

MINUTES

Meeting number: 53

Venue: Electricity Authority, 9.00am until 4.00pm, 23 October 2025

Members Present

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

Apologies: Nanette Moreau

In attendance

Name	Title	Agenda item(s) attended
<u>Electricity Authority (Authority):</u>		
Sarah Gillies	Chief Executive	Items 8, 12
Hayden Glass	GM, Wholesale and Supply	Items 8, 12
Sam Edens	Quantitative Analyst	Item 8
Doug Watt	Manager, Market Intelligence	Item 8
Allen Davison	Principal Analyst, Network Policy	Item 10
Natalie Bartos	Principal Analyst, Wholesale & Supply	Items 8, 12
<u>Other attendees:</u>		
Rebecca Osborne	Head of Market Services, Transpower	Item 8, 12
Ramu Naidoo	Market Operations Manager, Transpower	Item 8
Tracey Kai	Chief Executive, Electricity Networks Aotearoa	Item 10
Gareth Wilson	MBIE, Principal Strategy Adviser, Energy	Item 10
Brian Fitzgerald	EECA, Demand/Distributed flexibility Lead	Item 10
Chirs Forsman	Standards NZ, Principal Standards Programme Manager	Item 10
Stuart Johnstone	Lead Adviser, Engineering and Technical	Item 10
Buddhika Rajapakse	Concept Consulting	Item 11

The meeting opened at 9.00am, Jeremy Cain joined the meeting at 9.00am.

1. Attendance and apologies

- 1.1. The Chair welcomed members to the 53rd meeting of the Security and Reliability Council (SRC). A quorum was established.
- 1.2. The Chair noted Nanette Moreau as an apology, and Andre Botha and Karen Frew attended remotely.

2. Changes to disclosure of interests

The Chair reviewed the interests register.

- 2.1. The secretariat noted a change to Allan Miller's interests and Chris Ewers' job title.
- 2.2. There were no further changes disclosed. The Chair approved members to act despite those declared interests.

a) Members-only session

- 2.3. The members discussed their priorities for the meeting.

Jeremy Cain left the meeting at 9:15am, rejoined the meeting at 9:20am.

3. Minutes of previous meeting

- 3.1. Members discussed the minutes of the 26 August 2025 SRC meeting.
- 3.2. The minutes were accepted as a true and accurate record.

The Chair moved. All members approved.

4. Correspondence

- 4.1. The Chair noted the SRC's letter of 12 September sent to the Authority, the Authority's letter of reply dated 17 October and the SRC's letter of 8 October on cyber security regulation to the Department of Prime Minister and Cabinet.
- 4.2. Member comments included:
 - a) Recognising lateral thinking by the Authority, MBIE and the System Operator, as demonstrated by the System Operator through its latest consultation on the SOSFIP review, noting process still in train.
 - b) Acknowledge invitation from the Authority for SRC input on additional changes the Authority could make to help reduce system risk as intermittent generation increases.

Action 1: Secretary to add table tracking recommendations and actions to advice from this meeting onwards.

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

- 5.1. The Chair noted the ongoing and completed actions in the table, which were taken as read.
- 5.2. Members:
 - a) Discussed loss of supply on the system that day and the ongoing cost / risk to electricity consumers by tree contacting power lines.
 - b) Noted LNG import terminal procurement process currently underway

- c) Noted hydro, gas storage levels, the 1.1MT physical coal stockpile and draft Commerce Commission to approve the Huntly agreement (to preserve a 3rd Rankine unit, hold fuel reserves).

6. Agenda item #7) Risk radar / risk playback

- 6.1. The Secretary introduced analysis of how SRC could assess and present system performance and security risk.
- 6.2. Members provided feedback to that the Secretary will address ahead of the next SRC meeting.

Action 2: Secretary to reformat presentation of system performance and security risks.

Sarah Gillies, Hayden Glass, Natalie Bartos, Sam Edens, Doug Watt, Rebecca Osborne and Ramu Naidoo joined the meeting at 10:04am.

7. (Agenda item #8) Joint Security of Supply update

- 7.1. The respective Authority and System Operator staff presented the security of supply update.
- 7.2. The August briefing covered the current market situation, forecast supply / demand balance and security of supply outlook for 2026, historical and futures prices, fuel availability (hydro, gas, coal), generation plant availability, the 'generation pipeline', the BESS roadmap and planned regulatory and reporting changes.
- 7.3. In discussion with presenters the SRC:
 - a) Queried whether release of gas by Genesis affected medium term energy risk, noted that hydro spill meant no ability to store current strong inflows but need to watch closely with potentially low summer inflows if predicted La Niña event materialises.
 - b) Noted the persistent / recurring disconnect between increasing forecast and almost flat actual demand, and the potential causes. Noted grid connection one of top three constraints and questioned whether the Grid Owner is giving sufficient priority to connecting required generation.
 - c) Expressed concern with the growing trend of over forecasting of new generation commissioning¹ and again relying to 'get through winter' on:
 - i. extraordinary measures by generators
 - ii. availability and heavy utilisation of a shrinking, aging and less diverse thermal fleet
 - iii. explicit or de facto rationing by consumers, noting total demand remains flat (and lower than 2010) in defiance of forecasts.

¹ Presenters advised that actual generation commissioning over the past 12 months was 200MW less than expected.

This discussion was summed up with the statement “hope is not a good strategy”. This does not diminish the sector efforts to balance supply and demand, rather highlights persistently elevated risk that New Zealand consumers are exposed to – but mostly unaware of – and the economic consequences of having to curtail electricity demand or missing opportunities for growth.

- d) Noted the need for a clearer picture (i.e. reliable) of expected generation commissioning as the outlook tightens and actual commissioning lags the various forecasts from the Authority and System Operator.
- e) Continued to question whether investment and regulatory initiatives will be sufficient to address elevated capacity and energy risk to ~2028.
- f) Discussed need to align on how solar should be accounted for in the energy and capacity forecasts given seasonality. Concern was expressed, as it has been at previous meetings, that the graphical presentation of solar capacity alongside other generation capacity gives no indication of energy production. It was suggested that presentation of expected energy generation by season, especially winter, would be more informative for security of supply. Further noted the need to assess capacity for (and limits on) inter-seasonal storage – for example, it is likely oversimplistic to assume that 1GWh of solar in summer = 1GWh additional winter hydro storage.

Hayden Glass, Natalie Bartos, Sam Edens, Julie Hall, Rebecca Osborne and Ramu Naidoo left the meeting at 10:50am.

8. (Agenda item #9) Wrap-up discussion on Security of Supply update

- 8.1. The Chair led a Wrap-up discussion with members on item, #8, including areas of concern and points to note in the letter of advice.

Gareth Wilson (MBIE), Allen Davison (Authority), Brian Fitzgerald (EECA), Chris Forsman (Standards NZ), Stuart Johnstone (EEA), Tracey Kai (ENA) joined the meeting at 11:10am

9. (Agenda item #10) Inverter standards

- 9.1. The chair introduced the item and welcomed presenters from MBIE, the Authority, EECA, Standards NZ, the Electricity Engineers Association (EEA), and Electricity Networks Aotearoa (ENA).
- 9.2. SRC members, providing additional context for this item, invited presenters to share with SRC:
 - a) who is responsible for setting, developing, enforcing, electrical standards
 - b) how competency of EDBs, installers and inspectors is ensured
 - c) what is (and should be) mandatory vs discretionary
 - d) opportunities to improve, so this important part of the system performs for New Zealand
 - e) how, through its advice, the SRC can assist:
- 9.3. MBIE outlined the New Zealand standards ‘system’, its purpose, who it applies to and what is covered.

- 9.4. The Authority outlined the role of the electricity industry participation Code (the Code), changes currently under consultation and its intent to bring the Code into alignment with Electricity Safety Regulations (ESRs).
- 9.5. EECA explained imminent statutory changes that will bring it regulatory powers in relation to consumer and other equipment. For example, minimum interoperability and communications requirements. EECA introduced its 'FlexTalk' partnership with the EEA that implements common communication protocols.
- 9.6. Standards NZ explained its role setting standards and the use of Publicly Available Specifications (PAS) resources, noting the recent introduction of PAS 6014:2025.
- 9.7. The EEA summarised how it works to draw relevant standards, PAS resources and regulatory requirements into guidance for operators such as electricity distributors and installers.
- 9.8. The ENA represents electricity network businesses who are 'customers' of the standards 'system' administered by the entities above. The ENA expressed concern with the level of complexity and highlighted an opportunity for better cohesion and coordination in the formulation, regulation, application and update of technical standards (an inclusive term).
- 9.9. In discussion with presenters the SRC:
- a) Outlined its concerns that:
 - Outdated inverter standards present a growing risk to system stability, that failure to learn from other jurisdictions would unnecessarily expose New Zealand to serious risk.
 - There appears little (or no) technical consideration of the impact large numbers of small-scale inverters on other parts of the network, such as transmission. An example is the use of reactive power voltage control and the effect this might have on reactive and active power flows at grid exit points.
 - Considering DER more generally, the disjointed standards framework and confusion this creates, may not support suitable integration and interoperation of DER. In turn, New Zealand will miss the tremendous opportunity DERs can provide for things such as limiting peak demand; and instead may even increase peak demand. As a result, New Zealand may incur significant unnecessary network and generation costs and security of supply risk.
 - b) Was encouraged by presenter views that recent and pending changes would bring inverter standards for small DER up to currently recognised best practice for New Zealand / Australia for. Those changes included:
 - introduction of PAS 6014:2025
 - expected Code changes (installation and performance)

- expected update of ESRs
- existing and new initiatives by EECA (interoperability and connectivity)
- c) Expressed surprise and concern at the complexity of the NZ standards 'system', the apparent lack of cohesion and coordination and risk/impact this creates for standards development, application and maintenance.
- d) Expressed concern that there appears to be a lack of consideration of how the issues noted above create confusion and additional costs to consumers who want to install solar. Consequently, uptake of solar at a reasonable cost is hindered.
- e) That current standards approval process delays indicate an opportunity for improvement, including whether changes to organisational accountabilities are necessary.
- f) Discussed the need for / value of:
 - Expediting progression of the EECA Bill, currently before Parliament.
 - A steward to coordinate, bring cohesion to the fragmented 'system'.
 - Clear objectives for the 'system' that the different entities align to and develop plans around to ensure security of supply, electricity system performance and the energy transition is **enabled not impeded by** electrical standards and regulation
 - A reference / working group to coordinate current / future standards development and maintenance at a practical level
 - Public resources to aid stakeholder understanding of this complicated system, for example, Plain English explanations and supporting diagrams / flow charts describing:
 1. what each entity does
 2. how the different instruments interact (ESRs, the Code, PASs, guidelines etc)
 3. how and by whom these instruments are developed, maintained, enforced, updated, retired.

There was strong alignment between presenters and the SRC that these opportunities should be progressed.

Gareth Wilson (MBIE), Allen Davison (Authority), Brian Fitzgerald (EECA), Chris Forsman (Standards NZ), Stuart Johnstone (EEA), Tracey Kai (ENA) left the meeting at 1:05pm

10. Wrap-up discussion on inverter standards

- 10.1. 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.

The SRC broke for lunch at 1.15pm

Buddhika Rajapakse joined the meeting at 1.40pm

11.(Agenda item #11) Vehicle to grid

- 11.1. The Chair introduced the item and welcomed the presenter from Concept Consulting.
- 11.2. The presentation and points of discussion noted:
 - i. The significant opportunity presented by V2G to support security or supply and system efficiency by:
 - offsetting peak demand (capacity) and providing short duration energy storage
 - providing a 'solar sink' to absorb excess solar generation, reducing energy spill
 - avoiding or reducing the scale of distribution and transmission network build
 - ii. Recognition that there are technical / practical / commercial issues to work through, though these are all solvable with concerted effort
 - iii. The dependence on standard setters, regulators and sector participants to enable and realise this opportunity
- b) the extraordinary costs and security of supply risk of not capitalising on the V2G opportunity.

Buddhika Rajapakse left the meeting at 2:15pm, Sarah Gillies, Hayden Glass, Natalie Bartos and Rebecca Osborne joined the meeting at 2:15PM

12.(Agenda item #12) System Operator performance self-assessment

- 12.1. The Chair introduced the item, noted the SRC's support for the System Operator's SOSFIP review.
- 12.2. The presentation and points of discussion noted:
 - a) the increasing pace of change and intermittency and challenges this presents to the System Operator.
 - b) achievements and lessons learned by the System Operator in the 2025 financial year.
 - c) approach to setting System Operator strategy, which will be aligned to the SOSPA period.
 - d) how the System Operator can support connection / commissioning of new generation through its own processes and managing the performance of the Grid Owner (in respect of grid connection) and distributors.
 - e) the System Operator's organisational readiness to cope with increasing pace of change.

- f) concern that there appear to be unexplained differences in supply demand forecasts between the System Operator and Authority.

Rebecca Osborne left the meeting at 2:55pm

13. Wrap-up discussion on item 12

- 13.1. The Chair led a Wrap-up discussion with members on item 12 including areas of concern and points to note in the letter of advice.

14. Market review outcomes

- 14.1. The SRC briefly discussed market review outcomes.

15. Impact of declining gas production on security and reliability

- 15.1. SRC had a short scoping discussion for a future session on the first and second order implications of declining gas production for the electricity system.

16. Purpose and scope of next meeting and 2026 plan

- 16.1. The Chair led a discussion on the purpose and scope of the Q1 2026 meeting (February) and the outlook for the remainder of 2026.

The meeting ended at 3:55pm

MINUTES

Meeting number: 52

Venue: Transpower, Level 1 Time and date: 8.00am until 4.00pm, 26 August 2025

Members Present

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

In attendance

Name	Title	Agenda item # attended
<u>Electricity Authority (Authority):</u>		
Sarah Gillies	Chief Executive	Items 5 - 9 (part)
Hayden Glass	GM, Wholesale and Supply	Items 7, 10a 10b
Sam Edens	Quantitative Analyst	Item 7
Julia Hall	Manager, Monitoring Projects	Item 7
Viktoria Nordstrom	Manager, Market Intelligence (Acting)	Item 7
	<u>Other:</u>	
Chantelle Bramley	EGM Operations, Transpower	All items except 1-3, 8, 10c, 12
Rebecca Osborne	Head of Market Services, Transpower	Item 7, 10a and 10b
Ramu Naidoo	Market Operations Manager, Transpower	Item 7, 10a and 10b
James Kilty	Chief Executive, Transpower	Item 9 (part)
Tracey Kai	Chief Executive, Electricity Networks Aotearoa	Items 9 (part), 11a-11d
Andrew Knight	Chief Executive, Gas Industry Company	Item 9 (part)
Jonathan Pawley	National Cyber Security Centre	Items 11a-11d
Cobus Nel	EGM IST, Transpower	Items 11a-11d
Steve Smith	Chief Security Officer, Transpower	Items 11a-11d
Richard Timms	Senior Strategic Analyst, Contact Energy	#10b
James Tipping	Group Manager Market Strategy / Regulation	#10b

The meeting opened at 8.00am, Jeremy Cain joined the meeting at 8.00am.

1. Attendance and apologies

- 1.1. The Chair welcomed members to the 52nd meeting of the Security and Reliability Council (SRC). A quorum was established.
- 1.2. The Chair noted 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 Allan Miller's interests.
- 2.3. There were no further changes disclosed. The Chair approved members to act despite those declared interests.

Jeremy Cain left the meeting at 8.05am.

3. Members-only session

- 3.1. The members discussed their priorities for the meeting.

Jeremy Cain and Chantelle Bramley joined the meeting at 8:20am.

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.

The Chair moved. All members approved.

5. Correspondence

- 5.1. The Chair noted the SRC's letter of 6 June sent to the Authority, the Authority's letter of reply dated 1 July.
- 5.2. Member comments included:
 - a) Observing that Huntly Heads of Agreement and strategic coal reserve are positive developments, however, they do not directly affect reliance on slow-start thermal in high hydro storage/inflow conditions. Huntly firming options may have a positive impact, if they lead to Huntly generators being 'kept warm'.
 - b) The need to publish the SRC's advice and Authority response as soon as possible after each meeting is completed, in an obvious / prominent place and to draw stakeholder attention to these documents.
 - c) The need to more formally track actions by the Authority or other parties in response to SRC recommendations.

Action 1: Secretariat progress changes to SRC webpage and inclusion in relevant editions of the Authority's 'market brief'.

Action 2: Secretariat to look into a tracker or similar for actions arising from SRC recommendations.

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.

Hayden Glass, Sam Edens, Julie Hall, Viktoria Nordstrom, Rebecca Osborne and Ramu Naidoo joined the meeting at 8:30am.

7. (Agenda item #7) Joint Security of Supply update

- 7.1. The respective Authority and System Operator staff presented the security of supply update.
- 7.2. The August briefing covered the winter 2025 situation, the forecast the supply / demand balance and security of supply outlook for 2026, historical and futures prices, fuel availability (hydro, gas, coal), generation plant availability and the 'generation pipeline'.
- 7.3. In discussion with presenters, SRC:
 - a) recognised proactive steps by industry and regulators, which reduced security of supply risk (and constrained prices) in the face of declining gas production combined with historically low hydro inflows.
 - b) welcomed publication of the Authority's 'generation pipeline', while noting limitations of current data / views for assessing future generation capacity and energy risk. Additional granularity is needed for near term projects to gain confidence – type, timing, capacity, energy contribution.
 - c) queried drivers of increased 'peakiness' (6 of 12 historical peaks have occurred in 2025), noted lower capacity margins, increasing reliance on slow-start thermal and elevated capacity risk. Questioned extent to which expected generation build would help, given majority is solar and wind (either not, or only partially coincident with likely peaks)
 - d) questioned the extent to which investment and regulatory initiatives will be sufficient to address elevated capacity and energy risk to ~2028 given increased intermittency from renewables.
 - e) noted the value of this item as an opportunity to hear and discuss / challenge inputs, assumptions and methodologies used by Authority and System Operator teams.

Action 3: The secretariat to obtain the updated presentation slides and circulate to members (for all 'on the day' presentations).

Hayden Glass, Natalie Bartos, Sam Edens, Julie Hall, Viktoria Nordstrom, Rebecca Osborne and Ramu Naidoo left the meeting at 9:30am.

8. (Agenda item #8) Wrap-up discussion on Security of Supply update

- 8.1. The Chair led a Wrap-up discussion with members on item, #7, including areas of concern and points to note in the letter of advice.

9. (Agenda item #9) Risk and Strategy

- 9.1. The chair introduced the item.
- 9.2. Part 1: facilitated members discussion including:

- a) Reminder of SRC purpose
- b) Review of performance
- c) Environmental scan
- d) SWOT (strengths, weaknesses, opportunities and threats) assessment to inform a refresh of how the SRC can provide greatest value to New Zealand.

James Kilty, Tracey Kai and Andrew Knight joined the meeting at 10.05am

9.3. Part 2: what stakeholders think: perceptions of SRC, security and reliability risks and concerns, and, getting the most value from SRC. The SRC heard from and spoke with:

- a) James Kilty from Transpower
- b) Tracey Kai from Electricity Networks Aotearoa
- c) Andy Knight from the Gas Industry Company
- d) Lucie Drummond from the Energy Transition Framework.

9.4. Presenters thought the SRC:

- a) has a strong statutory mandate, the potential to draw on expertise of members and willingness of stakeholders to share information; to provide a firm, clear, expert and independent voice on the electricity system performance, security and reliability
- b) hasn't lived up to its potential - stakeholders perceive SRC as not truly independent of the Authority, are critical of its low profile and muted public voice. Support for independent secretariat and planned action to give prominence to its advice.
- c) has an increasingly important role to play. An independent, expert view, looking across the whole system is essential at this time, as vested interests interact with increasing pace of change, complexity and pressure on participants.
- d) focus is on the electricity system, but increasingly awareness of the broader energy system is needed as energy demand and supply side changes drive 'energy convergence' - now for gas/coal, over time for (some) liquid fuels.
- e) needs to retain its role as 'canary in the coalmine' but take a firmer stance where its advice is ignored or inadequate action is taken (by participants, regulators or both) to mitigate risk and prevent avoidable harm to New Zealand.
- f) is right to have done a self-assessment and have invited feedback, should make this routine – set goals, assess performance regularly so able to learn, improve and enhance value to New Zealand.

9.5. Part 3: Discussion and capture.

Sarah Gillies, Hayden Glass, James Kilty, Tracey Kai and Andrew Knight left the meeting at 11.35am

The SRC broke for lunch at 12pm

10. Control room visit

10.1. System Operator staff hosted SRC members for a control room tour.

Rebecca Osborne, Ramu Naidoo, Hayden Glass and Natalie Bartos joined the meeting at 1.05pm

11. (Agenda item #10a) Annual Security of Supply Assessment

11.1. The Chair introduced the item and welcomed presenters from the System Operator and Authority.

11.2. The presentation and points of discussion noted:

- a) Tightness of supply / demand balance in the near to medium term. Concerning that we look likely to cross the NZWEM Security Standard in 2026 (and discussed merit of reviewing the forecasting standards to reflect changing thermal fuel situation and increasing proportion of intermittent generation).
- b) Noted reliance on expected generation commissioning on or near to expected time and impact of declining / uncertain gas availability. Discussed importance of closely monitor progress, maintain pressure to deliver and acting remove regulatory and other impediments.
- c) Specifically, that monitoring entails a more granular understanding of critical paths for each project than is currently available. Also, a clearer understanding of distributor / Transpower ability to connect expected generation in a timely manner.
- d) Noted role of SOSA vs energy risk curves (ERCs) for assessing medium to long term (SOSA) vs near term (ERCs) risk.
- e) Discussed increasing capacity risk and reliance on slow start thermal, specifically where high hydro storage / inflows coincide with a cold snap and lower intermittent generation.

12. (Agenda item #10b) Contingent Storage

12.1. The Chair introduced the item, noted the SRC's support for the System Operator's SOSFIP review.

12.2. The presentation and points of discussion noted:

- a) System Operator intends to provide a market update after this briefing and is planning to consult in mid-September with final recommendations to the Authority in late 2025.
- b) That this timeframe is intended to allow time-critical changes to be implemented in advance of winter 2026.
- c) SRC noted and welcomed the offer from the System Operator for a briefing and discussion on its consultation proposals at the appropriate time.

Action 4: The secretariat to schedule briefing from System Operator on SOSFIP consultation proposals.

Rebecca Osborne, Ramu Naidoo, Hayden Glass and Natalie Bartos left the meeting at 1.05pm

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

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

Jonathan Pawley, Cobus Nel, Steve Smith (remotely), Richard Timms, Tracey Kai joined the meeting at 1.55pm. James Tipping joined at 2.05pm (remotely).

14. Cyber Security

- 14.1. The Chair introduced the item and welcomed presenters.

15. (Agenda items #11a) National Cyber Security Centre

- 15.1. Provided an overview of the global cyber threat environment, which is worsening with three geopolitical shifts playing out: from rules to power, from economics to security and from efficiency to resilience.
- 15.2. Summarised the New Zealand cyber threat landscape, which is worsening with geopolitics and strategic competition, increasing cyber dependent / enabled crime, improving 'tradedcraft', lower technical barriers to entry for malign actors and increase in state sponsored activity.
- 15.3. Noted 34 cyber incidents for nationally significant organisations in energy, water and waste services, the majority of which were financially motivated and of which five were service impacting / required remedial action incidents.
- 15.4. Expects these trends to continue, with energy as a target for sophisticated actors who have the ability to access and remain undetected for a long period of time. Encourages regulators to support / mandate pursuit of good practice, proportional to the risk / criticality of the entities.
- 15.5. Noted that perceived protection between internet/cloud based systems and physical plant control based systems is a misnomer as supply chain threats can compromise physical systems remotely.

16. (Agenda items #11b) Transpower

- 16.1. Summarised Transpower's view of the electricity sector's key strengths and weaknesses, emerging threats in cyber security and proposed cyber security regulation.
- 16.2. Transpower considers the gap between threat and readiness to be widening as the sophistication of malign actors outpaces local parties readiness. Recognises need for entity reporting, information sharing and regulation.
- 16.3. Acknowledge effort and progress across the sector to improve readiness and a maturing view of risk / criticality of different participants. Understanding risk / criticality is necessary to efficiently mitigate risk, allowing / requiring strong protections for system critical parties than for non-system critical parties.

- 16.4. Considers much to learn from the Australian experience as regulation is developed in New Zealand (by DPMC). Specifically, that a 'one size fits all' rules, which fail to account for the differing risk and criticality levels of each entity, risks setting the bar too high for some and too low for others. This approach risks weakening protections for both system critical and non-critical parties.

17.(Agenda items #11c) Vector

- 17.1. Described its work to grow a cyber security community amongst New Zealand's electricity distributors, that there had been a significant uplift in awareness, engagement and understanding and, as a result, readiness in recent years.
- 17.2. Observed that most of the cyber security technology products available today are very good now (this was not the case previously).
- 17.3. Provided an overview of services Vector offers to smaller distributors and these are intended to lift capability and readiness and to "teach to fish, rather than catch the fish for them".

18.(Agenda items #11d) Group discussion on Cyber Security

- 18.1. Concerning but not surprising that the sophistication of and tools available to malign actors continue to grow and proliferate. Cyber threat environment is worsening.
- 18.2. Encouraging that awareness, understanding, engagement and commitment has increased markedly in the last three years – with almost all (or all) network providers and generators involved in NCSC 'exchanges' such as the CSSIE group (Control Systems Security Information Exchange).
- 18.3. Discussed how the understanding of risk and system criticality is maturing, this should support design of proportionate regulation that lifts maturity, readiness and responsiveness of both system critical and non-critical parties. Discussed the value of Authority involvement in regulatory design, and monitoring readiness across the sector.
- 18.4. Noted suggestions to encourage participants to:
- a) voluntarily assess themselves against the Australian Cyber Security Standards, as one participant has already done
 - b) Participate in the upcoming DPMC regulatory consultation.

Jonathan Pawley, Cobus Nel, Steve Smith (remotely), Richard Timms, Tracey Kai and James Tipping left the meeting the meeting at 3.45pm

19.(Agenda items #11e) Wrap-up discussion on Cyber Security

- 19.1. The Chair led a Wrap-up discussion with members on items, #11a-, including areas of concern and points to note in the letter of advice.

20. (Agenda items #12) Purpose and scope of October SRC meeting and forward work programme

- 20.1. The Chair led a discussion on scope of October SRC, noting this will involve the System Operator's annual performance assessment.
- 20.2. Theme for October will be the impact / risk of standards falling out of date on future security of supply. Specifically, in relation to solar inverters and EV chargers.
- 20.3. Potential for an update on outcomes of the Government's electricity market review.
- 20.4. To discuss forward work programme and outcomes of strategy and risk discussion at the mid-period meeting.
- 20.5. Noted invitation from Meridian to visit Manapouri generation site, potentially to coincide with the SRC's Q1 2026 meeting in February.
- 20.6. Discussed potential to publish topic papers, where likely to be useful to stakeholders. For example, on cyber security.

Action 5: secretariat to add foundation documents to Diligent resource area and to add briefs for theme papers.

The meeting ended at 4.10pm

Sean Bolton
DCE National Security and Resilience
DPMC

By email: Sean.Bolton@dpmc.govt.nz

8 October 2025

Dear Sean

Cyber security requirements for the electricity sector

I am writing to share with the DPMC advice provided by the Security and Reliability Council (SRC) to the Electricity Authority on cyber security risk, readiness and potential regulation.

The Security and Reliability Council

The SRC is established under the Electricity Industry Act 2010 to provide independent advice on the performance of the electricity system, the electricity System Operator and matters relating to security and reliability of the electricity system.

At its recent meeting, the SRC heard from and spoke with the National Cyber Security Centre (NCSC), Transpower, Vector and Electricity Networks Aotearoa about the cyber threat environment and readiness across the electricity sector. We also discussed regulatory experience in Australia and the lessons we may learn from this to maximise the effectiveness and minimise the cost of New Zealand cyber security regulation.

While the SRC is encouraged by electricity sector progress and an improving understanding of cyber threats and readiness, it is clear the cyber threat environment has worsened - including for core services such as electricity supply.

SRC's advice to the Electricity Authority, and to DPMC

SRC heard that cyber security regulation introduced in Australia has been blunt. We believe there is an opportunity for New Zealand cyber security regulation to be more proportional and tailored to the differing risk and criticality of electricity sector participants.

The SRC's advice to the Electricity Authority, which we wish to share with the DPMC is:

- **the Authority should lift understanding of cyber security** through engagement with participants and the DPMC. The Authority should have a role in shaping tiered / proportionate rules to lift readiness and responsiveness for system critical and non-critical participants.
- **the Authority should encourage participants to** engage in DPMC's upcoming consultation and to consider voluntarily self-assessment against Australian Cyber Security Standards.

- **the policy maker should, in developing cyber security regulation** seek to tailor requirements for electricity sector participants so they are proportional to the risk and criticality presented by each in the power system. This will help avoid the downsides of a 'one size fits all' approach (when system participants are very different in terms of system risk and criticality, and size / capacity) , such as driving unnecessary compliance costs and potentially reducing overall readiness.
- **the SRC encourages DPMC** to work with the Authority, Transpower and other electricity sector participants so cyber security policy and regulation is is tailored to the risk and criticality of different participants in the electricity system.

The SRC appreciates its advice may be self-evident to the DPMC as a policy agency and the Authority as a market regulator. It is provided in good faith after constructive and informative discussion between the parties listed above and the SRC.

I look forward to the progression of cyber security regulation. The SRC considers this important to reduce the risk, and enhance the responsiveness of the electricity system to, cyber threats and incidents for the benefit of electricity sector participants, and importantly, consumers.

Yours sincerely

A handwritten signature in dark ink, appearing to read 'H Roy', with a stylized flourish at the end.

Hon Heather Roy

Chair, Security and Reliability Council

Attached: SRC advice to Electricity Authority

12 September 2025

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

Dear Anna,

Advice from 26 August 2025 SRC Meeting

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.

This quarter's advice is the first following our recent decision to adapt SRCs operation, how we interface with the Authority and to increase the prominence of our advice to the Authority. To recap, SRC:

- has implemented an independent secretariat from 1 July. The SRC has agreed to invite the System Operator (SO) for most items at quarterly meetings
- is leveraging SRC's independence and 'whole of system' perspective to identify blind-spots, current and future risks where action now can reduce pain later
- will continue to act as a 'canary in the coal mine', but take a firmer stance where we consider insufficient action is being taken
- has refreshed the SRC webpage to make our advice more accessible and draw attention to this page and advice through the Authority's 'market brief'

The SRC is pleased the more direct tenor of our advice has been well received by the Authority and we intend to continue this.

SRC members appreciated the opportunity to meet with the Authority Board on 25th August. Members were pleased that the stimulating discussion helped set the scene for the SRC meeting.

The August SRC meeting

The main focus of the August SRC meeting was the annual strategy and risk review. SRC also conducted a deep-dive on cyber security.

In addition the SRC received:

- a joint security of supply briefing from the Authority and System Operator:
- a briefing from the system operator on its annual security of supply assessment (SOSA);
- a review of the security of supply forecasting and information policy (SOSFIP).

Advice

As a general comment, the SRC is less optimistic than the presenters that new generation will arrive 'in time' to mitigate growing capacity and energy risk as gas generation declines, demand increases and becomes peakier. The risk is acute for the period to ~2028.

This letter sets out the discussion at the SRC's August meeting and its recommendations to the Authority, which are reproduced below:

1. **maintain pressure on participants** to mitigate near term energy and capacity risk (as done for 2025), to firm up and execute on generation build plans
2. **apply scrutiny to generation build** critical paths, understand impediments and act to address potentially systemic risk areas, for example, network connections
3. **prioritise improvement to / maturing of the generation pipeline.** It is the type of plant, its capacity (MW) and energy (GWh), plant (and connection) commissioning that really need to be understood when assessing security of supply risk
4. **accelerate rule changes** to enable / incentivise battery investment and mitigate capacity risk. These changes are shifting from 'nice to have' to 'must have' to mitigate near-medium term energy and capacity risk
5. **address the capacity and energy risks arising from increased intermittency.** As the proportion of intermittent renewables increases more flexibility is required. This includes sufficient thermal plant / fuel, batteries, efficient demand response, strategic fuel reserves and judicious use of contingent hydro storage.
6. **encourage creative and joined up thinking** in reviewing contingent storage access / the "Tekapo shadow constraint". Pursuit of greater flexibility, lower prices, stable security of supply, low environmental risk are worthy goals.
7. **lift understanding of cyber security** through engagement with participants and regulatory bodies. The Authority should have a role in shaping tiered/ proportionate rules to lift readiness/responsiveness for system critical and non-critical participants.
8. **encourage participants to engage in DPMC's upcoming consultation and consider voluntarily self-assess against Australian Cyber Security Standards.**

The recommendations above are primarily to the Authority. However, the SRC intends to write to the DPMC, as policy lead for cyber security regulation, to convey our advice directly.

1. Security of supply outlook

The joint Authority and System Operator briefing has become a standing item at each meeting. SRC finds this valuable for its information content, and the opportunity it provides to clarify, test and discuss the information, assumptions and forecast methodologies.

The August briefing covered the winter 2025 situation, the forecast supply / demand balance and security of supply outlook for 2026, historical and futures prices, fuel availability (hydro, gas, coal), generation plant availability and the 'generation pipeline'.

In discussion with presenters, SRC:

- recognised proactive steps by industry and regulators, which reduced security of supply risk (and constrained prices) in the face of declining gas production combined with historically low hydro inflows.

- welcomed publication of the Authority's 'generation pipeline', while noting limitations of current data / views for assessing future generation capacity and energy risk.
- queried drivers of increased 'peakiness' (6 of 12 historical peaks have occurred in 2025), noted lower capacity margins, increasing reliance on slow-start thermal and elevated capacity risk.
- questioned the extent to which investment and regulatory initiatives will be sufficient to address elevated capacity and energy risk to ~2028.

The SRC recommends the Authority:

- **apply scrutiny to generation build** critical paths, understand impediments and act to address potentially systemic risk areas, for example, network connections
- **prioritise improvement to / maturing of the generation pipeline.** It is the type of plant, its capacity (MW) and energy (GWh), plant (and connection) commissioning that really need to be understood when assessing security of supply risk

2. Annual strategy and risk review

The SRC held its annual strategy and risk review session. This involved:

1. Facilitated members discussion: SRC purpose, performance, environmental scan, a SWOT (strengths, weaknesses, opportunities and threats) assessment to inform a refresh of how the SRC can provide greatest value to New Zealand.
2. Hearing what stakeholders think: their perceptions of SRC, security and reliability risks and concerns, and, getting the most value from SRC. The
SRC heard from and spoke with James Kilty from Transpower, Tracey Kai from Electricity Networks Aotearoa, Andy Knight from the Gas Industry Company and Lucie Drummond from the Energy Transition Framework.
3. Discussion and capture. See below.

Common themes and sentiment from presenters were similar to those arrived at independently by SRC members in the prior discussion; and, broadly aligned with sentiment from the previous days' SRC – Authority Board discussion. These are summarised below.

Common themes / sentiment

Presenters thought the SRC:

- has a strong statutory mandate, the potential to draw on expertise of members and willingness of stakeholders to share information; to provide a firm, clear, expert and independent voice on the electricity system performance, security and reliability
- hasn't lived up to its potential - stakeholders perceive SRC as not truly independent of the Authority, are critical of its low profile and muted public voice. Support for independent secretariat and planned action to give prominence to its advice.
- has an increasingly important role to play. An independent, expert view, looking across the whole system is essential at this time, as vested interests interact with increasing pace of change, complexity and pressure on participants.

- focus is on the electricity system, but increasingly awareness of the broader energy system is needed as energy demand and supply side changes drive 'energy convergence' - now for gas/coal, over time for (some) liquid fuels.
- needs to retain its role as 'canary in the coalmine' but take a firmer stance where its advice is ignored or inadequate action is taken (by participants, regulators or both) to mitigate risk and prevent avoidable harm to New Zealand.
- is right to have done a self-assessment and have invited feedback, should make this routine – set goals, assess performance regularly so able to learn, improve and enhance value to New Zealand.

The SRC is fortunate that members individually have their own experience and information sources and stakeholders who are generally willing to share information. The SRC welcomed an offer to collaborate with the Energy Transition Framework where valuable and appropriate.

3. Cyber security

The National Cyber Security Centre (NCSC), Transpower and Vector presented to the SRC and joined a group discussion with the SRC. The discussion was facilitated by Tracey Kai from Electricity Networks Aotearoa.

The NCSC:

- provided an overview of the global cyber threat environment, which is worsening with three geopolitical shifts playing out: from rules to power, from economics to security and from efficiency to resilience.
- summarised the New Zealand cyber threat landscape, which is worsening with geopolitics and strategic competition, increasing cyber dependent / enabled crime, improving 'tradedcraft', lower technical barriers to entry for malign actors and increase in state sponsored activity.
- noted 34 cyber incidents for nationally significant organisations in energy, water and waste services, the majority of which were financially motivated and of which five were service impacting / required remedial action incidents.
- expects these trends to continue, with energy as a target for sophisticated actors who have the ability to access and remain undetected for a long period of time. Encourages regulators to support / mandate pursuit of good practice, proportional to the risk / criticality of the entities.

Transpower:

- considers the gap between threat and readiness to be widening as the sophistication of malign actors outpaces local parties' readiness. Recognises entity reporting, information sharing and regulation needed.
- considers much to learn from the Australian experience as regulation is developed in New Zealand (by DPMC). Specifically, that a 'one size fits all' rules, which fail to account for the differing risk and criticality levels of each entity, risks setting the bar too high for some and too low for others. This risks weakening protections for both system critical and non-critical parties.

Vector:

- described its work to grow a cyber security community amongst New Zealand's electricity distributors, that there had been a significant uplift in awareness, engagement and understanding and, as a result, readiness in recent years.
- observed that most of the cyber security technology products available today are very good now (this was not the case previously). Vector provided an overview of the services it offers and these are intended to lift capability and readiness and to “teach to fish, rather than catch the fish for them”.

Common themes

- the sophistication of and tools available to malign actors continue to grow and proliferate. Cyber threat environment is worsening.
- awareness, understanding, engagement and commitment has increased markedly in the last three years – with almost all (or all) network providers and generators involved in NCSC ‘exchanges’ such as the CSSIE group (Control Systems Security Information Exchange).
- the understanding of risk and system criticality is maturing, this should support design of proportionate regulation that lifts maturity, readiness and responsiveness of both system critical and non-critical parties.
- the perceived protection between internet/cloud based systems and physical plant control based systems is a misnomer as supply chain threats can compromise physical systems remotely.

SRC's advice to the Authority:

- **lift understanding of cyber security** through engagement with participants and regulatory bodies such as NCSC and DPMC. The Authority should have a role in shaping tiered/ proportionate rules to lift readiness/responsiveness for system critical and non-critical participants.
- **encourage participants to** engage in DPMC's upcoming consultation and consider voluntarily self-assess against Australian Cyber Security Standards.

It is evident electricity sector participants are engaged on cyber risk and improving readiness. This is an area where risk appears to be increasing, despite endeavours of participants. The Authority should have (a) a good understanding of risk and readiness (for example, regular survey or information provision¹) (b) can provide a valuable role in shaping rules under development by the DPMC.

4. 2025 Security of Supply Assessment

SRC members were already in possession of the System Operator's final 2025 annual security of supply assessment (SOSA). The System Operator was invited to present headlines from the SOSA, changes since it was published on 30 June and share key insights.

¹ The surveys conducted by SRC in 2021 and 2022 were cited by presenters as an example of what could be done annually by the Authority. An AEMO survey was also referenced.

The presenter explained that SOSA looks at winter energy and capacity margins over a ten-year period taking into account forecast demand, demand profile and new generation known or expected to come online:

- the SOSA analysis presents a very tight energy and capacity outlook where there is little margin for higher than forecast demand growth, plant retirement, fuel shortage or delayed commissioning of new generation
- there is a moderate likelihood that even faster build of new generation will be needed to keep winter energy margins above the NZ electricity standard

The SRC recommends the Authority:

- **maintain pressure on participants** to mitigate near term energy and capacity risk (as done for 2025), to firm up and execute on generation build plans.
- **accelerate rule changes** to enable / incentivise battery investment and mitigate capacity risk. These changes are shifting from ‘nice to have’ to ‘must have’ to mitigate near-medium term energy and capacity risk.
- **address the capacity and energy risks arising from increased intermittency.** As the proportion of intermittent renewables increases more flexibility is required. This includes sufficient thermal plant / fuel, batteries, efficient demand response, strategic fuel reserves and judicious use of contingent hydro storage.

5. SOSFIP review

The System Operator updated the SRC on progress with its SOSFIP review. The SRC:

- supports the System Operators work and recognises the opportunity to refine energy risk curves, simulated storage trajectories and “watch” and “alert” triggers
- notes the project timeline and intention to submit proposals to the Authority in December 2025, with the intention changes are in place before winter 2026.

The SRC’s view is, if flexibility can be increased (and prices reduced) while preserving or enhancing security of supply and without unduly impacting local environments, then this should be done. SRC recognises there are regulatory complexities and hopes the System Operator, Authority and Government are all joined up and thinking laterally about how to overcome these.

The SRC recommends the Authority:

- **encourage creative and joined up thinking** in reviewing contingent storage access / the “Tekapo shadow constraint”. Pursuit of greater flexibility, lower prices, stable security of supply, low environmental risk are worthy goals.

6. The SRC’s next meeting

The SRC’s Q4 (October 2025) agenda is still being finalised. The following themes are being considered:

- a. Technical standards: the extent to which standards falling out of date exposes New Zealand to future system security risk and unnecessary costs. Case study: inverter standards.

- b. Implications of falling gas production on the electricity system: fuel for generation (capacity/energy), impacts of accelerated gas to electricity conversion (generation / network capacity, energy)
- c. Annual System Operator performance assessment

Yours sincerely,

A handwritten signature in dark ink, appearing to read 'H Roy', is positioned above the typed name.

Hon Heather Roy
Chair of the SRC

cc: SRC members, Natalie Bartos, Hayden Glass (Authority)

16 October 2025

Hon Heather Roy
Chair
Security and Reliability Council (SRC)

By email: heatherjroy@gmail.com

Dear Heather,

Re: SRC advice from its 26 August meeting

Thank you for your letter of 12 September 2025. The Electricity Authority Te Mana Hiko (Authority) Board considered the SRC's advice at its 29 September 2025 meeting. This response reflects that consideration.

Maintain pressure on participants to mitigate near term risks (as done for 2025)

The Authority agrees that we should maintain pressure on participants to mitigate near-term security of supply risks. We are actively monitoring and reporting on risks for winter 2026, including the level of industrial demand, new generation capacity, demand response agreements, and the availability of thermal units and fuel.

The Commerce Commission's draft determination to authorise the Strategic Energy Reserve Huntly Firming Option is a significant and positive development that materially reduces security of supply risks for winter 2026 (and the decade ahead). As a result, we do not consider a repeat of the contingent arrangement review undertaken for winter 2025 to be necessary at this stage.

Apply scrutiny to generation build critical paths and continue to mature generation pipeline information

We are committed to improving our [generation investment pipeline](#) dashboard over time. We appreciate SRC's suggestions for improvement and have engaged with the secretariat to explore its recommendations in more depth.

We are working on getting data on distributed generation and looking at expanding our information gathering powers. This could enable more effective data sharing with the System Operator to support security of supply monitoring.

Accelerate rule changes to enable BESS investment and mitigate capacity risk

Enabling BESS is a priority for the Authority. Our [BESS roadmap](#) sets out what we have done so far, and what we are planning to do over the next two years.

Consultation in June/July showed strong support for the roadmap. The work programmes in the roadmap address a wide range of challenges such as:

- Reviewing the common quality requirements for BESS
- Improving the wholesale market arrangements for BESS (including hybrid plant)
- Updating the regulatory settings for distribution networks to accommodate the growth of technologies such as BESS
- Improving visibility of distribution network constraints to support more targeted investment in distributed energy resources such as BESS
- Improving the transmission pricing methodology to better support BESS
- Ensuring correct incentives for investment in smaller-scale BESS

We are reviewing the BESS roadmap in response to feedback received in the consultation and will publish the updated roadmap by the end of the year.

Address the capacity and energy risks arising from increased intermittency

The Authority's efforts on the risks from increased intermittency are focused on ensuring that market participants have access to the best available information, and on removing any inefficient barriers to investment from the Code.

For example, in addition to our BESS work, and the recently launched centralised forecaster for intermittent generators, we are at present establishing an Emergency Reserve Scheme. We intend for a first version of this scheme to be in operation by winter 2026. We are also investigating repurposing the multiple frequency keeping (MFK) tool as a five-minute variability management tool to provide cover for a sudden reduction from intermittent generation sources.

We would welcome SRC input on additional changes the Authority could make to help reduce system risks as intermittent generation grows. As you know, the Government has recently announced some proposals to strengthen security of supply, including a new regulatory framework to incentivise investment in firm generation. We look forward to engagement with MBIE and the System Operator as the details of these proposals are clarified.

Encourage creative and joined up thinking in reviewing contingent storage arrangements

The Authority has been meeting regularly with the System Operator and MBIE to facilitate joined up thinking on the contingent storage arrangements set out in the System Operator's security of supply forecasting and information policy (SOSFIP). As part of the current SOSFIP review, the Authority has encouraged the System Operator to think broadly about the problem and to present options other than the status quo and the options proposed by participants.

We think that the System Operator's proposal to increase the contingent storage release boundary default buffer to better account for operational limitations is a sensible improvement on the status quo and a reasonable balancing of the interest involved. We look forward to receiving the System Operator's final proposal in December.

Lift understanding of cybersecurity and encourage engagement in DPMC's upcoming consultation

The Authority welcomes the SRC's focus on lifting cybersecurity awareness across the sector. Though it falls outside our current functions, we agree that maintaining cybersecurity is an important issue for system resilience, especially amongst distributors, and we support efforts to promote engagement with policy and regulatory bodies such as NCSC and the DPMC.

We are pleased to see the positive engagement from participants on this issue. As suggested, we will encourage market participants to engage with DPMC's upcoming consultation and to consider voluntary self-assessment against the Australian Cyber Security Standards, where appropriate.

Thanks again for the work of the SRC. It is always helpful for the Board to receive its independent and expert view.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Anna Kominik', with a stylized, cursive script.

Anna Kominik
Chair
Electricity Authority Te Mana Hiko

ACTION LIST

The following are the current SRC actions for completion.

	Action	Date for completion	Status
1	Secretariat progress changes to SRC webpage and inclusion in relevant editions of the Authority's 'market brief'.	October	Completed
2	Secretariat to look into a tracker or similar for actions arising from SRC recommendations.	October	Completed
3	Secretariat to obtain the updated presentation slides and circulate to members (for all 'on the day' presentations).	October	Completed.
4	Secretariat to schedule briefing from System Operator on SOSFIP consultation proposals.	October	Completed
5	Secretariat to add foundation documents to Diligent resource area and to add briefs for theme papers.	October	Completed

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/>.

Generation pipeline

- 1.1.4 The EA is consulting on proposals to include significant load and generation connecting to distribution networks. Link to the consultation [Proposals to improve visibility of distributed generation and load pipeline | Electricity Authority](#)
- 1.1.5 This information will complement existing information gathered by Transpower which is the basis for its current 'generation pipeline'. SRC commented on the Authority's generation pipeline in its August Advice.

