets is important to infrastructure protection but defining what qualifies as "critical" requires careful balance. Too narrow a scope risk overlooking key dependencies; too broad, and the register becomes unmanageable. A Critical Asset Register should focus on assets whose compromise would significantly impact electricity supply or national security—such as control centres, major substations, HVDC links, and essential IT/OT systems.

The challenge lies in applying consistent, system-wide criteria. Smaller assets may be deemed critical if they serve as interconnection hubs or enable core functions. Over-classification, however, can dilute focus and inflate compliance burdens without proportional benefit.

Not that risk-based controls must be applied across the organisation using established standards or frameworks. These serve as the minimum safeguard for all assets.

Assets classified as critical require an additional layer of protection. Supplementary controls must be selected and applied based on the specific risks associated with each asset. This layered approach mitigates the risk of lateral threat movement from non-critical to critical assets.

A well-calibrated register supports prioritised investment, targeted risk management, and regulatory readiness, ensuring that protection efforts are both proportionate and effective.

5.2 Risk Programme

A Risk Management Programme provides a structured, system-wide approach to identifying, assessing, and mitigating risks to critical infrastructure.

Effective programmes incorporate enterprise risk frameworks, regular assessments, and assigned mitigation owners. They consider both technical and systemic threats, including coordinated cyberattacks and low-probability, high-impact events such as full SCADA failure. Contingency planning, manual workarounds, and scenario testing are essential components.

Cross-sector collaboration is vital. Joint exercises with generators and distributors help explore cascading risks and coordinated responses. Workshops involving IT, OT, and operations teams ensure risks are reviewed and escalated appropriately. This proactive, integrated approach strengthens resilience and demonstrates readiness for compliance, moving the sector from reactive incident response to anticipatory risk governance.

5.3 Frameworks

Under SOCI, from August 2024, responsible entities must implement a cybersecurity framework from an approved list or demonstrate equivalence. Accepted frameworks include the Essential Eight, NIST CSF, ISO/IEC 27001, AESCSF, and others

Framework adoption ensures structured, risk-based security management across threat identification, protection, response, and recovery. It promotes consistency, avoids duplication, and supports clear communication internally and with regulators. However, implementation must be tailored—rigid application or chasing maturity scores without risk relevance can waste resources.

Smaller entities often begin with baseline controls (e.g. Centre for Internet Security (CIS) Implementation Group 1 or Essential Eight), while larger organisations layer multiple frameworks to meet strategic, compliance, and operational needs.

5.4 Mandatory Reporting

Mandatory cyber incident reporting is expected to become a regulatory requirement for critical infrastructure operators via the proposed regulation. Incidents affecting electricity supply or compromising critical systems will likely need to be reported within 24 to 72 hours. Annual reporting on cyber posture and capability may also be introduced.

This shift promotes transparency and sector-wide learning, surfacing incidents that might otherwise remain undisclosed. It also introduces challenges: vendors may fear reputational or legal exposure, and smaller entities may lack the detection capabilities to comply. Confidentiality protections and safe harbour provisions will be essential to encourage honest reporting.

5.5 Threat Intelligence

There is no mention of support for threat intelligence within the shared documents for the proposed regulation. This is a concern as it is an area requiring support. We believe the regulation should facilitate better intelligence sharing mechanisms. Government has access to classified threat info; industry has operational visibility. Both should be able to exchange threat intelligence in a timely and secure fashion.

5.6 Supply Chain Assurance

There is no mention of support for supply chain assurance within the shared documents for the proposed regulation. This is a concern for Transpower as it is not reasonable to expect individual companies being responsible to vet global suppliers – there needs to be central support (e.g. government-run programmes to vet critical product suppliers or provide threat assessments on foreign companies/technology).

Something like the Telecommunications (Interception Capability and Security) Act 2013 (TICSA) is required with the associated support from GCSB.

5.7 Clearances For Personnel

The shared documents for the proposed regulation do not address simplifying security clearance processes. Bridging national security and Human Resources is crucial to ensure key roles, such as those in control rooms and system design, are vetted more rigorously than standard pre-employment checks.