SRC member thoughts on this section

- 1.1.6 Members should already receive the EA's 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 In the news, interesting publications

- 1.2.1 The long-awaited Frontier report and the Government's response was published earlier in October. The package of documents is available here: [Securing New Zealand's energy future | Beehive.govt.nz](#)
- 1.2.2 The appendix presents the published summary of Frontier recommendations and Government decisions.
- 1.2.3 The Commerce Commission has provisionally approved the Genesis-Contact-Meridian-Mercury agreement to establish a strategic energy reserve at Huntly. Link to [Commission release](#).
- 1.2.4 The Agreement establishes a strategic energy reserve at Huntly. Genesis says it will ensure 720MW of Rankine capacity (3 Rankine units) remains available for another decade and support a solid fuel reserve of 600kt for dry winters and low inflows.
- 1.2.5 Boston Consulting Group (BCG)'s 'mind the queue' report looks at challenges grids are facing around the world meeting demand to connect new generation and load. The report doesn't look at New Zealand, but the issues are just as applicable here. You can access the report here: [mind-the-queue-connection-reform-for-the-electricity-grid-r2.pdf](#)
- 1.2.6 Fraser Whineray (former Mercury CEO) argues in the Herald that New Zealand needs two additional 500MW thermal plants, flexible enough to run on coal, gas, black pellets or blended biomass at Huntly and Marsden point. Article here (paywall): [We're headed for electricity shock: Four urgent policy fixes to insulate us – Fraser Whineray - NZ Herald](#)

1.3 Looking to winter 2026

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

1.4 SOSFIP review

- 1.4.1 The SO has published its draft amendment proposal. The consultation paper is available [here](#). The SO's briefing to SRC from 14 October will be circulated.

1.5 System operator security of supply updates

- 1.5.1 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."*
- 1.5.2 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.

- 1.5.3 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>
- 1.5.4 If members have concerns, or require further information, about the system operator security of supply updates, they can raise these with the secretariat.
- 1.5.5 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>

1.6 System operator weekly market movements

- 1.6.1 Link to Transpower's [Market Operations Weekly Report | Transpower](#).
- 1.6.2 The report provides an overview and update on security of supply (energy and capacity), generation breakdown and risk curves, amongst other information.
- 1.6.3 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.

1.7 New Zealand Generation Balance - NZGB

- 1.7.1 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 \(transpower.co.nz\)](#).
- 1.7.2 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).

1.8 Scheduled generation outages

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

1.9 Load Duration Curves

- 1.9.1 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
- 1.9.2 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. Does the SRC have a preference for how information in this paper is presented?

Appendix: electricity market review - Frontier recommendations, Government response, SRC relevance

	Frontier recommendation	Government response and action	SRC relevance
Energy security, monitoring and competition			
1	The Crown to establish an entity to take primary responsibility for securing and selling thermal fuel and firming capacity	Agree with diagnosis but not with creation of a centralised Crown entity. Instead, responsibilities for energy security will be distributed across existing agencies. • Transpower will provide enhanced energy risk assessments. • The Crown will commence procurement of LNG infrastructure. Government will develop a regulatory framework to incentivise the sector to invest in firm generation. • The EA will oversee and enforce the regulatory framework.	
2	Publish additional information via a single 'gas market dashboard'	Agree. Reporting of reserves and production will be accelerated, supported by a public dashboard and regular supply–demand studies.	✓
3	Require an annual gas supply and demand study by the GIC	Agree, and will ensure the supply and demand study is produced annually.	✓
4	Update the North Island Winter Capacity Margin	Agree. EA has commenced an independent review of the Security of Supply Standards.	✓
5	Require Transpower produce an annual Electricity Opportunities Statement	Agree, and will progress with Transpower, EA, and New Zealand Trade and Enterprise.	✓
6	Require Transpower maintain a market surveillance data catalogue to assist the EA's market monitoring	Agree, and will progress as part of the work to strengthen the EA.	✓
7	Require EA fill gaps, and make better use of, hedging data and do an annual hedge market assessment	Agree, and will progress as part of the work to strengthen the EA.	
8	Require the EA develop a more sophisticated approach to assessing market power	Agree, and will progress as part of the work to strengthen the EA.	
9	Do not progress non-discrimination requirements for the gentailers as these options will not resolve the underlying issue in the market	Government agrees the non-discrimination measures will not address the underlying problem of a lack of new firm capacity in the market. However, the non-discrimination measures complement the actions to improve security of supply set out in this table.	
Energy markets' structure			
10	Divest Crown shareholdings in Genesis, Meridian, and Mercury to address capital constraints	Shareholding Ministers have been clear to the three Mixed Ownership Model companies that they should explore commercially sound opportunities for new	

		generation, and perceived barriers should not impede consideration of such projects. Assets sales are not being progressed.	
11	Remove electricity from the Emissions Trading Scheme (ETS)	Disagree. Government remains committed to the ETS as central to climate strategy.	
Regulatory institutions			
12	Merge the EA and GIC into a new "Energy Authority"	This could create uncertainty at a critical time. Instead, Government will focus on strengthening the Electricity Authority.	
13	Confirm a formal Code change process for the EA	Agree, and will progress this as part of the work to strengthen the EA.	
14	Launch a targeted review of how the EA performs its functions	Government will focus on strengthening the EA. An effective regulator is essential for a well-functioning electricity market and must have the right tools for the job.	✓
15	Retain System Operator role within Transpower	Agree.	
Network regulation			
16	Amalgamate the 29 electricity distribution businesses (EDBs) into five super distributors	Agree with diagnosis, but not with the forced amalgamation of EDBs. Instead, Government is encouraging greater efficiency and the EA and Commerce Commission are progressing measures to promote greater alignment and innovation.	
17	Move to Individualised Price Paths for all Electricity Distribution Businesses	Agree that further oversight could improve efficiency. However, this can be achieved without the need for individualised price paths.	
18	Retain existing restrictions on EDBs owning and controlling generation assets in their own service areas	Agree. The threshold for generation connected to an EDB's own network will be lifted from 50 MW to 250 MW (rather than be removed).	
19	Require the EA to determine the scope of Input Methodologies (IMs) for EDBs	Disagree as this would not materially improve outcomes.	
20	Allow the Commerce Commission to benchmark performance of Electricity Distribution Businesses	Agree in principle. This could be considered in a targeted review of Part 4 of the Commerce Act.	
21	Include a financeability test in the regulatory framework	Disagree (note this was considered and rejected by the Commerce Commission in 2023).	
22	Introduce a streamlined Investment Test for Transpower for projects below the \$30 million base capex threshold but above e.g. \$8 million	The Commerce Commission can already consider this.	
Improving consumer information			
23	Achieve electricity bill consistency	Agree. The EA will consult on standardised bill information before end of 2025.	
24	Improve consumer data access to make comparison and switching easier	Agree. A consumer data right for the electricity sector is being progressed.	

Security of supply update

SRC 23 October 2025

Agenda

- Current situation update
- Investment pipeline
- SoS outlook
- EA regulatory action underway

ELECTRICITY AUTHORITY UPDATE

Current situation + Investment
pipeline

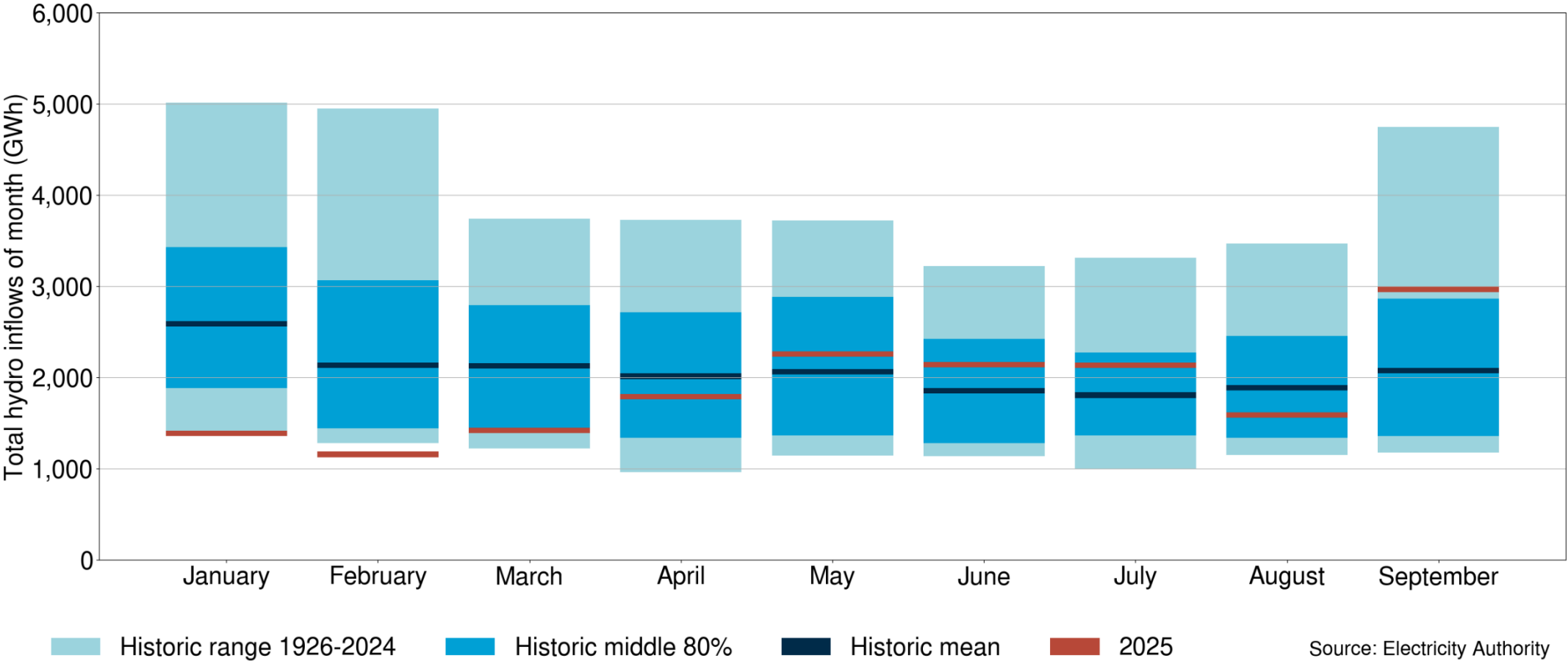
Current Situation

- **Hydro storage has been increasing:** 123% of mean and 76% nominally full as of 20 October
- **Snowpack improving:** Just above historic mean
- **Huntly 5 off** to release gas for industrials.
- **Demand falling** as weather becomes warmer, less thermal generation.

Rainfall and decreasing demand have reduced prices from late August:

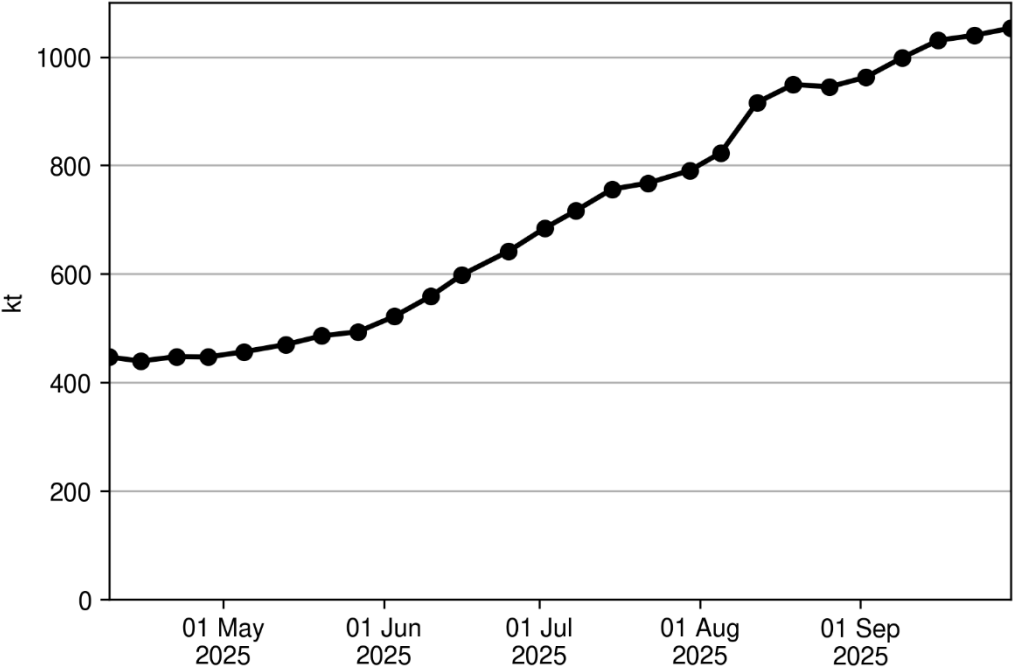
- Average spot price for October so far is \$38/MWh, compared to \$177/MWh during August and \$115/MWh during September.
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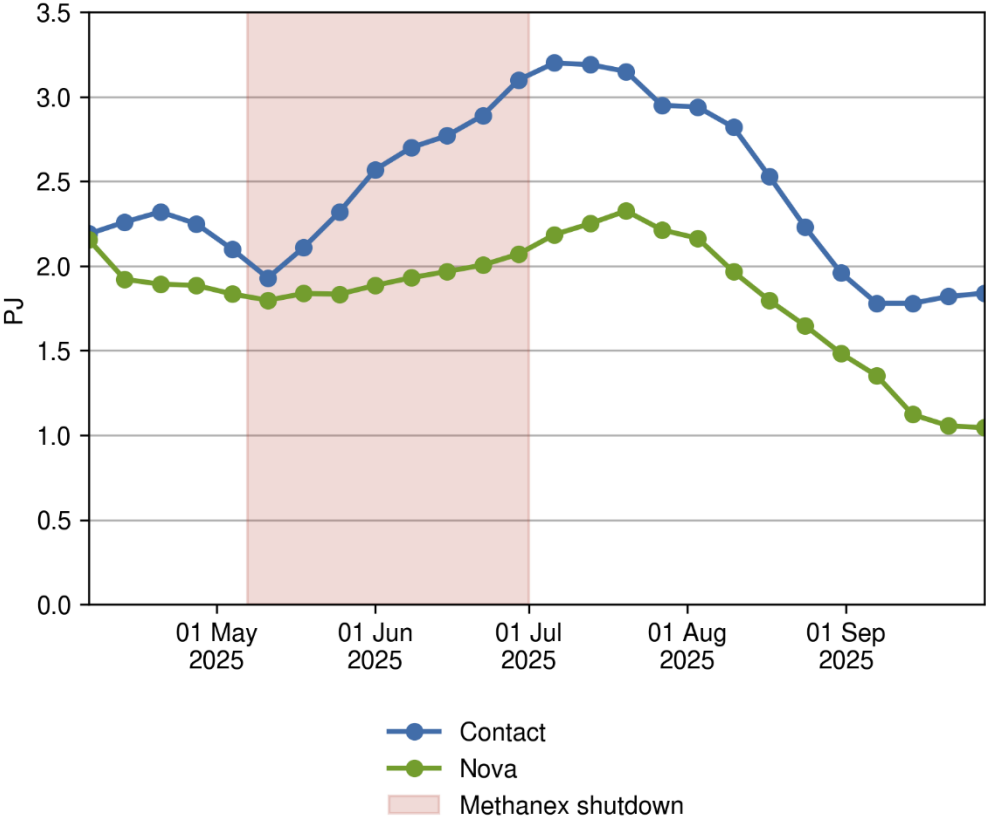


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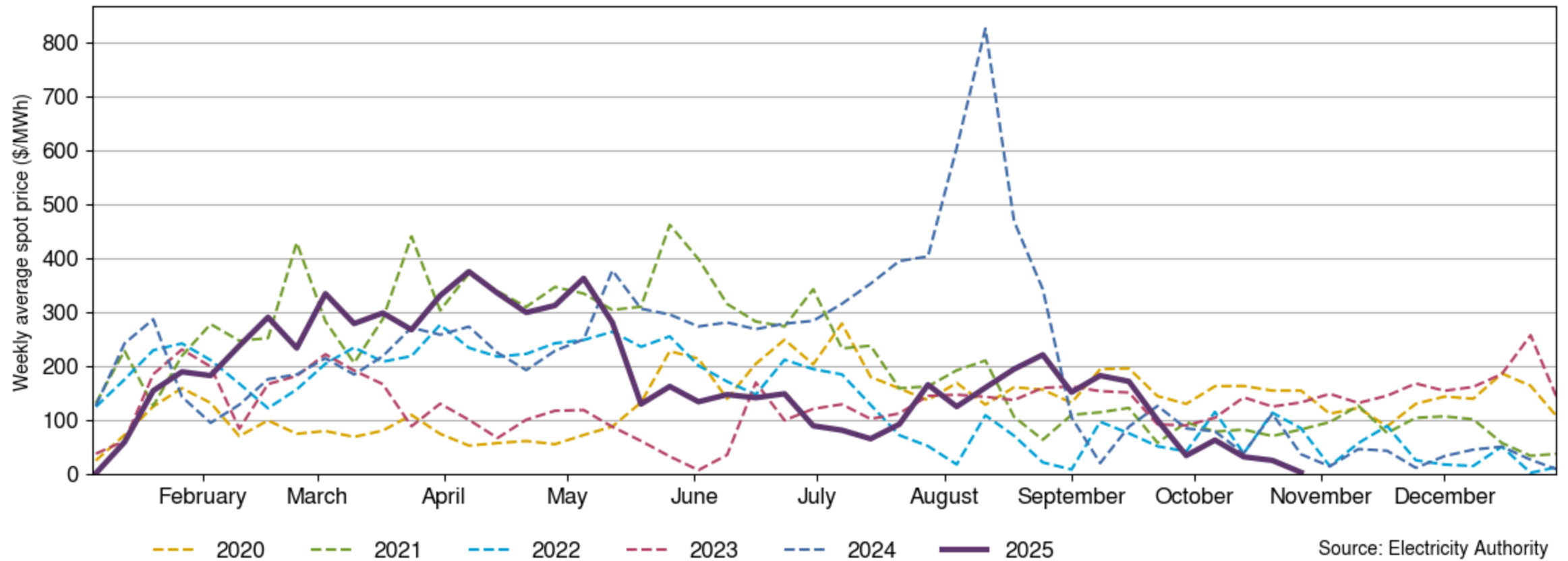
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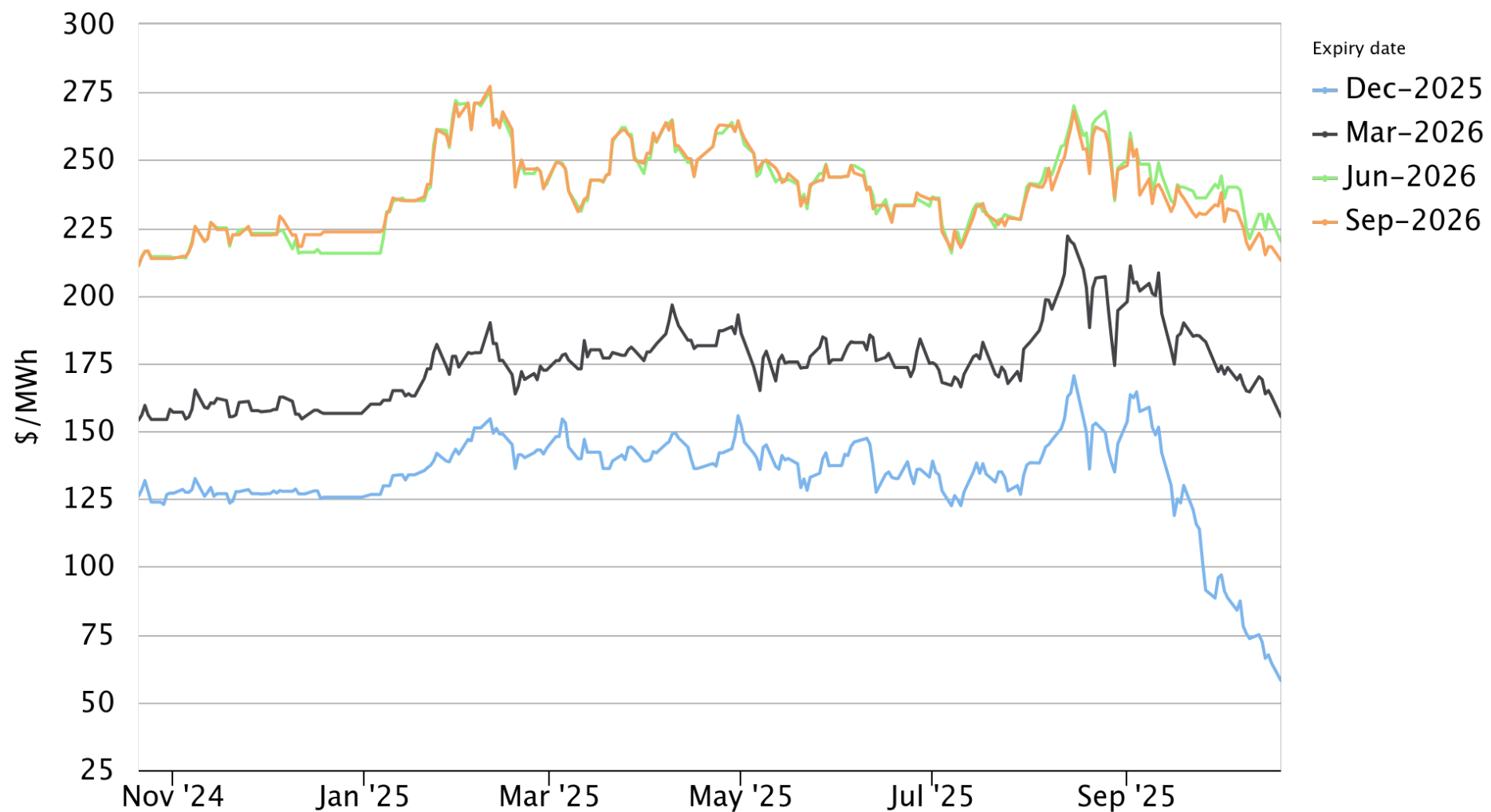
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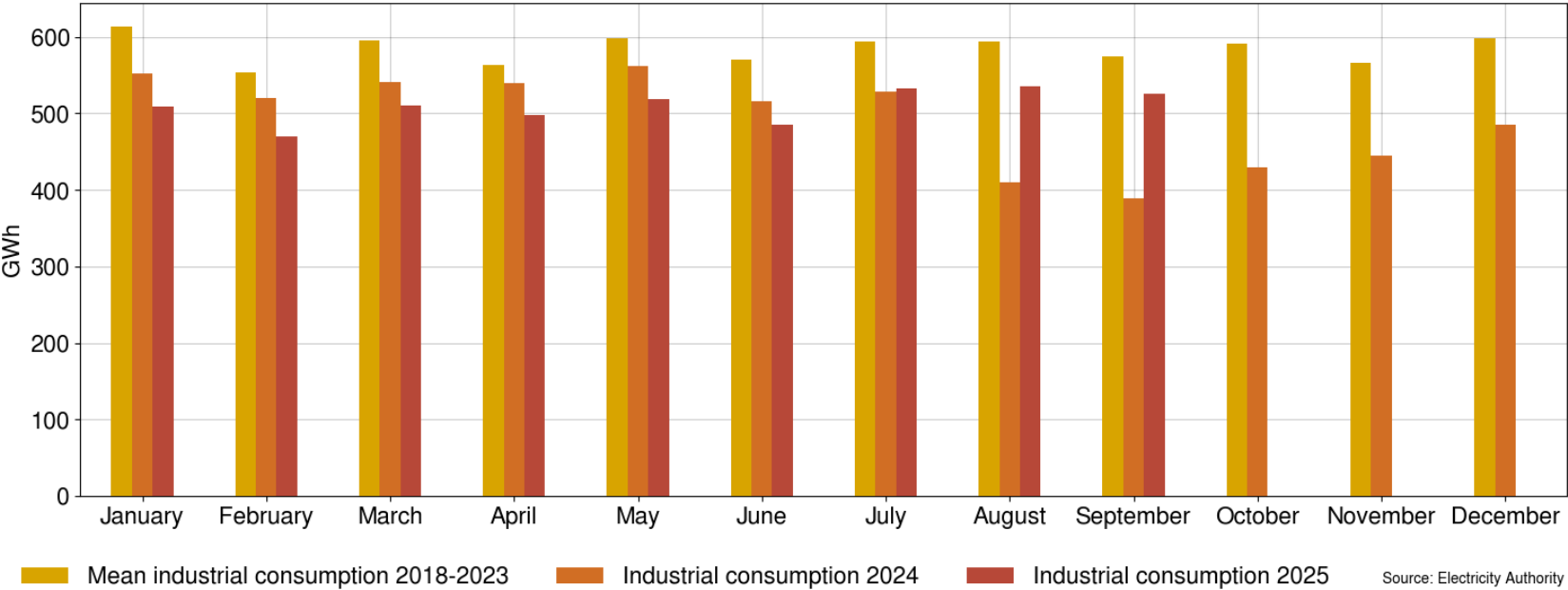
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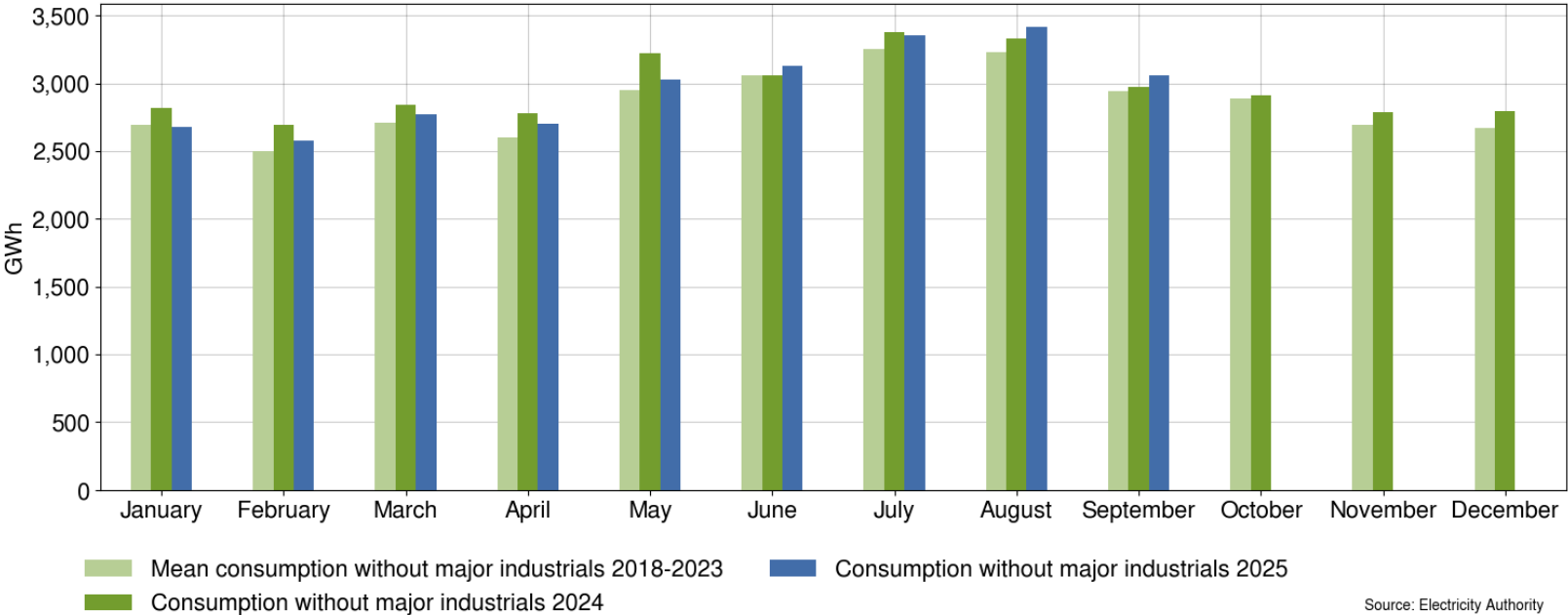
emi.ea.govt.nz/r/olqqg

Growing residential demand and falling industrial demand

Industrial



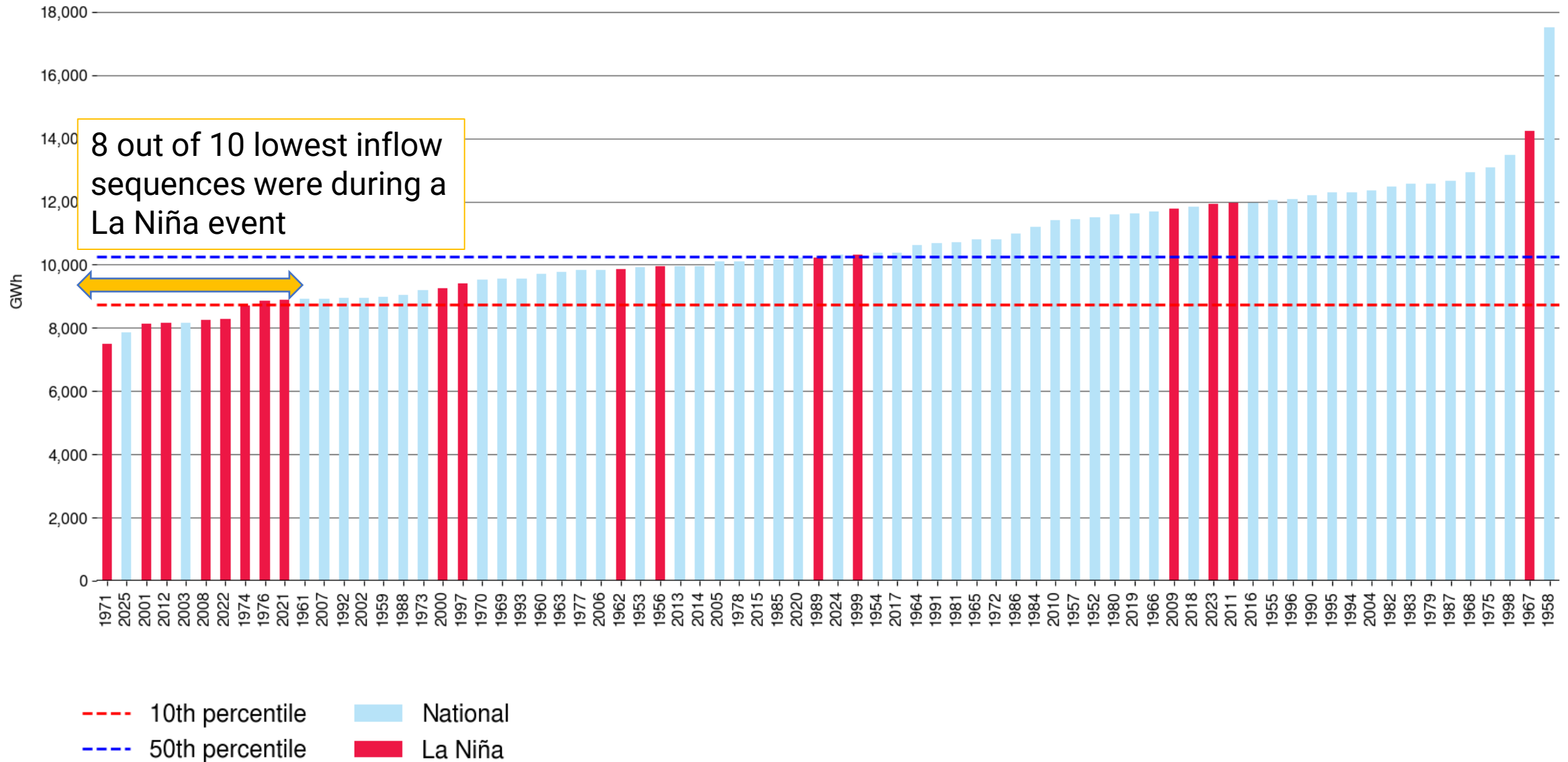
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January-May national inflows since 1952





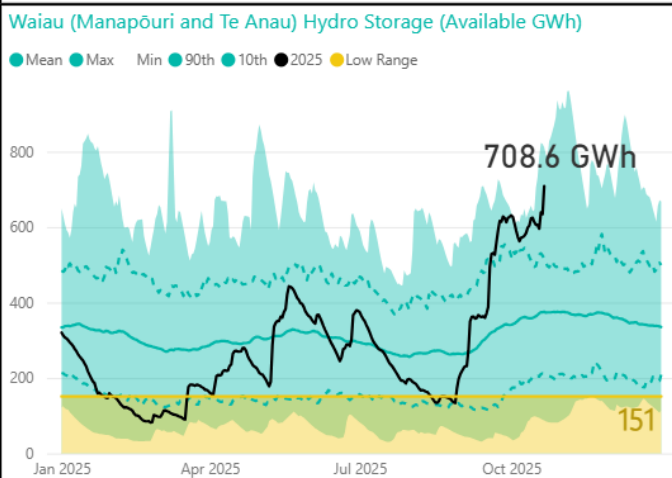
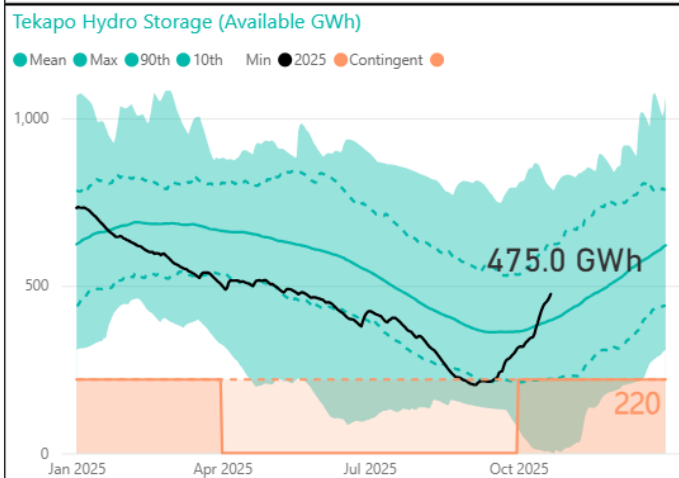
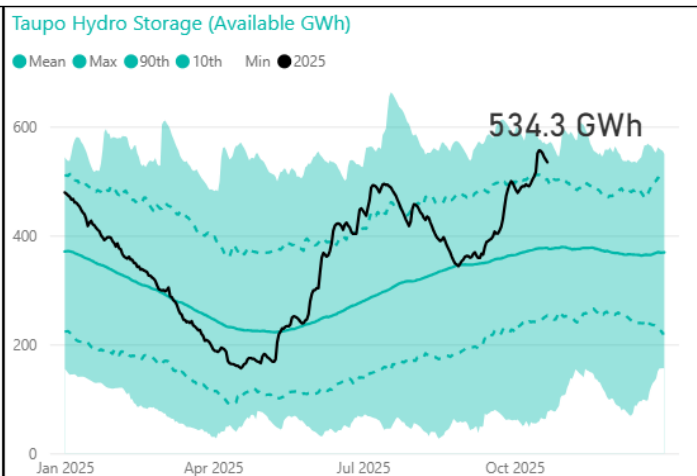
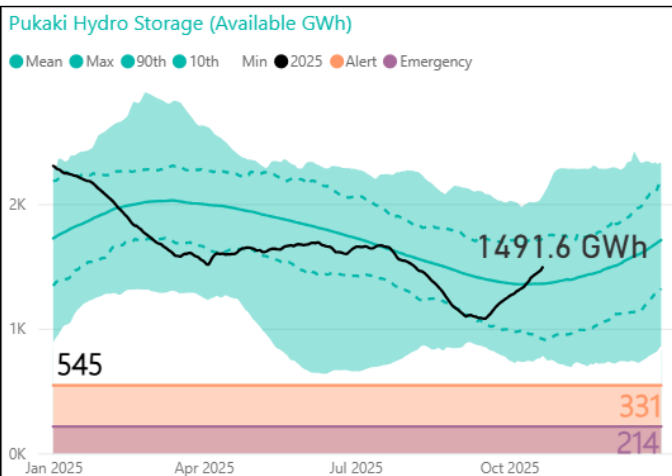
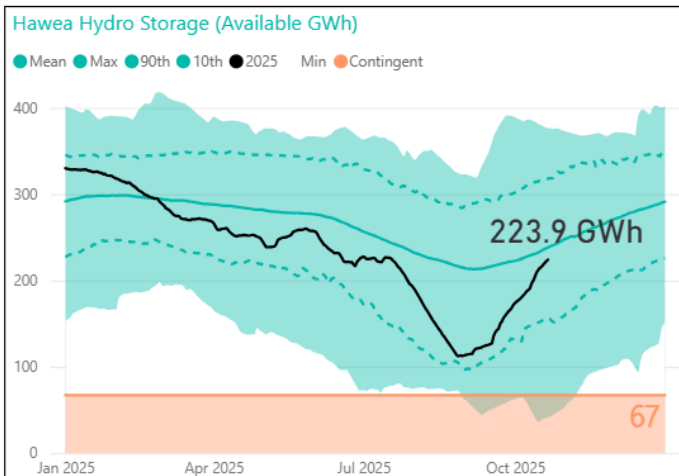
TRANSPower

System Operator update

Security of supply outlook



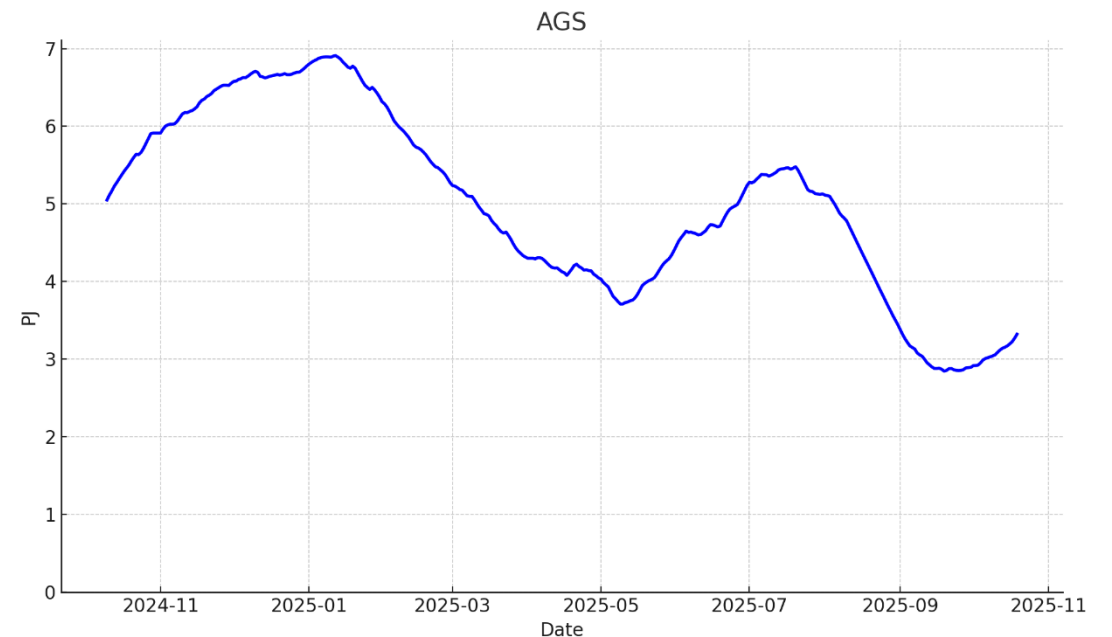
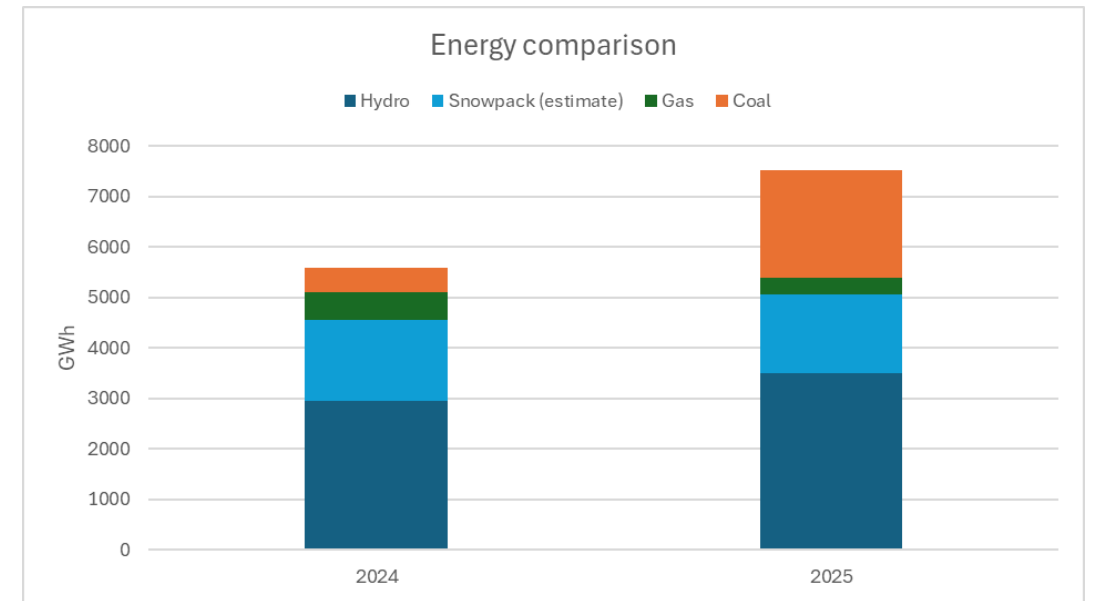
Hydro storage by scheme



Lake	Current (%) avg
nz_controlled	125
si_controlled	122
hawea	94
pukaki	110
manapouri	191
te_anau	187
tekapo	120
taupo	142

Stored fuel

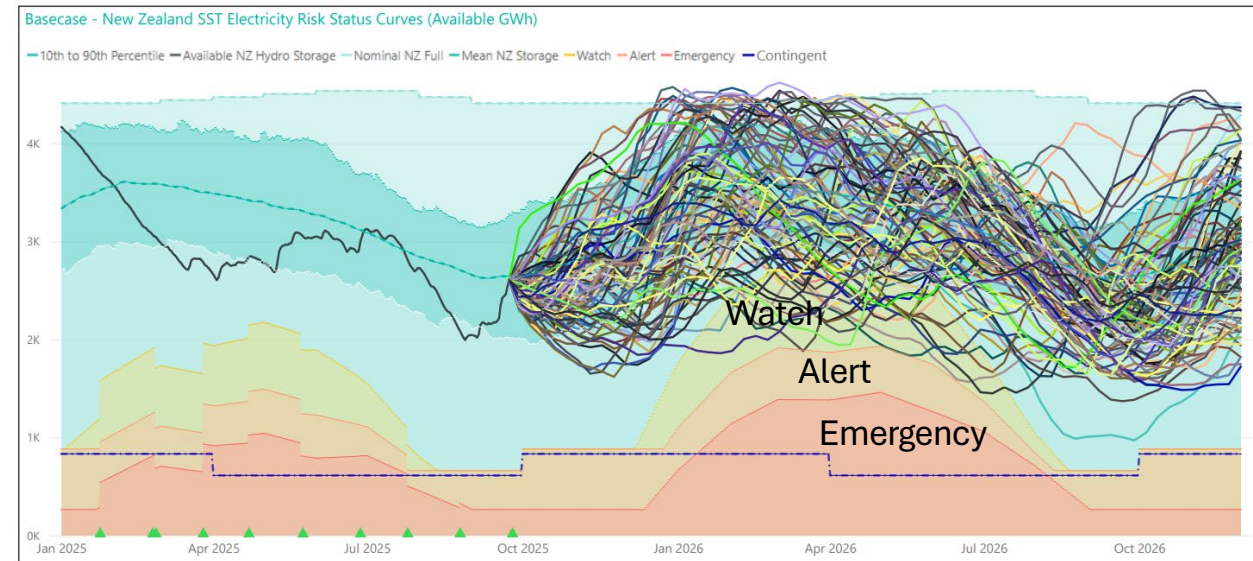
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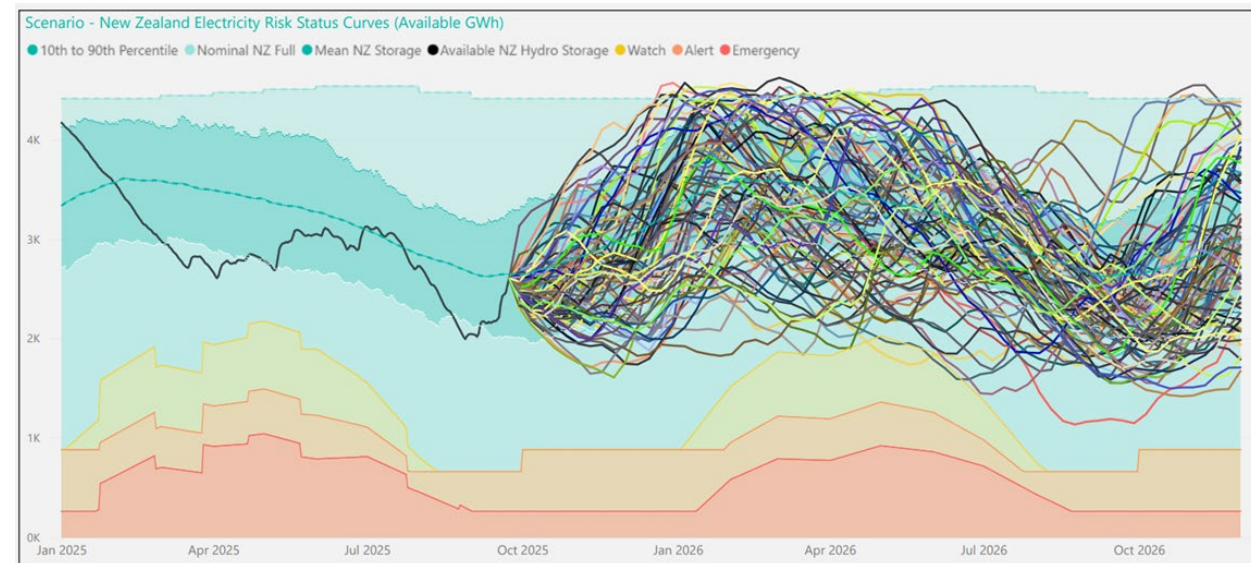
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- Above average inflows in September has lifted storage above mean
- Increased energy risks in 2026 if no 3rd Rankine
- 31 SSTs cross NZ Watch in 2026, 1 SST crosses the Alert
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- Agreement signed to support 3rd Rankine + fuel reserve at winter start (initially 600 kT)
 - ComCom draft decision on 29-Sep is to grant authorisation
- TCC modelled as exiting in 2026