5.8 Degree of Regulatory Specification

Transpower has cautioned against overly prescriptive rules that don't scale to different sizes of organisations. For example, we suggest that while core principles must be mandatory, the regulation should allow flexibility in how smaller companies implement controls versus how larger and potentially more complex and targeted organisations, given funding/resource differences. The emphasis is on outcomes (secure and reliable operations) rather than prescribing methods for all. A risk-based approach utilising descriptive rather than prescriptive frameworks will support this.

6.0 Conclusion

In summary, this paper underscores the need for a coordinated, sector-wide approach to cybersecurity and reliability within New Zealand's electricity sector. As the threat environment continues to escalate government and industry must work in partnership.

Key recommendations we make include the establishment of robust intelligence-sharing frameworks, government-supported supply chain vetting, and streamlined security clearance processes for personnel in vital roles. Moreover, regulatory design must remain flexible, outcome-focused, and scalable, allowing organisations of all sizes to implement security controls that are both practical and effective.

In anticipation of the forthcoming resilience regulations, CSSIE is establishing a focused working group dedicated to regulatory preparedness and industry-wide coordination. This working group will bring together security leaders from major sector participants specifically to collaborate on the challenges and requirements posed by the new critical infrastructure security regulations. By working collectively, the CSSIE members aim to present more unified and coherent feedback to DPMC on the proposed rules.

TRANSPOWER

TRANSPOWER.CO.NZ

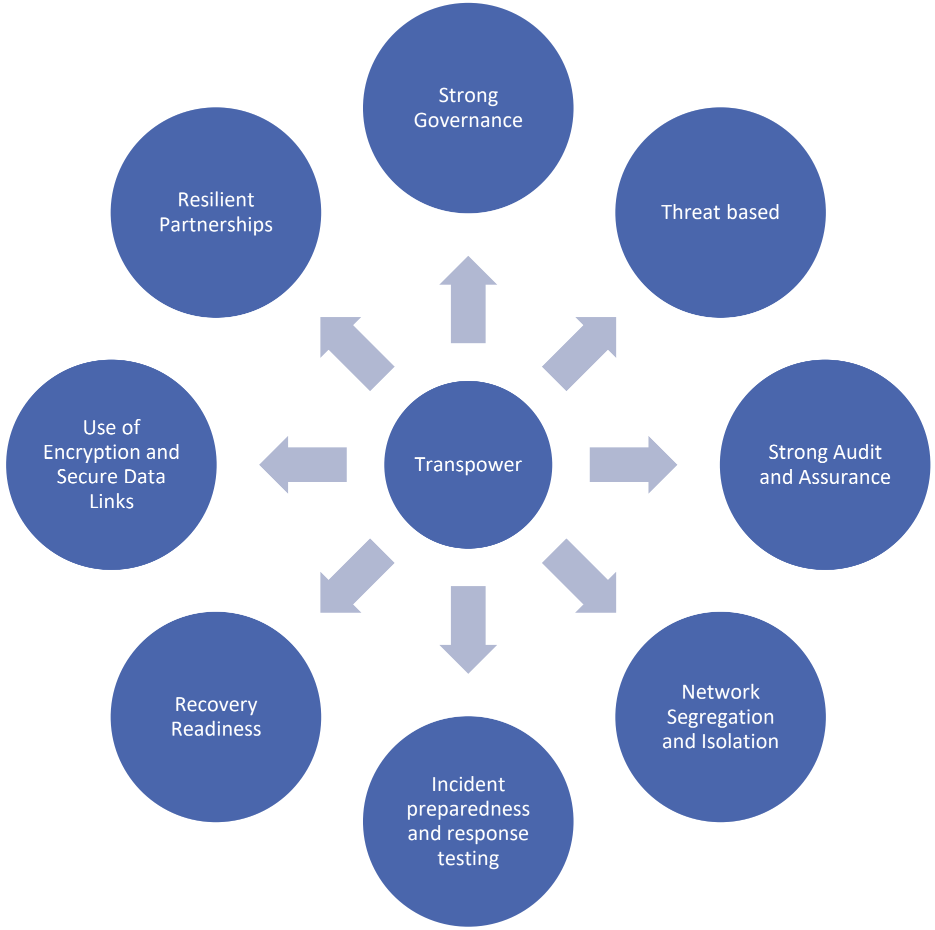
TRANSPOWER

Whakamana i
Te Mauri
Hiko

Cybersecurity – Transpower & Industry

Purpose of this briefing:

- Sector's key strengths and weaknesses
- Emerging threats in cybersecurity
- Proposed regulations



Industry Strengths & Weaknesses

Strengths

- Major utilities have strong multi-layered defenses
- The industry collaborates
- Utility executives treat cyber risk as a top priority

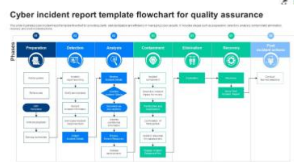
Weaknesses

- Cyber capabilities aren't uniformly implemented
- Reliance on common vendors and systems
- Incident preparedness varies
- Industry divide between emerging threats and defensive readiness is widening

Proposed Regulation – Key Content

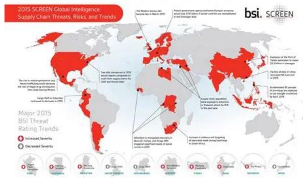
Transpower supports the benefits of potential regulation to bring all players towards an appropriate level of cyber maturity against risk. This would include:

- Critical Asset Register & Risk Management
- Baseline Security Standards
- Incident Reporting & Information Sharing



Transpower's position on regulation:

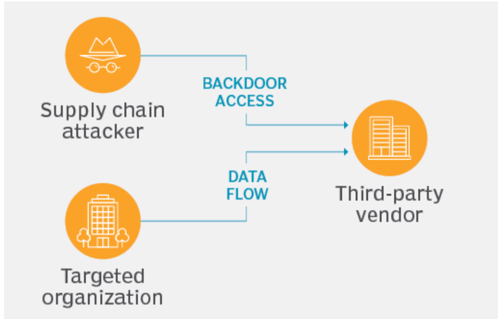
- Threat Intelligence & Supply Chain Support
- Personnel Security Clearances
- Flexible, Proportionate Application



Emerging Threats

New Zealand's electricity sector needs to keep ahead of our threat landscape and changing technologies

Supply Chain Attacks



State-sponsored Actors

Social Engineering & Insider Risks

AI-driven phishing, deepfake impersonation..

Conclusion and take aways

- Defending the system requires a close partnership.
- Robust threat intelligence sharing and centralised vetting of critical suppliers a gap.
- Consistent and methodical risk-based investment required.
- New cyber regulations can assist.
- The sector should proactively prepare.