No 3rd Rankine

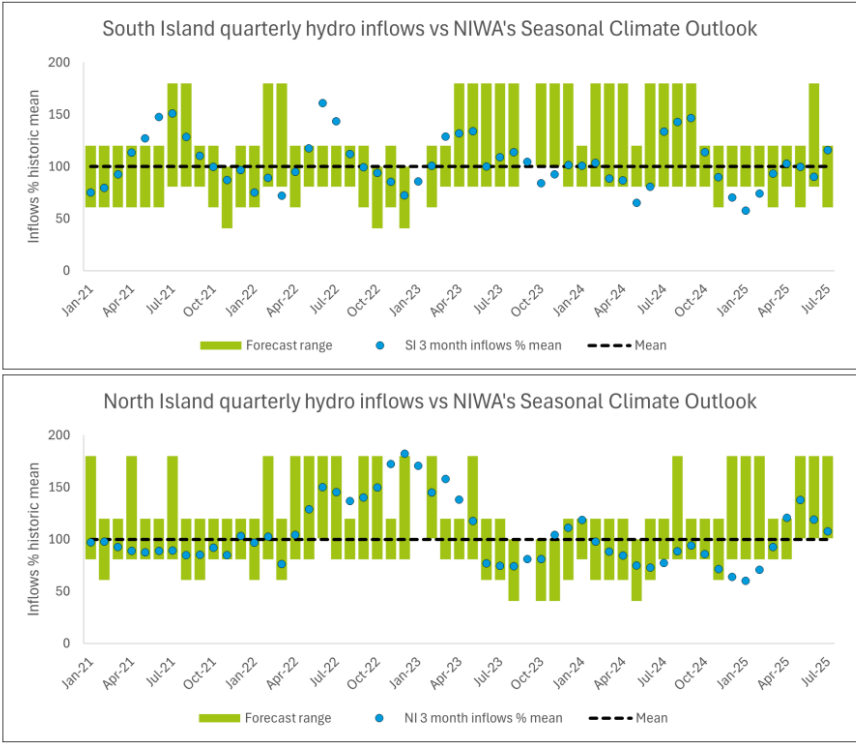
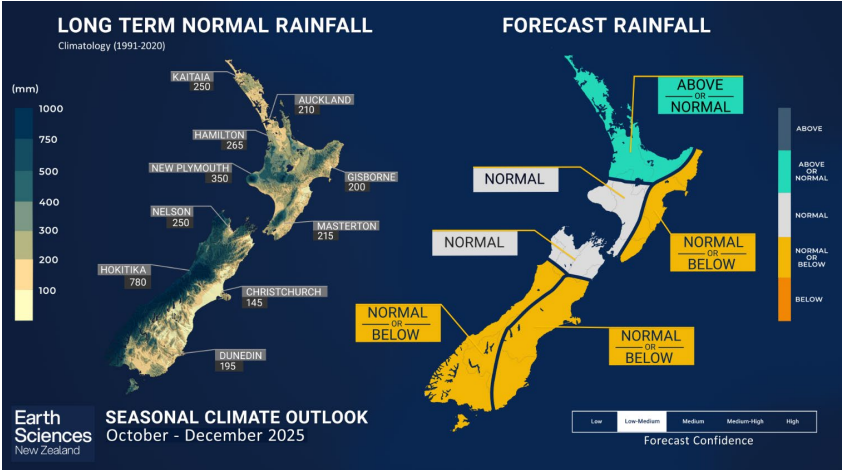


With 3rd Rankine



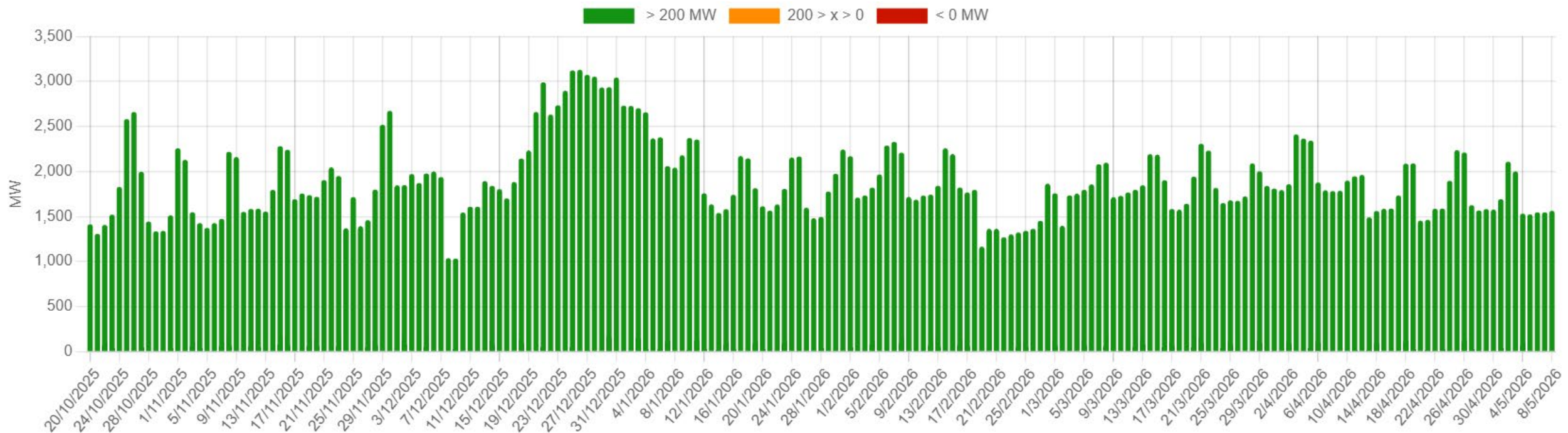
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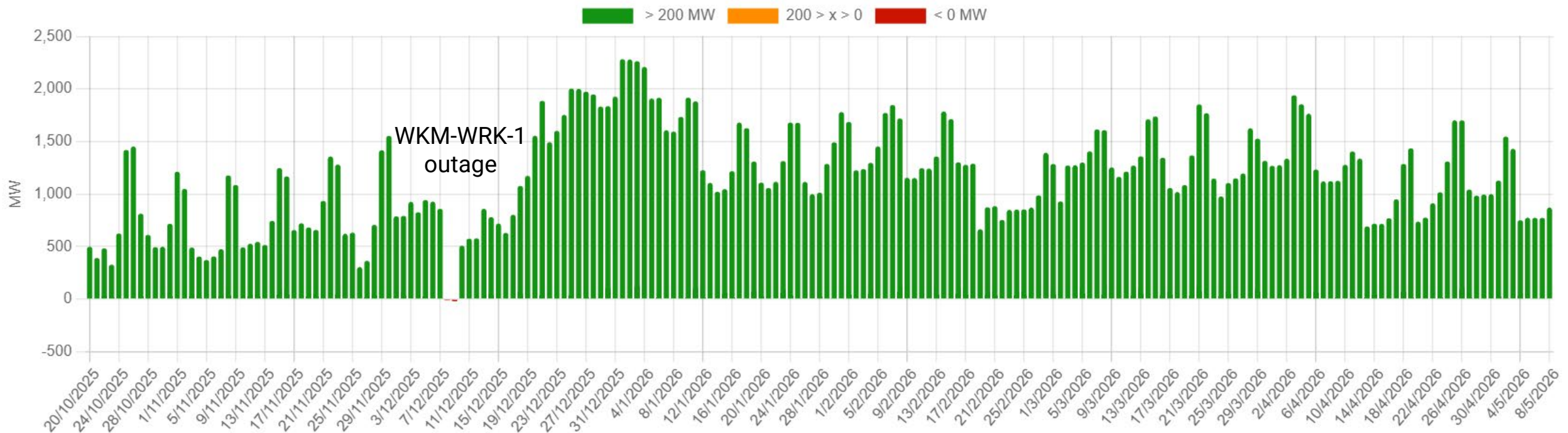
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- NZGB looks at national generation capacity available to meet demand
- Capacity not on outage is offered into the market
- N-1 margins are looking healthy out to early 2026



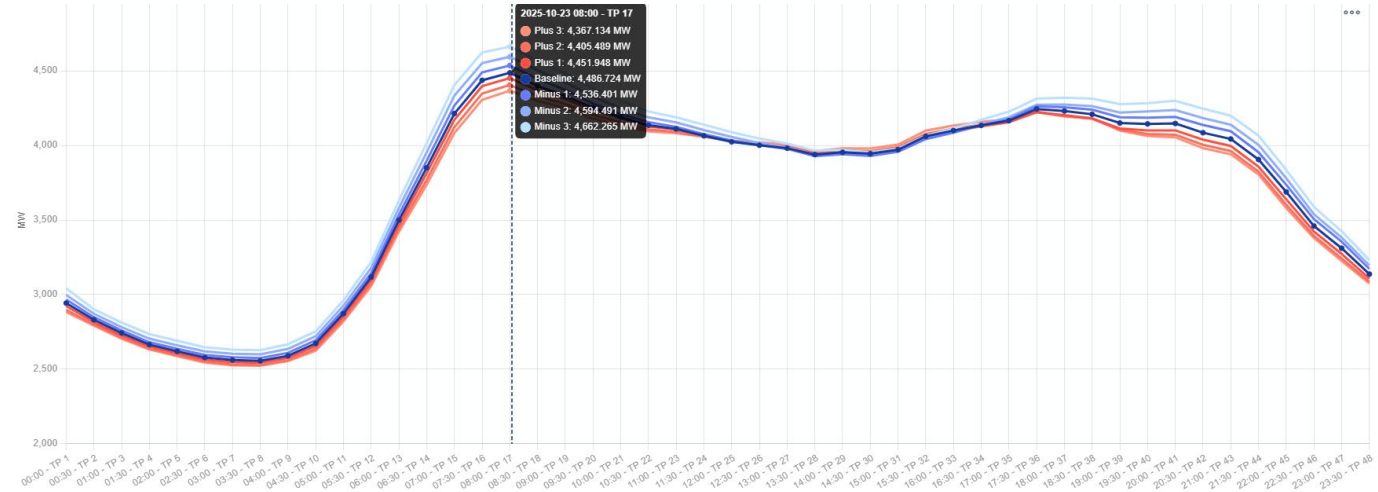
NZGB update: Colder weather and Firm capacity

- Impact of downside risks
- Colder weather = higher demand (P99)
- Some slower start thermals not committed – More likely if hydro storage increases + Huntly 5 not operating from Oct-Dec
- Increased risks in early Dec (transmission outage)



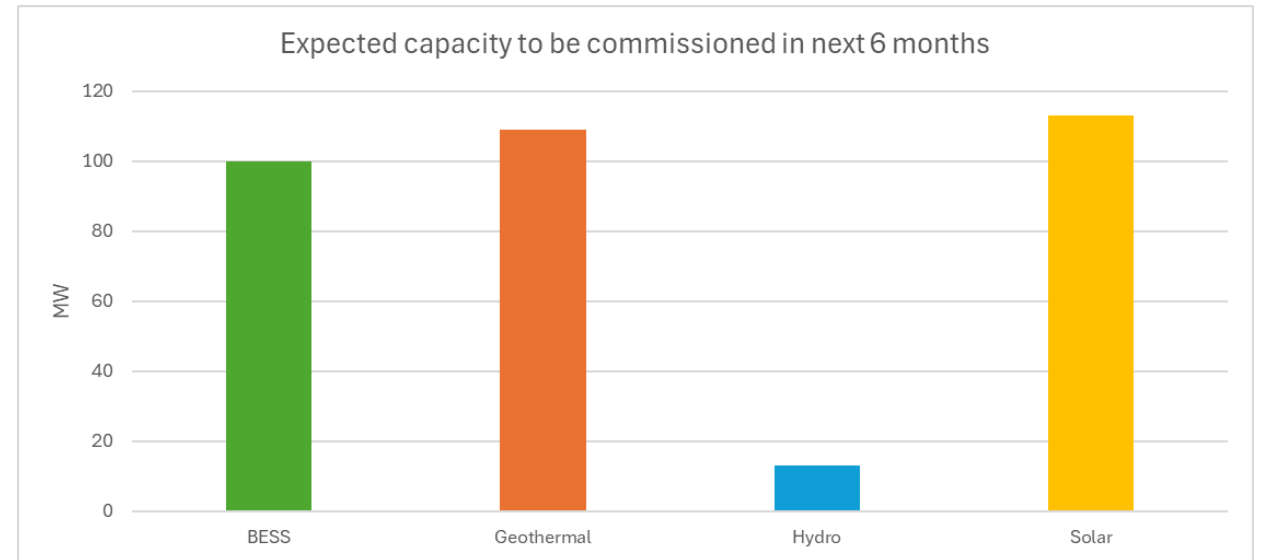
Temperature sensitivity

- Cooler temperatures in these shoulder months can increase load
 - 1 degree cooler ~ 50 MW
 - 2 degrees cooler ~ 110 MW
- Less severe than during mid-winter
- Can cause issues if combined with limited generation availability (e.g. low thermal commitment, low wind generation, plant outages)



New supply commissioning

- Additional supply expected to come online by 1-May-26
- 100 MW Glenbrook battery – will help manage capacity risks
- 113 MW (~225 GWh annual energy) of solar – limited support for energy and capacity
- 109 MW (~860 GWh annual energy) of geothermal



Looking ahead to Spring/Summer/Winter 2026

- Upcoming Spring/Summer:
 - Low thermal commitment with increasing hydro and HLY5 offline from Oct-Dec
 - Increasing planned outages (including transmission)
 - Increased capacity risk during cold snap with low wind
- Winter 2026:
 - Keeping a close eye on gas production forecasts and downstream impacts
 - Ensuring fuel and plant availability ahead of winter 2026 will help manage risks
 - Availability of three Rankines + fuel is a key risk for winter 2026
 - Plant availability (existing and new build)



SO initiatives

- 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 - Consultation in progress
- Winter 25 review – In progress
- SOSA 2026 Reference Case and Sensitivities – In progress



ELECTRICITY AUTHORITY UPDATE

Regulatory action underway

EA Near-term regulatory action underway

Energy risk management

- **Ensuring market resource information is collected and published** (Reinforce system operator information gathering powers)
- **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

- **Risk management products are available**
 - standardised super-peak hedge product
 - standardised demand flexibility product
- **Ensure security of supply standards are up to date** (security standards and SSAD review)
- **Reinforce market signals to build and commit flexible resources**
 - Emergency Reserve Scheme (MVP by winter 2026)
 - peak management ancillary service (MFK) review
 - improve BESS participation

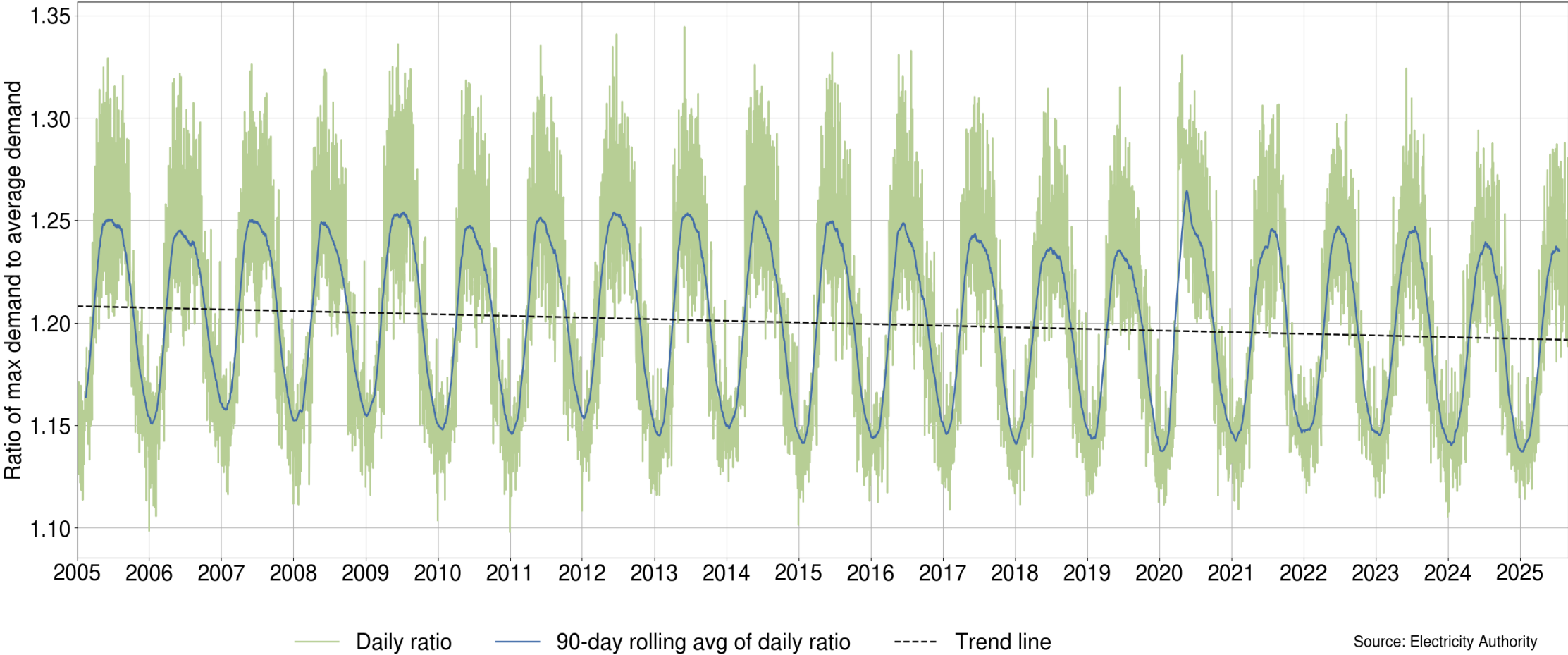
BESS Roadmap

Work programme	2025		2026		2027
	January – June	July – December	January – June	July – December	January – June
Review Part 8 Code common quality requirements	First Code amendments come into effect	Defining an ESS / AOPOs for hybrid plants & when ESS idle / Grid forming technologies		Joint work: Hybrid plants / BESS / System strength (incl. grid forming technologies)	
Ensure efficient use of BESS / BESS market enhancement		Consult on issues and options			
Improve distribution network connections process		Stage 1: Decisions	Stage 2: Options paper	Consultation	
Improving visibility of distribution network constraints		Consult on options	Final decisions	Implementation	
Flexibility markets for distribution networks		Finalise guidelines	Consider next steps in flexibility markets		
Improve functionality of transmission pricing methodology for BESS			Code amendments come into effect		
Ensuring correct incentives for investment in BESS		Final decisions expected	Guidance on compliance, if the Code is amended.		
Generation pipeline disclosure	Publish monthly information				
Improved forecasts of wind and solar generation		New forecasting arrangements take effect			
Standardised flexibility product	Publish flexibility competition dashboard				

Update to the [BESS roadmap](#) in response to feedback will be published by end of the year

Extra slides

Demand has been getting less 'peaky'



Security of supply update

SRC 23 October 2025

Agenda

- Current situation update
- Investment pipeline
- SoS outlook
- EA regulatory action underway

ELECTRICITY AUTHORITY UPDATE

Current situation + Investment
pipeline

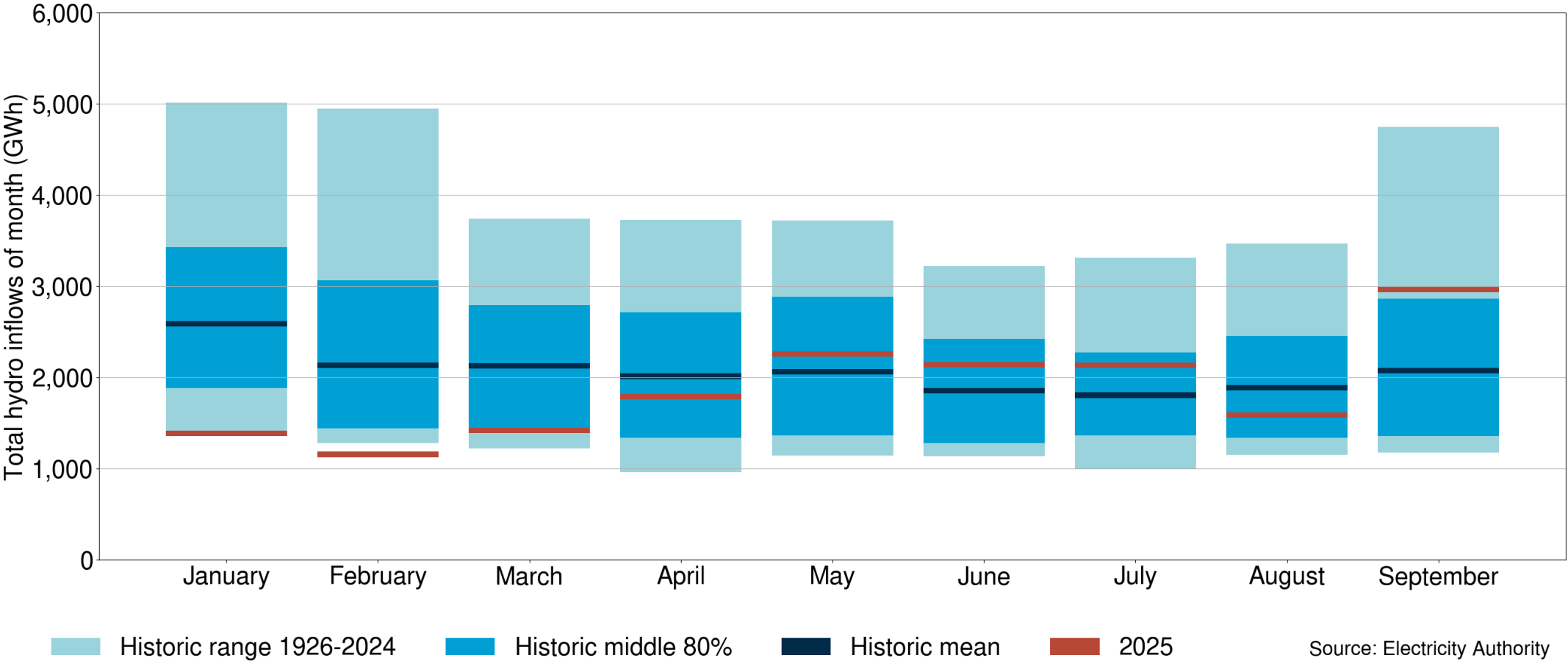
Current Situation

- **Hydro storage has been increasing:** 112% of mean and 68% nominally full as of 11 October
- **Snowpack improving:** Just above historic mean
- **Huntly 5 off** to release gas for industrials.
- **Demand falling** as weather becomes warmer, less thermal generation.

Rainfall and decreasing demand have reduced prices from late August:

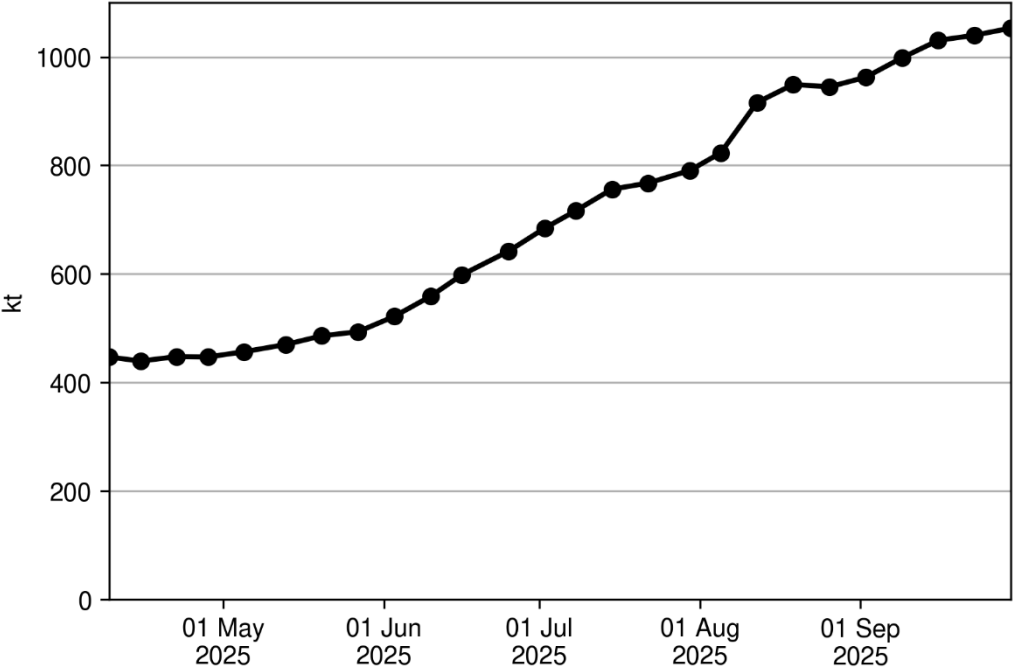
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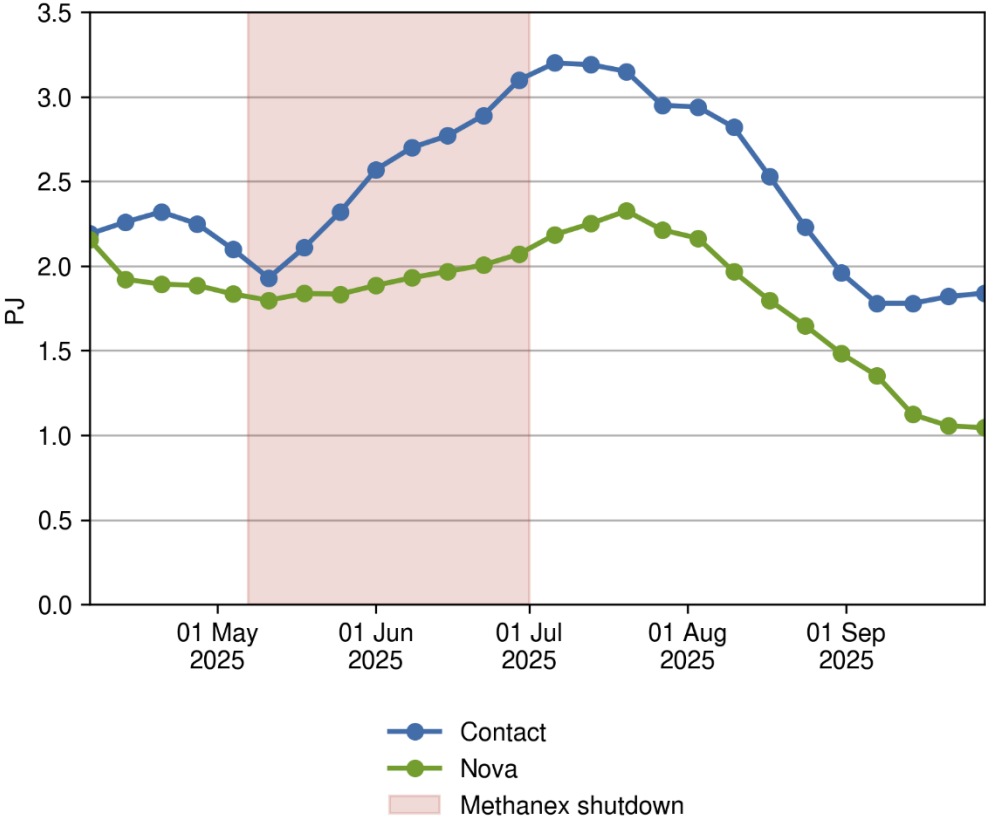


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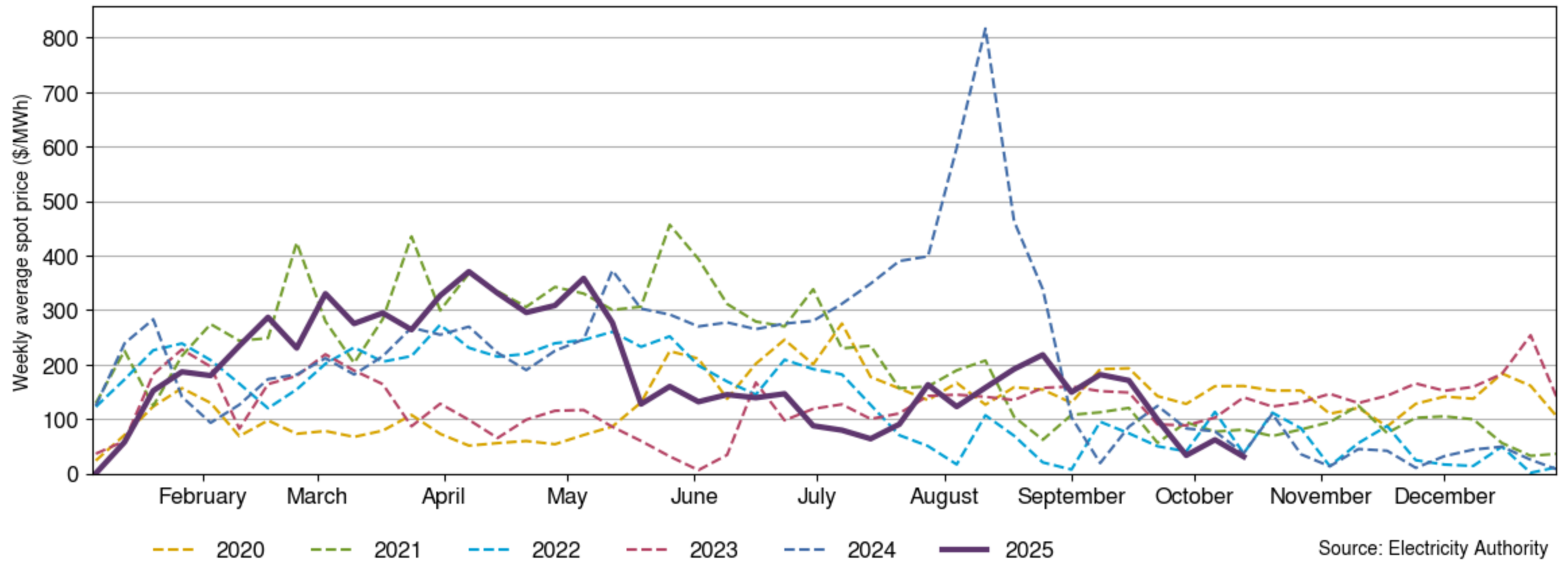
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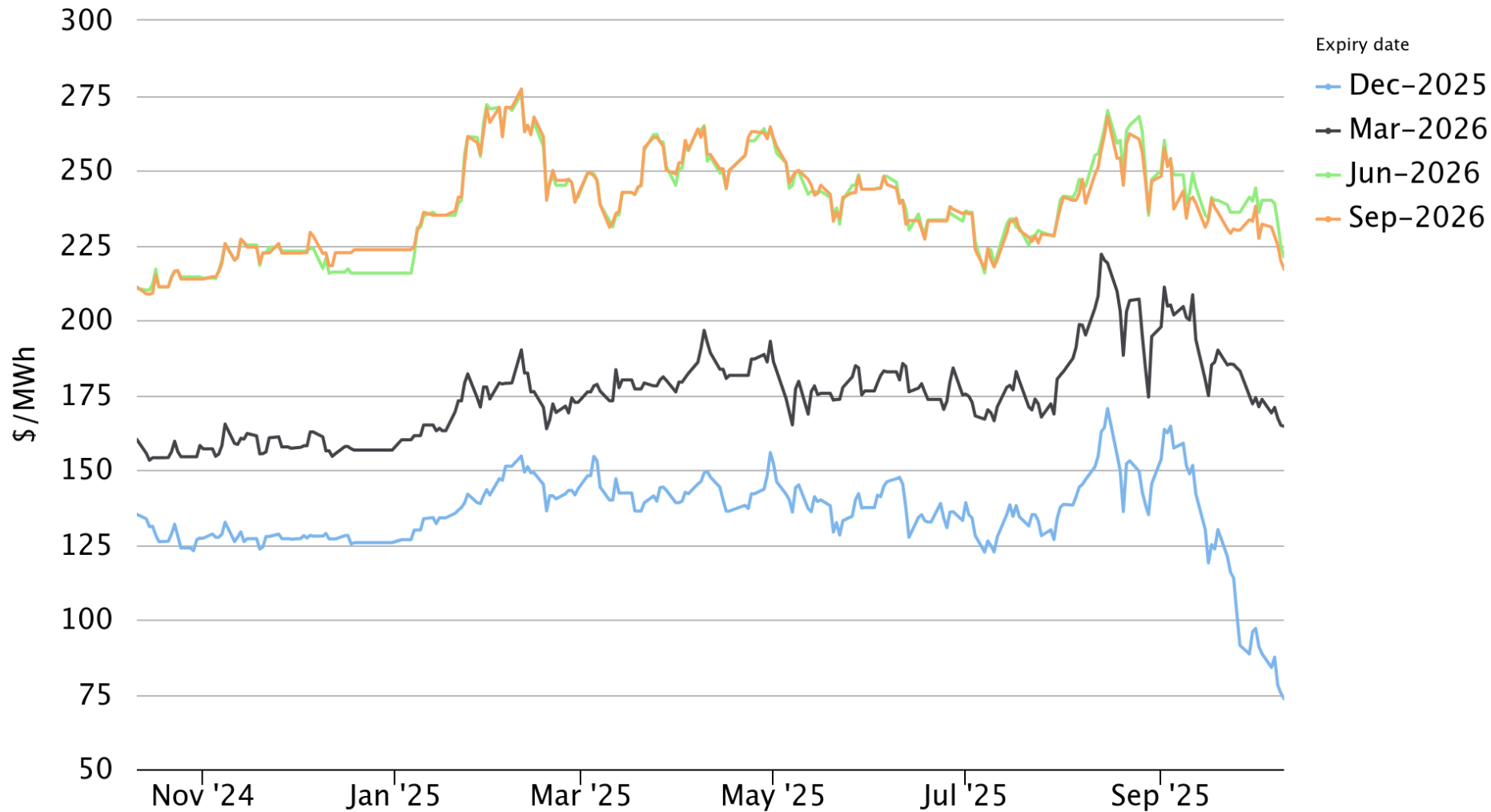
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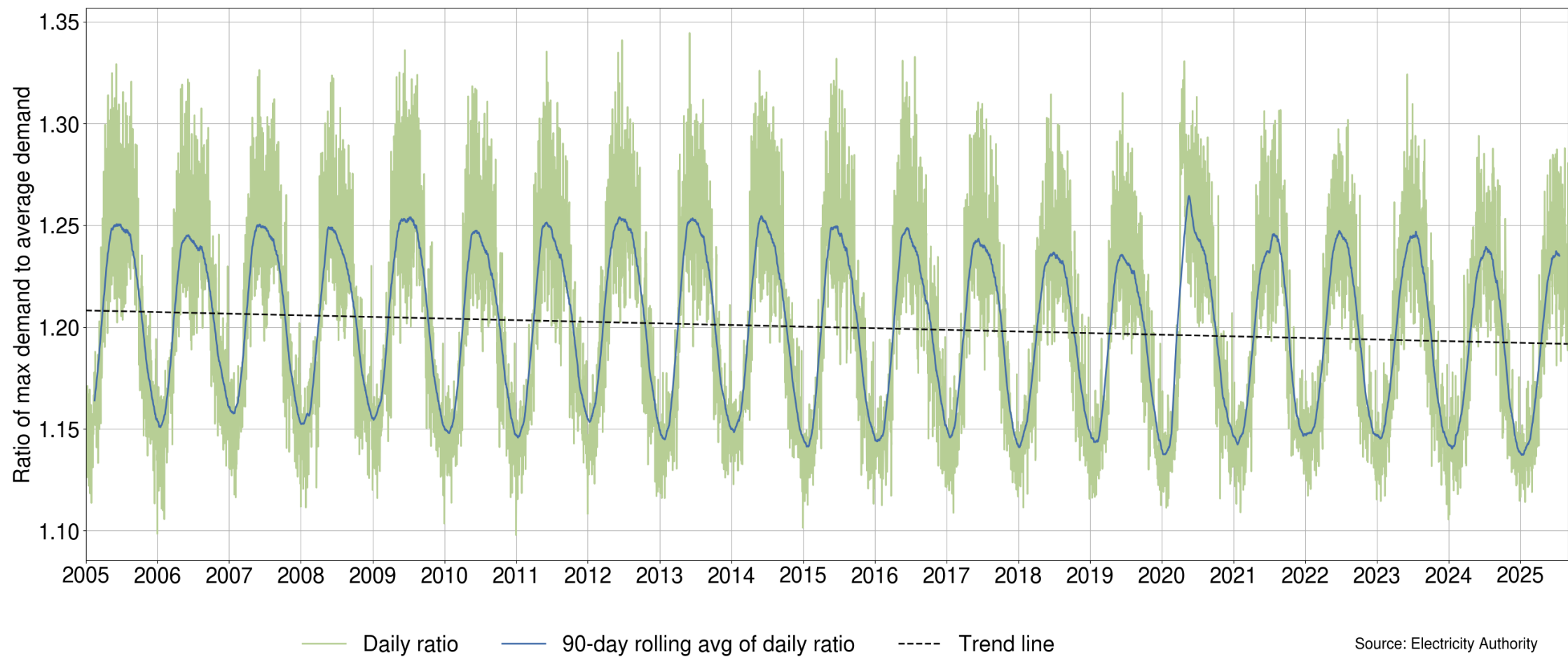


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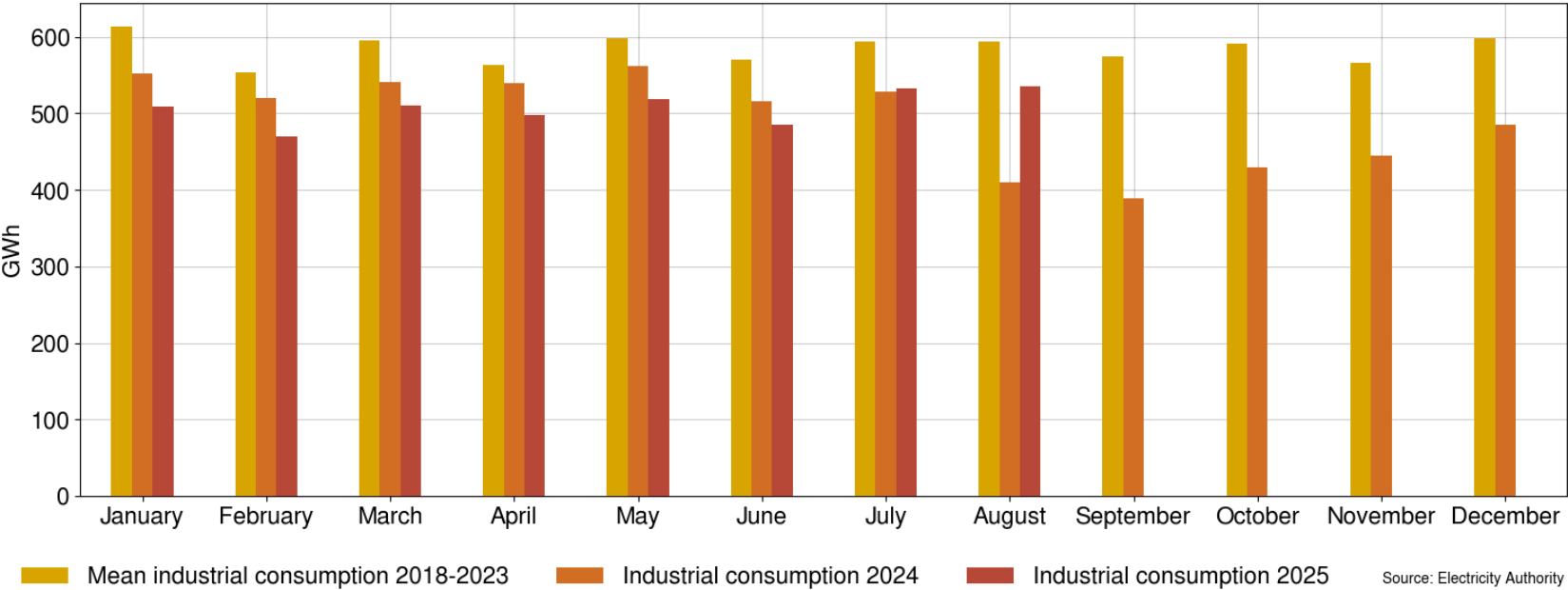
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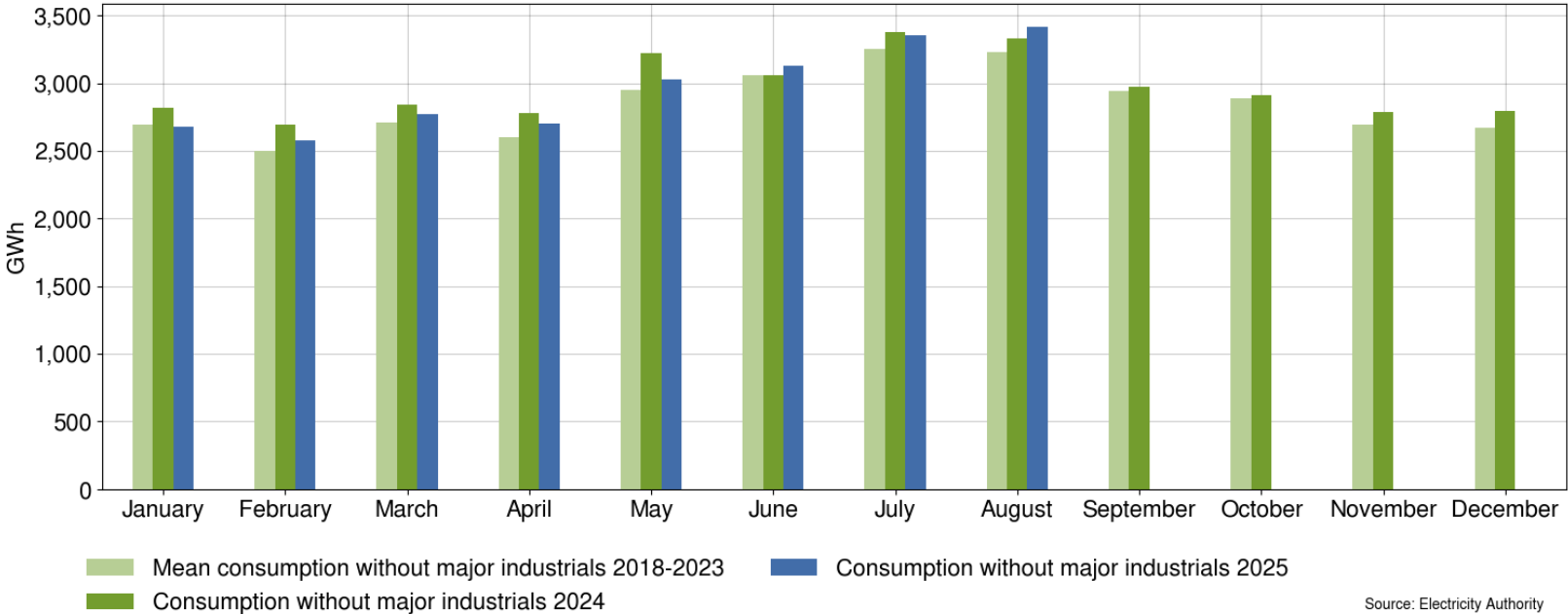


Growing residential demand and falling industrial demand

Indsustrial



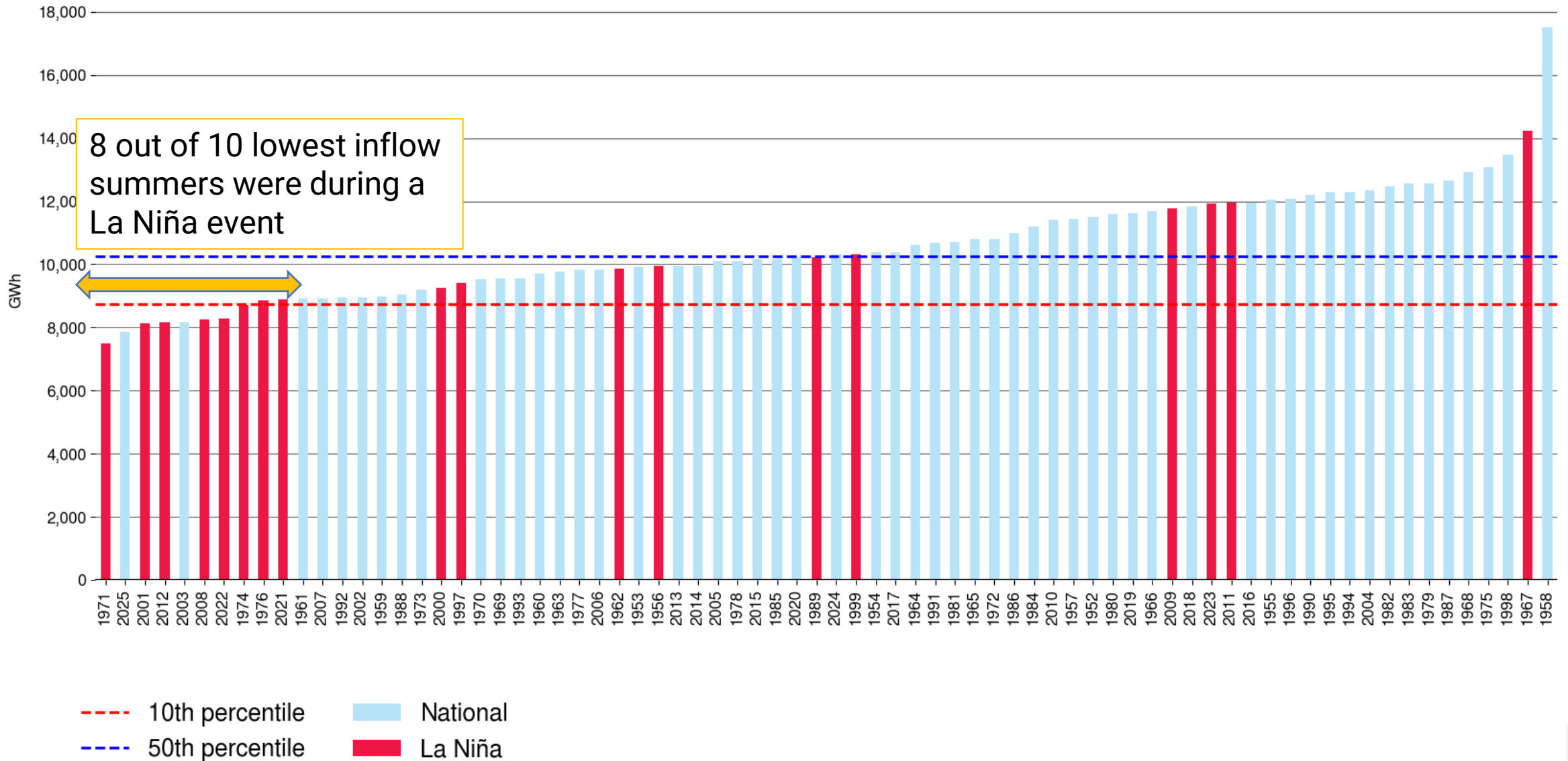
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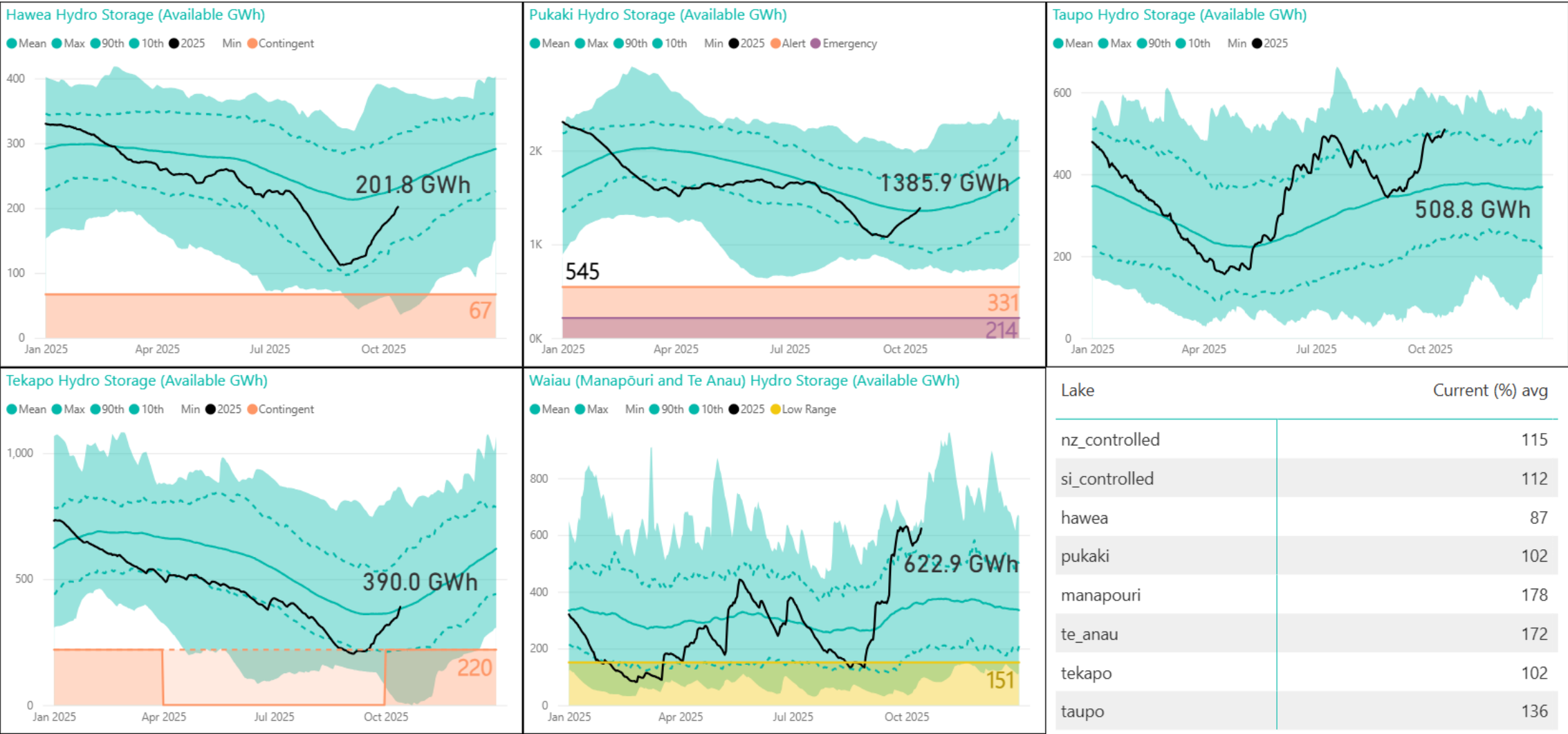
TRANSPower