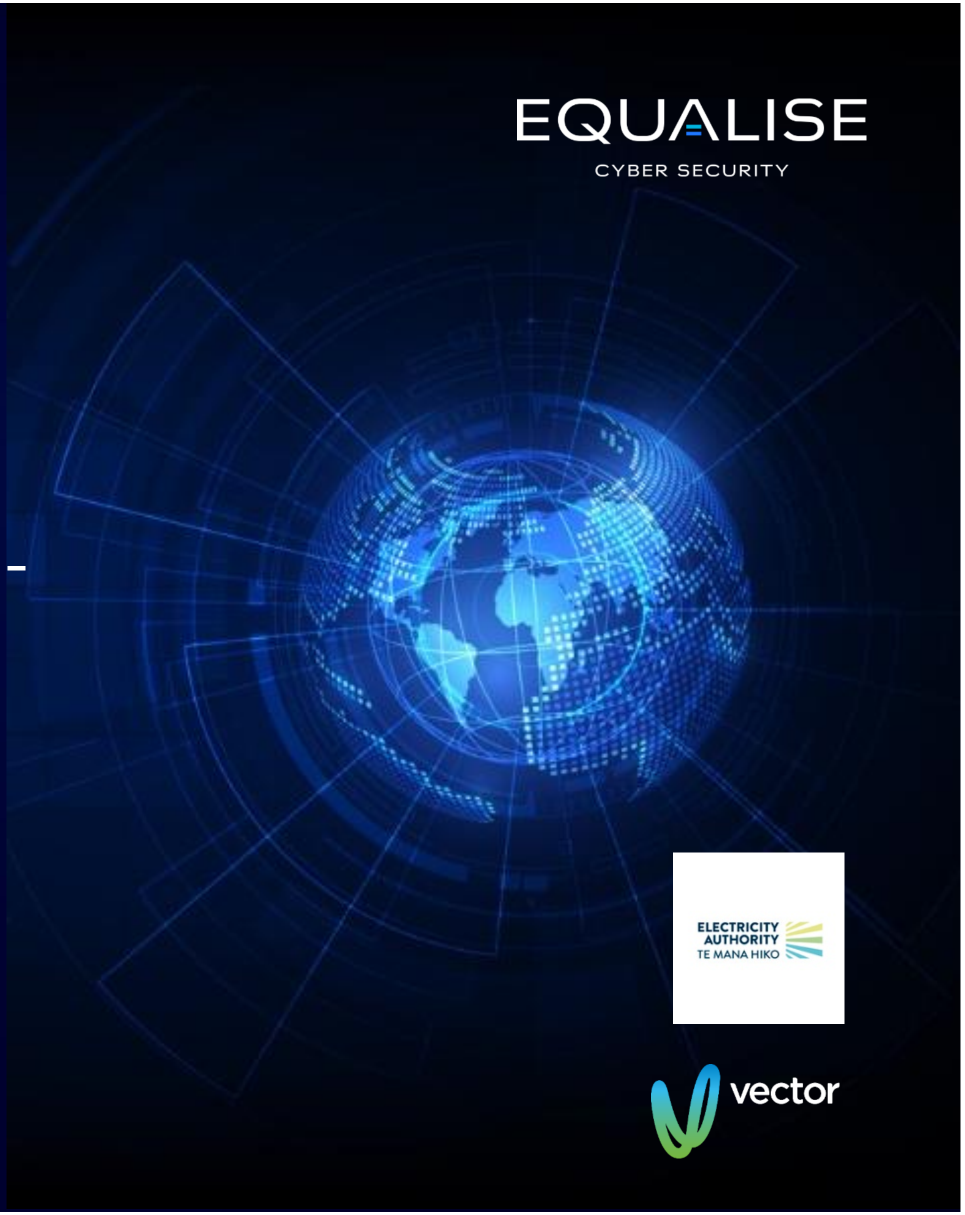

Discussion

Thank you

TRANSPOWER.CO.NZ

21 August 2025

Security and Reliability Council - Equalise Overview



Equalise Background

- Equalise was set up in 2021 as a wholly owned subsidiary of Vector
- The objective of Equalise was to help uplift the security posture of its customers by providing greater visibility of potential cyber security threats
- The underlying technology leverages many of the tools and experience that Vector has built as part of its own security operations
- We currently offer a range of security services to EDBs across NZ

Value Proposition

EXPERIENCE & EXPERTISE
Team of highly skilled, experienced security professionals.

NZ SECURITY POSTURE
Uplifting the security posture of the sector

FIT FOR PURPOSE TECHNOLOGIES
Technology and tools available to protect client environments

COST EFFECTIVE
Offer clients a cost-effective approach to cyber security

USER COMMUNITY

vector EQUALISE CYBER SECURITY

Our services

A summary of the base services offered is listed below

- **Unified IT/OT Security Operations Centre (SOC)**
- **Vulnerability Management (VM)**
- **Managed Email Security**
- **Managed Endpoint Security**
- **Managed Network Detection & Response (NDR)**
- **Managed Secure Access**

vector EQUALISE CYBER SECURITY

Questions

Meeting Date: 26 August 2025

Wrap session – Cyber Security

Security and Reliability Council

The Chair will conduct a Wrap session for agenda item 11

Note: The Chair will lead this item, there is no additional material to review.