System Operator update

Security of supply outlook

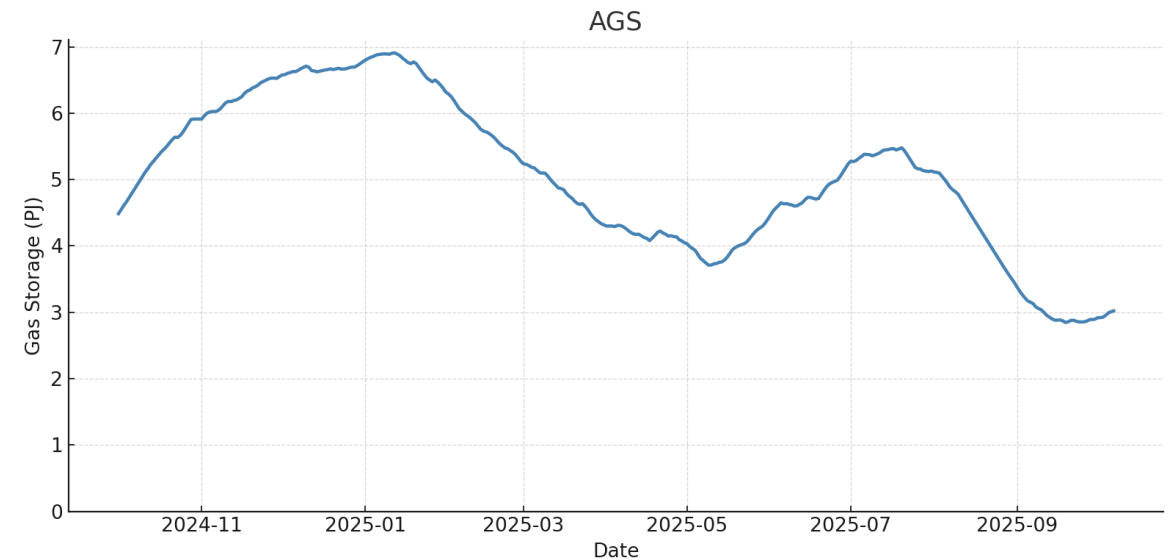
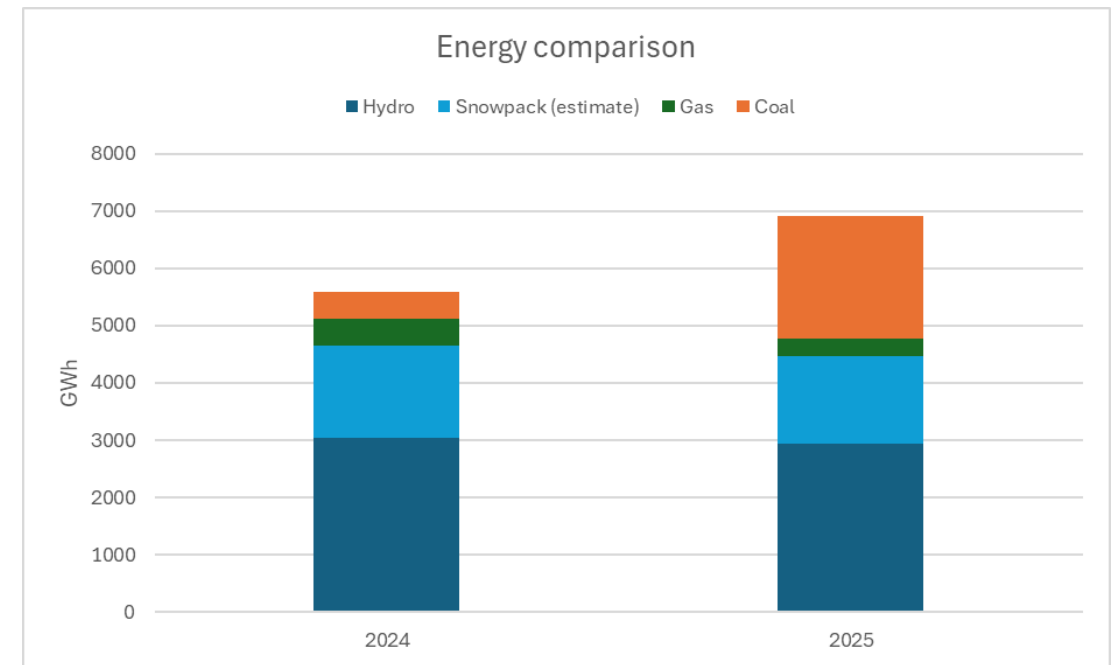


Hydro storage by scheme



Stored fuel

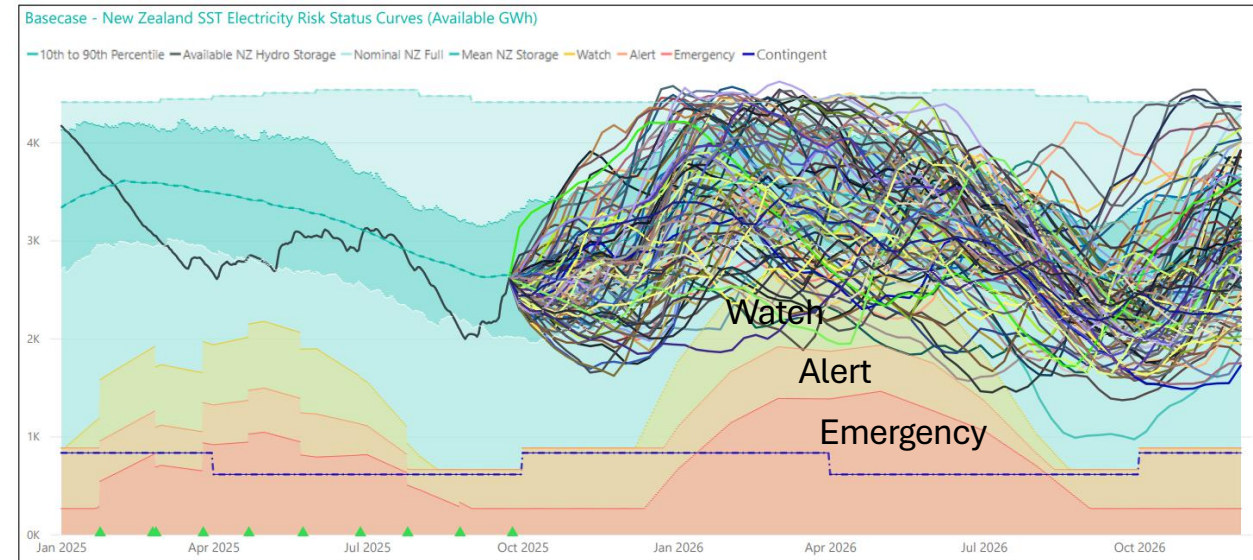
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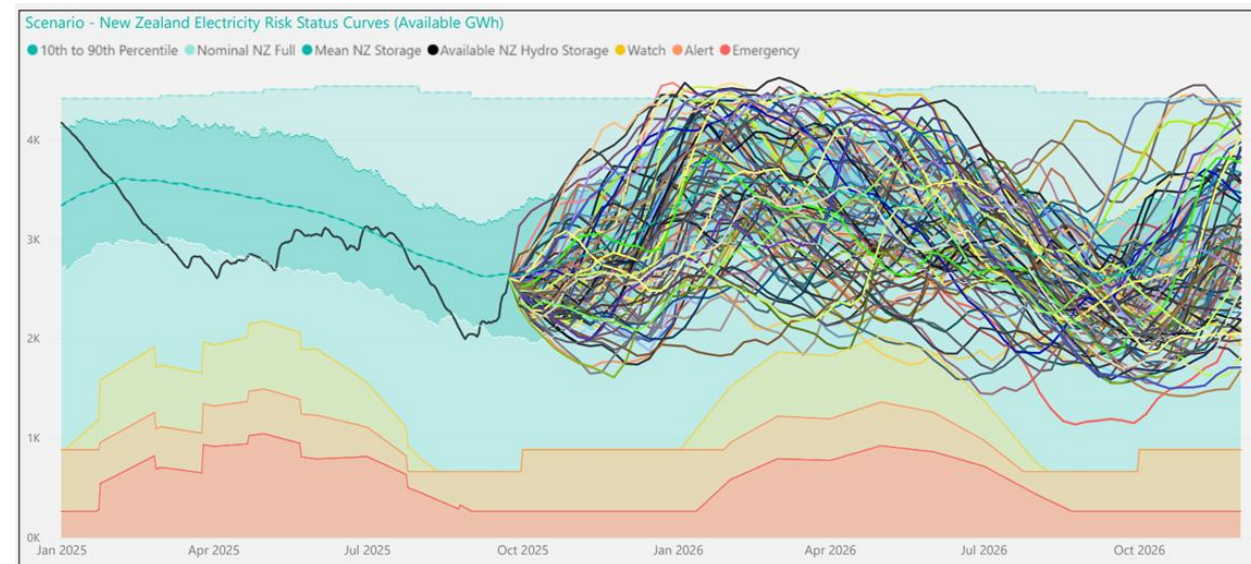
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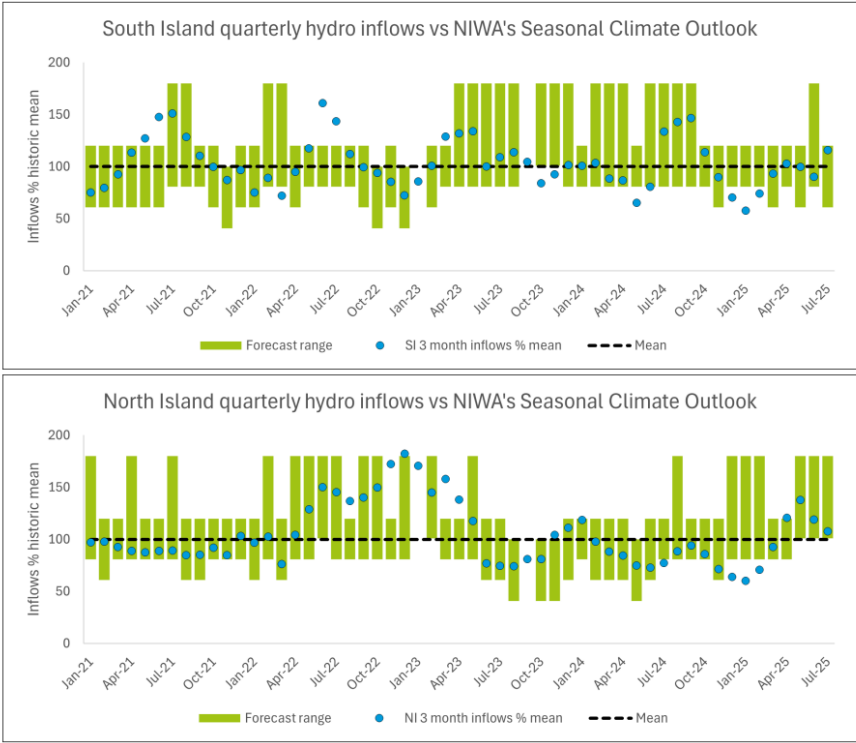
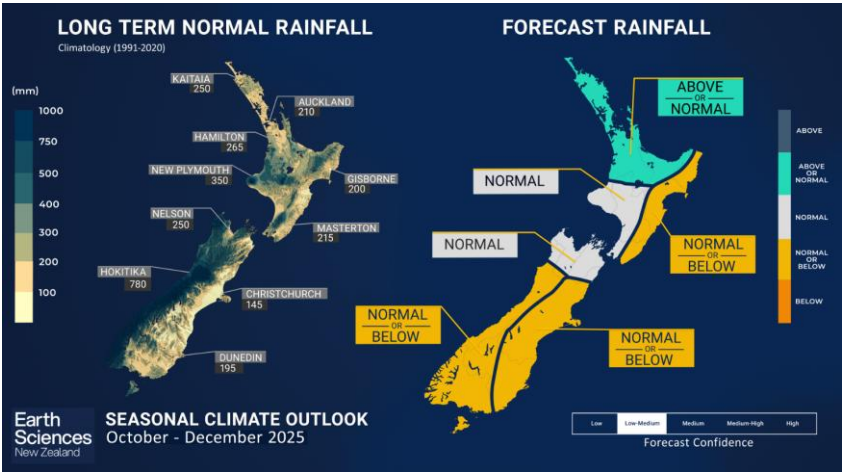


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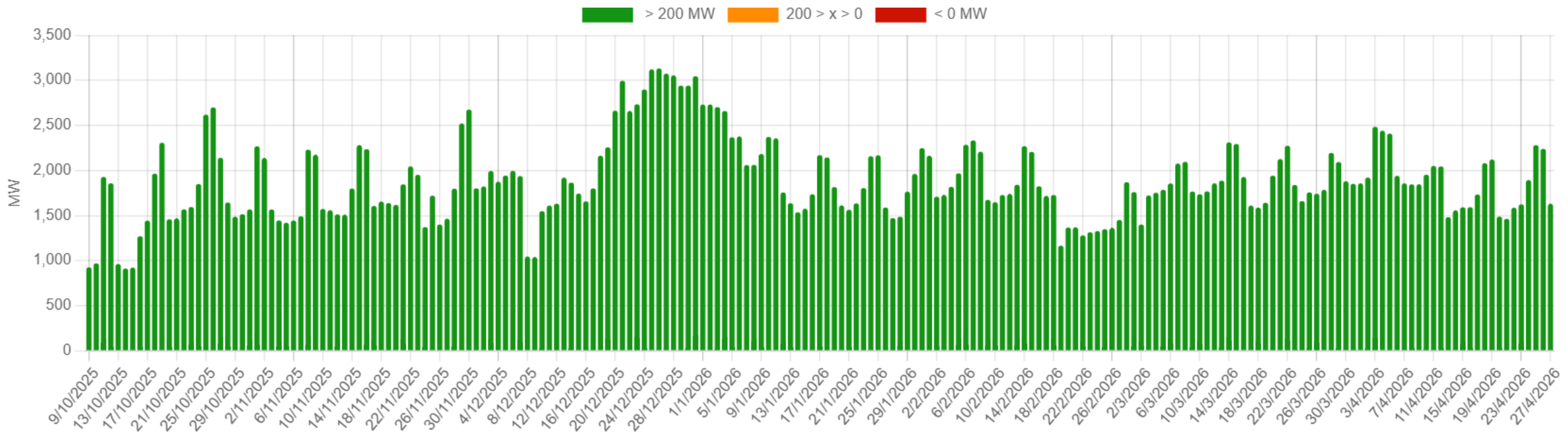
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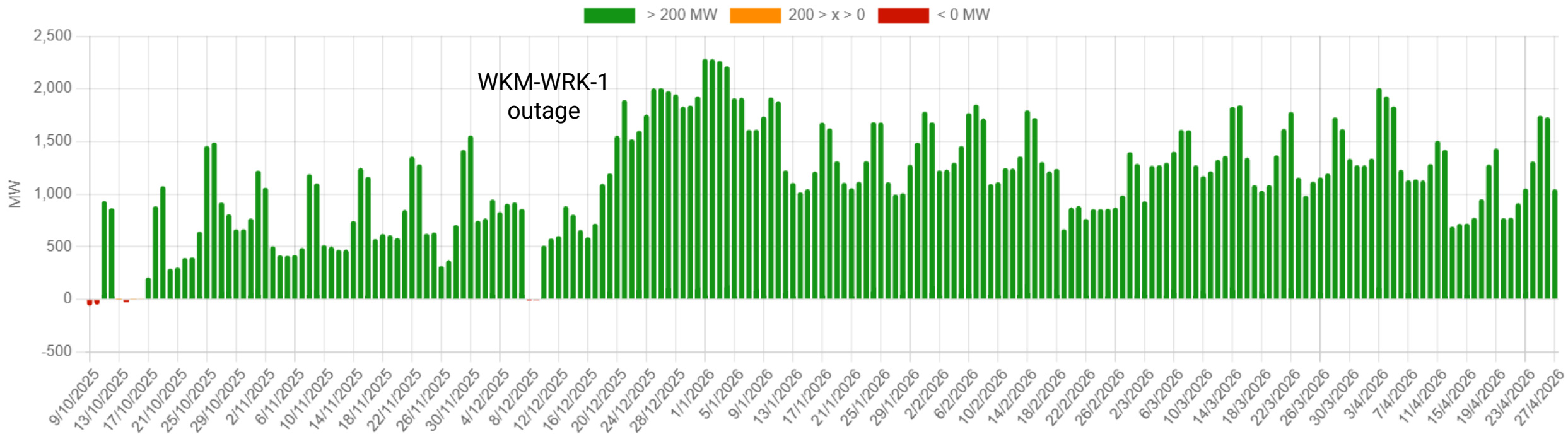
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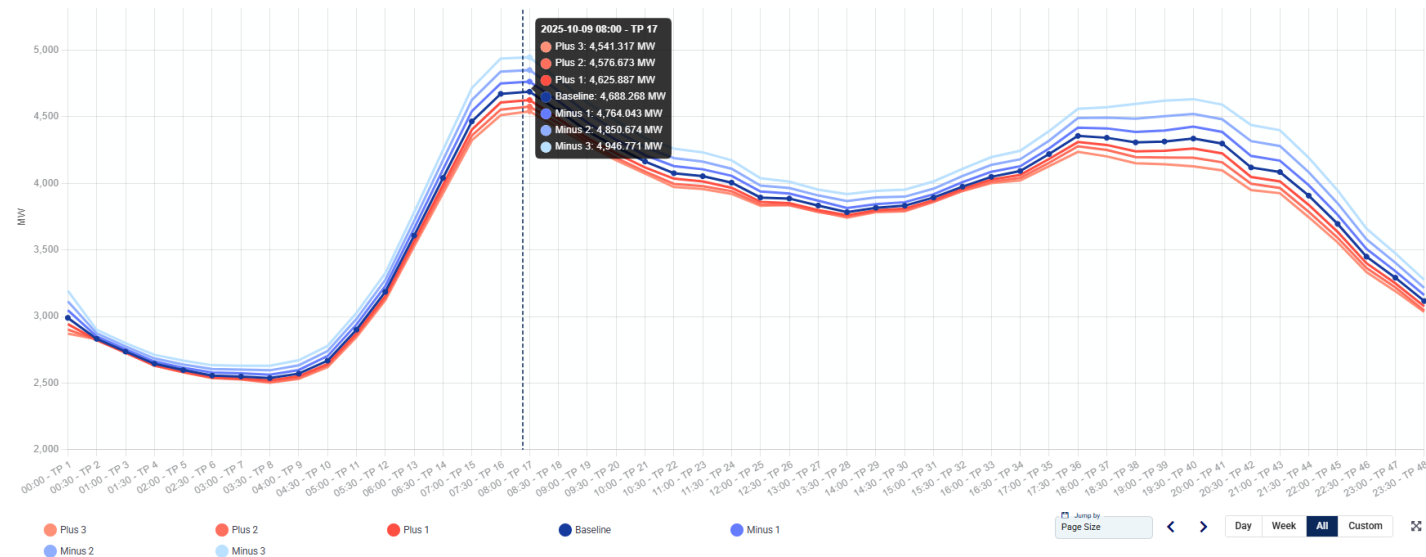
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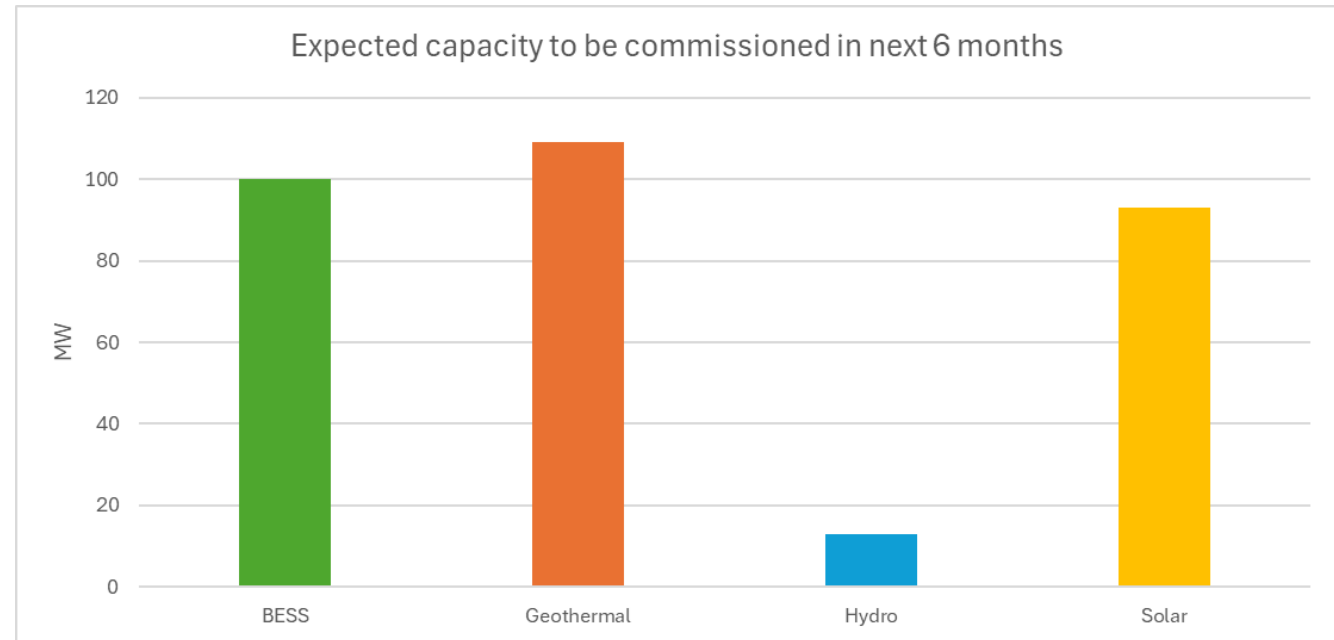
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SO initiatives

- 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
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ELECTRICITY AUTHORITY UPDATE

Regulatory action underway

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 - peak management ancillary service (MFK) review
 - improve BESS participation

WRAP SESSION – SoS UPDATE

SECURITY AND RELIABILITY COUNCIL

Members may wish to ask presenters:

- Do you understand the feedback / recommendations flagged in SRC's August advice? (see below)
- If so, what steps are being taken to address these recommendations?
- How can we have lower total demand (GWh), higher peaks (MW) and less peaky system, is this fewer but higher peaks but a flatter overall profile?
- What are the implications of that demand profile for generation, networks?
- How do the SSTs look if proposed SOSFIP changes implemented?

Snip from August advice:

This letter sets out the discussion at the SRC's August meeting and its recommendations to the Authority, which are reproduced below:

1. **maintain pressure on participants** to mitigate near term energy and capacity risk (as done for 2025), to firm up and execute on generation build plans
2. **apply scrutiny to generation build** critical paths, understand impediments and act to address potentially systemic risk areas, for example, network connections
3. **prioritise improvement to / maturing of the generation pipeline.** It is the type of plant, its capacity (MW) and energy (GWh), plant (and connection) commissioning that really need to be understood when assessing security of supply risk
4. **accelerate rule changes** to enable / incentivise battery investment and mitigate capacity risk. These changes are shifting from 'nice to have' to 'must have' to mitigate near-medium term energy and capacity risk
5. **address the capacity and energy risks arising from increased intermittency.** As the proportion of intermittent renewables increases more flexibility is required. This includes sufficient thermal plant / fuel, batteries, efficient demand response, strategic fuel reserves and judicious use of contingent hydro storage.

The Chair will conduct a Wrap session for agenda item #7 (SoS update).

SRC brief: inverter standards ‘theme’

- SRC members have repeatedly raised concerns that electrical standards / rules are not being effectively maintained. That it is unclear who or how standards / rules are managed across multiple government and industry bodies.
- The substantive concern for SRC is the impact on electricity system performance, security and reliability in the near, medium and longer term of failing to effectively maintain electrical standards and rules. This relates specifically to the potential for:
 - Outdated rules/standards to contribute to power quality and medium-long term system stability and reliability issues
 - Prevent or reduce the potential for DER to contribute to peak load management, reducing security and reliability risk and system cost
 - Incurring of unnecessary “technical-debt” as consumers, sector participants deploy legacy equipment or utilise outdated installation practices (preventing / reducing their, and the power systems, ability to benefit from the DER in question)
- As there are multiple parties available and does not appear to a single party accountable for the standards / rules system, SRC has invited the parties who it thinks have the most direct role to play. Each will describe their role in standards development, review, regulation, application / enforcement.
- There are other parties with a formal role (MBIE health & safety, Worksafe) or informal have a role (e.g. SEANZ, rewiring Aotearoa) that are less relevant for this SRC session.
- In addition to the Authority, it may be that SRC’s advice on inverter standards / rules, and electrical standards / rules generally, is offered to some or all of the other organisations introduced on the following page.

SRC brief: inverter standards ‘theme’

Organisation	Presenter / position	Presentation focus
 MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT HIKINA WHAKATUTUKI	Gareth Wilson: principal strategy adviser, energy	Overview of electrical standards and agencies involved, MBIE’s role(s)
 ELECTRICITY AUTHORITY TE MANA HIKO	Allen Davison: principal analyst, network policy	Overview of EA’s live consult + impact for system stability / reliability, EA’s role
 EECA TE TARI TIAKI PŪNGAO ENERGY EFFICIENCY & CONSERVATION AUTHORITY	Brian Fitzgerald: demand /distributed flexibility lead	EECA’s role, current state (SNZ PAS 6014:2025), role regulating ‘smarts’ (interoperability / connectivity)
 STANDARDS NEW ZEALAND TE MANA TAUTIKANGA O AOTEAROA	Chris Forsman: principal standards programme manager for electricity sector	Standards NZ’s role, electrical standards programme
 eea	Stuart Johnstone: lead adviser, engineering & technical	EEA’s role, converting standards / regulation / rules into operating guidance / procedures for EDBs / other parties
 ena electricity networks aotearoa	Tracey Kai: CEO	ENA as agent for ‘customers’ of standards, rules, regulations, guidelines ... how EDBs perceive the situation.

SRC brief

Many parties working diligently on what is / should be an integrated ‘system’.

While some collaboration, the work is often in organizational / functional silos, lacks coordination, cohesion and medium-long term strategy or plan.

This, coupled with degree of complexity, accelerating pace of technical and consumer change led one to describe the situation as a “hot-mess”.

However, recent / pending changes are encouraging and *should* bring NZ inverter standards up to NZ/Aus best practice:

- EA Code changes: installation + performance stds
- EECA: interoperability + connectivity

Changes supported / translated into standards and guidance by Standards NZ and EECA, applied by EDBs, installers, others.

Appears to be clear need for a ‘reference group’ or equivalent to bring cohesion, establish common objectives, a plan and to coordinate iteration and delivery against that.

Also, need for clear articulation of the role of different entities/ parties in the ‘system’ from installers to EDBs, regulators, standard setters and so on. Even those ‘in the know’ struggle to explain this clearly, describe what should be logical interfaces and feedback loops.

Questions SRC may put to presenters

1. [questions contained in presenter brief [see next 2 pages]
2. So, will we have inverter rules/standards that (a) mitigate security / reliability risk (b) enable effectively utilisation of growing DER resource?
3. Will these rules/standards be mandatory i.e. can installers / others just ignore and opt for cheaper equipment / installs?
4. Why has it taken so long and been so excruciating to get to this point? What is driving that ...
5. How can we bring more clarity to the 'ecosystem' of electrical standards and rules, with so many parties in what should be an integrated system?
6. What could make life easier for all of you, speed up and simplify the process of updating rules/standards so they meet the needs of our power system and minimise cost / risk for NZ? E.g.
 1. establish reference group, clear ToRs, agreed objectives, plan
 2. managing as a joint programme with effective leadership, accountability, prioritisation and coordination
7. How could the SRC assist in bringing these changes about?
8. What should our advice be to the EA, to each of your organisations?

What SRC advice might cover

- Encouraged by recent progress across the group of organisations involved in electrical standards rule / standards making. Specifically XX
- Strongly advise Authority, MBIE [and XX] to ensure changes are expedited to ensure [XX] rules / standards:
 - mitigate risk of Spain-like system failure
 - enable the tremendous opportunity afforded by DER / EVs to the power system, and avoid the catastrophic security, reliability and economic of failure to do so
- [MBIE] take lead in establishing a reference group or equivalent and create joint programme to [integrate electrical rule/standard development, update, application and adherence].
 - Elaborate on what this might look like, what is required to make such a programme successful vs just another layer of admin.
- EA develop a 'map' and flow-diagram to show who does what and the journey of an electrical rule/ standard from idea to retirement.
- Other ...

Brief to presenters

1. Introduction

The function of the SRC is to provide independent advice to the EA on:

- a) the performance of the electricity system and the system operator; and
- b) reliability of supply issues.

In its work the SRC has identified a number of risks relating to standards and consumer technologies.

This paper summarises the risks and poses several of questions to presenters invited to the SRC standards discussion. While standards in general are of interest to the SRC, at this meeting the SRC is specifically interested in:

Standards relating to small-scale inverter-based distributed generation (practically PV and batteries that connect to the 400 Volt low voltage network) and EV charging (typically home or Type 2 chargers).

Given its current relevance, as a case study for the panel discussion, the forthcoming expansion of the low voltage network voltage limits from +/- 6% to +/- 10%. Specifically:

how the industry will adapt standards for this such that the industry (EDBs in particular), installers, and ultimately consumers are well supported with the long-term interests of consumers preserved, and that decisions are supported by appropriate power system engineering analysis.

How similar changes will be managed in the future.

2. Risks identified

- Reduction in power quality on the shared network (point of common coupling) from poor and/or unenforced standards
- Increasing network congestion and costs imposed on consumers from:
 - export from small-scale DG and
 - increasing peak demand from EV uptake, consumer disengagement, and due to a loss of diversity if autonomous devices respond to signals simultaneously (e.g. batteries charging and discharging at the same time as they respond to, for example, tariff structures).
 - Electric hot water cylinders in new homes no longer installed with a pilot wire from the smart meter, meaning the hot water heater cannot be controlled. While not directly related to PV, this is raised as an example of a need for consistent standards between industries.

Ultimately this could lead to peak demand that exceeds distribution and transmission network capacity and national generation capacity. In turn all consumers may have additional costs imposed on them.

3. Questions for the presenters

Case study: changing of the LV voltage limits from +/- 6% to +/- 10%

Parties invited to present to SRC and participate in discussion with SRC: Electricity Authority (EA), Electricity Networks Aotearoa (ENA), Ministry of Business, Innovation and Employment (MBIE), Standards NZ (SNZ), Electricity Engineers' Association (EEA)

Brief to presenters

3.1 Responsibility for standards

- a) What is the standards framework in New Zealand (consider from the perspective of regulations, the Electricity Industry Participation Code, EDBs' Connection and Operation standards, EEA Guidelines, and official NZS standards)?
- b) How do they interact and how is consistency between these achieved?
- c) Who is responsible for writing and approving standards? This includes writing, updating, ensuring appropriate technical input, and approving.
- d) Who is responsible for ensuring compliance with standards of plug-in solutions (e.g. a balcony solar installation)?
- e) Who is responsible for ensuring compliance with standards of wired installations (e.g. rooftop solar)?
- f) How is cross industry consistency achieved (for example, something important to the electricity industry is required in building standards)?
- g) What are the gaps, how can they be improved, by who, and what actions are underway to improve them?

3.2 Ensuring competency of EDBs, installers and inspectors?

- a) What workforce training is undertaken to ensure installers, for example, know what standards should apply and how they should implement what is required by the standards?
- b) What organisations are undertaking training?
- c) What organisation undertakes competency checks of the various parties (e.g. of installers)?
- d) What are the gaps, how can they be improved, by who, and what actions are underway to improve them?

3.3 Mandatory and discretionary parts of standards

- a) Standards may include recommended settings, for example. How are decisions made on what parts of standards are mandated versus left optional?
- b) In assessing these decisions, how is technical advice sought and put into practice such that the implementation of a standard in New Zealand does not lead to a system security issue. Examples might be:
 - a) the risk of a cascade failure. For example, reactive power control by small-scale inverters and its impact on reactive power flow in transmission and any impact this may, or may not, have on stability.
 - b) The risk of increased peak demand. For example, from concurrent charging of stationary batteries and/or EVs, responding to mass market pricing structures.
- c) Generally, with regard to the risk of increasing peak demand from (a) concurrent EV charging and/or (b) autonomous devices responding to signals simultaneously (e.g. batteries charging simultaneously), can a standards framework deal with this risk, and if so which standards, and how and what actions are underway to manage this?

The SRC is also interesting in presenter views on how the industry ensures sufficient focus on standards when dealing with changes or new technologies, such as solar and EV chargers, to mitigate the risk of future problems (and or to realise the full value the change or technology offers).

Purposes of mandatory standards cited in legislation	Applying to importation, manufacture and sale of consumer products	Applying to design and operation of networks, generation and energy storage plant
Safety and power quality	Electricity (Safety) Regulations Made by Cabinet under the Electricity Act 1992 Developed by MBIE and WorkSafe, enforced by WorkSafe Electricity Safety Instruments (since March 2025) Made by Minister or WorkSafe (if delegated) Developed and enforced by WorkSafe Referred to in regulations	
Minimum energy performance	Energy Efficiency (Energy Using Products) Regulations Made under the Energy Efficiency and Conservation (EEC) Act 2000 Developed by EECA and MBIE (in collaboration with Australia) Enforced by EECA	
Market competition and reliability (e.g. interoperability of smart appliances)	Regulations in development (initially for smart EV chargers) To be made under the EEC Act (subject to necessary amendments) To be developed by EECA and MBIE To be enforced by EECA	Electricity Industry Participation Code Made and enforced by EA under the Electricity Industry Act 2010

Code low voltage inverter requirements

SRC meeting

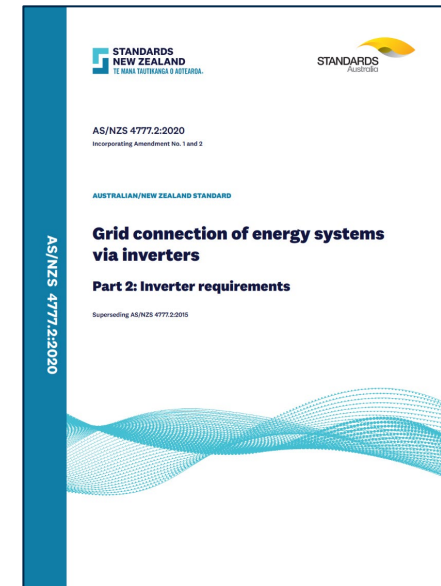
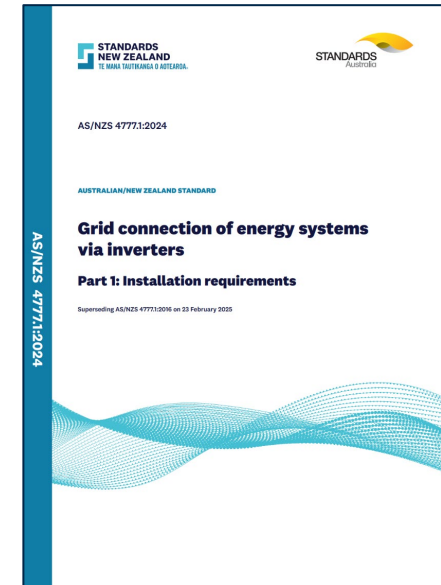
23 October 2025

Allen Davison

Principal Analyst – Network Policy

Low voltage inverter standards

- AS/NZS 4777.1 sets installation requirements for inverters (eg, connections, overload, weathertightness and seismic protection)
 - ESR currently cites the 2005 version, Code cites 2016 version
 - ESR will cite 2024 version by end of 2025
-
- AS/NZS 4777.2 sets performance requirements for inverters – primarily for safety and network management (eg, anti-islanding, fault ride through, voltage management)
 - AS/NZS 4777.2 compulsory for LV inverters in Australia since 2021
-
- These standards do not cover smartness (eg, connectivity, interoperability), cyber security etc.



Code low voltage inverter requirements

- Code sets the rules for connecting DG to networks (Part 6)
- Part 6 sets inverter requirements only when streamlined application process for $DG \leq 10kW$ is used (Part 1A)
 - Inverters must comply with AS/NZS 4777.1:2016 and AS/NZS 4777.2:2020
 - Distributors can set alternative performance settings via their 'connection and operation standards' (COPS)
- Distributors set inverter requirements for all other DG applications via COPS
 - Problem – distributors vary with some citing superseded versions of AS/NZS 4777.2

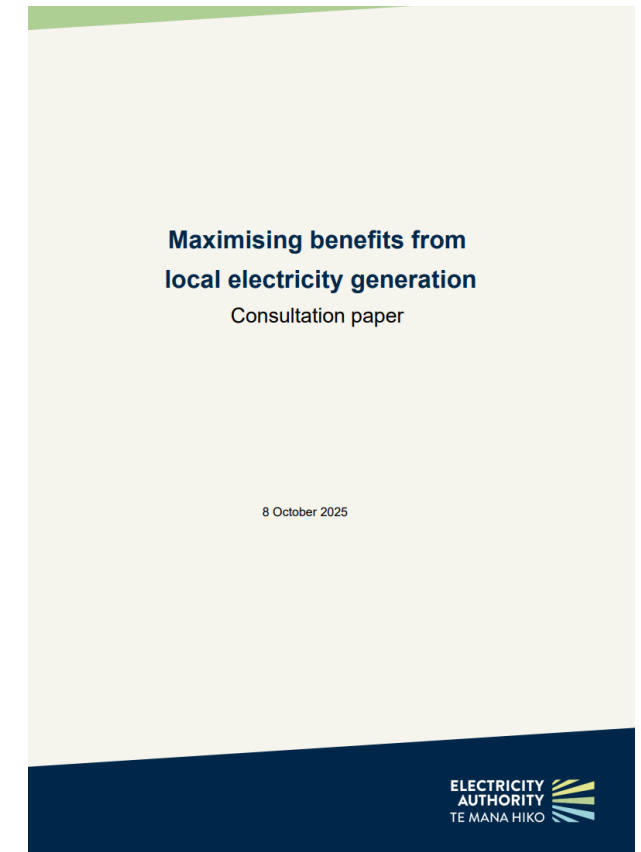
Electricity Industry Participation Code 2010	
Part 6	
Connection of distributed generation	
Contents	
6.1	Contents of this Part
6.2	Purpose
6.2A	Application of Part to distributors in respect of embedded networks
6.2B	Application of Part to distributors in respect of systems of lines not directly or indirectly connected to grid
6.3	Distributors must make information publicly available
6.4	Process for obtaining approval
6.4A	Distributor and distributed generator may agree to simpler process for existing connection
6.5	Connection contract
6.6	Connection on regulated terms
6.7	Extra terms
6.8	Dispute resolution
6.9	Pricing principles
6.10	<i>[Revoked]</i>
6.11	Distributors must act at arm's length
6.12	This Part does not affect rights and obligations under Code
<i>Transitional provisions</i>	
6.13	This Part does not apply to earlier connections
Schedule 6.1	
Process for obtaining approval	
<i>Preliminary provisions</i>	
<i>Part 1</i>	
<i>Applications for distributed generation 10 kW or less in total</i>	
<i>Application process</i>	
<i>Post-approval process</i>	
<i>Part 1A</i>	
<i>Part 2</i>	
<i>Applications for distributed generation above 10 kW in total</i>	
<i>Initial application process</i>	
<i>Final application process</i>	
<i>Post-approval process</i>	
<i>Part 3</i>	
<i>General provisions</i>	
<i>Confidentiality</i>	
<i>Annual reporting and record keeping</i>	
<i>Costs</i>	
Schedule 6.2	
Regulated terms for distributed generation	

1 April 2023

Authority's low voltage inverter proposals

Export limits paper proposes:

- 1) Part 1A applications must comply with AS/NZS 4777.1:2024 and AS/NZS 4777.2:2020 (incorporating Amendment No.1 and 2):
 - ESR and Code cite the same, latest installation standard
 - Code cites latest performance standard
 - Distributors get greater assurance of performance for Part 1A applications
- 2) All low voltage inverters must comply with AS/NZS 4777.2:2020 (incorporating Amendment No.1 and 2)
 - Aligns NZ with latest Australian performance requirements
 - Greater assurance and more consistency of inverter performance over time





Smart technology in a smart grid

EECA's role in delivering distributed
flexibility at pace and scale

EECA
TE TARI TIAKI PŪNGAO
ENERGY EFFICIENCY & CONSERVATION AUTHORITY





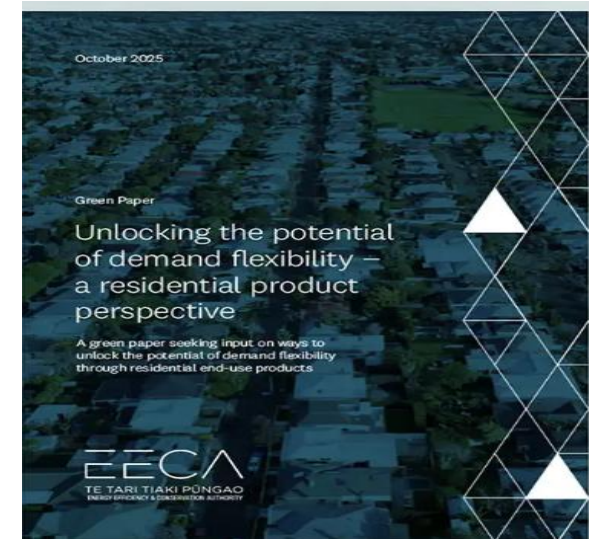
- EECA is a technology regulator. EECA regulations are co-developed with MBIE.
- EECA currently regulate 20 consumer and commercial technologies for minimum energy performance (MEPS) and labelling in a joint trans-Tasman arrangement with the Australian Government.



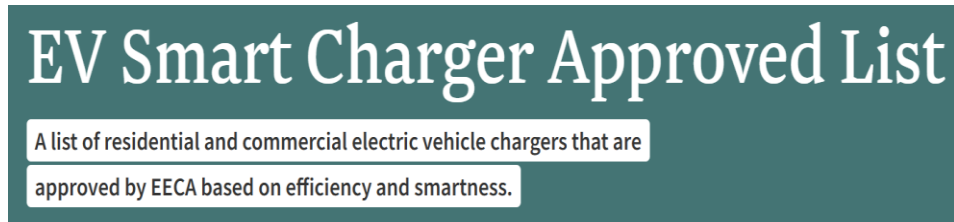
- Cabinet have signed off changes to EECAs governing legislation to enable regulation of technologies for connectivity and interoperability as well as the systems they operate in.
- The amended Act is planned for first reading before the end of 2025 with a target of enactment by mid 2026.



- The amended Act will expand the number of technologies EECA plan to regulate and the systems in which they operate. This will include technologies such as inverters, batteries, solar systems and existing residential appliances.
- EECA regulation will include the efficiency and functionality (connectivity and interoperability) of the technology and signpost safety and grid/network connection requirements in WorkSafe regulation and the EA Code.



- In the interim EECA are running large scale pilots and trials of connected technologies in NZ homes and businesses.
- EECA have also published voluntary guidance (PAS) and a whitelist for smart EV chargers.



- EECA have consulted on a solar, battery and smart inverter specification and plan to introduce a whitelist for these technologies prior to regulating under the amended Act.

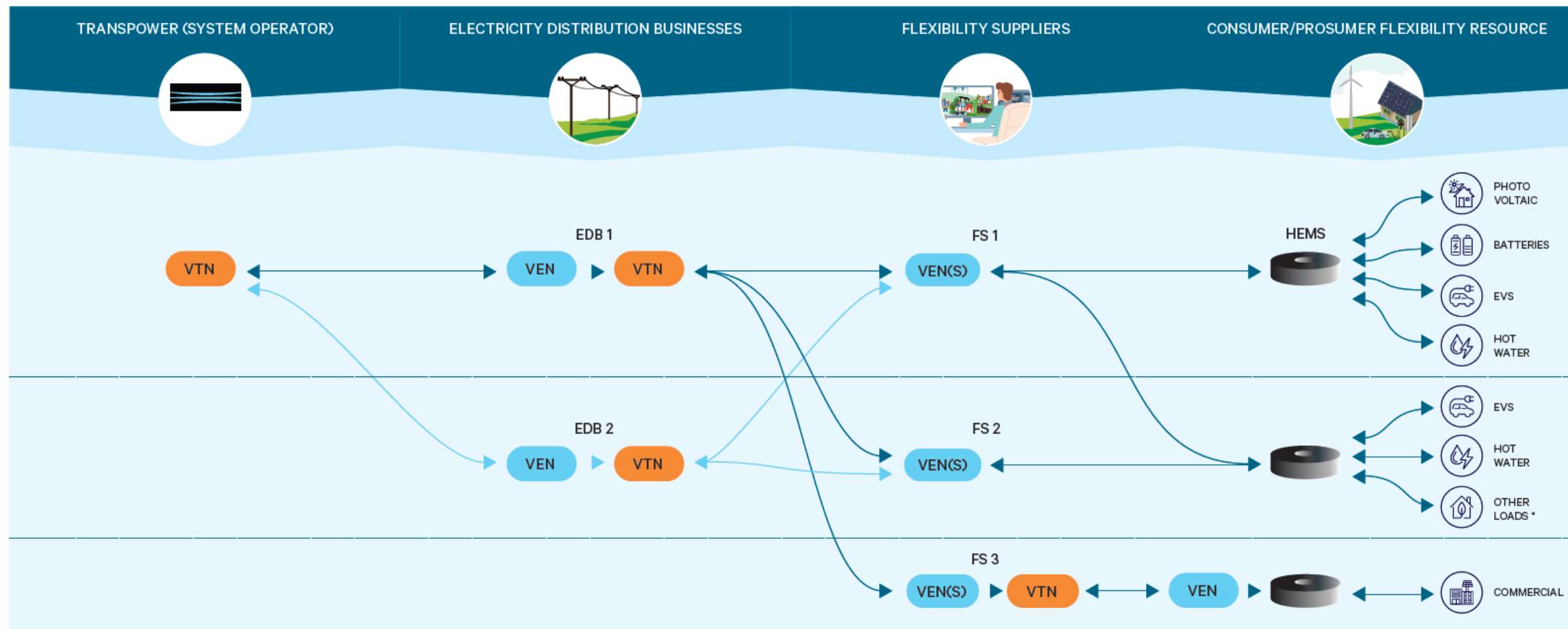
TRADITIONAL GRID
ONE WAY POWER FLOW
SIMPLE INTERACTION



SMART GRID
MULTI-DIRECTIONAL
POWER FLOW
MULTI-STAKEHOLDER
INTERACTION



OpenADR Tree Structure



* Other loads = Air conditioning, pool pumps, spa pools etc



Electricity Engineers'
Association

23 October 2025

EEA: Coordinating Technical Standards Across the Electricity System

SRC meeting

Stuart Johnston, EEA Lead Advisor, Engineering & Technical



Electricity Engineers'
Association



EEA's Role in the Standards Landscape

- Independent, member-led body linking engineering, safety & technical practice across NZ's electricity system
- Works with MBIE, EA, EECA, WorkSafe, and Standards NZ
- Represents NZ interests in IEC and IEEE technical standards discussions
- Provides the bridge between regulatory settings (ESR / Code) and industry practice (COPS, EEA guides)
- Purpose: *Connect and equip the sector to solve complex problems so we can electrify Aotearoa together*

Findings from Distributor Connection Standards Review – Inverter Standards

Scope: Review of 29 EDB Connection and Operation Standards (COPS) to identify alignment with AS/NZS 4777 and other DER requirements.

Key Findings

- Wide variation in cited standards – versions ranging from AS/NZS 4777.2:2005 to 2020
- Mixed interpretation of voltage and frequency response modes (ride-through settings and Volt/Watt curves)
- Inconsistent export-limit rules and testing requirements
- Most COPS lack clear path for transition to AS/NZS 4777.1:2024 and 2020 Amendments 1 & 2

EEA Recommendations

- **Align Code, ESR and COPS citations** – common national version control for AS/NZS 4777.1 & 2
- **Develop national technical connection guidelines** for LV and MV connections – endorsed by EEA/ENA/EA
- **Publish COPS templates** to promote consistency of inverter settings and compliance testing
- **Maintain a living register of standard citations** to support timely industry updates

Next Steps & Opportunities for SRC

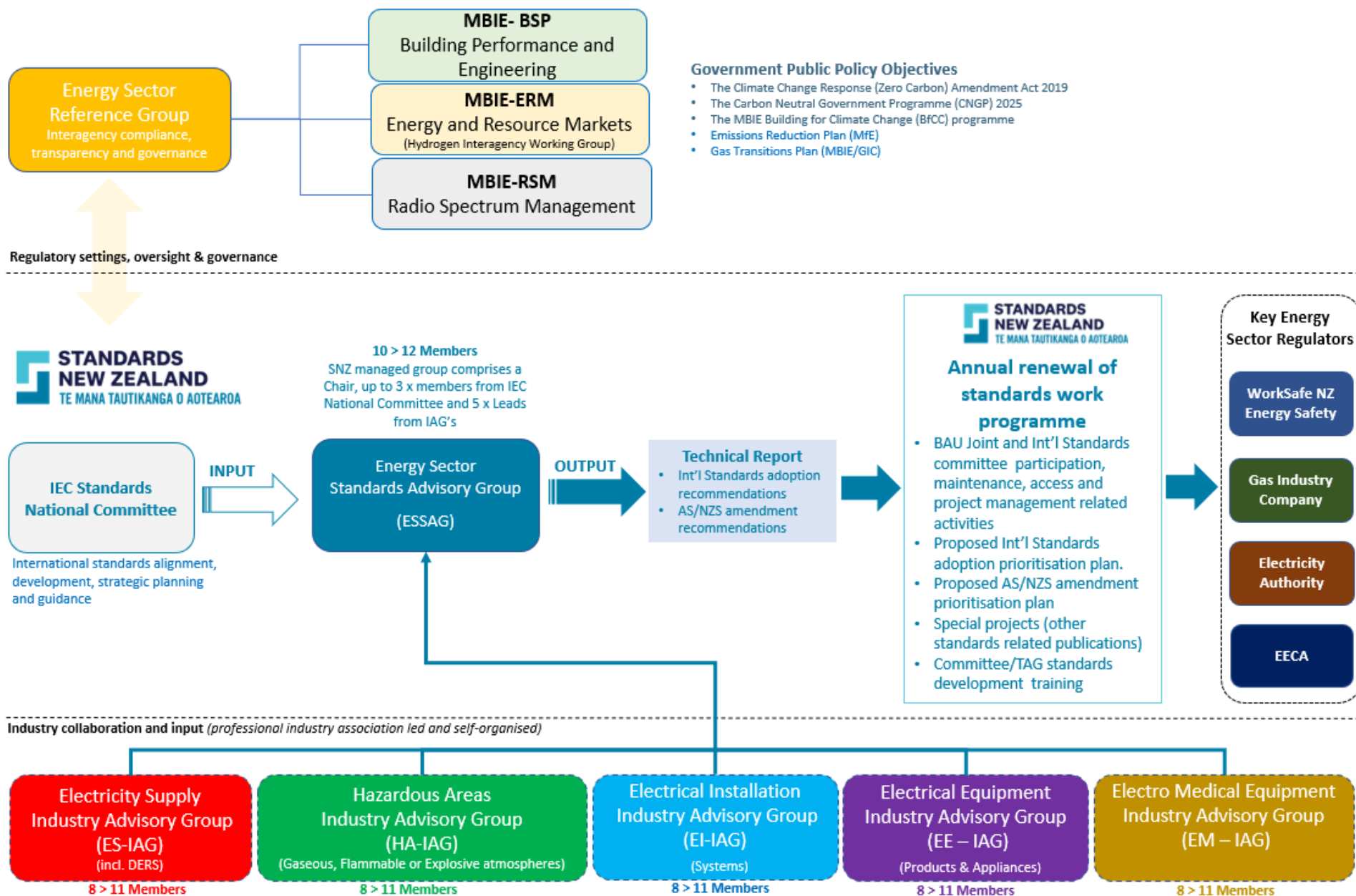
Challenges

- ESR and Code not yet aligned on AS/NZS 4777.1 / 2 citations
- COPS updates lag behind standards adoption
- Emerging gap around smartness (connectivity, cybersecurity, interoperability)

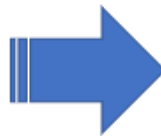
Opportunities for SRC and Regulators

- Endorse EEA's recommendation for a national connection guideline platform
- Establish a Technical Standards Coordination Forum (EEA + EA + ENA + MBIE + WorkSafe)
- Use EEA industry guides as transitional tools to smooth future standard updates

Energy Sector Standards Development Framework



**Energy Sector
Standards Advisory Group
(ESSAG)**



Proposed Composition

- Standards New Zealand + Independent Chair
- IEC Standards National Committee (reps.)
- **Electricity Engineers Association (EEA)**
- **GASNZ**
- **Chartered Institution of Building Services Engineers (CIBSE) ANZ Region**
- **Medical Technology Association of New Zealand (MTANZ)**
- **Business NZ**

Joint Stds related committees

EL-003, EL-007, EL-008, EL-010, EL-011, EL-042, EL-054

Joint Stds related committees

AG-001, AG-006, AG-008, EL-014, EL-023, MS-011, ME-015, ME-018, ME-038

Joint Stds related committees

EL-001, EL-003, EL-006, EL-009, EL-021, EN-001, LG-001, LG-002, LG-007, LG-010, EL-036, EL-042, ME-006, ME-008, ME-013, ME-086

Joint Stds related committees

EL-002, EL-004, EL-008, EL-015, EL-020, QR-12, EL-041, EL-056, EL-059, EL-060

Joint Stds related committees

HE-003, HT-021, LG-001, LG-07, TE-001

ISO/IEC Int'l Stds related committees

IEC SET, TC-69,

ISO/IEC Int'l Stds related committees

TC28-SC 7, TC197, TC31, TC31J, TC20-SC17

ISO/IEC Int'l Stds related committees

TC207-SC1, SC2, SC5 and SC7, TC 274, TC64

ISO/IEC Int'l Stds related committees

TC34, TC34-SC34D, TC59, TC59M, TC86-SC7, TC61, , 61H, TC291

**Electricity Supply
Industry Advisory Group
(ES-IAG)
(incl. DERS)**

- Innovation and Participation Advisory Group (IPAG)
- Electricity Networks Association (ENA)
- **Electricity Engineers Association (EEA)**
- Energy Efficiency and Conservation Authority (EECA)*
- Electricity Authority (EA)*

**Hazardous Areas
Industry Advisory Group
(HA-IAG)**

(Gaseous, Flammable or Explosive atmospheres)

- New Zealand Hydrogen Council
- WorkSafe New Zealand – Energy Safety*
- Gas Industry Company*
- Bioenergy Association
- Energy Resources Aotearoa
- **GASNZ (formerly LPGA and Gas Association of New Zealand)**
- Institution of Professional Engineers New Zealand
- Aviation and Marine Engineering Association
- Electrical Contractors Association of New Zealand (ECANZ)

**Electrical Installation
Industry Advisory Group
(EI-IAG)
(Systems)**

- Institute of Refrigeration Heating & Air Conditioning Engineers of New Zealand (IRHACE) and Climate Control Companies Association New Zealand (CCCA)
- Geothermal Heat-pump Association of New Zealand (GHANZ)
- Illuminating Engineering Society of Australia and New Zealand Ltd (IESANZ)
- Carbon and Energy professionals NZ
- **Chartered Institution of Building Services Engineers (CIBSE) ANZ Region**
- NZ Green Building Council
- Sustainable Energy Association New Zealand (SEANZ)
- Energy Efficiency and Conservation Authority (EECA)*
- Local Government New Zealand*
- NZ Electrical Institute
- Engineering New Zealand
- Electrical Contractors Association of New Zealand (ECANZ)
- NZ Sustainable Business Network

**Electrical Equipment
Industry Advisory Group
(EE – IAG)**

(Products, Lighting & Appliances)

- Gas Equipment Suppliers Group (GES)
- Lighting Council New Zealand (LCNZ)
- **Business NZ**
- Skope Industries Ltd
- New Zealand Retailers Association
- NZ Manufacturers and Exporters Association
- Heat-Pump Suppliers Association of New Zealand (HPSA)
- Energy Efficiency and Conservation Authority (EECA)*
- Master Electricians
- WorkSafe New Zealand – Energy Safety*

**Electro Medical Equipment
Industry Advisory Group
(EM – IAG)**

- **Medical Technology Association of New Zealand (MTANZ)**
- Auckland District Health Board
- Canterbury District Health Board
- Capital, Coast and Hutt-Valley
- Fisher & Paykel Healthcare
- USL Equipment
- Master Electricians
- Schneider Electric New Zealand
- Lighting Council New Zealand (LCNZ)
- NZ Manufacturers and Exporters Association
- WorkSafe New Zealand – Energy Safety*

Objective

ESSAG will ensure that standards are and remain:

- Fit-for-purpose, remove barriers to international trade and investment
- Aligned to best-practice international product and application standards within the New Zealand regulatory framework, to facilitate safe and effective consumer outcomes and efficient commercial trade
- Underpin and support New Zealand Government Public Policy Objectives (GPPO)

Systems

(measurable outcomes)

Wherever possible ESSAG will apply a systems based (*measurable outcomes*) approach to standards that support New Zealand's energy transition, without hindering innovation.

- Systems will factor alignment with the spirit of Tiriti o Waitangi/The Treaty of Waitangi and the resource management (RM) system.
- Systems are designed to remove barriers to trade, by letting the needs of business innovation determine which **regulatory tools** (and therefore levers) are appropriate (and necessary), to maintain compliance (*the safety of people, property and energy efficiency*). This allows regulators greater scope to support rapidly evolving technology, by further reducing barriers to investment - while at the same time provide market certainty and confidence, that quality assurance will drive uptake.

Regulatory tools (standards related publications) appropriate for the adoption of new technology will include:

- Publicly Available Specifications (PASs) and Guidelines
- Technical Specifications
- Codes of Practice (CoPs)

These publications will need to be acknowledged (*as deemed to comply*) within respective regulator settings, for both central government agencies and LGNZ (29 member) regional regulatory requirements.

- The **regulatory tools** will point to international standards considered by the ESSAG as necessary for NZ inc. to adopt and or modify. Including the revision of existing NZS and AS/NZS standards, where deemed necessary by the respective regulator.

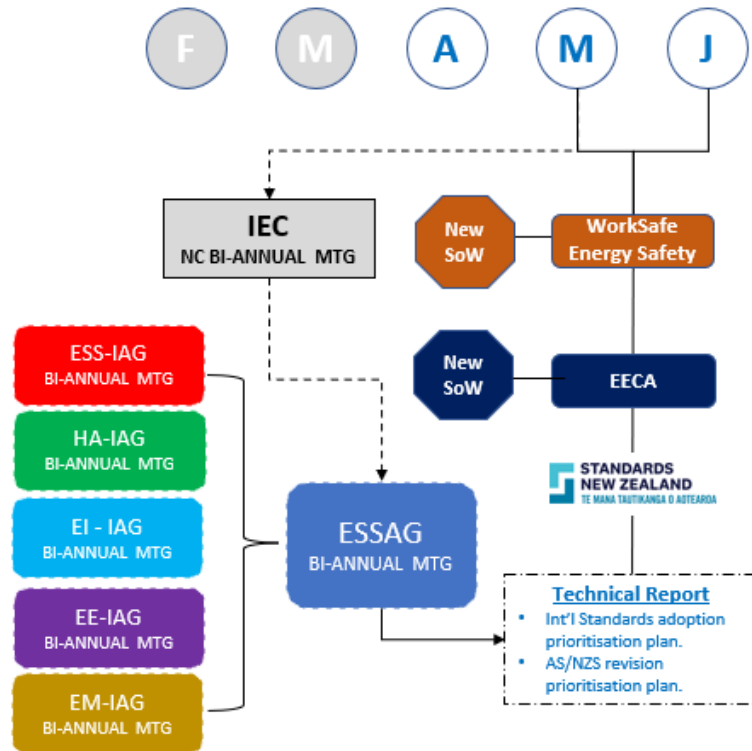
Recommendations

ESSAG will determine and recommend

- Which *regulatory tools* are needed, what considerations need to be factored within each, and a suggested timeframe for implementation.
- A suite of standards solutions that underpin each *regulatory tool* and the nature of the implementation. Either direct adoption, adoption with MODs, revision of existing NZS or AS/NZS standards or a combination thereof.
- Recommendations will be prepared in the form of a report by the ESSAG Chair for SNZ/regulator annual planning purposes.

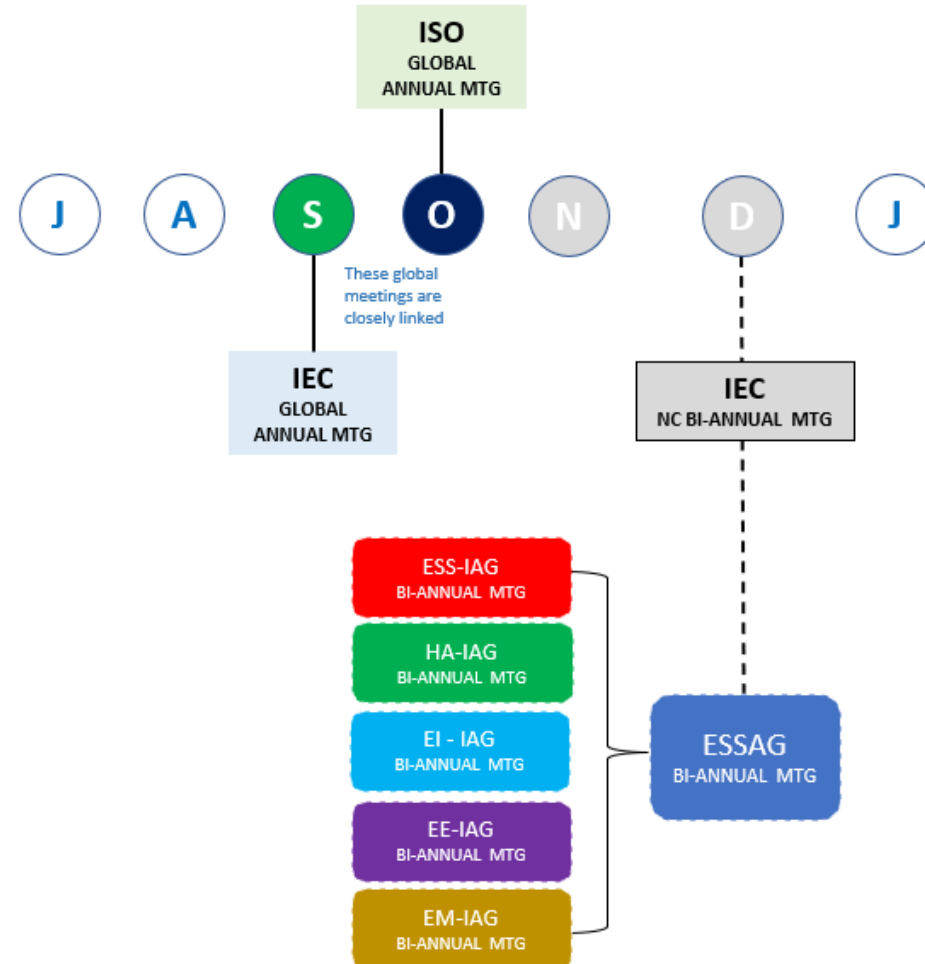
Standards Development Forward Workplan

FY 2025/26



Complete Planning for FY 2025/26

FY 2026/27



Commence Planning for FY 2026/27

General Information: Int'l Standards committee representation and

Com	Reg	
IEC SET	EECA	Sustainable Electrified Transportation
IEC TC69	WS-ES/EECA	Electric road vehicles and electric industrial trucks
ISO/TC28 SC 7	WS-ES	Liquid biofuels
ISO/TC197	WS-ES	Hydrogen technologies
IEC TC31	WS-ES	Equipment for explosive atmospheres
IEC TC31J	WS-ES	Classification of hazardous areas and installation requirements
ISO TC20 SC17	WS-ES	Airport Infrastructures
ISO/TC207 SC 1	MfE*	Environmental management systems
ISO/TC 207 SC 1	MfE*	Environnemental management Systems
ISO/TC 207 SC 3	MfE*	Environmental labelling
ISO/TC 207 SC 5	MfE*	Life cycle assessment
ISO/TC 207 SC 7	MfE*	Greenhouse gas management and related activities
ISO TC274	WS-ES/ EECA/MfE*	Light and lighting
IEC TC64	WS-ES	Electrical installations and protection against electric shock

Com	Reg	
IEC TC34	WS-ES/ EECA/MfE*	Lamps and related equipment
IEC TC34 SC34D	WS-ES/ RSM/EECA/ MfE*	Luminaires
IEC TC59	EECA	Performance of household and similar electrical appliances
IEC SC59M	EECA	Performance of electrical household and similar cooling and freezing appliances
ISO TC86 SC7	EECA	Testing and rating of commercial refrigerated display cabinets
IEC TC61	WS-ES	Safety of household and similar electrical appliances
IEC TC61 SC61H	WS-ES	Safety of electrically-operated farm appliances
ISO TC291	WS-ES/EECA	Domestic gas cooking appliances

* Regulator participation and or interest - *to be confirmed*

General Information: Joint Standard committee representation and

Com	Reg	
AG-001	WS-ES/EECA	Gas Appliances
AG-006	WS-ES/GIC	Gas installations
AG-008	WS-ES/GIC	Gas distribution networks
CS-028	EECA	Solar Water Heaters
EE-001	EECA	Residential Air-conditioning
EL-001	WS-ES/EECA	Wiring Rules - AS/NZS 3000
EL-002	WS-ES	Safety of Household and Similar Electrical Appliances and Small Power Transformers and Power Supplies
EL-003	WS-ES	Electric Wires And Cables
EL-006	WS-ES	EL-006 : Industrial Switchgear And Controlgear
EL-007	WS-ES	Power Switchgear
EL-008	EECA	Performance of Electrical Appliances - Power transformers
EL-009	EECA	Three Phase Cage Induction Motors
EL-010	WS-ES	Overhead Lines
EL-011	WS-ES	Electricity Metering Equipment
EL-014	WS-ES	Equipment for Explosive Atmospheres - AS/NZS 4114

Com	Reg	
EL-015	EECA	Quality and Performance of Household Electrical Appliances
EL-020	EECA	Electric Water Heating Appliances
EL-021	WS-ES	Installation Of Electric Fences
EL-023	WS-ES	Electrical Equipment in Mines and Quarries
EL-036	WS-ES	In-service safety inspection and testing of electrical equipment NZS/AS 3760
EL-041	WS-ES/EECA	Lighting
EL-042	WS-ES/EECA	Renewable Energy Power Supply Systems - AS/NZS 5139
EL-054	EECA	Remote Demand Management of Electrical Products
EL-056	EECA	Room Air Conditioners
EL-059	EECA	Dishwashers, Clothes Washers and Dryers
EL-060	EECA	Performance of Household Electrical Appliances Refrigerating Appliance
EN-001	EECA	Energy Auditing
HE-003	WS-ES	Medical Electrical Equipment- AS/NZS 2500
HT-021	WS-ES	Wiring of Medical Treatment Areas in Hospitals - AS/NZS 3003
LG-001	EECA	Interior and Workplace Lighting

General Information: Joint Standard committee representation and regulator interest cont'd

Com	Reg	
LG-007	WS-ES	Emergency Lighting In Buildings
LG-010	NZTA/LGNZ	Control of obtrusive light
ME-006	WS-ES/EECA	Refrigeration
ME-008	EECA	Refrigerated Display Cabinets
ME-013	EECA	Industrial Fans
ME-018	WS-ES	Mining Equipment
ME-038	WS-ES	Petroleum Pipelines
ME-086	EECA	Commercial Air-conditioning Equipment
MS-011	WS-ES	Classification of hazardous areas due to explosive atmospheres
QR-012	WS-ES	Conformance Marking to Regulatory Requirements
TE-001	WS-ES	Medical Electrical Equipment- AS/NZS 2500

SRC Discussion

Electrical standards, small scale DG inverters

Chris Forsman, Principal Standards Project Manager

October 2025



Standards related solutions...

- *Handbooks*
- *Guidelines*
- *Technical Reports*
- *Codes of Practice*
- *Publicly Available Specifications (PAS)*

SNZ PAS 6014:2025

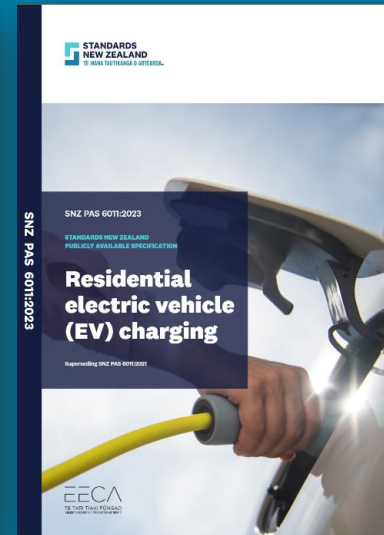
STANDARDS
NEW ZEALAND
TE MANA TAUTUKANGA O AOTEAROA

SNZ PAS 6014:2025

STANDARDS NEW ZEALAND
PUBLICLY AVAILABLE SPECIFICATION

Residential solar photovoltaic (PV) and battery storage systems guideline

EECA
TE TARI TIAKI PONGAO
ENERGY EFFICIENCY & CONSERVATION AUTHORITY



What is a PAS?

Publicly Available Specification (PAS)

- A fast-track standards document developed in response to an urgent market need
- It is not a standard, but a related solution (best-practice guidance document) such as specification, code of practice, or guideline.
- Has a lower level of conformity (informative) yet still requires consensus
- Often points to existing local cited, or international standards for regulatory harmonisation and alignment purposes

Key attributes

- Valuable best-practice guidance document
- Provides unbiased and independent expert advice, to help consumers make informed decisions about the adoption of such technology, and what are the benefits in doing so
- PAS's contain a technical specification, which is a powerful tool for the regulator to tie to government incentive schemes too
- PAS's employ a 'Pull Strategy'. This encourages industry players to adopt more energy efficient technology solutions, should they wish to participate in government incentive schemes – otherwise they miss out!
- **Publication life 6-years, at which point it must be turned into a standard, or removed**

5 key issues that cause us the greatest concern

- **No harmonised framework for residential solar and battery systems** – a lack of clarity adds administrative burden and absence of unified technical standards creates installer confusion
 - **Obscure regulatory regime** – complex permitting processes creates confusion for equipment importers, installers and homeowners about their regulatory obligations
 - **Grid Integration is complex** – a lack of consistent clarity from electricity network providers creates a minefield for the homeowner wishing to do the right thing from a regulatory perspective
 - **No official independent consumer-facing safety guidance** – on the do's and don'ts of solar and battery storage installations and what to consider before embarking on an installation
 - **Poor installations can lead to increased fire risk** - Insurance companies are less likely to insure a property that has a solar installation not installed by an accredited and licensed professional and do these installations void roof cladding warranties?
-

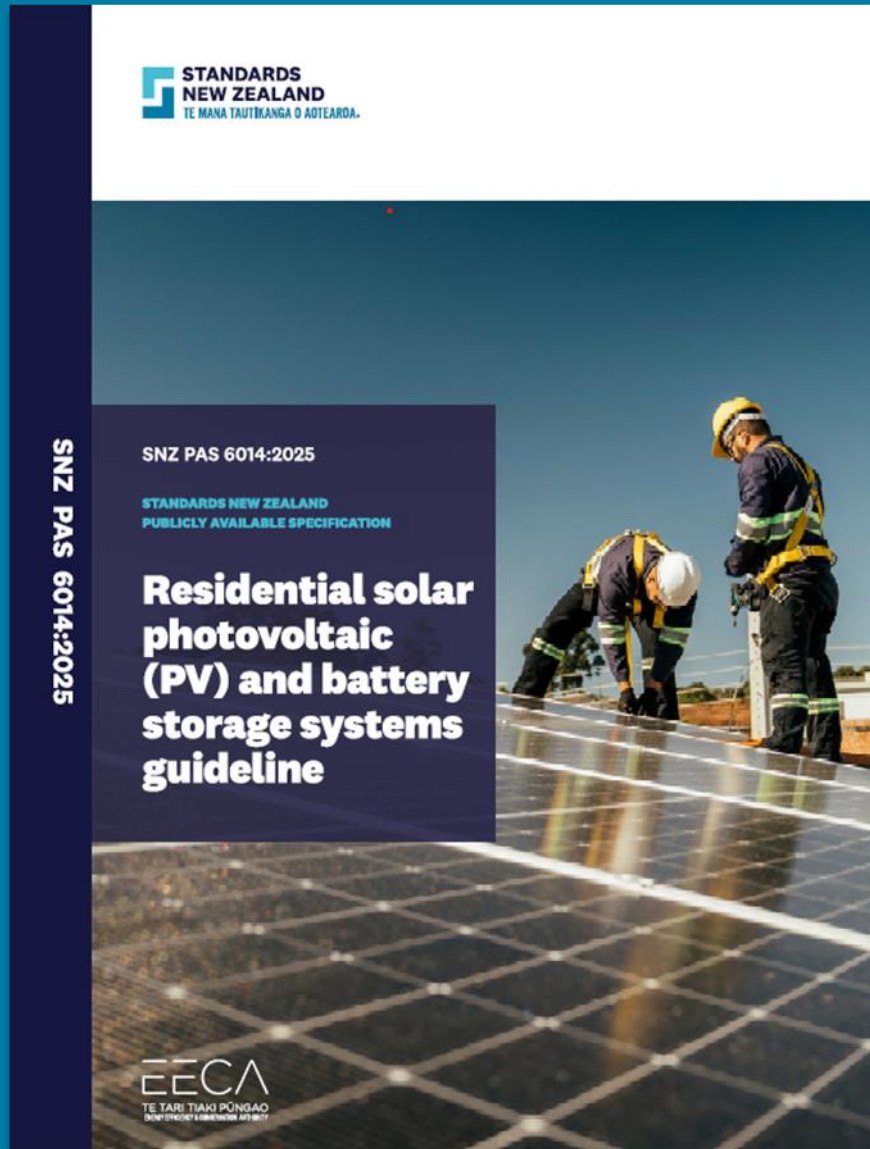
4. Precisely define the problem

“

New Zealand's residential solar industry lacks harmonised standards, clear regulations and consumer safety guidance. This creates confusion for installers and homeowners, complicates grid integration and increases risks from poor installations—undermining safety, insurability, and public confidence in clean energy adoption.

”

SNZ PAS 6014 Structure



STRUCTURE

1. Scope
2. Becoming home energy secure
3. Participating in the electricity system
4. Introducing solar PV technology
5. Learning about solar PV systems
6. Solar panels
7. Rooftop applications
8. Ground mount applications
9. Grid-tied systems without batteries
10. Grid-tied systems with batteries and backup capability
11. Off-grid systems
12. Batteries

Appendix A – Choosing a system that is right for you

Appendix B – Technical specifications

Appendix C – Data capture and cybersecurity

Addressing substandard components and poor installations

Section/Clause	Heading	Page
5	Learning about solar PV systems	35
6	Solar panels	42
7	Rooftop applications	47
Appendix A	Choosing a system that is right for you	91
Appendix B	Technical specifications	97



Undertaking pre-installation risk assessments



Section/Clause	Heading	Page
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6	Solar panels	42
Table 5	Typical New Zealand roof systems	47
7.2	Access and Safety	49
Figure 14	New Zealand wind zones	50/51
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Battery storage system assessment

Section/Clause	Heading	Page
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3.9	Islanding	29
12	Batteries	79
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PAS/Guideline development principles

1. **Ensure a balanced technical advisory group (TAG) and independent Chair**
2. **Clarity and Accessibility**
3. **Relevance to the Audience**
4. **Safety and Compliance**
5. **Practical Guidance**
6. **Transparency and Neutrality**
7. **Sustainability and Future-Proofing**





Let's keep the kōrero (conversation) going

Chris Forsman

Principal Standards Project Manager

Standards New Zealand | Market Integrity | Te Whakatairanga Service Delivery Group

Ministry of Business, Innovation & Employment

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WRAP SESSION – ELECTRICAL
STANDARDS: INVERTERS FOR SMALL
SCALE DG

SECURITY
AND
RELIABILITY
COUNCIL

The Chair will conduct a Wrap session for agenda item #10a – 10g

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



Powerful Potential

New Zealand's vehicle-to-grid
potential



► **Consulting**

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► **Public reports**

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Orion



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Scope

1. Opportunity (value)
2. Consumer choice
3. Technical platforms
4. Commercial platforms

4x Technical Appendices

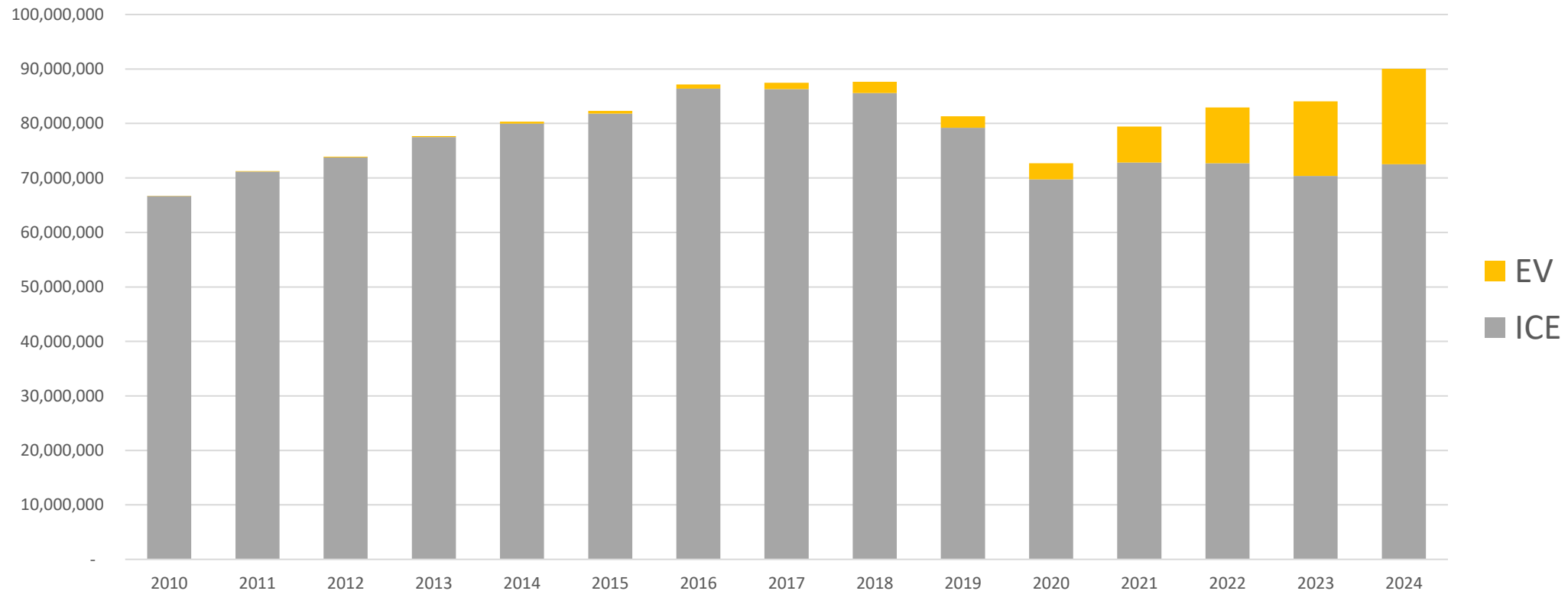
Case studies (insights from trials)



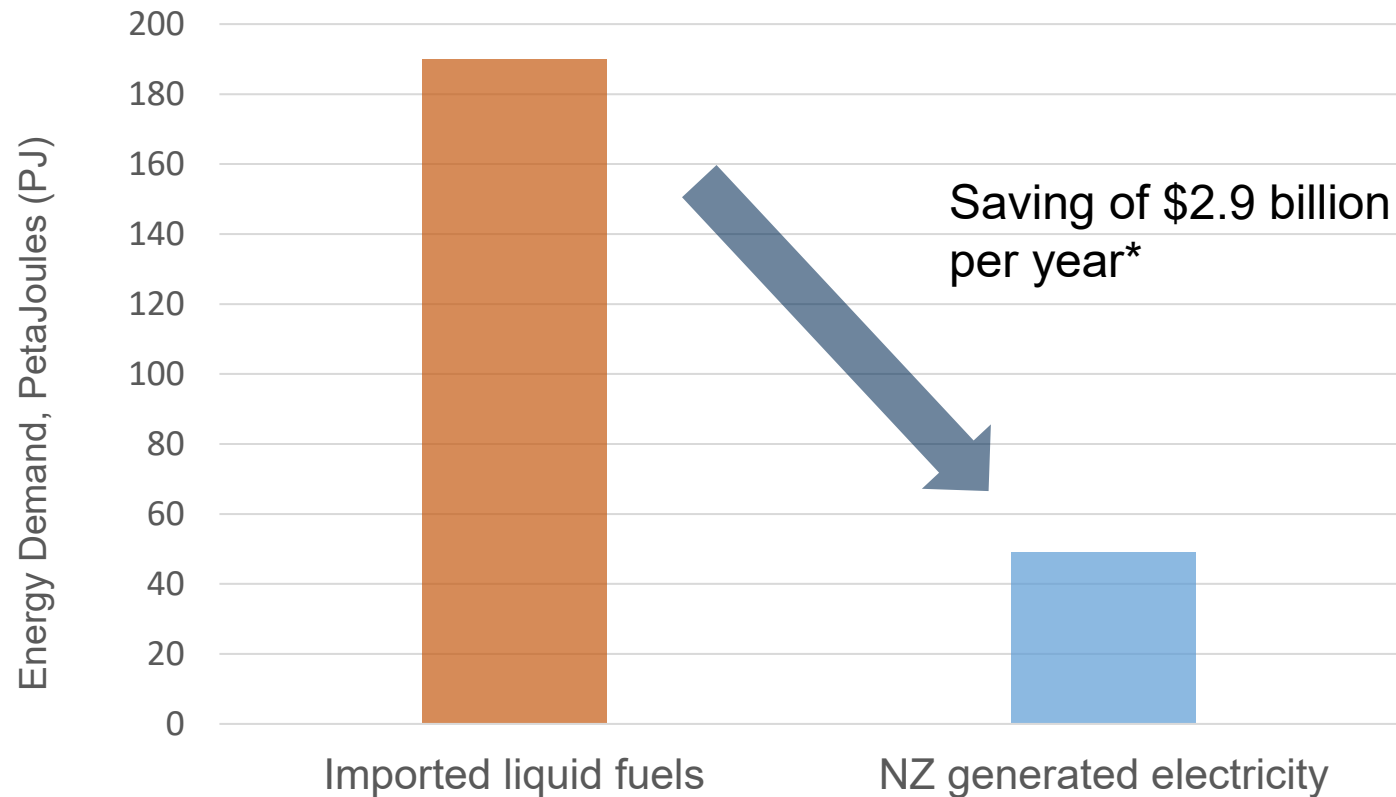
**Understanding
the opportunity**

Global sales of Internal Combustion Engine (ICE) vehicles peaked in 2017

Annual global passenger car sales

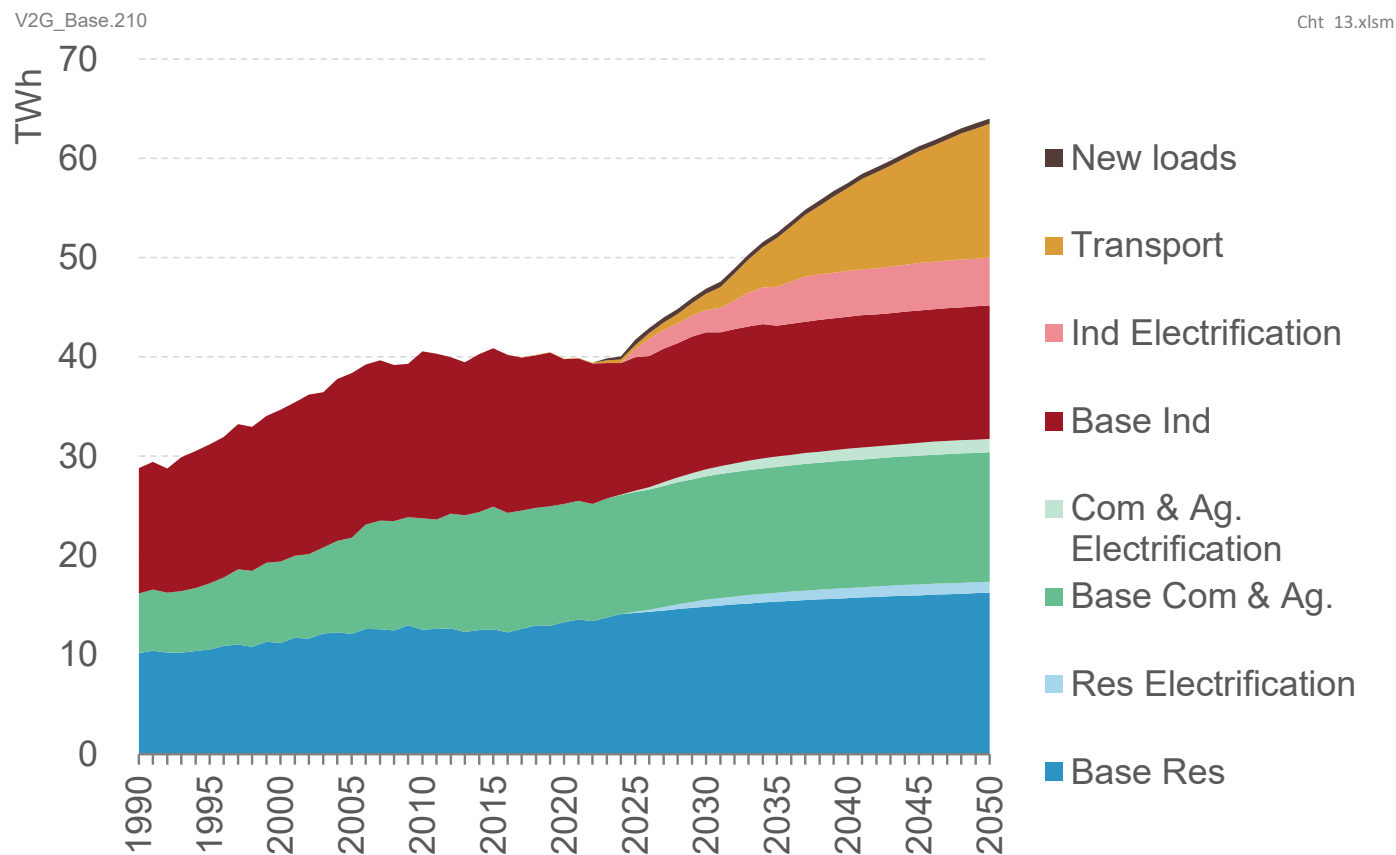


Land transport electrification will transform energy demand

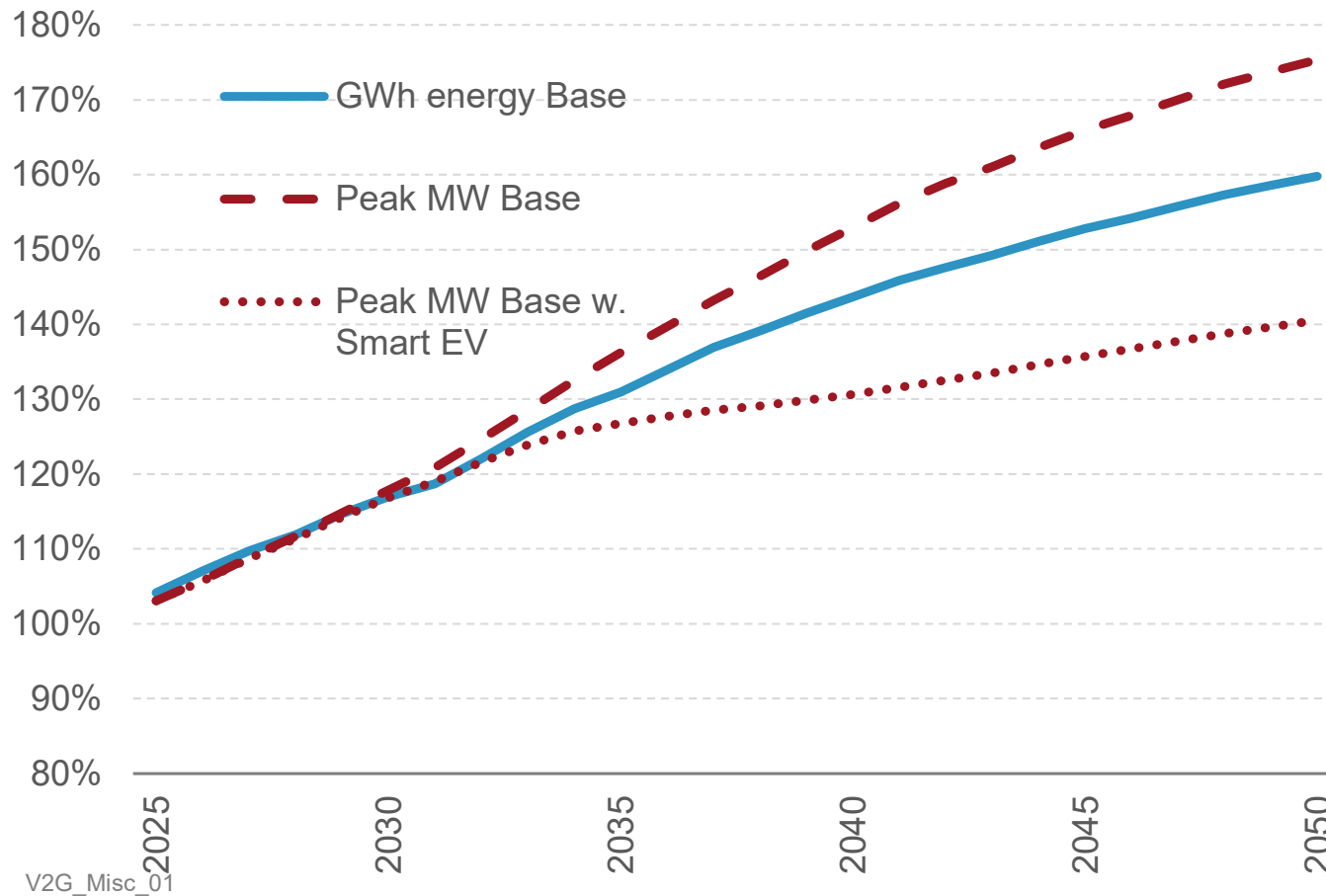


* Spend on importing fuels vs. LCOE of renewables

EVs will be a major source of energy demand growth...



...and could worsen or improve capacity adequacy relative to energy consumed



EVs do not need to charge at peak

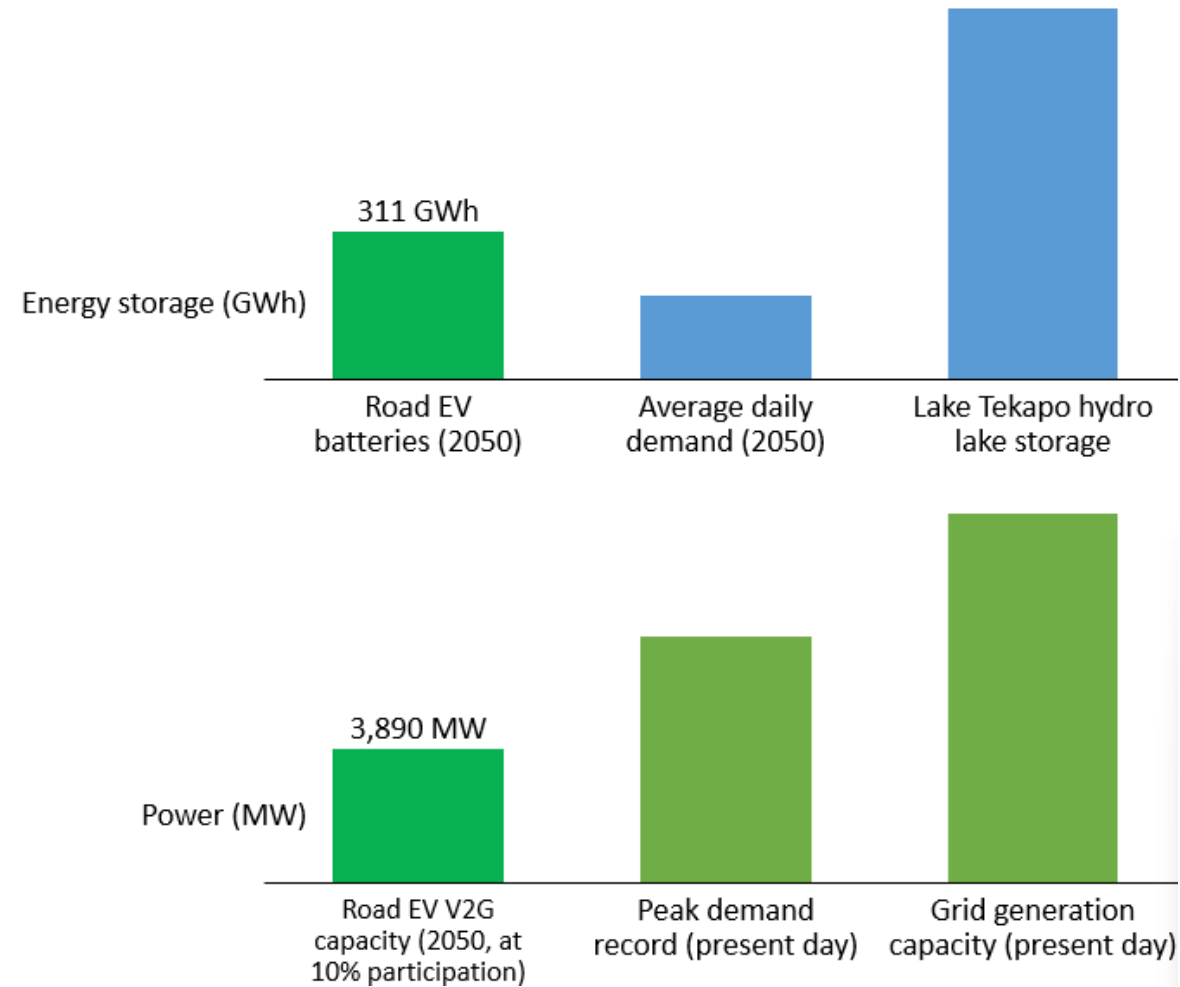
Terminology

Vehicle-to-load (V2L)	EV has a power outlet. Can provide remote power (eg, building site) or emergency backup (eg, recharge phone or freezer).
Vehicle-in-grid (V1G)	Smart charging – demand can be scheduled, throttled or stopped remotely.
Vehicle-to-home (V2H) Vehicle-to-premises (V2P)	Bidirectional converter in vehicle or charger. Vehicle synchronised. Property does not inject back into the grid.
Vehicle-to-grid (V2G)	As above, but property can inject back into the grid.



“V2G”

V2G offers large energy storage and capacity potential



V2G benefits the wholesale market, transmission and distribution

Vehicle	Value (\$/kW/yr)			Size (kW)	Value (\$/yr)
	Energy	Network	Total		
Commuter car	130	150	280	7.4	\$2.1k
Weekend car	210	150	360	7.4	\$2.7k
Delivery truck	85	130	215	50	\$10.8k
Milk tanker	135	100	235	100	\$23.5k

Generation
firming /
wholesale market

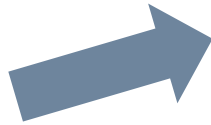


Distribution and
transmission deferral

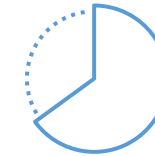
Three horizons...



High value per EV
Technically feasible
...need platforms



Platforms in place
Strong system benefits
Healthy value per EV



Mature service
High participation
Modest value per EV



Commercial platforms
Technical platforms
Consumer services



Local saturation
Stationary batteries

Consumer choice



Compare and contrast



Traditional ripple-controlled hot water

- Fixed installation
- Maintained alongside metering
- Comms intrinsic to network connection
- No consumer intervention

Low-touch, distributor-led



Managed EV charging

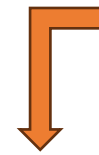
- Customer-selected and retrofitted
- Value stack = generation/wholesale & networks
 - Non-coincident value across generation/wholesale and networks as the grid becomes more renewable
- Active participation (plugged-in & charged)

Retailer-led consumer engagement



Next-gen controlled hot water

UK example



Fine print = plug-in



Vehicle-to-Grid enabled car

Lease a BYD Dolphin, with upgraded tech that's ready to export energy back to the grid.



Free charging for your entire lease

Up to 12K miles/year on Octopus Energy's Power Pack tariff, matched to your lease mileage



Home charger installed by Octopus

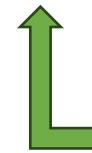
Innovative V2G enabled Zaptec Pro with a standard installation by expert engineers.



Servicing, maintenance and repairs

We'll keep your car in top condition. Service, maintenance and repairs are included.

Car is anchor product



V2G is a sweetener

Heavy EV V2G



V2G at scale

- For trucks and other heavy electric vehicles back at depot during evening peak
- Regular daily routes – greater V2G certainty for contracting
- Discharge rates of 100-200 kW per heavy vehicle possible, multiple vehicles at depots
- Niche cases of seasonal transport demand with heavy electric vehicles that are parked through winter months to meet winter peaks, e.g. milk tanker trucks and tourism coaches

Success factors



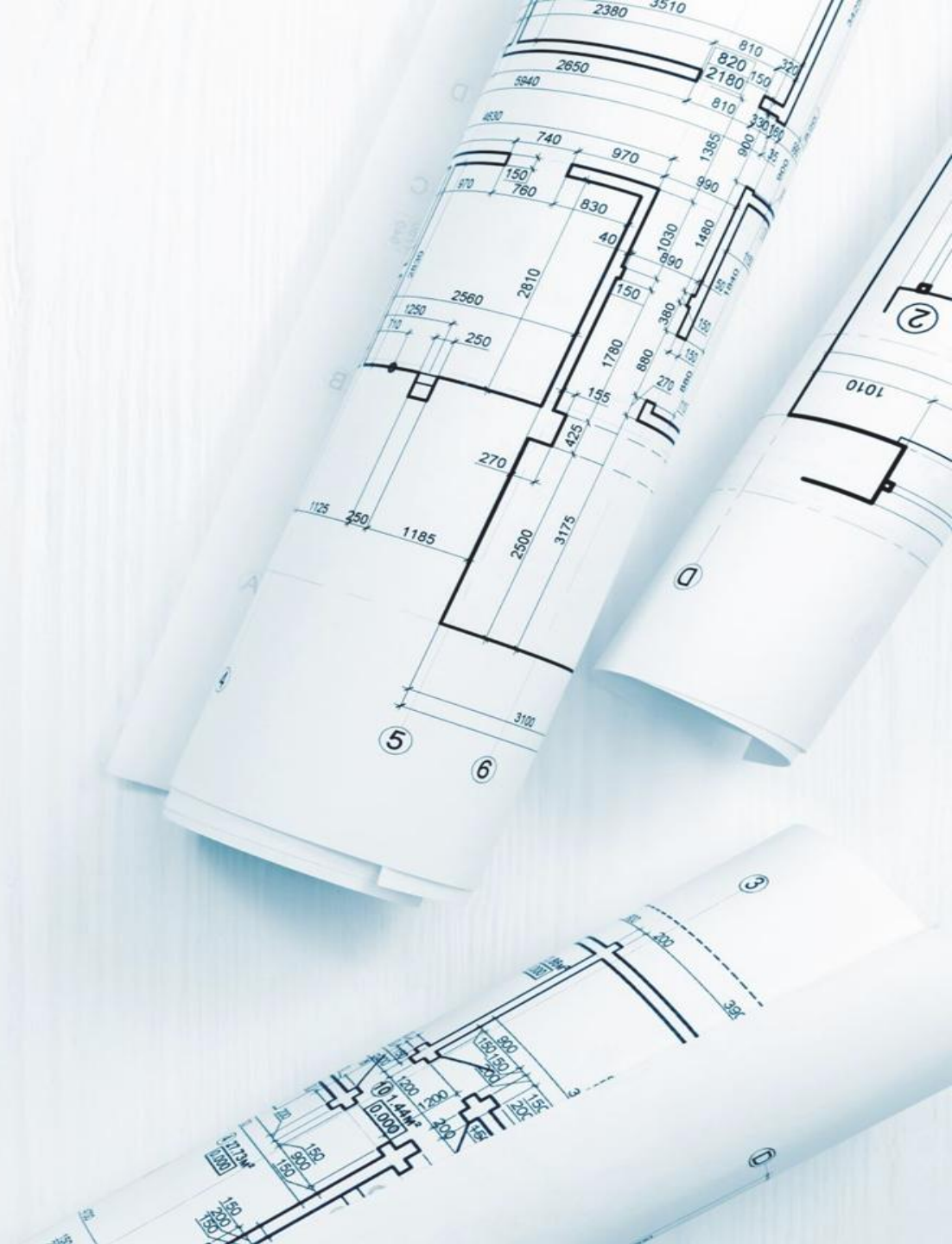
For EVs and chargers, standards/protocols specified and **Trans-Tasman** alignment is helpful



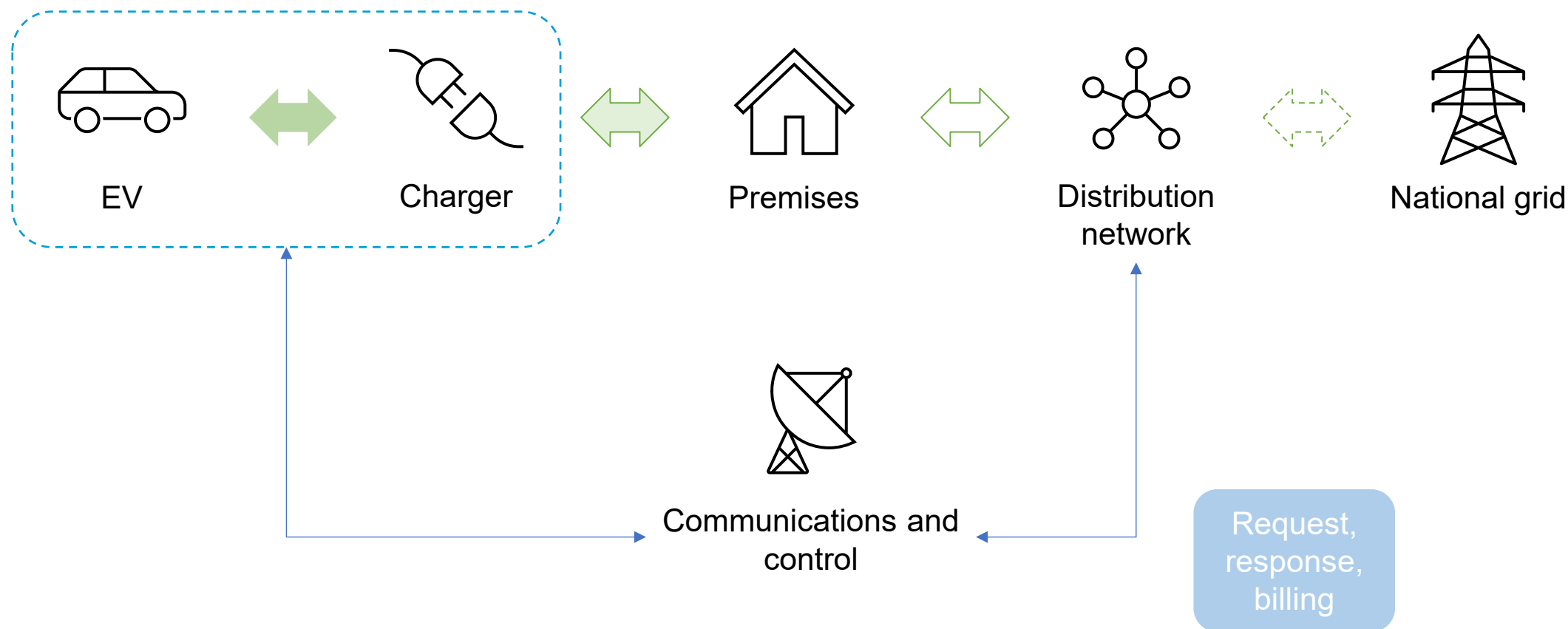
For network standards, communications and pricing, **national** consistency is helpful

...and vehicle manufacturer battery warranties that permit V2G

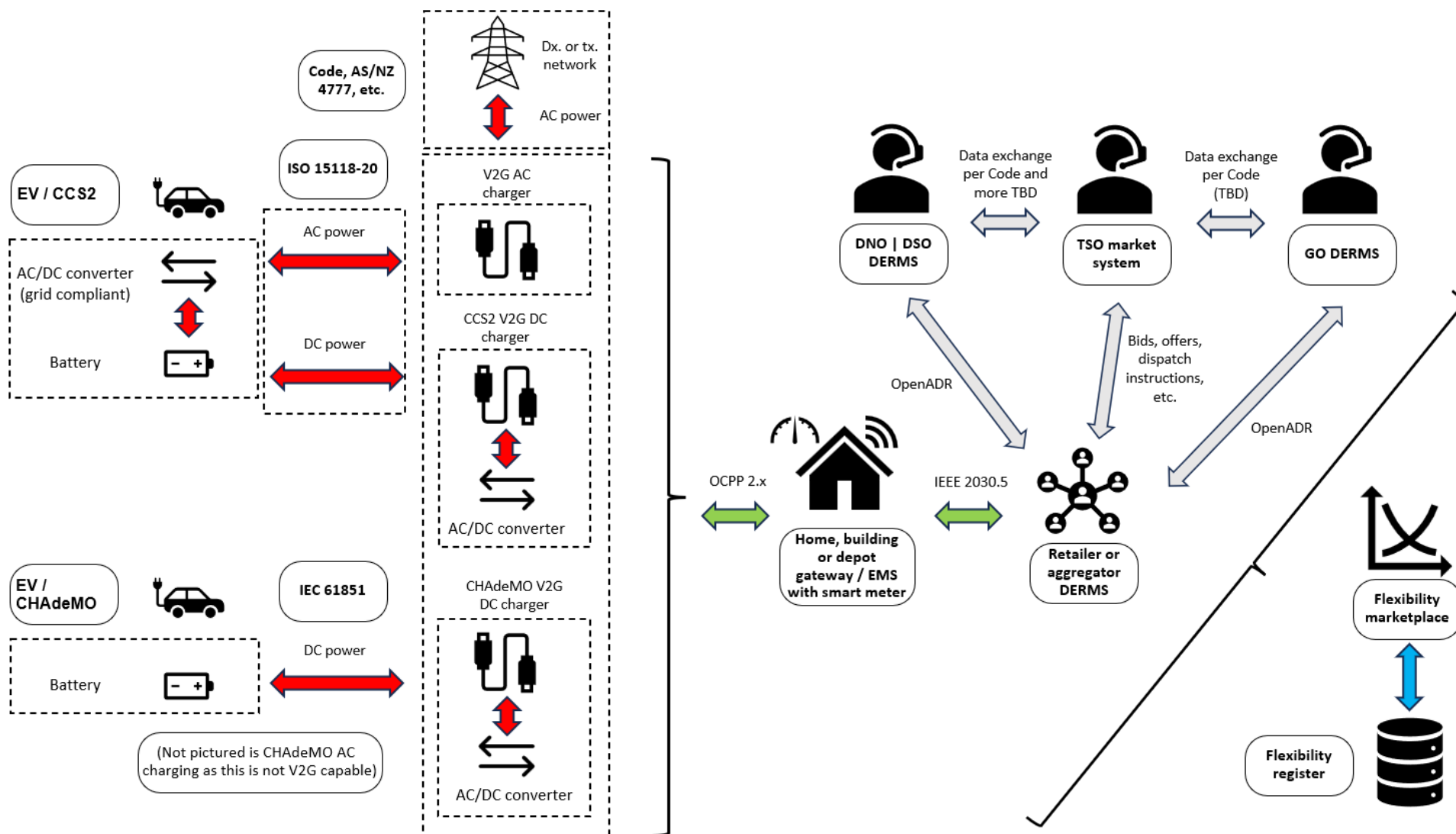
Technical platforms



The stack at a glance



The stack in greater detail



Commercial platforms

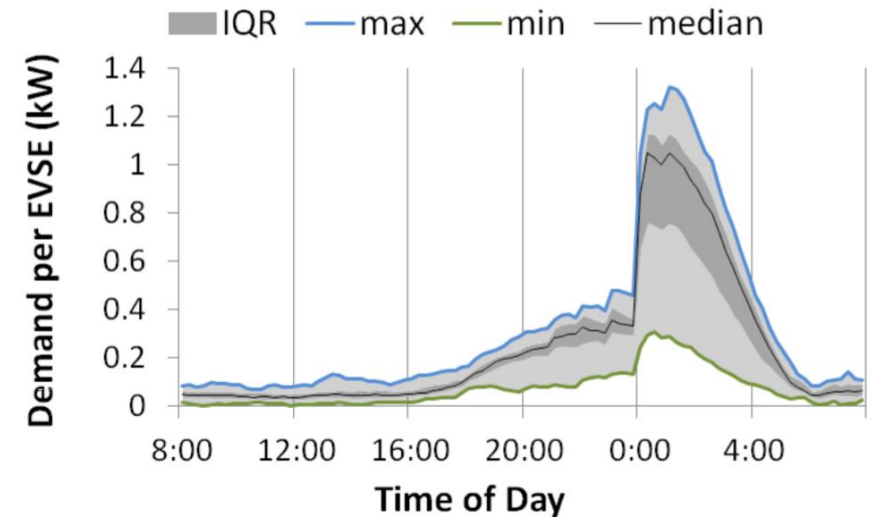


Time of use **not** preferred

TOU tariffs do not work for controlled EVs at scale.

Simulated symmetric 13.4 c/kWh tariff with 7.4kW charger:

- household *earns* \$1,500 per year
- 3% of households = 25% higher peak



Type of use offers a better alternative

1. Off-peak rates anytime for enrolled consumption
2. Available if enrolled with any eligible service
3. Eligibility criteria = modest and nationwide
4. Provider-supplied consumption data (car or charger)



Smart charging



Nextgen hot water



Stationary battery

Deeper flexibility platforms and marketplaces can build on type of use

Incentivise and compensate for:

- deeper curtailment
- longer curtailment
- specific locations

...for more acute flexibility needs

Read the full report online



<https://www.concept.co.nz/updates.html>

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Concept is one of New Zealand's leading applied economics consultancies. We have been providing high-quality advice and analysis for more than 20 years across the energy sector, and in environmental and resource economics. We have also translated our skills to assignments in telecommunications and water infrastructure.

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Our directors have all held senior executive roles in the energy sector, and our team has a breadth of policy, regulatory, economic analysis, strategy, modelling, forecasting, and reporting expertise. Our clients include large users, suppliers, regulators, and governments – both in New Zealand and the wider Asia-Pacific region.

About Retyna Ltd (retyna.co.nz)

Retyna is a specialist, independent consultancy focusing on electric vehicles and renewable energy for transport.

Elizabeth Yeaman, Managing Director of Retyna, has a rare mix of technical, communications, strategy, policy design and implementation experience. She has worked in the renewable energy and transport fields for over 30 years in both the private and public sectors.

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System operator self review 2024/25

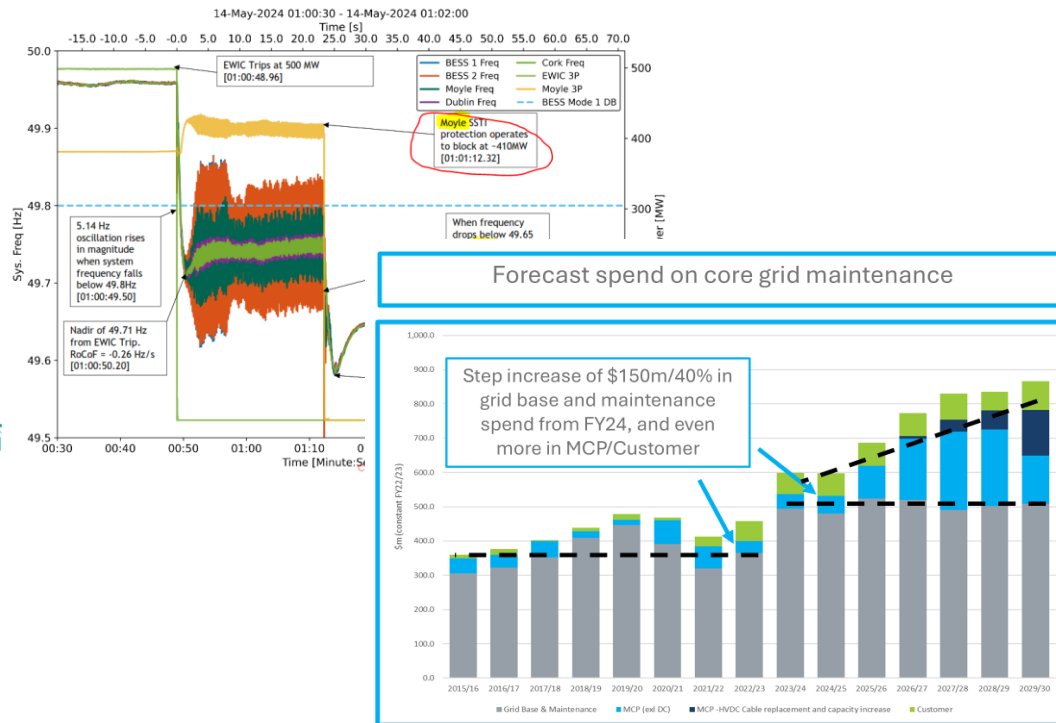
Security and Reliability Council

23 October 2025



Our changing operating context

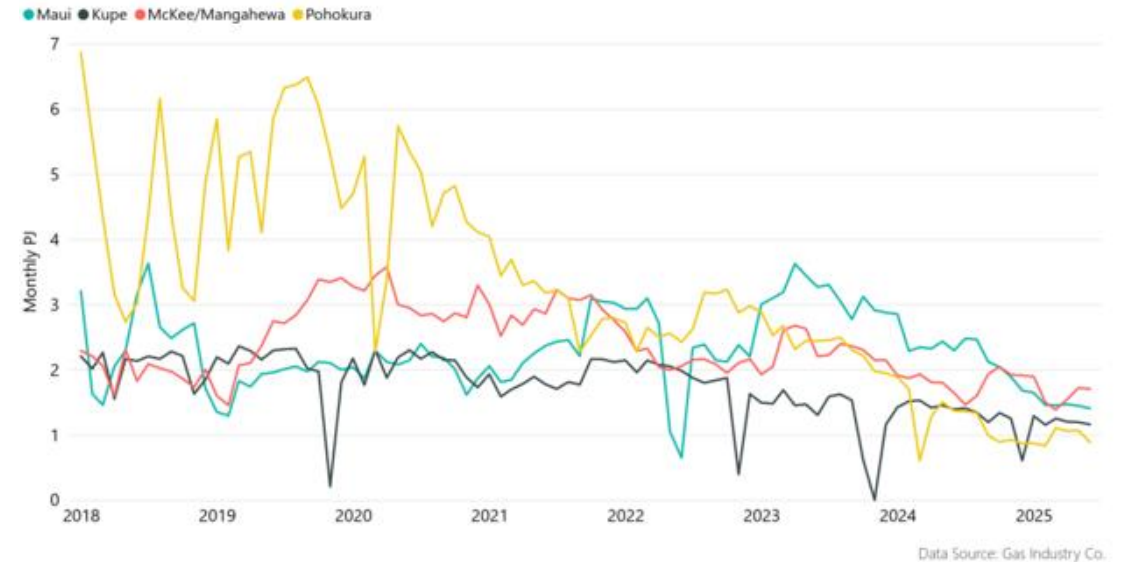
Impact on System Frequency



“Soon after the first automobiles were on the road, there was the first car crash. But we didn’t ban cars – we adopted speed limits, safety standards, licensing, requirements, dunk-driving laws, and other rules of the road.”

– Bill Gates, cofounder of Microsoft

Gas Production by Major Fields



Power pain: Two-thirds of electricity consumers worried about their bills



NZ’s big chill was an early winter warning: power should be subsidised for struggling households

Published: May 13, 2024 2:31pm AEST Updated: September 10, 2024 9:20am AEST

What went well

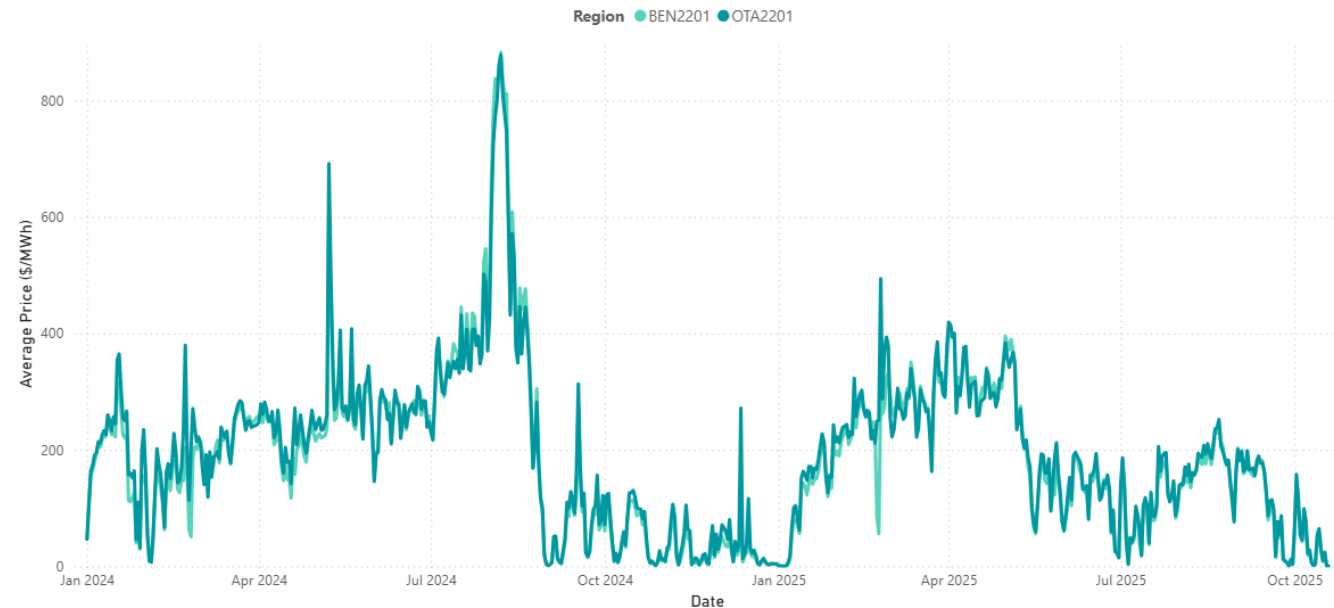


Security of supply over the last 12 months

- The System Operator has progressed several initiatives since last winter aimed at improving our analysis and processes to better support industry, including:
 - Lessons learnt published following first use of discretion in relation to Contingent Storage Release Boundary (CSRB);
 - Commenced the Security of Supply Forecasting and Information Policy (SOSFIP) review;
 - Established a new Quarterly Security of Supply Outlook that brought together previously separate energy and capacity analysis as well as more extensive commentary on fuel adequacy;
 - Evolving the Energy Security Outlook (Electricity Risk Curves (ERCs)/Simulated Storage Trajectories (SSTs)) and focus on key messages;
 - Refreshing the Energy Security Outlook 101 – an education piece, which published our CSRB buffer discretion process
 - Low residual situations review completed;
 - Thermal fuels information disclosure to SO improved through Urgent Code change.
- Information and engagement saw the industry respond by ensuring fuel availability early and progressing Huntly deal

What we Learned:

- Importance of early and consistent messaging in ensuring industry has the time needed to contract and have alternative fuels available ahead of any extended dry period
- Early action by participants was reflected in moderated wholesale prices through autumn/winter 2025, despite low inflows persisting (particularly in key South Island catchments)
- Importance of continually considering where rules and our work could be improved, and taking proactive action early



Engagement with asset owners

Automatic under-frequency load shedding transition

The System Operator and the Authority worked well with Connected Asset Owners (CAOs) to complete the full transition of North Island distribution network feeders from the 2 block AUFLS to the new 4 Block AUFLS regime.

- By the target date of 30 June, 95.4% of the 1500 feeders had transitioned with just 70 across two distribution business still to complete.
- Monthly review cycle involving: reviews and acceptance of the CAO plans; security assessments to assure AUFLS provision was sufficient in case of a severe under-frequency event; and monthly reporting.
- Joint quarterly forums with CAOs to provide updates, advice and answer AUFLS provider questions.
- This has been a successful transition, with good collaboration with the Authority and AUFLS providers.
- The Authority has acknowledged the hard work and strong cooperation between North Island Distributors and the System Operator.

Space weather preparations

- Ongoing collaboration with the Electricity Industry Space Weather Working Group, including leading the development of an industry response to an extreme geomagnetic storm (PR-DP-1077). Desktop exercise of the plan held in October 2024.
- Published an [event response summary and lessons learned](#) from the May 2024 Gannon G5 geomagnetic storm, including input from industry. Updated our internal response procedures based on learnings.
- Prepared communications around space weather, including the development of an [external webpage](#) to help educate the public of the risk.
- Worked with GNS to provide a live feed of Eyrewell Geomagnetic Observatory data into Transpower. Also develop a Geomagnetic Induced Current (GIC) prediction tool based on NOAA satellite data.
- Developed ability to share Transpower GIC data with industry partners to improve their situational awareness.
- Ongoing engagement and input with NEMA to develop the country response plan to Space Weather. (Note NEMA exercise participation planned for November 2025).



Future Security & Resilience (FSR) programme

We have work well with the Authority to advance its Future Security and Resilience (FSR) programme.

We supported the Authority in their response to queries, and the assessment of submissions for the Frequency and Voltage Management consultation process. This also included supporting the development of a Cost Benefit Analysis tool to help inform the decision paper for these consultations.

Our activities in support of the Authority also included:

- Completed the BESS AOPO's literature review and provided preliminary feedback on the Authority's BESS regulatory roadmap paper.
- Completed the GXP Reactive Power Assessment analysis to support the voltage options paper.
- Supported to the Authority in drafting the options decision and Code Amendment consultation paper
- Completed the draft Connected Asset Commissioning, Testing and Information Standard (CACTIS) in prep for consultation
- Completed draft report for phase 1 of the system strength investigation initiative.
- We have also worked with the Authority to help prioritise FSR work for the next year and identify areas we can assist with.



Enabling growth and reliability

Planned outages are essential for enabling maintenance activities that support system reliability, and project work that enables growth in the power system.

We've worked closely with Transpower's Grid Delivery team to reduce the number of outages they schedule annually - allowing for a 100% increase in work volume while lowering cost and risk for other asset owners, and the market. Key actions include:

- Raising awareness of the potential impact of their forward work programme on the power system and market.
- Advocating for planning process improvements, including:
 - Longer lead times for outage planning.
 - Increased scope of work per outage.
 - More focused planning for outages on the Wairakei ring.
- As a result:
 - Short-notice outage requests have decreased by 15%.
 - Coordinated outages that combine maintenance and project work have increased.
- An ICT project has been initiated to explore how future tools - such as AI - could enhance planning processes. This may also offer technology synergies for the system operator.



Significant amount of market engagement

Consultations and publications

11 targeted consultations including:

- Adjustment to Alert Contingent Storage Release Boundary
- Low Residual Situations Review
- SOSFIP Review 2025 – Issues Paper

Also, 21 submissions as SO to industry consultations

Forums and events

2025 Industry Exercise, and SI Black Start Exercise

28 System Operator Industry Forums including

- weekly SOS 2024 dry year forums
- Winter preparedness extended forum
- Energy Security Outlook 101 extended forum

Education pieces

- Difference Bid Refresher Winter 2025 Workshop
- Asset Owner Engineering Forum
- Energy Security Outlook 101 publication
- Scheduling, Pricing, and Dispatch 101 publication

International engagement

- Ongoing engagement with AEMO and NESO, including control centre visits and operational discussions.
- Collaboration with international peers (EPRI, EirGrid, TransGrid, Tennet) on the Control Room of the Future initiative.



What we learned

An aerial photograph of a town at dusk, with lights glowing from the buildings and streets. The town is nestled in a valley, surrounded by dark, forested hills. In the background, a large body of water (a lake or fjord) stretches towards distant, snow-capped mountains under a twilight sky. A large, white, stylized line-art circle is superimposed over the center of the image, with several smaller concentric circles at its top, bottom, left, and right points, resembling a compass or a decorative frame.

Very low pricing operational challenges

From late August to September 2024, the market experienced a surge in very low-priced generation offers (\$0–\$0.01/MWh). This period highlighted emerging operational challenges with more intermittent generation (IG) resources connected to the grid.

- IG setting island risk triggered automatic constraints to manage generation and maintain system security.
- IG constraints didn't behave as expected: When IGs were constrained for security, their output was expected to remain stable. However, constraints were lifting if IG dropped slightly below dispatch, allowing uncontrolled rapid ramp-up of the IG, which was disrupting system frequency and security.
- This behaviour also resulted in constraints flip flopping between different IG within the risk group.

Our response to stabilise IG dispatch without negatively impacting system frequency or security was:

- System changes were made in October 2024 to reduce premature constraint releases and slow ramp-up.
- Further enhancements to real-time IG dispatch were implemented in March 2025, particularly when IG sets risk and actual output falls below dispatch.

In addition, we have consulted on a proposed tie-breaker change to SPD in July 2025 and a complimentary Code amendment proposal is being developed to help resolve the challenges of inflexible generation such as geothermal being dispatched down.



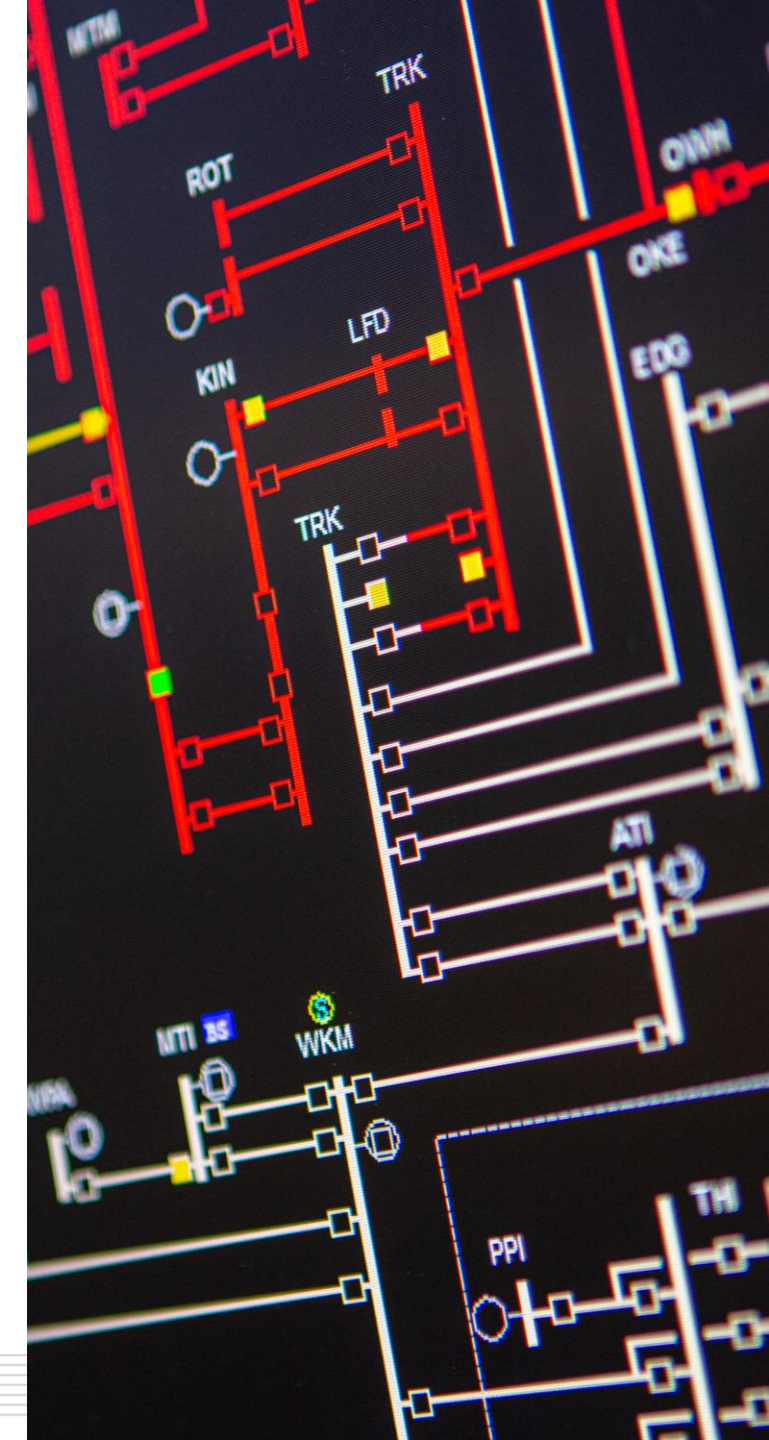
Impartial review of under frequency events

- On 21 December following a lightning strike Tauhara–Wairakei and Wairakei–Whirinaki circuits tripped.
- Loss of supply to Hawke's Bay and loss of associated generation in the region; frequency dropped to 49.20 Hz.
 - Grid emergency declared to enable load management and grid reconfiguration and restoration of supply in ~2.5 hours.
 - Event classified as 'moderate' under significant event reporting.
- Complex engineering investigation that need to be coordinated with under-frequency event (UFE) investigation.
- Moderate event report submitted to the Authority provided five recommendations for Transpower's grid business – including contingency planning, and protection scheme reviews
- UFE investigation recommended Transpower as the Grid Owner as the UFE causer.
- This event identified improvements for the Hawkes Bay contingency plan which have now been implemented and shared with regional stakeholders at a workshop held in Hasting on 7 August 2025.
- There were five UFEs in 2024/25 so increasing trend



SOSPA contract reset: July 2025 to June 2028

- On 30 June the System Operator and the Authority successfully executed agreement to amend and restate version 3.0 of the SOSPA.
- The outcome of the 2 years work and significant resources commitment was a new 3 year term. Lessons learnt across SO and EA teams to ensure a faster process going forward
- The Authority had commissioned 4 independent reports to support their review of the SO in the lead up to contract review:
 - Link Consulting Group – Business process maturity assessment, including review of impartiality.
 - VedArc – Assessment of System Operator ICT systems.
 - RBP – ICT Assurance for a future focussed system operator.
 - KPMG - System operator service financial arrangements.



New approach to refresh the System Operator Strategy

- The System Operator is now required to provide a single Strategy per SOSPA funding period.
- The Strategy will take a broad focus, covering the whole system operator service (including ICT) and consider the future needs of the electricity system, market and industry.
- This will look beyond the scope of the System Operator's role and functions today, and contemplate the future needs of the electricity system.
- We will engage with the Electricity Authority as the Strategy develops, and how it best supports the Authority's work programme.
- We intend to consult with industry in two stages – firstly part of our scoping exercise later in 2025 and secondly in 2026 on the draft strategy.
- Our first task is to undertake a macro assessment of the current and expected future state of the energy sector.





Thank you

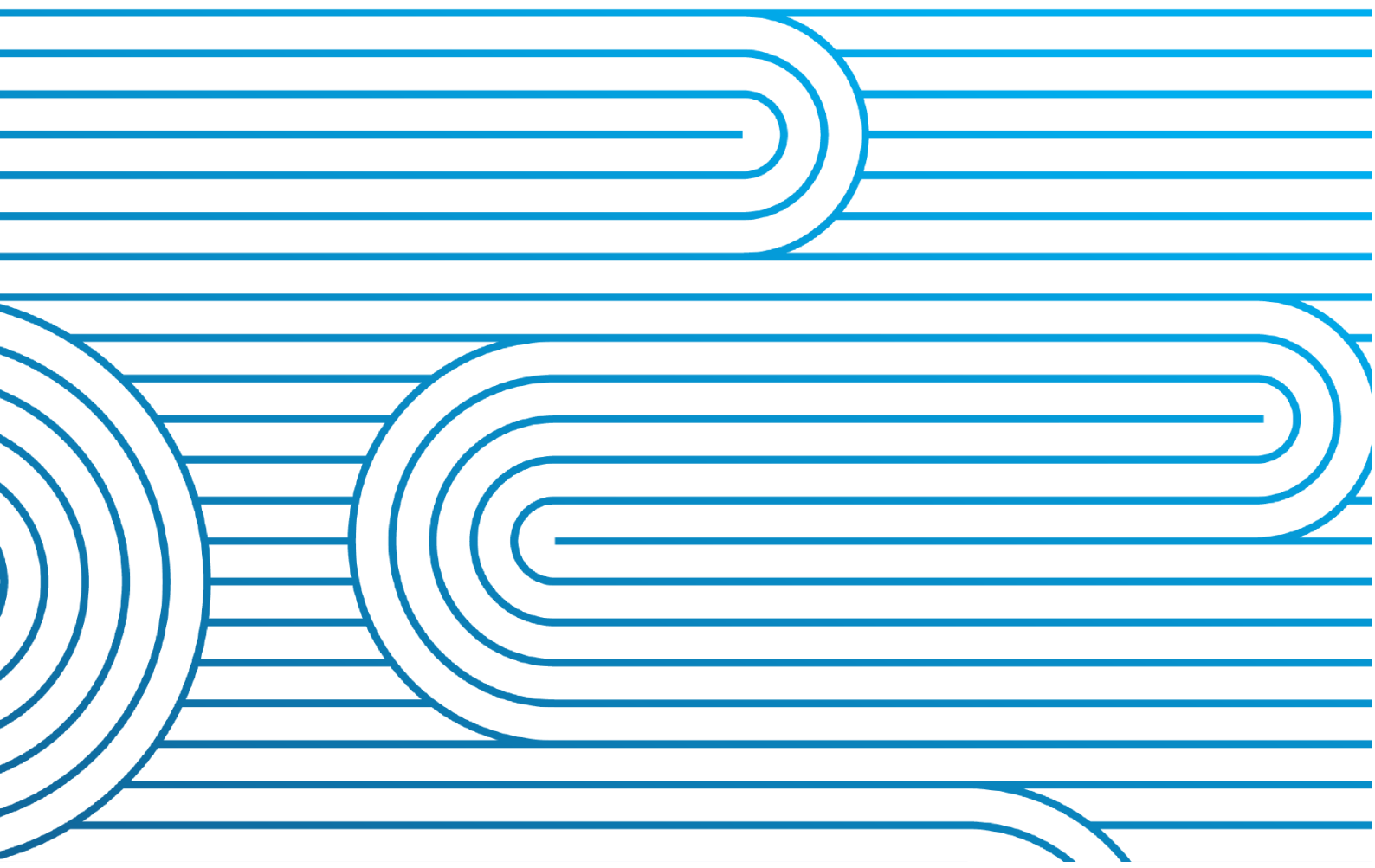
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System operator annual self-review and assessment

2024-25

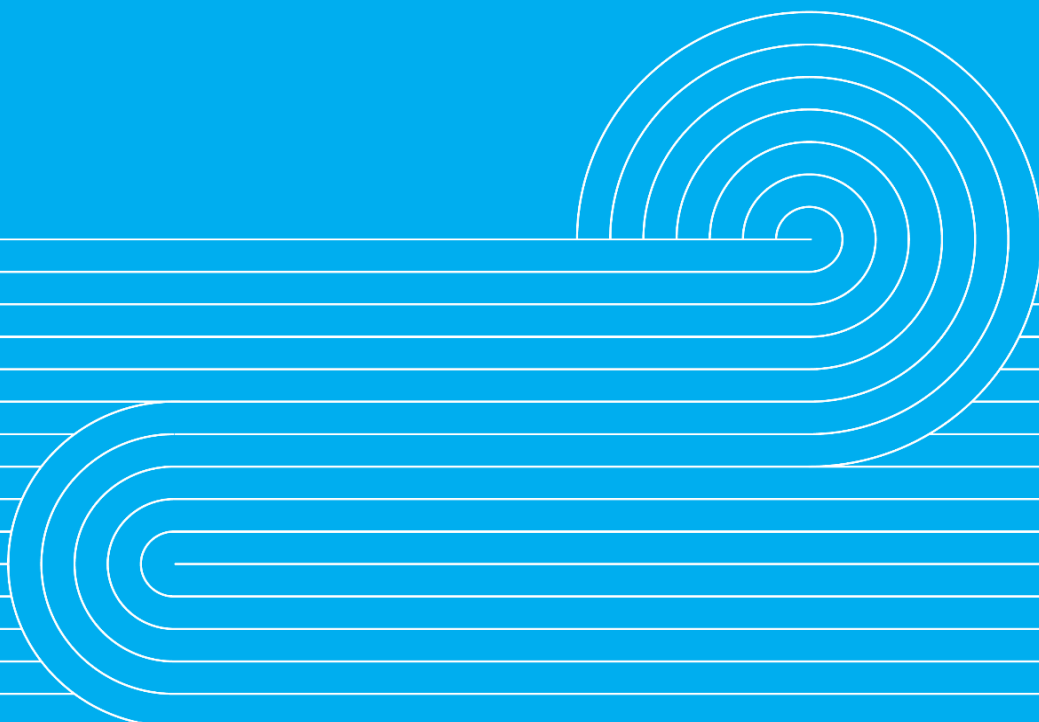
Date: August 2025



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1 Overview



1.1 Overview of the year

The 2024/25 reporting period has proven to be another dynamic year for New Zealand's power system. We saw the commissioning of our first grid scale battery, the addition of new baseload geothermal capacity as well as record volumes of wind generation. There was significant progress made on changes to both the System Operator's information provision and processes but also to critical market settings that support the transition to a more variable, renewable system.

The year began with an extended period of dry weather that saw controlled hydro storage falling to among the lowest levels in around 90 years. Elevated wholesale prices, reallocation of gas for electricity generation, industrial closures and the triggering of demand response agreements highlighted the tight security of supply situation that Aotearoa faced. As System Operator, significant effort was made to keep stakeholders, the media and the wider public informed about the evolving situation and necessary mitigations. These mitigations included our decision to bring forward generators' access to contingent storage – for the first time – to allow time for the hydro inflows to return. This period highlights the 'always-on' nature of the System Operator's role in supporting industry's response to the current security of supply challenges as we continued to message the need to manage hydro storage conservatively and ensure thermal fuel availability. Going into 2025 the industry responded by taking early action that ensured thermal fuels have been available during Winter 2025. This has contributed to moderate wholesale prices despite record low inflows from January to April, and ongoing prevailing below mean storage in the South Island.

Despite this very necessary focus on managing operational challenges associated with security of supply, we also continued to deliver our core security of supply reporting obligations set out in the Security of Supply Forecasting and Information Policy (SOSFIP). The 2025 Security of Supply Assessment (SOSA) incorporated new data sources and modelling improvements and highlighted the step-change needed in investment in new renewable generation given the faster than expected decline in gas availability. Enhanced reporting and sector engagement, including the publication of the updated Energy Security Outlook 101, supported sector understanding and decision-making.

Throughout the year, the System Operator continued to support the Authority's evolving market initiatives, contributing to technical studies, consultation processes, and joint development programmes. Engagement with stakeholders increased significantly, with 11 consultations conducted, including the start of a wider review of the risk reporting framework set out in the SOSFIP. We also continued to make good use of the fortnightly System Operator Industry Forums as well as sector exercises, webinars, and publication of educational resources.

A revised System Operator Rolling Outage Plan (SOROP) was implemented following Authority approval. This was then put to the test through a full-scale industry exercise in April organised with the Electricity Authority. This brought together more than 250 operations and communications colleagues from 60 organisations across the sector.

A handful of major system events were well managed through improved processes, proactive communications, and strengthened sector coordination and collaboration. These included:

- The Hawke's Bay loss of supply on 21 December, caused by a lightning strike that tripped key circuits and disconnected regional generation.
- A severe G4 geomagnetic storm on 2 January, which triggered a grid emergency and tested the sector's preparedness.

- A low Southland generation risk in February, which prompted contingency planning and grid reconfiguration studies.
- Three potential shortfall or low residual situations, which were managed without a WRN or GEN needing to be issued.

We also completed the transition of the North Island Automated Under Frequency Load Shedding (AUFLS) system from a two-block to four-block scheme to further enhance system security against major power system events.

Setting ourselves – and the sector – up for the future

The year saw an uptick in generation commissioning activity with 300 MW of new generation assets and capacity upgrades added to the power system, including utility-scale solar farms, geothermal stations, and battery energy storage systems. With the build phase of Aotearoa's energy transition picking up pace, we set ourselves up for a further step-change by streamlining our generation commissioning process through a dedicated improvement project, enhancing transparency, scalability, and stakeholder experience. This was timely – next year, we expect to integrate 930 MW of additional capacity into the system.

The number of outages needed to manage this expanding power system could be expected to grow 30-40% if we stuck to a business-as-usual approach. Instead, we are committed to changing the way we work to benefit our partners across industry and all New Zealanders. We have completed a deep dive into how we plan outages to help co-ordination and drive efficiencies for all asset owners and are planning upgrades to our Planned Outage Coordination Portal (POCP) and improvements to our New Zealand Generation Balance (NZGB) outage planning tool.

We successfully renegotiated our System Operator Service Performance Agreement (SOSPA 3) with the Authority. This built on the good working relationship sustained over the four years of SOSPA 2 and has set the foundation for the next three years of service delivery.

Building on our extensive risk management framework at Transpower, we developed a System Operator-specific Risk Appetite Statement and Matrix, which addresses the System Operator-specific exposure risk. This is supported by the Transpower Board and going forward will help support effective risk discussions with the Authority.

As agreed under SOSPA 3, work has already started on a new approach to the System Operator Strategy that will incorporate broader sector input following consultation through 2025/26. The strategy will guide development across people, systems, and technology to meet the demands of a rapidly evolving transforming power system and drive closer alignment with future investment planning.

The pace and complexity of change in the electricity sector continues to accelerate. As the provider of the System Operator service, we remain at the centre of this transformation. With strengthened processes, deeper collaboration, and a clear strategic direction, we are well-positioned to deliver for the Authority, the sector, and all New Zealanders in the years ahead.

This report is Transpower's review of its performance as System Operator from July 2024 to June 2025, in accordance with clause 7.11 of the Electricity Industry Participation Code 2010 (the Code).

1.2 Authority's 2023/24 Annual Review recommendations

In its review of the System Operator performance for the 2023/24 year, the Authority made eight recommendations which we have acted on:

Recommendation 1: The system operator clearly demonstrates and communicates line of sight between its strategic plan and other planning and delivery artefacts such as the ICT roadmap, capex roadmap, capex plan, and business plan. The system operator should explicitly show how investment and prioritisation decisions are driven by the system operator focus areas (and any other parameters).

Response: As part of the SOSPA negotiation we agreed with the Authority on a new approach to developing and setting the System Operator strategy going forward, and a refresh of the Joint Work Planning Team (JWPT) terms of reference. An intent for doing so was to ensure that System Operator strategy is better positioned to explicitly inform our investment and prioritisation decisions across people, process and technology going forward. The JWPT becomes a more useful forum for ongoing, more forward-looking sharing of respective planning and prioritisation discussions across both System Operator and Authority work programmes. The new arrangements are expected to ensure that System Operator strategy more visibly supports the next SOSPA reset proposal to the Authority, regular forums are better leveraging respective expertise towards alignment of future market design work programme priorities, and the Authority has ongoing information about potential future System Operator levy requirements.

The System Operator is now working with the Authority team to refresh the JWPT terms of reference, and to evolve our planning deliverables further through the 2025/26 period.

Recommendation 2: The system operator tests its strategy, and particularly its strategic risks, opportunities, and focus areas with market participants. Feedback from engagement with smaller, less traditional participants and recent entrants to the market would be of particular value.

Response: A new approach to developing and setting System Operator strategy was agreed with the Authority through the SOSPA negotiation. Under SOSPA 3 the SO Strategic Plan and IST Strategic Roadmap are to be integrated into a single System Operator Strategy covering all aspects of the System Operator service and thinking beyond the current scope of the System Operator's role. A key feature of the new approach is completing an environmental scan to inform the draft strategy. We will consult on the draft strategy with a broad cross-section of the industry. The feedback we receive will inform refinements we make before finalising the new strategy by the end of 2026. This timing (agreed through SOSPA 3) will ensure the new strategy informs and is reflected in the System Operator's proposals for the next SOSPA period, which will be provided to the Authority by 1 July 2027.

The System Operator will keep the Authority, including the Market Operations Committee (MOC), updated as we progress in the 2025/26 period.

Recommendation 3: The system operator and Authority continue to work together to refine communications issues and responsibilities for security of supply and power system events to maintain public confidence in the electricity system. This relates to communications to the industry and communications between the system operator and Authority.

Response: Through the 2024/25 period the System Operator and the Authority have focussed on improving effective communications and information sharing between the organisations, recognising the various layers of engagement and working to ensure appropriate information is shared in a timely manner. This has been achieved through regular MOC engagement, monthly Management and Operational meetings, and JWPT sessions, as well as ad hoc meetings to support information sharing on particular initiatives. The System Operator has made a conscious effort through the period to provide the Authority the opportunity to review and input on consultations and publications that the System Operator has published. The System Operator has also ensured, where possible, the Authority had at least 2 business days preview prior to any final publication being released.

To support visibility of engagements and consultations a System Operator publications and engagements calendar was developed. This calendar is available to the Authority and the information shared as a standing agenda item at monthly Operational meetings. A helpful future development, to support consistency and clarity for industry and other stakeholders, would be to incorporate system operations and security of supply publications and engagements planned by the Authority.

We continue our focus on active and timely communication of our publications and engagements with the Authority.

Recommendation 4: The system operator communicates lessons learned and improvements implemented after power system events, as well as improvements to tools (e.g. dispatch from back up tools, failure to publish schedules).

Response: Over the past year, we have experienced one significant system event, though most of the work investigating the June 2024 Northland loss of supply event was also completed in this review period. In response to each, we completed detailed post-event reports that outlined the nature of the event; and identified key actions and recommendations in the final report. Where applicable, we also considered relevant findings and recommendations from the Authority's event reports to ensure consistency and alignment with external expectations.

Where we respond to recommendations or complete actions, these are tracked and reported on as part of our performance reporting and also form part of the System Operator performance metrics. This process ensures that the Authority has visibility of the actions taken and can monitor their timely completion.

Recommendation 5: The system operator formally reports all issues in its tools and cybersecurity through the correct channels and includes (where appropriate and not confidential) those issues in the published monthly reports. The system operator could provide confidential issues to the Authority, as needed, through a separate appendix which would not be published.

Response: Due to its criticality to business operations and the market system as a whole, IST risk and cybersecurity are of significant importance to Transpower and the System Operator. We maintain the mechanism to report issues with our tools and cybersecurity to the Authority directly and where appropriate this will be included in our reporting processes. Additionally, through the review period we have provided regular IST and cybersecurity updates to the MOC.

Recommendation 6: The system operator continues to improve information used in the Security of Supply Assessment where this is available (noting the system operator has the flexibility under clause 7.3(2C) of the Code to deviate from the assumptions in the Security Standards Assumptions Document (SSAD)).

Response: We have had a significant focus on iterating and improving the inputs, assumptions and scenarios of our security of supply forecasting and reporting including for the SOSA this year. The 2025 SOSA included a material shift in gas industry inputs with the utilisation of Enerlytica's newly available production forecast, which gave us a gas production benchmark that is more grounded in industry expertise, better reflects recent actual trends, and is likely to be more familiar to the SOSA's audience. We also completed analysis to evaluate the peak supply of solar generation and batteries. This allowed us to assess the contributions of these technologies, which dominate the upcoming project pipeline but are new enough that assumptions for them were not included in the most recent version of the SSAD. This analysis was included in the 2025 SOSA and used to inform battery and solar contribution as part of our sensitivity analysis.

Our SOSA analysis and insights depend on participants and other potential investors providing the System Operator with good information (confidentially). Generally, we have a good response to our consultation on scenarios and assumptions, asset/investments survey and consultation on the draft SOSA. As we seek more regular information updates and new data streams (including from non-participants who are not bound by the Code) there could be increasing challenges ensuring access to timely and accurate data.

Recommendation 7: The system operator shares the results and actions of its regular critical control risk reviews with the Authority going forwards. The system operator regularly conducts reviews, but the Authority currently has no visibility of the completed reviews or resulting actions.

Response: For the 2024/25 period we have provided more in-depth information on our regular critical control risk reviews and actions through our quarterly updates to the Authority against our agreed performance metrics. Our report of the year end outcome against our performance metrics provided the full list of actions, assessment of criticality and year-end status relative to due date to the Authority.

We have made significant improvements to our risk and assurance processes, particularly with a focus on visibility for the Authority as highlighted in the Risk & Assurance section 10 of this review.

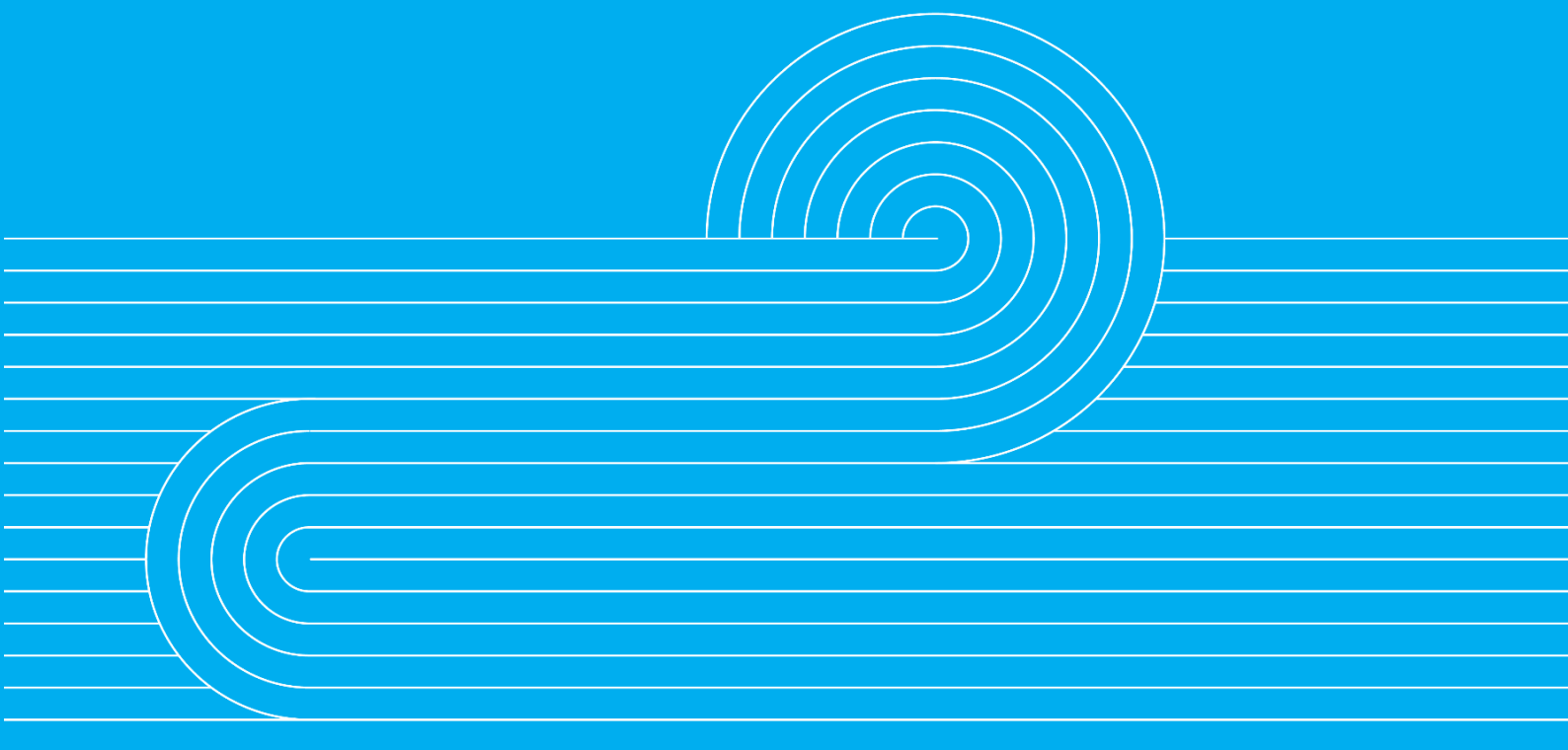
Recommendation 8: The system operator proactively analyses, identifies, and alerts the Authority to information it needs, and from which participants, to effectively manage the electricity system.

Response: Throughout 2024/25 there has been significant focus on engagement and support of the Authority including proactively providing relevant information where possible or responding to requests. This ranges from senior engagement with the MOC, to monthly Management and Operational meetings, JWPT engagement, various regular Subject Matter Expert (SME) catchups between the organisations and seeking feedback from the Authority's teams ahead of releasing System Operator publications.

Over the year, we have also enhanced transparency by consistently reporting our results, recommendations and follow-up actions. This is exemplified by the inclusion of redacted compliance information in our monthly reports, a secure way to provide proprietary data to the Authority. Additionally, we have identified and reported on several potential Code-related issues, most notably in the Intermittent Generation Central Forecasting project.

We continue to focus on improving visibility and transparency of our work as System Operator by ensuring that information of importance is communicated through the appropriate channels and evolving our approach to reporting, including in response to Authority feedback.

2 Operating the power system



2.1 Responding to system events

The System Operator manages the electricity system to meet the Principal Performance Obligations (PPOs) established in Part 7 of the Code (clause 7.2). We record and review system events and report to the Authority on any moderate or major events using a definition agreed with the Authority.

Our operating environment continues to be increasingly challenging due to tightening capacity margins, increasing quantities of variable generation and less flexibility of the available resources.

2.1.1 Dry Year 2024 security of supply situation

Dry year conditions were a significant feature at the start the 2024/25 year. Hydro storage declined to historically low levels due to a combination of relatively low inflows, very low wind generation, higher demand especially earlier in the winter, and constraints on gas production. By mid-August, hydro lake levels were just 51% of average for the time of year, which is among the lowest levels New Zealand had reached in around 90 years of historic records. The potential for South Island peak capacity challenges was heightened by some controlled hydro storage reservoirs declining more rapidly than others.

As a result, security of supply risks affecting spring increased rapidly in late winter. With few options remaining for the industry to secure additional fuel for generation, prices in the wholesale electricity market rose to very high levels. We undertook a number of actions in response to these conditions including:

- We increased security of supply reporting to keep industry stakeholders informed of the rapidly evolving conditions. We brought forward the commencement of Watch risk status reporting activity including daily market updates, increasing the frequency of our SO Industry Forum to weekly, more frequent (fortnightly) Energy Security Outlook (ERCs and SSTs) updates and establishing a dedicated webpage for relevant information.
- To ensure the grid was optimised to conserve hydro storage should Alert risk status be triggered, we completed Southland and Lower North Island engineering studies to determine possible grid configurations and other potential mitigations.
- In preparation for the chance that Emergency risk status might be reached, we wrote to all distributors, and to those direct connects required to have participant rolling outages plans, requesting they be reviewed to ensure they were up to date. We also began preparing a communications plan for use should rolling outages be required (through an Official Conservation Campaign).
- We consulted on and adjusted the contingent storage release boundary (CSRB) buffer to make contingent hydro storage easier to access. The grounds for doing so were that early access to contingent storage could have become necessary to mitigate capacity risks during cold snaps should intra-day flexibility in both the Waitaki and Hāwea generation schemes be impacted by resource consent conditions.

Rain eventually arrived in late August, which together with lower electricity demand, increased thermal generation (with access to gas purchased from Methanex) and record high wind generation in August, helped restore hydro storage levels back up above mean levels by the end of September without needing to dip into contingent hydro storage. Avoiding the need to access contingent storage proved important for security of supply in 2025, which started with a sustained period of record-low inflows lasting from January through April.

The energy and capacity challenges experienced in Winter 2024 provided an opportunity to review and improve current processes to reduce future security of supply risks. The response to a post-event survey indicated that participants were largely positive or neutral regarding our overall performance to the security of supply event. All of the respondents felt we were impartial in managing this event.

We found the weekly newsletter, risk curves, and overall communication very useful."

Market Participant

We published our Winter 2024 Review (including lessons learned) in November 2024, continued our work to implement the new SOROP approved by the Authority, and continued to prepare materials ahead of any potential Official Conservation Campaign that may be needed in the future.

2.1.2 Hawke's Bay loss of supply

At approximately 14:49 on 21 December the Tauhara - Wairakei and Wairakei - Whirinaki circuits tripped due to a lightning strike. This caused a loss of supply to Hawke's Bay and loss of connection of associated generation in the region. Frequency dropped to 49.20 Hz. A grid emergency was declared to enable load management and grid reconfiguration for restoration of the region. Supply was restored at approximately 17:20 (2 hours 31 minutes later).

This event was classified as 'moderate' under our significant event reporting framework. The engineering investigation was complex, navigating multiple technical matters and needing coordination with the separate underfrequency event (UFE) causer investigation. The moderate event report was submitted to the Authority on 31 March and the report recommending Transpower as the grid owner as the causer of the UFE followed in May.

2.1.3 Winter 2025

As early as February, there were signs of potential dry conditions developing for Winter 2025. In response, we increased our focus on the risk of an extended dry Winter period earlier than we typically do, including following the learnings we took from Winter 2024. We commenced additional security of supply monitoring, and engagement with participants:

- We increased our energy security scenario modelling and analysis. Our ability to obtain timely information disclosure to inform this work, particularly in relation to thermal fuel arrangements, was enhanced by the Authority's urgent approval in March of our proposal that it amend the Code to extend our information gathering powers across the SOSFIP and the Emergency Management Plan.
- We adopted a heightened focus on our Energy Security Outlook messaging, including the importance of thermal fuel availability being brought to market by participants' contracting and trading activity, and a heightened focus on hydro storage and thermal fuel management ahead of and through Winter 2025. This was met with a strong industry response providing earlier cover with a Tiwai demand response call, gas being reallocated from Methanex and additional coal orders. The combined effect meant the fuel position heading into winter 2025 was much stronger and diverse than winter 2024. This has had significant impacts on pricing and reducing security of supply risks on the system compared to last year.

- We introduced key messaging to the fortnightly SO Forum to clearly articulate developing risks and draw awareness to key information that the System Operator wants the market and participants to consider.
- We extended a System Operator Forum focussed on winter preparedness, to raise awareness and educate participants on the potential risks developing and steps the industry could take to prepare.
- We commenced our internal MetService daily updates at the start of June to support increased monitoring of coincidental weather patterns, especially with regard to low temperatures and low wind generation that might align with high demand periods. We also monitored potential rainfall events in the storage catchments.
- We held a difference bid refresher workshop, with support from the Authority, for direct connect customers and distributors. This was followed by an exercise triggered by a customer advice notice where these parties then needed to submit difference bids. This was aimed at ensuring industry were ready to respond when called upon in a real event.

"Significant improvement in communication, overall, a better understanding of the role of the CAN, WRN and GEN notices across the industry now."

Market Participant

We ensured early and consistent messaging about the need for fuel diversity on the back of Winter 2024 was relayed through our various communication channels including industry forums and security outlooks. This was met with a strong industry response providing earlier cover with a Tiwai demand response call, gas being reallocated from Methanex and additional coal orders. The combined effect meant the fuel position heading into winter 2025 was much stronger and diverse than winter 2024. This has had significant moderating impacts on pricing and reducing security of supply risks on the system compared to last year.

Rain events in April and May alleviated some concerns following record low inflows earlier from January to April. Significant rainfall in the North Island had restored the national storage levels back above mean for the time of year, though aggregate South Island controlled storage remained below mean reflecting an increased hydro storage risk due to ongoing prevailing below mean storage in the South Island.

During a cold snap across the country in July 2025 we experienced four of the top ten load peaks. While there was tight capacity, the system coped well. Our ability to manage peaks has improved over the last couple of years with the addition of new firm generation, increased capacity of existing generation and reduced generation outages during peak load periods.

Very low pricing operational challenges

From late August to September 2024, the market experienced a surge in very low-priced generation offers (\$0–\$0.01/MWh), driven by reduced industrial demand (including Tiwai's demand response with Meridian), high hydro inflows, increased wind output, and inflexible baseload generation (geothermal and thermal) remaining online.

This period highlighted emerging operational challenges as more intermittent generation (IG) resources connect to the grid. Oversupply and IG's setting island risk triggered automatic constraints to manage generation and maintain system security. IG's were also dispatched down to keep inflexible generation online due to safety, consent, or future system needs.

When IGs are constrained for security, their output is expected to remain stable. However, constraints are lifted if they drop below dispatch, allowing uncontrolled rapid ramp-up if wind returns, which can disrupt system frequency and security. To address this, two system changes were made in October to reduce

premature constraint releases and slow ramp-up. Further enhancements to real-time IG dispatch were implemented in March 2025, particularly when IG sets risk and actual output falls below dispatch. These changes have stabilized IG dispatch without negatively impacting system frequency or security.

Low Southland generation

In February 2025 the Southland region experienced a prolonged dry period, which impacted inflows into lakes Manapōuri and Te Anau. As a result, hydro storage levels at both lakes were in their low operating ranges, where generation becomes limited to the amount of daily inflow. These conditions resulted in an emerging system security risk in Southland that had the potential to reduce the availability and flexibility of Manapōuri generation.

The System Operator refreshed Southland engineering studies to determine preferred Grid reconfiguration options as mitigation to limit the potential impact on consumers and maintain system stability in the region. Had this Grid reconfiguration been needed, the System Operator and the Grid owner would have been able to action it in a timely way. While completing the studies and options, the System Operator ensured the market and stakeholders were informed through regular updates in the SO Forum. Rain and resulting inflows returned the lakes levels to normal operating ranges by the end of March, removing the need for Grid reconfiguration to be put in place. After feedback from the System Operator, the Grid Owner is considering a permanent conditional split in the region, which would make it possible to manage future events more efficiently.

2.1.4 Grid Emergency: Severe geomagnetic storm

On 2 January, an Alert was received from National Oceanic and Atmospheric Administration (NOAA) that a severe (G4) geomagnetic storm was in progress and NER alerts were also triggered at multiple South Island sites. In line with our processes, a Grid Emergency was declared at 7:13am and the situation monitored. The Grid Emergency was ended at 10:00am after the storm subsided.

The increased focus on and understanding of space weather through the joint work of the Electrical Industry Space Weather Working Group (EISWWG), and applying learnings from the extreme (G5) Gannon event in May 2024, have enabled the industry to be better prepared to deal with this type of event. This has included the development of an industry response plan, which has been tested via a desktop exercise with the working group, and shared with NEMA to help inform their National Response Plan. Our work in this area continues to be acknowledged by world experts in the field.¹

2.1.5 Other notable events

Overall, for the year we issued 150 customer advice notices (including revisions), 344 voltage and frequency excursion notices, 0 warning notices, 1 grid emergency notice (including revisions), and 5 grid emergency reports.

There were five grid emergencies declared and managed during the year. In addition to the Hawke's Bay loss of supply and G4 Geomagnetic Storm events outlined above, the three others were:

- 30 January 2025 at 09:06: a verbal grid emergency was declared at Matahina to enable us to de-energise the substation and isolate generation equipment notified by the Asset Owner as being in distress.

¹ [NZ leads world in solar storm preparedness, say ex-NASA centre boss](#)

- 17 April 2025 at 10:30: due to an unplanned outage on HVDC Pole 3, a verbal grid emergency was declared to request more South Island Sustained Instantaneous Reserves due to existing offers being insufficient.
- 29 May 2025 at 07:22: due to the tripping of Islington_T3, a verbal grid emergency was declared at Islington to manage N-1 security. Orion was instructed to remove controllable load in their 66kV network and transfer load from Islington to Bromley.

"Significant improvement in communication, overall, a better understanding of the role of the CAN, WRN and GEN notices across the industry now."

Market Participant

Three potential shortfall or low residual situations were managed during the 2024-25 year which did not result in a WRN or GEN being issued:

- 17 & 18 September 2024 Low Residual Situation: Two CANs were issued on the 17 September, one for the evening peak on 17 September (17:30 – 20:00), and the other for the morning peak on 18 September (07:00 – 08:30).
- 24 February 2025 Low Residual Situation: A CAN was issued to advise of a North Island low residual situation forecast for the afternoon of 24 February from 13:30 – 17:30.



Industry feedback highlighted that more information about our low residual threshold and processes was required. We subsequently undertook a consultation on this topic in November 2024 and have been working to apply improvements where appropriate.

Feedback also highlighted some uncertainty in the interpretation of the ERCs in relation to contingent storage. We have since updated the ERCs to more clearly illustrate contingent storage and pursued further changes to ensure Watch status is triggered ahead of an Alert. We also published a refreshed ESO 101 document to support stakeholder understanding of the ERCs, SSTs and how they together are used to indicate forward system-wide energy risks.

The period of very low prices we experienced in spring 2024, and the operational challenges with integrating proportionally higher contributions from intermittent generators provided an early signal of the new operational challenges we should expect to encounter as the transition progresses.

2.1.6 Further opportunities

- We will consider incorporating aspects of our low residual situations processes into the scope of the 2025/26 Policy Statement review.
- We will further enhance ESO 101 as part of incorporating any changes arising through the 2025 SOSFIP review.

2.2 Ancillary Services

2.2.1 Ancillary Services operations and compliance

We procure ancillary services to support the reliable operation of the power system and as part of meeting our PPOs as specified in the Electricity Industry Participation Code.

In August 2024 we commenced our annual Ancillary Services tender process. This year's tender procured Over Frequency Reserve (OFR) and South Island Black Start services. The tender process was run in accordance with the System Operator's obligations under the Code to achieve an appropriate balance between cost and quality for each ancillary service.

For a number of the services, there are a limited number of suitable assets/sites that comply with the specific requirements, but we did receive enough offers to contract the necessary services. We continue to seek greater participation, and ultimately competition, between providers. There were encouraging signs, with increased capacity offered for North Island OFR when compared with the previous round (two years prior), and we anticipate future rounds will become increasingly competitive.

In 2024/25 the System Operator added additional resources to support our ancillary services processes, with a focus on procurement, commercial, and compliance support. This approach is enabling key technical resources to focus on the increasingly complex core ancillary services operational support. The additional resource has also enabled more focus on timely issue investigation and engagement with participants.

We completed the early stages of a process improvement initiative to identify pain points from inefficient or resource intensive processes. These will inform the scope of an ancillary services optimisation project in 2025/26. The project will leverage improvements, and potentially tools, from the recent generator commissioning process project.

2.2.2 Ancillary Services procurement plan review

The Ancillary Services Procurement Plan sets out the mechanisms we use for procuring ancillary services, as well as the technical requirements and key contractual terms applying to each service. The System Operator is required to use reasonable endeavours to both implement and comply with the Procurement Plan.

The System Operator must conduct a full review of the Procurement Plan at least once every 2 years (clause 7.15(1) of the Code). In 2024 the System Operator defined an initial scope that included a range of detailed technical changes to accommodate new technology such as BESS, operational improvements, and a number of minor updates to improve the consistency of the Procurement Plan across services. The scope was reviewed by the Authority before the System Operator commenced work on the draft amendment proposal and consultation materials.

The more complex changes required a significant level of technical consideration and input prior to drafting, and legal review of the proposed updates. In April 2025 we published our draft Procurement Plan, including our proposed updates, for industry consultation through into May. We appreciated the support of the Authority to quickly turn around its pre-consultation review given time constraints, including due to the SOSFIP review commencing in parallel.

Based on feedback from participants through the consultation process, we chose to defer several of the proposed updates to allow time for further industry engagement. On 6 June 2025 we submitted our updated Procurement Plan and proposal to the Authority for consideration.



The recent Procurement Plan review highlighted the importance of maintaining a regular review process, particularly with the increasingly complex context and new technology. We will consider the benefit of an annual review cycle that aligns with the biannual contracting timeframes of specific services.

2.2.3 Further opportunities

- A priority in 2025/26 is implementing any changes to operational processes required as a result of the approved Ancillary Services Procurement Plan, for example in relation to ancillary services contracts and our tender process.
- A number of proposed updates to the Procurement Plan were deferred following industry feedback at the consultation stage. We will continue our engagement with industry on these updates and consider them for a future amendment cycle if deemed appropriate.
- We have committed to an Ancillary Services optimisation initiative leveraging the approach and structure developed during our recent generator commissioning project. Work in 2025/26 will include developing an Ancillary Services improvement roadmap and the delivery of initial optimisation improvements.

2.3 Event preparedness and exercises

To ensure we are prepared for future events, we incorporate lessons learned into our event preparedness. This includes collaborating with industry and targeting specific training areas.

2.3.1 System Operator Rolling Outage Plan (SOROP) implementation

The SOROP is one of our key security of supply planning and policy documents. It is used to determine when an electricity supply shortage would be declared and how this would be managed. On 21 August 2024, the Authority approved the System Operator's updated SOROP, which came into effect on 1 September 2024.

Throughout the remainder of 2024/25 we have worked with industry to implement the new SOROP. This has included carrying out modelling and working with distributors and direct connect participants. Participants have been required to review and submit updated Rolling Outage Plans. A key part of enabling this process was the additional dedicated webinar as part of the industry exercise, which educated stakeholders about the changes and what is required of them.

Our 2023/24 self-review identified the importance of stress testing the updated SOROP processes with industry to ensure they remain fit for purpose. Significant resources were invested into developing the full industry exercise focussed on the new SOROP processes and procedures to ensure they are fit for purpose and advance the proficiency and coordination of the industry as a whole.

2.3.2 Industry Exercise 2025

Our recent review of the performance of the electricity system and market over Winter 2024 made it clear that the tight supply conditions experienced in that year could well persist into 2025. With that in

mind, and on the back of our recent SOROP review, we began working alongside the Authority to use the exercise to build the sector's capability to implemented rolling outages if necessary to manage an extended electricity supplied shortage. We also jointly planned two industry webinars in March ahead of the industry exercise on 9 April.

The 4 March webinar focussed on presenting the updates to the SOROP and what this meant for associated processes and participants. It also covered the content and approach to an OCC.

The 18 March webinar covered our processes for declaring a supply shortage and the communications that would accompany any declaration of an OCC. It also provided information to help participants prepare for the industry exercise itself.

The 9 April industry exercise scenario started on day one of rolling outages and tested industry's capability to implement their agreed rolling outage plans from an operational and public communications perspective. While control room teams worked on managing demand, communication teams used a social media simulator to both proactively and reactively communicate the situation to the public. Over the course of the day, time-shifts in the exercise occurred to test different points in the rolling outage process, which in reality would occur over weeks.

"Industry exercise is a good addition."

Market Participant

The exercise had around 250 participants from 60 organisations from across the sector. Feedback on the exercise from participants was positive. We worked with the Authority and Risk Logic to gather lessons learned, agree improvement opportunities, and publish a report for industry.² We are now working through the improvement opportunities, which are tracked as part of the agreed KPI framework.

Relative to previous industry exercises, the effort involved for the System Operator, including our Communications team, was high. The value to the industry was also high and timely.

2.3.3 Official Conservation Campaign (OCC)

From October to April, a communications approach was prepared for an OCC as part of Watch status activities. Two campaign concepts were developed and tested for clarity and effectiveness, with one selected for refinement. Planning activities for a coordinated industry response included a February workshop ahead of the industry exercise involving communications leads from lines companies and retailers, focusing on readiness and messaging for medically dependent consumers.

Digital assets were finalised in early 2025 and presented during the March industry exercise webinar, with additional materials prepared in case an OCC was needed. The campaign approach was well received across workshops, and by April, the sector was positioned to launch the OCC quickly if required.

2.3.4 South Island black start simulation industry exercise

In February 2025, our real-time operational teams successfully hosted an industry simulation exercise to black start the South Island. For this training session we invited generation controllers from Meridian and Contact Energy as well as controllers from the New Zealand Aluminium Smelters at Tiwai to simulate how

² [Industry Exercise 2025 - Key Insights and recommendations](#)

we would re-energise the South Island national grid in the event of a blackout. The exercise was successfully completed in 3 hours and 6 minutes (just above our 3-hour target). Some process improvement opportunities were identified and were being assessed for implementation. This collaborative approach to training tests our contingency plans, identifies areas of improvement, and serves as a valuable learning experience for all involved. It also helps us ensure our communication channels with all key participants are set up and ready to go.

2.3.5 Other notable initiatives

Electrical Industry Space Weather Working Group (EISWWG)

Over the course of the year the working group developed, tested and published a high-level industry response plan to an extreme G5 event. This is a major achievement and ensures that key participants with assets at risk of damage due to space weather are aligned on what actions need to be taken and when to mitigate the risk. This response plan continues to evolve as more technical studies are completed by Transpower as Grid Owner.

Transpower as both Grid Owner and System Operator worked with MBIE, NEMA and the Authority to review the industry response plan to an extreme G5 event and discuss the role of government in decision making during an event. Two webinars with international experts on space weather were arranged - one on NOAA space weather forecasting, and the other on the impacts of space weather on communications. These were well attended by not only the New Zealand electricity sector, but others responsible for New Zealand infrastructure at risk due to space weather.

Initial discussions with the Authority have identified an extreme space weather event as a likely scenario for the 2026 Industry Exercise. NEMA are also exercising the national response to space weather in November 2025, which the System Operator will take part in.



The industry exercise highlighted the importance of collaboration, not just across the stakeholders to learn from other industry peers, but also between operational and communications teams within organisations to develop better understanding of requirements through the simulation process.

The EISWWG has shown the value of working together with not just industry participants, but other organisations such as NEMA, GNS, University of Otago, to ensure we have a common understanding of a risk and can develop a robust aligned response based on the latest knowledge and expertise brought to the table.

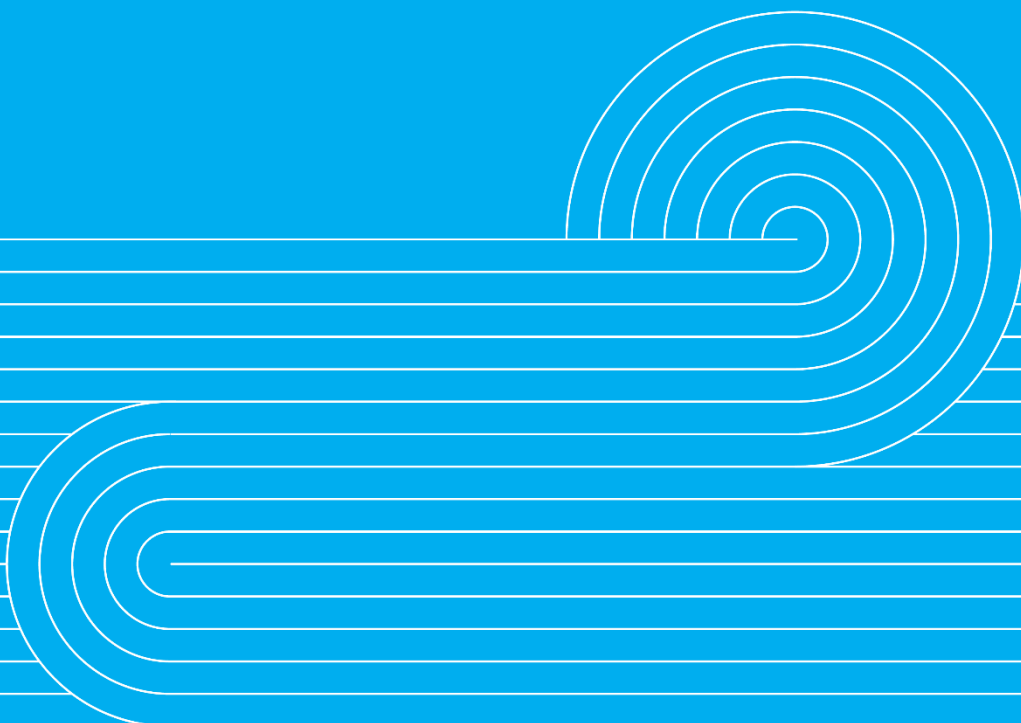
2.3.6 Further opportunities

We also note the following opportunities to further improve our event preparedness and response:

- Agree and implement any appropriate recommendations and actions for the System Operator that are identified in the industry and other exercises throughout the year.
- Continue to work with industry via the EISWWG to increase the overall level of understanding of space weather events and how the industry will need to respond, including removal of any transformer and generation assets. It would also be beneficial to embed and test a developed response through simulated exercises.

- Strengthen relationships and share knowledge between operational teams across the country to enable effective event preparedness and response. Extend existing engagements to include an annual in-person forum of operations managers from across the country.
- Deliver the operational communication system enhancements project, which will modernise our delivery of notices such as CAN, EXN, WRN and GEN to industry. Similarly deliver the new demand allocation tool project, and black start communications project. These projects are executing learnings from past events such as the 9 August event.

3 Security of supply



3.1 Security of supply: long-term

The Electricity Industry Act 2010 requires that, as System Operator, we provide information and forecasting on all aspects of security of supply.

3.1.1 Security Of Supply Assessment (SOSA)

In June 2025 we published our annual SOSA, which assesses the ability of the electricity system to meet New Zealand's winter energy and capacity security standards over the next ten years. The work is the culmination of two consultation processes, a survey of participants, and significant analysis and documentation.

In November 2024 we consulted on the proposed reference case and sensitivities, and through January and February 2025 we completed a survey of participant asset investment intentions. Both these industry engagements informed our SOSA 2025 analysis and draft SOSA report. We consulted on the draft SOSA in May, and having considered the feedback received, we published the final SOSA in late June.

The process this year incorporated new data inputs for the gas industry demand forecast. We included changes to key inputs, as forecast gas availability has decreased given declining field production and revised reserves, prompting a shift to an external forecast. Demand forecasts are also lower, driven by reduced industrial activity. We also incorporated better modelling of rooftop solar, battery storage and solar contribution. Flexible resources are increasingly needed to support capacity margins.

3.1.2 Security of supply forecasting and information policy (SOSFIP) review

In early 2025, we decided to bring forward work on review of the SOSFIP, which had originally been planned for 2025/26, partially in response to the tighter energy security outlook arising from declining gas production. In March 2025, we released an Issues Paper for consultation, which invited feedback to inform the scope of the review and the urgency with which any proposed changes should be made. We also welcomed early feedback on a proposal we had received from Meridian Energy to permanently amend the default contingent storage release boundary (CSRB) buffers in the SOSFIP, which would result in easier access to contingent storage.

Based on the feedback received, in April we released a Summary and Decisions paper confirming that the 2025 SOSFIP Review will consider potential amendments to section 6 (Determining the electricity risk curves), section 12 (Simulated storage trajectories), and section 13 (Thermal fuel supply disruptions). Given the potential impacts on dry year risk management in both the short-term and longer-term, we decided not to change the CSRB buffers by Winter 2025 but will consider this in the SOSFIP review. We also published our refined CSRB buffer discretion process for use during Winter 2025, including our criteria against which any decision to apply the discretion would be made. We also updated our ERC101 document to support better understanding of the CSRB buffer discretion process and consolidated our ERC and SST assumptions document into the new Energy Security Outlook 101 document (removing duplication) ahead of Winter 2025.

By the end of the 2024/25 review period, we had commenced our analysis phase of the SOSFIP review to test key assumptions, ensure energy and capacity risks are appropriately captured as part of the Security of Supply reporting, consider any wider risk scenarios, and assess contingent storage and broader strategic options. We are on track for consultation to commence in September 2025. We are engaging regularly with the Authority as we progress the review.



The dry Winter 2024 event, and the subsequent extended dry period in 2025 highlighted the importance of clarity about the role of, and access arrangements for, contingent hydro storage. The SOSFIP Issues paper consultation confirmed the complexity and breadth of often competing views in relation to contingent storage, and has usefully informed our work on the 2025 SOSFIP review.

3.1.3 Further opportunities

- We have a continued focus on improving our tools and processes to better integrate with participants and service providers for obtaining key input data, particularly for SOSA, but also for a whole range of security of supply applications.
- Completing the full SOSFIP review will remain a significant undertaking for much of 2025/26. On completing our analysis phase, we will consult with industry on our proposed changes to the SOSFIP. We will submit our final SOSFIP amendment proposal to the Authority in late 2025.

3.2 Security of supply: medium-term

3.2.1 Energy Security Outlook (ESO)

As System Operator we monitor security of supply to track whether there is enough generation and transmission capacity to meet New Zealand's needs and regularly inform and update the industry about the current situation. This includes our monthly ESO report, which is based on an assessment of the Electricity Risk Curves (ERCs) and Simulated Storage Trajectories (SSTs)³. ERCs indicate the risks of running out of hydro storage over the next 12 months ("energy" risks) while the SSTs provide an indication to the market of the risks of crossing the ERCs.

We continued to evolve the ESO by ensuring inputs and assumptions are refined and validated against multiple sources and running a broader range of scenarios to enhance the robustness of our assessments. These changes have better supported the ESO as the key information we publish in relation to medium term energy security risks.

We also added a 'key messages' section to the monthly reports and monthly webpage updates and began using direct Email to distribute each monthly update to industry to support visibility and ease of access.

Energy Security Outlook 101

As we have made iterative improvements to the ESO and associated processes, and to address feedback we received in our Low Residual situations and SOSFIP Issues Paper consultations, we updated and expanded our original 'ERC 101' education piece to a revised 'ESO 101' resource. In May, we published the document and followed this up with an extended System Operator Industry Forum on 24 June to take participants through the ESO and how it forms a key part of the electricity industry's security of supply forecasting and information framework. Positive feedback on this initiative was received from an industry stakeholder.

³ The process is outlined in the SOSFIP.

Additional thermal fuel information

We updated our monthly ESO process to include additional thermal fuel information gathered from market participants. Our ability to collect this information was enabled by the Authority's urgent approval of our proposal to amend the Code to extend our information gathering powers across the SOSFIP and Emergency Management Plan. The information is being used to inform our ESO commentary to the market. Our SOSFIP Issues Paper proposed using these thermal fuel contracts information disclosures to demonstrate the differences between physical and contracted risk assessments to the market. This potential development received wide-spread support and we have confirmed it is a potential amendment which is in scope for the 2025 SOSFIP review. It is dependent on the urgent Code amendment being made permanent and we are pleased to see the Authority progressing its work to consider doing so. We will be consulting on our SOSFIP review later in 2025 as outlined above.

3.2.2 Quarterly Security of Supply Outlook

Commencing in September 2024 we introduced a quarterly Security of Supply Outlook publication, to bring together System Operator analysis and information as an overview of the 6-month ahead situation in a form accessible to a wider group of stakeholders. Our Outlooks combine insights from latest ESO update, NZGB, generation commissioning expectations, annual SOSA, and observed operational conditions. We also used the Outlooks to provide updates on key matters in a timely way, and on progress on System Operator security of supply initiatives such as activity in preparation for Winter 2025. They have been well received by participants and other stakeholders.

3.2.3 Low residual situations consultation

The System Operator worked closely with the Authority to review and consult on how we manage low residual situations and potential amendments to the 200 MW low residual threshold and coordination process. Our consultation paper was published in November, seeking feedback on thresholds, procedures, and communications, with submissions and cross-submissions received by mid-December.

Having considered the feedback we decided to maintain the current 200 MW low residual threshold; continue reporting our ongoing monitoring on sensitivity analyses and risk levels implied by different LRS thresholds in our monthly reports to the Authority; and progress work to provide CAN revisions that notify participants when a potential LRS has eased or been resolved by the response by industry.

Ahead of Winter 2025 we updated our website with a new page to support industry understanding of our low residual situation processes.⁴ This information includes a copy of our operational procedure PR-DP-264 (Managing Insufficient Generation Offers and Reserve Shortfalls) and information to support distributors to submit difference bids (GL-SD-1202 Guideline for submitting controllable load difference bids). We have made improvements to our GEN, WRN and CAN notice templates to more clearly provide key information such as distinguishing between requests and instructions, specifying who is expected to respond, including relevant locational detail, and referring to relevant parts of NZX and Transpower websites.

⁴ [Process for notifying and managing energy or reserve shortfalls | Transpower](#)



We continue to evolve the inputs, assumptions and scenario analysis to improve our security of supply reporting to highlight forward risks, but it is ultimately up to market participants to take the direct action to mitigate and manage dry winter risk.

We have found significant value in direct engagement with industry through forums and webinars to improve the understanding and obtain feedback on the inputs, assumptions, and processes involved in our security of supply analysis and publications.

3.2.4 Further opportunities

- During 2025/26 a Policy Statement review will consider feedback from the low residual situations consultation, including which elements of the low residual situations process should be included in the Policy Statement to support best practice and provide greater transparency and clarity to the industry.

3.3 Security of supply: short-term

The market is responsible for coordinating sufficient resources in the short-term (7 days out to real-time). We continue to evolve the pre and post event information we provide to industry via our weekly market insights⁵ and fortnightly System Operator industry forums. This helps participants understand the operational risks the System Operator observes in the lead-up to real-time and how these interact with current market settings.

"The Market Services team are doing a great job with the weekly Insights piece."

Market Participant

Wind forecast – wind spill

In 2025/26 we completed an improvement initiative to aid our wind forecasting processes (currently provided by Meteologica). We have added an IG curtailment flag in our data feed to Meteologica which indicates when a wind generation asset is curtailed (wind spill) by the market. This will allow the Meteologica forecasting models to account for manually reduced generation output, improving the accuracy of the wind forecast over time.

Intermittent generation central forecast

We worked closely with the Authority on the hybrid intermittent generation forecasting initiative. The System Operator was part of the tender evaluation panel, and provided significant technical advice and support to the Authority's consultation and decision processes, to ensure the successful implementation on 31 July 2025. We continue to engage regularly with the Authority and the central forecaster through monthly meetings.

Updated residual sensitivity process

We also streamlined our internal residual sensitivity process which is used to understand the risks to the residual in the forecast schedules. These improvements were to increase automation to incorporate weather risks (from MetService daily briefings), wind, demand and other manual risks. These are used to inform the control room of potential risks to the residual in the forecast schedules.

⁵ See [here](#) and [here](#)



We continue to evolve our short-term risk assessment tools, processes and monitoring. This includes incorporating additional information, increasing automation and monitoring of risks. Over this year, we've re-assessed the 200 MW residual threshold and constantly monitor and report on its performance to the Authority. These initiatives together with our risk assessment improvements provide the System Operator with increased situational awareness in security planning and our ability to respond and provide information internally and to industry on potential security of supply risks in the forecast schedules.

3.3.1 Further opportunities

- We are continuously enhancing our monitoring dashboards to make sure the information we monitor meets our needs. This is no different for 2025/26. As an example, we will be incorporating the newly received DNV Services intermittent generation forecasts (wind and solar) into our forecasting monitoring dashboards. This will allow us to compare the performance of Meteologica's wind forecast against DNV Services to help drive improvements in both providers.

3.4 Engagement with the Security & Reliability Council (SRC)

During 2024/25, we worked with the SRC Chair and the Authority to improve the SRC's oversight and understanding of the System Operator's work, particularly in relation to security of supply. We established regular joint Authority and System Operator security of supply updates to each SRC meeting, with the System Operator covering physical aspects and the Authority focussed more on market implications. This approach reflects our respective roles. We also valued opportunities to discuss other aspects of our work with the SRC, including as we progressed SOSA and SOSFIP review consultations.

We welcomed the Authority's decision to appoint an independent Secretariat for the SRC, and the SRC Chair's invitation for a System Operator Observer to attend SRC meetings on an ongoing basis.

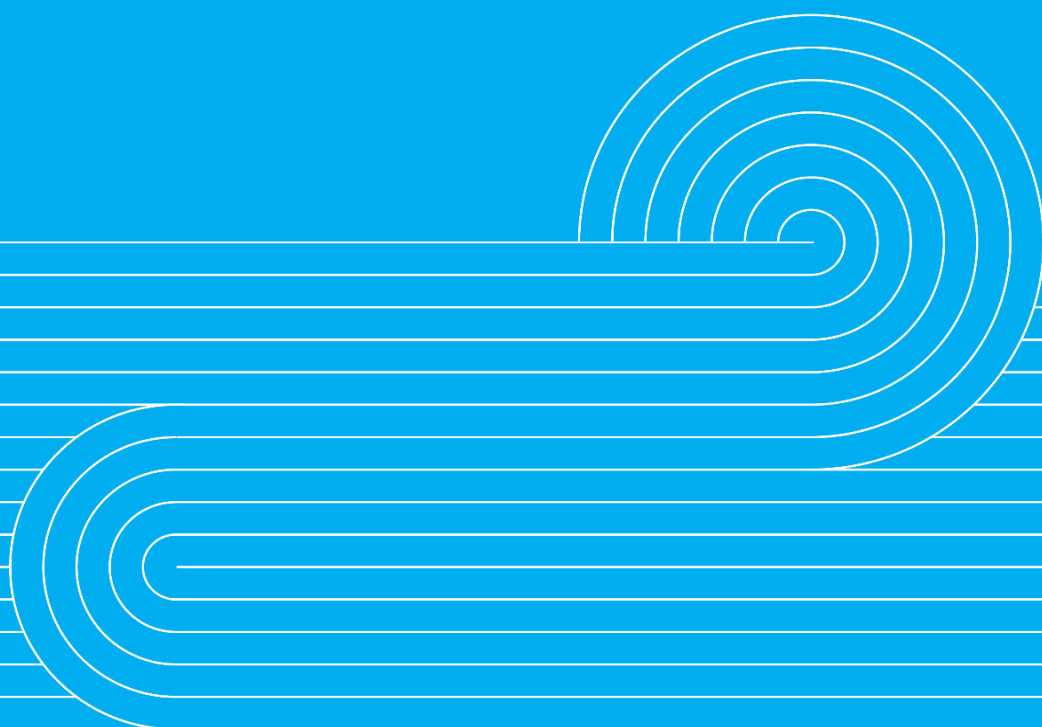


We continue to work with Authority teams towards ensuring our respective security of supply work programmes are complementary and support industry with consistent information. The establishment of the independent SRC Secretariat and SO observer role, and regular SO:SRC engagement enhance our ability to better engage with industry, including by ensuring we understand areas of concern, misunderstanding or need for improvement earlier and more directly.

3.4.1 Further opportunities

- Through 2025/26 we will provide the SRC the opportunity to discuss our key security of supply consultation processes including SOSFIP review and SOSA 2026 consultations and expect them to play a central role in supporting development of the System Operator Strategy.

4 Supporting asset-owner activity



4.1 Outage coordination and System Operator support

The System Operator coordinates planned outages across the industry to minimise power system risk. This involves conducting power system studies and modelling to identify risks and recommend mitigation strategies to asset owners. Detailed engineering assessments begin 10 weeks before real-time, while national capacity impacts are evaluated from 7 to 200 days ahead using the NZGB.

Policy advocacy and Authority support

We continue to advocate for improved industry outage coordination policies and processes. In support of the Authority's code changes to enhance outage information in POCP, we have:

1. Engaged with the Authority through formal consultations and informal discussions.
2. Translated Code amendments into practical rules for industry implementation, particularly affecting EDBs⁶.
3. Communicated these changes via the System Operator Forum, ENA channels, and one-on-one meetings with distributors.

Supporting Transpower in its grid owner role

We have actively supported the Grid Owner's End-to-End Works Planning and outage optimisation reviews, which aim to increase throughput to meet RCP4 investment targets. This collaboration has enabled us to advocate as System Operator for outcomes that reduce operational risk, enhance system security, and improve market coordination – which benefits all electricity users.

Key contributions include:

1. *Annual Plan Improvements:* We recommended lodging outages with high, but not absolute, date certainty to allow longer lead times. This approach improves risk assessment efficiency and gives asset owners better visibility. Combined with the Grid Owner's process changes, this led to over 500 additional outages in the annual plan, a 20% increase.
2. *Short Notice Outage Request (SNOR) Process Enhancements:*
 - We identified outage types that impact risk assessment quality and advised on appropriate lead times.
 - Introduced an endorsement process where the Grid Owner seeks System Operator approval before lodging outages. This early collaboration reduces rework and improves planning efficiency.

"Our Network Operations team has a great working relationship and communications. SO recently providing POCP and controllable load difference process change to adapt to industry needs."

Market Participant

As a result of these changes, Grid Owner SNOR volumes have decreased by 10%, providing greater certainty for asset owners and improving the System Operator's efficiency.

To further support the Grid Owner's increased workload, we developed a report highlighting high-risk or high-impact outages occurring 10–25 weeks ahead. This enables earlier assessments and advice, helping

⁶ [System operator outage planning coordination](#)

the Grid Owner to instigate a locked down 4 monthly outage plan, and other asset owners to coordinate more effectively with grid outages.

Process improvement

We streamlined the outage assessment process by aligning long-term and short-term engineering assessment timeframes, eliminating gaps between them. A new data dashboard was introduced to highlight material outages up to six months in advance. These improvements have enhanced coordination between asset owners and improved early identification of risks.

Enhancing outage coordination information

The System Operator has engaged with asset owners, including the Grid Owner, to identify opportunities to improve tools and processes. This feedback is informing a roadmap for ongoing enhancements to outage coordination and updates to POCP and NZGB systems.

Initial improvements already underway include:



A Grid Owner outage on the Wairakei Ring was cancelled in real time due to market dynamics that created unfavourable conditions in the Upper North Island, impacting outage plans across multiple asset owners. This experience highlighted the need for earlier and more proactive monitoring of emerging power system risks. In response, we've strengthened our approach to monitoring emerging power system dynamics that risk planned outages being unable to proceed, and are engaging asset owners early to discuss potential impacts and mitigation strategies.

This was evident later in the year when we engaged asset owners about how we would constrain down geothermal generation during a Wairakei Ring outage. It was also evident during October when low hydrology in Southland led to reduced generation posing a risk of cancellation to planned grid outages. However, by collaborating early with relevant asset owners, we were able to proceed with the planned outages.

These situations underscored the importance of monitoring and proactive engagement with industry to identify risks, develop operable mitigations, and implement them if needed. This approach enabled several outages to proceed that might otherwise have been cancelled.

4.1.1 Further opportunities:

Looking ahead, we see several opportunities to build on this progress:

- **Regulatory Engagement:** We plan to provide the Electricity Authority with our views on regulatory settings and potential changes in the 2025/26 financial year, following industry discussions in 2024/25.
- **Digital Training Integration:** We aim to transfer our updated progression plan and training modules into online systems. This will support long-term sustainability, enable self-service learning, and allow for targeted gap assessments.
- **Reporting Consolidation:** We are exploring ways to merge NZGB capacity reporting with energy reporting into a single, unified report. This will improve consistency in industry messaging and better reflect the relationship between energy and capacity risks.

- Customer-Centric Reporting: Future updates to outage and NZGB reporting will aim to include customer-relevant insights alongside technical details, making our communications more accessible and impactful.

4.2 Generation commissioning

4.2.1 Generator commissioning

Commissioning and testing remain essential to ensure new generation assets meet the Code's requirements. As the System Operator, we continue to support an increasing number of new customers connecting to the power system and entering the market, while also working with existing participants to commission and test both new and upgraded equipment.

Throughout 2024/25 this workload has continued to expand. We are seeing increased interest from a broader range of participants, including many smaller, distributed energy resources and emerging technologies. These developments introduce new complexities into the commissioning and testing processes. Our engagement with new generators and energy resources typically begins around a year prior to their connection, encompassing planning activities, connection studies, and demonstrating compliance with Code requirements, through to the completion of testing and modelling. Over the last year we have had 10 new sites in the process of being connected or increasing their power output, the most in one year since 2005. We have also had twenty-two upgrades in that same period.

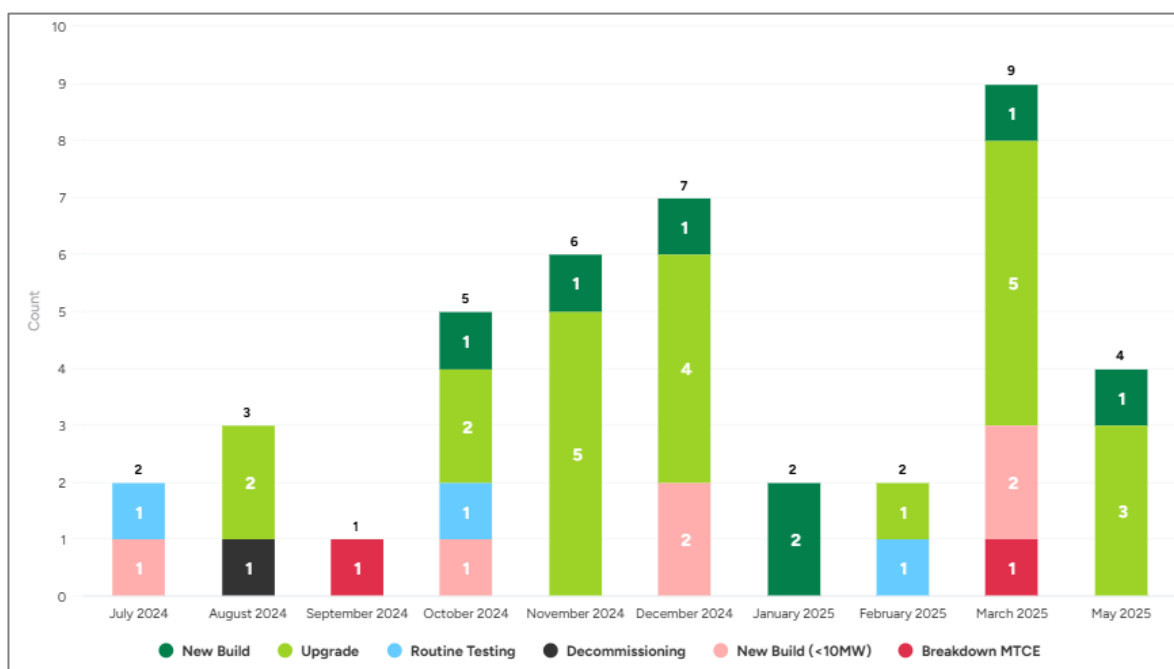


Figure 2 FY 2024/25 Completed Commissioning

Summary of 2024/25 new commissioning

During 2024/25 we connected 300 MW of new generation and capacity upgrades. Some key projects included:

- Lodestone Energy's 34 MW Te Herenga o Te Rā Solar Farm at Waioatahe.
- Genesis Energy's 47 MW Lauriston Solar Farm near Ashburton.

- Contact Energy's 54 MW Te Huka 3 geothermal power station near Taupo.
- Meridian Energy's Ruakākā BESS, New Zealand's second grid-scale battery at Bream Bay, which adds 100 MW of energy storage to the system.
- Northpower's 14 MW Te Puna Mauri ō Omaru solar farm at Ruawai.
- Far North Solar Power and Aquila's 17 MW Pukenui Solar Farm at Pukenui.

With the uptick in new generation and BESS commissioning, we have worked with asset owners and the Authority to work through Code and technical requirements as technologies evolve, and the Authority investigates and proposes Code changes. For example, considering how to handle different requirements for operational indications for generation with strings of units, to understand how to manage AUFLS requirements for BESS, and how to model BESS in our tools and systems.

4.2.2 Generator commissioning project

In mid-2022, we launched the Generation Commissioning and Testing Improvement Project in response to a rapidly changing electricity sector, driven by the development of new renewable projects to meet Net Zero Carbon 2050 targets. The project's primary goal was to overhaul and streamline commissioning processes, ensuring the power system could accommodate more frequent integration of diverse, smaller-scale generation assets—such as wind, solar, and batteries—without compromising stability or security. Following extensive analysis and design work through 2022 and 2023, the identified improvements were rolled out over the financial year 2024/25. These advancements included:

"Support and services provided have been satisfactory"

Market Participant

- Streamlined commissioning: Simplified workflows and reduced bottlenecks, enabling new generation to connect and deliver energy more quickly in support of national decarbonization goals.
- Maintain grid stability and safety: Enhanced protocols and coordination to ensure that commissioning activities, including deliberate stress tests, safeguard real-time grid stability—even as multiple projects are commissioned in parallel.
- Improve stakeholder experience: Made processes more transparent and user-friendly for asset owners, with clearer upfront requirements, consistent communication, and better visibility of commissioning schedules to reduce confusion.
- Establish performance standards: Introduced data-driven targets and internal performance metrics for commissioning, creating accountability by tracking key steps such as document review turnaround and on-time completion of testing milestones.



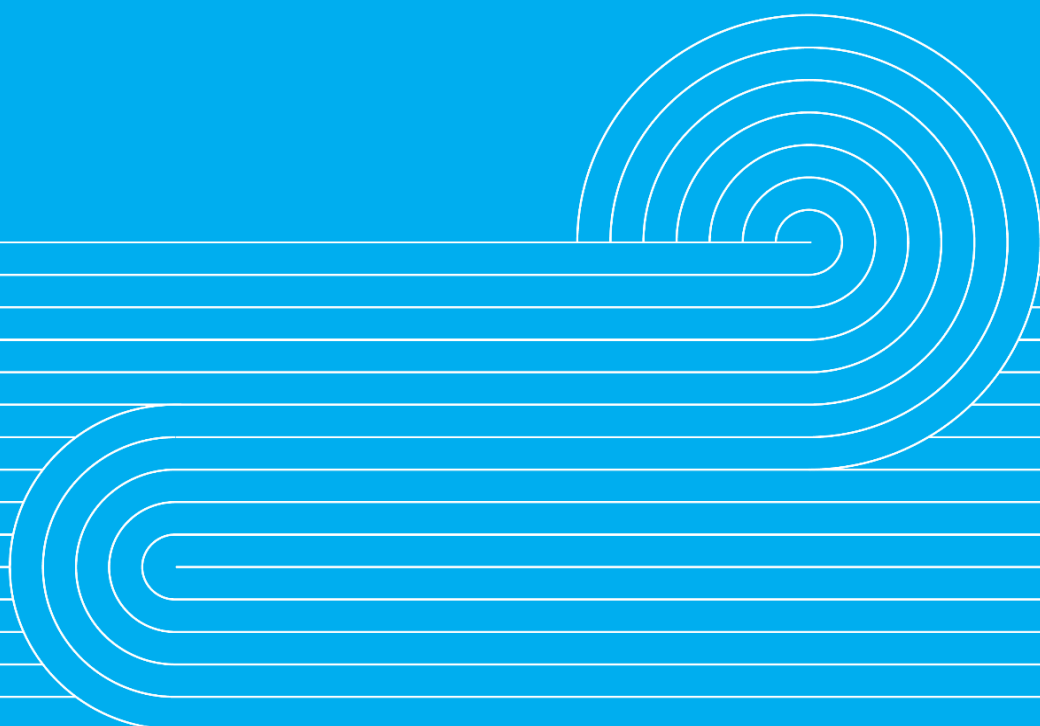
As new technologies (batteries, hybrids, offshore wind, hydrogen) emerge, the processes need to remain flexible to accommodate evolving requirements, we will need to proactively reviews standards and seek industry feedback to address unforeseen challenges as technology evolve.

4.2.3 Further opportunities

While the improvements have been effective, certain risks and considerations remain as the process continues to operate and evolve:

- We will continue to manage risk of resource constraints under high demand, especially where a surge in projects may strain resources, as staff capacity is limited. To address this, the System Operator will be training more staff and will standardise tasks to boost scalability.
- We are committed to continuous improvement and ensuring commissioning processes remain fit for purpose and are regularly updated. Team leads own continual process improvement, monitoring KPIs and feedback loops to resolve delays and adapt the process as needed.
- Commissioning depends on steps like grid connection and market registration; delays elsewhere can impact timelines. Improved planning and collaboration help, and we will work to maintain shared visibility and communication across teams critical to maintaining an efficient process.:
- As we continue to optimise other parts of the commissioning process, market participant onboarding will be the next stage we focus on.

5 Power systems investigations and reporting



5.1 Investigations

5.1.1 Significant incident investigation

20 June 2024 - Northland loss of supply

The preliminary fact-based report for the incident was published on Transpower's website on 5 July. In parallel, we commissioned a full review by an independent investigator which included interviews with internal and external parties.

Our independent investigator's draft report was provided to the Authority and affected parties on 30 August and published on our System Operator system events and assessments webpage on 6 September. Seven recommendations were made by the investigator. We had accepted all the recommendations and our response to the investigation was published alongside the report.

Following the publication of the Authority's report into the event, we reviewed their actions against those we proposed following the completion of the System Operator commissioned report. The two sets of actions were very similar. We coordinated with the Grid Owner on preparing a plan for the Authority.

5.1.2 Moderate incident investigation

21 December 2024 – Hawke's Bay loss of supply

In December we commenced work to investigate the Hawke's Bay loss of supply event, which met the 'moderate' event threshold under our significant event reporting framework. We also began work on the related under-frequency event (UFE) investigation. The UFE investigation was completed in line with the Code based timings for data provision from participants.

On 31 March we submitted our moderate event report to the Authority for the loss of supply to the Hawke's Bay and loss of connection of associated generation in the region. This included five recommendations for Transpower as Grid Owner and System Operator including recommendations around some updates to the relevant contingency plan and the Grid Owner to complete their self-identified review of the protection schemes in place.

5.1.1 Further opportunity

- We will continue to focus on reducing the timeframes to complete under frequency event investigations. Despite allowable response timeframes being defined we encourage all participants to complete their analysis and provide information as soon as possible rather than treat these as a target.

5.2 System Security Forecast

The [System Security Forecast \(SSF\)](#) identifies risks to our ability to achieve our to meet our PPOs over the next three years. It serves to inform participants about potential security risks and the strategies in place to manage them. The SSF is published biennially, with interim updates every six months if there are significant changes to the power system.

Historically, the SSF has concentrated on thermal and voltage stability risks. However, we are now shifting away from this traditional focus. During the 2023/24 year, we introduced a new scoping process that reflects the evolving energy landscape and the emergence of new security challenges—particularly those arising from the increasing use of inverter-based resources in place of conventional synchronous generators.

Our first report was finalised in December 2024, it focused on a [study of transient rotor angle stability \(TRAS\)](#), which refers to the ability of a synchronous machine to remain synchronised under normal operating conditions and to regain synchronism after a disturbance. The study includes an initial 'screening' exercise to understand potential TRAS risks across the full system and recommends further assessment, discussions with asset owners and mitigation strategies.

The second report published in June 2025 was a minor update to the [N-1 Thermal and Voltage Study](#). We also undertook additional studies on TRAS, the results of which we published early in the 2025/26 financial year.



We are well practised in progressing our thermal and voltage studies for the SSF, extending the SSF studies into emerging security risks such as TRAS require careful planning of different scenarios and models.

5.2.1 Further opportunity

- This is the first time we have included transient rotor angle stability (TRAS) across the whole of New Zealand. It will be important going forward to develop our System Security Forecast documents to cover emerging security risks, especially given the system is changing more rapidly than we have seen historically.

5.3 Automatic Under-Frequency Load Shedding transition

Throughout 2024/25 the System Operator and the Authority have worked with Connected Asset Owners (CAOs) in the North Island to complete the full transition of feeders from the 2 block AUFLS to the new 4 Block AUFLS regime by 30 June 2025.

This is a significant undertaking to transition more than 1500 feeders across the applicable distribution businesses. On 30 June 95.4% of feeders had transitioned with just 70 across two distribution business still to complete the transition but continuing to make progress.

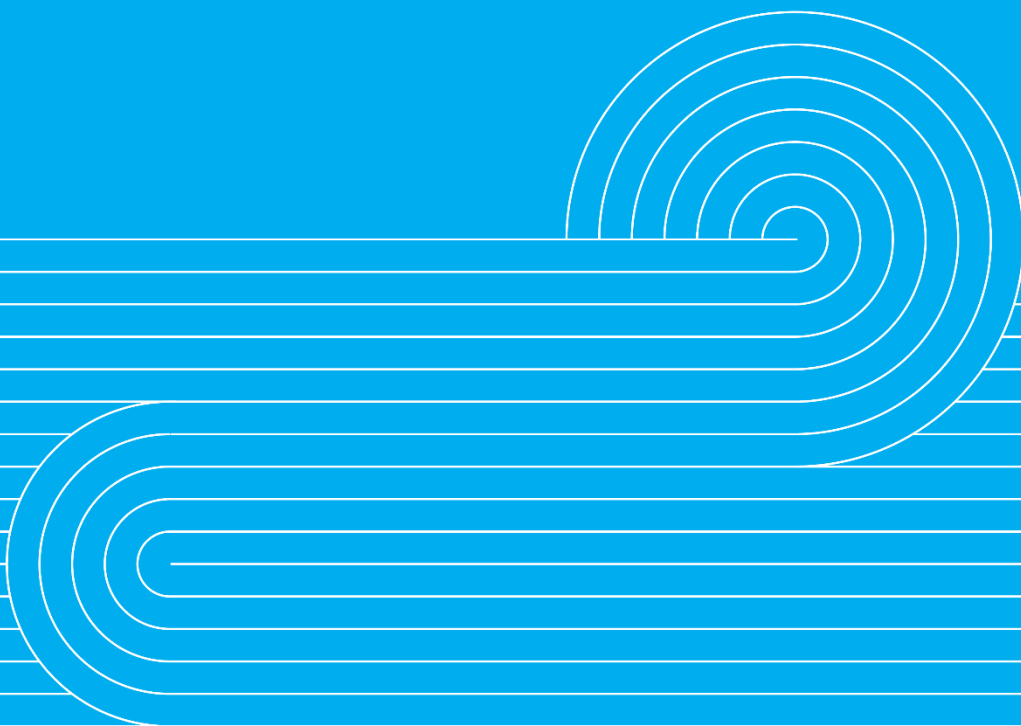
The work involved maintaining a monthly review cycle involving: reviews and acceptance of the CAO plans; monthly security assessments to assure AUFLS provision was sufficient in the event of a severe under-frequency event; and monthly reporting to the Authority. We also ran joint quarterly forums with the asset owners to provide updates, advice and answer AUFLS provider questions.

This has been a successful transition, with collaboration with the Authority and AUFLS providers. The Authority has acknowledged the hard work and strong cooperation between North Island Distributors and the System Operator. We continue to monitor and support the remain two distribution business transition plans and to collect and assess the AUFLS testing.

5.3.1 Further opportunity

- Work with the two distribution businesses that didn't complete their feeder transition by 30 June and ensure the remaining feeders are transitioned to the new scheme.

6 Compliance and impartiality



6.1 Compliance

In our role as System Operator, we have compliance obligations under the Code, and we also monitor and report Asset Owner compliance with certain Code obligations. While ultimately Code compliance is enforced by the Authority, our central role within industry gives us visibility of many participant activities that are the subject of Code obligations. In addition, there are statutory obligations on all industry participants around the reporting of Code breaches by other industry participants.

We take our compliance responsibilities seriously and we report and communicate compliance activity to the Authority in different ways and through various forums. Our new Corporate Counsel – Compliance & Impartiality started in July 2024 and meets regularly with Authority staff. During 2024/25 System Operator observations and follow up discussions with participants led to several participants self-reporting breaches of the Code (including the Grid Owner). We report this activity to the Authority in our monthly System Operator reports.

The System Operator has been working with generators to help them understand the requirements in submitting their Forecast Of Generation Potential (FOGP) to the market. To assist the Authority, we have also agreed to include monitoring of static FOGP values as part of our monthly monitoring process. This will allow us to identify any historical offers in each month when the IG FOGP has not changed for extended periods.

We have created a new Compliance Advisor role which will allow an increased focus on our compliance framework in light of the increased complexity of change in the electricity sector.

Breach activity summary

Seven breaches were alleged against the System Operator: 6 were self-notified and 1 was alleged by Meridian Energy. One of the alleged breaches is still under investigation by the Authority. The remaining 6 alleged breaches (including the one alleged by Meridian Energy) have been closed by the Authority with no further action.

We also notified 3 alleged breaches against other participants. All 3 are currently under investigation by the Authority and the System Operator is assisting the Authority by responding to fact finding and further information requests.

Under Frequency Events (UFEs)

We completed System Operator Causation reports for 5 UFEs. Of these, 2 were complex UFEs requiring engineering investigations.

We have been assisting the Authority in its aim to reduce its UFE causer decision timeframes overall. In particular, we have made our initial information requests on complex UFEs more comprehensive, which reduces the time spent going back and forth and waiting for information from participants. This has been particularly challenging given a marked increase in the number of UFEs and complex UFEs.

Event #	Title	Event Date	Report Date
4477	UFE 26 July 2024	26/07/2024	11/12/2025
4500	UFE 17 September 2024	17/09/2024	20/11/2025
4523	UFE 21 December 2024	21/12/2024	1/05/2025*
4527	UFE 14 January	14/01/2025	24/03/2025
4550	UFE 21 April 2025	21/04/2025	4/07/2025

**April and May discussions between System Operator and the Authority to improve timelines overall*

AUFLS compliance

We completed our review of the 2023 AUFLS compliance and in November 2024 we provided the full compliance report and security assessments for 2023. The report detailed non-compliances from distributors, the Grid Owner and some directly connected customers. We notified the Authority of all AUFLS providers who did not meet their obligations to provide information to us by 30 April 2024, ahead of providing the full report later in 2024. We also kept the Authority across the grid owner's progress in delivering its information, noting that its obligations are different to providers in the North Island. We recognise that the Authority would like to better understand and discuss the worst-case scenarios to use for the 2024 year and have built in time to discuss and agree these scenarios ahead of finalising our studies.

The Authority raised concerns about South Island AUFLS testing compliance at the end of this year and asked that we request that the Grid Owner develop a plan to comply with testing. We have worked with the Authority and the Grid Owner on this and continue to address AUFLS compliance requests from the Authority.

6.2 Impartiality

In July 2024, members of our senior leadership team presented to the MOC a paper setting out our approach to System Operator impartiality. The purpose of that paper was to provide the Authority with an overview of the mechanisms we use to ensure that we perform our System Operator role in an impartial and independent manner. We continued to actively monitor, manage and mitigate any impartiality risks through our embedded policies, procedures, processes and controls.

"My impression is that the SO makes special efforts to meet impartiality requirements."

Market Participant

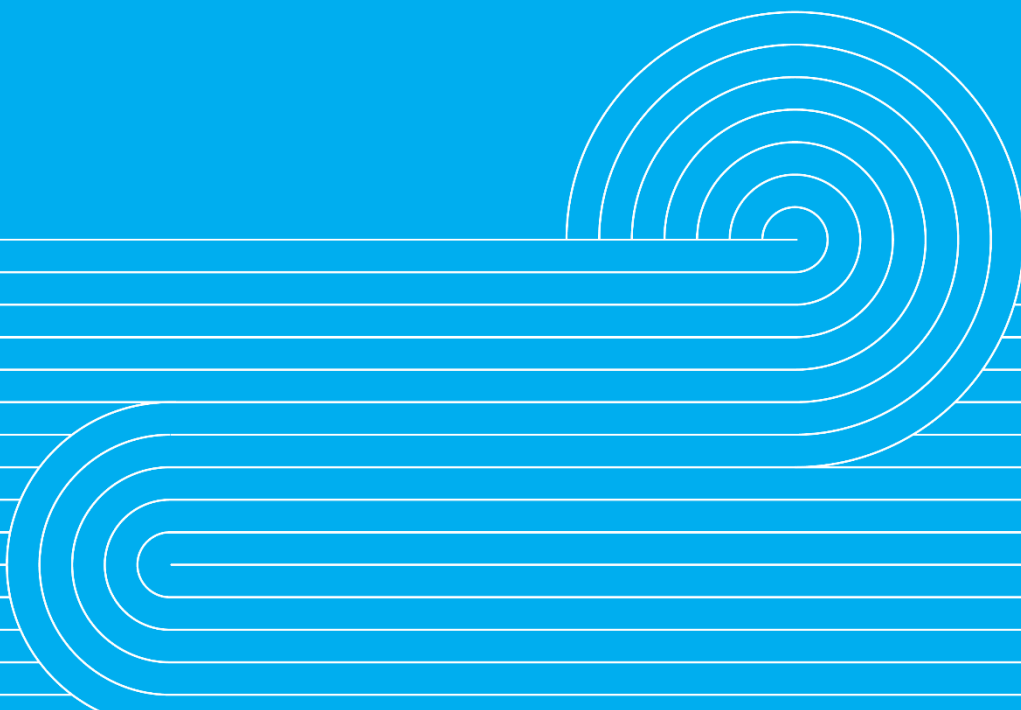
As agreed with the Authority during the recent SOSPA negotiations, we have started to include more detailed reporting in our Monthly Reports to give the Authority greater transparency and visibility of how we manage impartiality risks and/or perceptions. There is a new section in our Monthly Report that covers any specific activity that involved internal information barriers in place, the separation of key roles and functions, and oversight by Corporate Counsel, Compliance and Impartiality.

During this reporting period we reported on 3 specific instances where we were monitoring risks and/or perceptions – the details around these were included in each of our Monthly Reports to the Authority.

Our 2025 System Operator Participant Survey showed an average score of 90% from stakeholders on their perceptions of System Operator impartiality. The survey asked about stakeholder perceptions on whether in the last 12 months we had acted impartially in performing the following functions:

- Monitoring compliance with the Code
- Outage coordination
- Procurement of ancillary services
- Dispensation and equivalence arrangements
- Investigating under frequency events (including causer determinations)

7 Strategy and business planning



7.1 SOSPA negotiation

Throughout the 2024/25 period the System Operator and the Authority were committed to the preparation and engagement required to negotiate the next SOSPA agreement for a three-year term that commenced on 1 July 2025.

The process required significant resource commitment not just of the negotiation team but from wider business experts to support the preparation and detailed discussions, particularly through the last 6 months of workshops, negotiation, drafting and legal review.

On 30 June the System Operator and the Authority successfully executed agreement to amend and restate version 3.0 of the SOSPA.

7.2 System Operator strategy

7.2.1 System Operator Strategic Plan 2024/25

Each year we have prepared a [System Operator Strategic Plan](#), which sets out the strategy and principles according to which Transpower provides the system operator service.

The 2024/25 Strategic Plan was finalised at the end of 2023/24 through a process which:

1. Defines System Operator strategic objectives as a synthesis of the Transpower and the Authority's strategic priorities
2. Undertakes an environment scan and identifies risks and opportunities that are arising and developing in our increasingly complex operating environment, and
3. Sets out areas of focus for the coming 5 years and beyond, which together directs how we will apply resources to improving our capabilities and respond to those changing needs.

Overall, our strategic direction for 2024/25 remained consistent with previous years. Following the refresh of both Transpower and the Authority's strategies to consider the rapidly changing industry and electricity consumer. Our System Operator strategic objectives remained the same for 2024/25:

- Enhance trust and confidence
- Ensure a reliable electricity system
- Drive innovation
- Enable the transition to electrification
- Facilitate and efficient electricity market
- Deliver an effective service.

The following table details our activities for the year against our strategic focus areas for the 2024/25.

Strategic focus areas	Examples of supporting activities
Enabling whole system development	- Continued engagement with Future Networks Forum and FlexForum to develop a shared vision of distribution system operation in New Zealand, and begin to define operations at the TSO/DSO interface - Control Room of the Future (CRoF) Roadmap - North island 4-block AUFLS implementation
Integrating new asset technologies	- Adapting process to support the increase in new technologies particularly solar and BESS. - Supporting the subsequent integration of new asset types into the Ancillary Services market where appropriate e.g. BESS.
Providing market information in operational timeframes	- In response to dry Winter 2024 we increased cadence and adapted information to better meet industry needs, continued to refine and apply learnings heading into Winter 2025. - Low Residual consultation and implement resulting recommendations. - Completed significant event reporting and complete resulting actions within required timeframes.
Enhancing scalability and adaptability	- Implementation of new generator commissioning processes to sustainably support the rapid increase in interested parties and actual development. - Adapting processes and engagement with the Asset Owners and particularly the Grid owner to optimise the coordination of significantly increasing planned outages while reducing short notice outages.
Data-driven decision making	- Progressed the deployment of enhanced market data warehouse. - Increased security of supply scenario modelling and industry engagement and education of the processes and assumptions applied.
Event preparedness and response	- Significant commitment to implementing the new SOROP and the annual pan industry exercise focussed on improving processes around managing rolling outages. - Joint Black Start industry exercise with key stakeholders. - Participation in Electrical Industry Space Weather Working Group as the industry awareness develops on the potential impact of space weather.

During 2024/25 we commenced our draft review of System Operator Strategic Plan in accordance with the SOSPA 2 requirements. During the SOSPA negotiation process the parties were aligned that a new approach to developing the System Operator strategy was required. As agreed in the SOSPA 3

Transitional Arrangements (Schedule 5) the System Operator did not deliver a new System Operator Strategic Plan and IST Strategic Roadmap in lieu of defining the new approach to the strategy and completing the full refresh over 2025/26.



The need to develop an integrated System Operator strategy that includes IST, includes broad industry input and ultimately guides key decision making including future development and appropriation

As a rapid changing industry puts pressure on the pace of development of core systems it is important that the System Operator strategy considers a longer-term horizon

7.2.2 New approach to System Operator strategy

Under new contractual arrangements commencing for the SOSPA 3 term (from July 2025), the System Operator will provide a single System Operator Strategy per funding period, covering a 10-year outlook. The contract requires the Strategy to be finalised at least 18 months before the commencement of the next SOSPA term – in this case by December 2026. This timing ensures that the Strategy informs and is reflected in the System Operator's funding proposal to the Authority for the subsequent SOSPA term, which must be submitted by 1 July 2027. The System Operator Strategy will take a broad focus, covering the whole System Operator service (including ICT strategy) and considering the future needs of the electricity system, market and industry.

On 17 June we submitted our proposed approach to refreshing the System Operator Strategy for the Authority's consideration. The approach was subsequently agreed under the new SOSPA 3 and activity during 2025/26 will include stakeholder engagement, further engagement with the Authority and regular updates to the MOC.

7.3 Business planning

7.3.1 Statutory Objective Work Plan (SOWP)

The SOWP sets out the steps the System Operator must take towards delivering its service in a manner that assists the Authority to give effect to its statutory objective and consider the impact on participants in its decision making.

The 2024/25 SOWP contained four objectives which were all completed within their agreed due dates:

- *To review the current Policy statement:* The review has been completed with the Authority approving the submitted draft which took effect on 14 March
- *To review the Ancillary Services Procurement Plan:* The draft Ancillary Services Procurement Plan was submitted to the Authority on 6 June. A number of changes were deferred following the feedback received during the consultation process. We intend to gather further information and address the deferred items as part of an out-of-cycle review during 2025/26.
- *To Identify CANs into two categories 'informational' and 'low residual':* Completed September 2024, and ongoing in each Quarterly System Performance Information report
- *To review Low residual notices, threshold and process:* On 4 April we published our summary and response to the 6 submissions and 2 cross-submissions to our Low Residual Situation review

consultation paper. We will develop and consult on potential Policy Statement amendments related to Low Residual Situations as part of the next Policy Statement review, which we are progressing in 2025/26.

7.3.2 Education & Engagement Plan

The System Operator produces and publishes a significant amount of content supported by various forms of market engagement to deliver on our Education and Engagement Plan. Details of the initiatives we have completed are outlined in Appendix 1.

7.4 Workforce planning

The System Operator's staff are critical to the success of the business and the electricity system as a whole. We have a highly skilled and technical workforce, with many of the necessary skillsets being in high demand globally. This requires us to have strong development pipelines to ensure we're constantly growing the required skillsets. We also need to address the challenges of an ageing skill base, and the need for our team to more closely reflect the diversity of the communities we serve.

Over the 2024/25 period we have seen a small increase in our diversity statistics with Female staff numbers up nearly 2% to 22.8%, while female staff in leadership roles is at 30%. There is still work to do to reach our next key target of 35% by 2030, and the overall corporate goal of 40% female staff.

Staff engagement from our regular surveys remains high at 8.1 out of 10, which achieves our current target for this KPI. We continue to analyse survey responses and ensure we address issues and opportunities where possible to ensure this improves over time.

7.4.1 Recruitment

There is strong competition for some of our specialist roles and this has continued this year. Despite this we have been successful in both recruiting for a small number of extra positions and in filling vacancies as they arise.

In the last year we rotated Transpower power system and operations planning graduates through the System Operator business and we have been successful in recruiting graduates for permanent roles in both the Operations Planning and Power Systems Groups. The expanded Transpower graduate programme is proving effective in building a strong talent pipeline, reducing onboarding and overall efficiency. We have been successful in recruiting entry-level market analysts, progressing market analysts to reflect growing experience and competencies, and appointed a new principal market adviser with experience across our System Operator teams including IST. Also, within our Market Services Group we reinforced our commercial, reporting and information-management resources. Amongst other things this capability is progressively helping to create capacity in the every-more busy ancillary services space.

We took on several interns of the summer break as another way of providing our next generation of employees a first-hand experience and insight of the System Operator service.

7.4.2 Training, development, & progression

A structured 12-week training programme was developed for new start operations planning engineers. This ensures consistent onboarding, comprehensive knowledge transfer, and targeted support in key

focus areas reducing the amount of time spent onboarding new starters. During 2024/25 this programme was also used to develop four security coordinators for the control rooms, and 4 graduates.

Our system coordinator training this year included amongst other things undertaking black starts (for both North and South Islands), responding to an AUFLS event, application of SOROP, preparing for an islanding situation and then resynchronisation, and HVDC management.

We continued to embed improvements from Operational Excellence programme into our System Coordinator training and development, including an improved competency development framework and assessment processes. Work is also underway to enhance our training simulator such that it provides an even more realistic experience for training. Over the last 12 months we have also successfully trained, assessed and deemed competent 6 Energy Coordinators and 2 Security Coordinators to be able to operate without supervision in the control room.

We are building a focus on power systems engineering training to provide development aligned with our core competencies. We are also supporting engineers to complete their chartership, with an increase this year in chartered engineers, and one of our engineers volunteering to become an assessor for Engineering NZ.

In the 24/25 year we reviewed our power systems progression framework, following work to update the operations planning framework the previous year. In both cases the work has provided clearer focus on core competencies and simplified competency demonstration to support retention. We also updated our market analysts progression framework.

We undertake regular engagement with key international organisations (in particular CIGRE and ESIG) to learn from overseas experience, alongside our international engagements. Both of these organisations provide regular webinars on key engineering and energy transition topics.

Our Market Analysts and a number of other key staff completed a Markets and Behaviours course that provides deeper insights into the dynamic New Zealand energy market while developing critical thinking. It also builds knowledge and tools to increase their ability to better understand participant decision making and anticipate market impacts.

7.4.3 OPTI optimisation

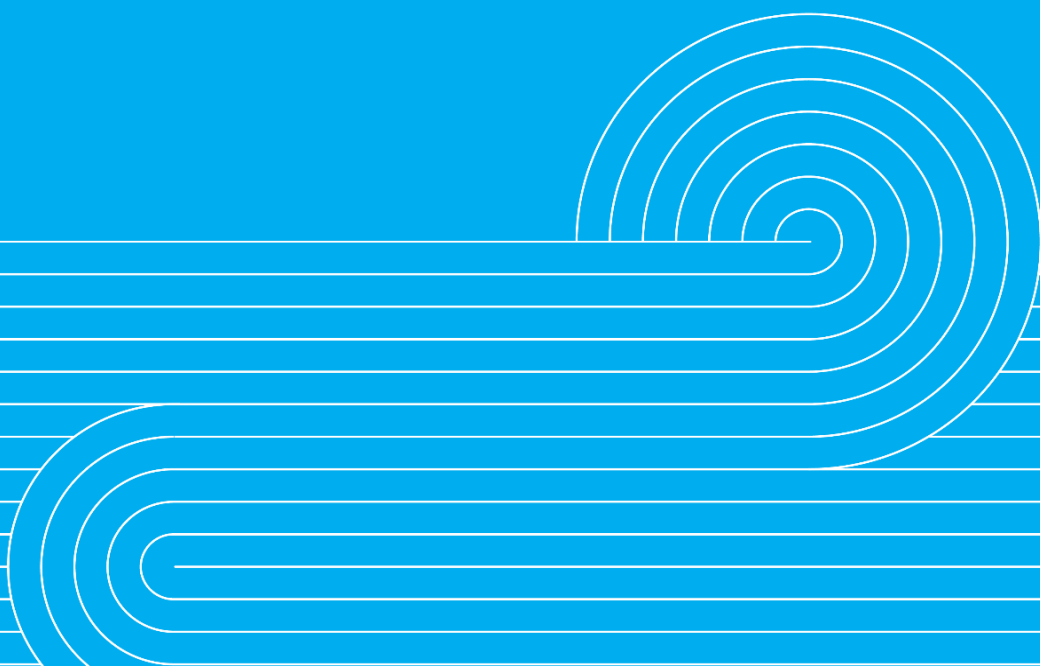
The Operations Process & Technology Improvement (OPTI) team has undergone a change to address structural and role clarity issues that have emerged over time due to multiple restructures and staff turnover. Feedback from stakeholders and a thorough assessment revealed that roles and responsibilities were not well understood within OPTI, across Operations, or with Transpower IST. Many job descriptions were outdated, leading to misalignment between people's actual work and their formal roles. Without change, the team risks inefficiencies and a weakening of essential services in a rapidly evolving business and operating environment.

The changes have introduced a more fit-for-purpose structure that enables OPTI to operate with greater clarity, accountability, and impact. By aligning people to standardised roles and strengthening collaboration, particularly in capability and capital planning, OPTI will become a more effective facilitator across the System Operator. The new model will also enhance project governance, embed best practices in process improvement and change management, and ensure that investments deliver value for money. Ultimately, this change will position OPTI to drive better outcomes for the business and its stakeholders.

7.4.4 Further opportunities

- We will continue to refresh our progression frameworks across other groups within the System Operator to ensure they are free of bias, align with functional areas, and efficient to assess and complete.
- We have a focus on identifying targeted secondment and rotational assignment opportunities within operations, and target development opportunities for emerging leaders.
- We continue our work to manage key person risk particularly in critical roles. This includes people focussed initiatives to build a resilient knowledge base with the System Operator by capturing and transferring key institutional expertise.

8 Commitment to evolving industry needs



8.1 Industry engagement

We continue to work with stakeholders to support their participation in the market, including through providing educational materials, and gathering advice and knowledge from our industry participants and partners. The key feature of 2025/26 is the increasing volume of engagement as the evolution of technology has enabled new participants to engage with and enter the market.

We have focused on strengthening our reporting capabilities and improving the accessibility and transparency of information for participants. This has involved exploring and implementing a range of approaches aimed at enhancing stakeholder understanding and fostering greater engagement. We have worked to build participant knowledge, encourage active involvement, and ensure that key insights are communicated effectively and consistently.

From our annual participant survey, 96% of our respondents agreed or strongly agreed that, overall, Transpower performs well in providing the system operator service.

Over the past year, we released 11 consultations, a substantial increase compared to previous years. This growth reflects our commitment to supporting the evolving power system by actively seeking insights and expertise from our industry participants and partners. As the energy landscape continues to shift, we remain focused on fostering collaboration and informed decision-making through meaningful engagement.

"Overall Transpower does a very good job in engaging participants."

Market Participant

Consultations and publications

Significant effort goes into developing and publishing documents, managing consultation processes and responding to submissions. Over the period we have completed the following consultations:

Consultation	Month	Subs	Cross subs
Evolving market resource coordination	Jul-24	15	N/A
Adjustment to Alert Contingent Storage Release Boundary	Aug-24	11	N/A
Policy Statement Review	Oct-24	1	N/A
CER: HVDC Single Pole Risk Classification & Cable Discharge Modelling Reviews	Nov-24	0	N/A
CER: ICT Methodology, Approach to FRT, 110kV busbar fault review	Dec-24	1	N/A
2025 SOSA: Reference Case Assumptions and Sensitivities	Dec-24	4	N/A
Low Residual Situations Review	Dec-24	4	2
SOSFIP Review 2025 – Issues Paper	Mar-25	15	4

Consultation	Month	Subs	Cross subs
Ancillary Services Procurement Plan Review 2025	May-25	6	1
Draft Security of Supply Assessment 2025	May-25	5	N/A
CER: Groups of generating units	Jun-25	2	N/A

Education publications

Energy Security Outlook 101: The ESO101 document builds on ERC101 and incorporating feedback from our Low Residual consultation to support understanding of the monthly Energy Security Outlook, offering a more integrated view of supply forecasting and management, including ERCs, SSTs, and regulatory requirements.

Scheduling, Pricing, and Dispatch 101: SPD101 explains the Scheduling, Pricing, and Dispatch (SPD) application used in New Zealand's electricity market. Designed for stakeholders and market participants, it outlines SPD's role in ensuring a secure, efficient, and economically optimised power system, including how prices are calculated and vary across time and location, and the relationship between energy and reserve pricing.

System Operator Industry Forums

The fortnightly System Operator Industry Forum has been a key engagement mechanism for the System Operator and is well supported by participants of which >100 regularly attend the sessions. Standing items include our market update, NZGB update, operational update, and regular updates on generator commissioning. The Forum is a great platform to provide targeted messaging of current events of detailed overviews on topics of interest, some of note from 2024/25 include Generation Commissioning Process Improvements, System Security Forecast (SSF) Update on Transient Rotor Angle Stability, Scarcity pricing settings update and covering the Operational impacts of low Southland generation among others

We have also held targeted forums to provide more detail on a specific topic:

"Forums with opportunity to ask questions provide the best insight."

Market Participant

- *Winter preparedness:* The 29 April industry form was largely dedicated to winter preparedness where we stepped through a refresher on how winter peaks are managed. This included what information in published regarding meeting peak demand, operational notices, NZGB assumptions and scenario combinations and response, as well as industry communications.
- *ESO101:* we extended the 24 June industry forum following the publication of our ESO101 document to take participants through the energy security outlook and how it forms a key part of the electricity industry's security of supply forecasting and information framework.

Difference Bid Refresher Winter 2025: On 6 May in collaboration in the Authority we held a presentation for EDB's on difference bids. The presentation provided a comprehensive overview of the role of difference bids in managing New Zealand's electricity grid during high-risk winter periods. It explains the challenges posed by peak demand, especially during cold, windless, and sunless conditions, and outlines how difference bids help anticipate and mitigate capacity shortfalls. The presentation covered regulatory obligations, submission processes, compliance requirements, and future developments in load

management technologies. It emphasised the strategic use of difference bids to avoid rolling outages and ensure stability, especially from May to September.

Asset Owner Engineering Forum: On 30 October we hosted our annual forum for asset owners. The event included asset owners from generation and distribution businesses, as well as consultants from across the sector. The forum focused on generation commissioning in New Zealand's evolving power system, with particular attention given to the commissioning framework, timelines and modelling requirements. These discussions have ensured we are in a stronger position for future changes to the power system.

Industry forums and conferences

To keep up to date with industry developments and engage with our peers, we attend and present at various forums and conferences. Examples of such engagement are:

- *Electricity Networks Aotearoa (ENA) Future Networks Forum (FNF) Innovation Forum:* Our Principal Market Advisor joined the "Roles and Functions project", which aims to align EDBs on the capabilities, roles, and industry structures needed to support distributed flexibility. They also presented on "How system operations is changing, what we're experiencing and what we think will happen. Covering changes in the power system, regulation, industry role, and expectations for our role - and how we are planning to meet them".
- *Energy Trader Forum:* In July our Head of Market Services participated in a Winter Peak panel discussion. In December our Market Operations Manager and Head of Market Services presented our first Security of Supply Outlook and contingent storage access arrangements, and in April our Market Operations Manager presented our latest quarterly Security of Supply Outlook.
- *Downstream 2025:* Our Market Operations Manager participated in a panel discussion focussed on "A question of security".
- *Outage planning forum:* The System Operator participated in the Grid Owner's annual outage forum, presenting on the assessment process for the annual outage plan and any subsequent planned outages. The presentation covered how transmission outages are evaluated, the type of advice provided, how that advice is used, and the respective roles and responsibilities of the System Operator and the Grid Owner. The session aimed to educate industry participants on the System Operator's approach to outage assessments and reinforce impartiality by clearly outlining the distinct responsibilities of each party.

Reporting and communications

Additional content in regular reporting: We've continued to expand and refine our monthly reporting including incorporating feedback from the Authority where possible. We are working to proactively share more detailed updates on our workstreams, while also including insights we believe will be valuable to the wider industry.

Updates for the period include:

- Ancillary services activity - Testing for Interruptible Load, Over-Frequency Reserve, Black Start
- Security of Supply specific section
- Monthly update on the Forecast v realtime variability and data going back 24 months
- Commissioning activity - Completed and Confirmed Commissioning and New Capacity (MW) by Generation Type
- Low residual CAN information

Enhanced Communication Coordination: We have taken significant steps to improve the coordination of our external communications, partly out of necessity in response to the increased number of publications and consultations from all across the System Operations Business.

We've incorporated the use of a mail system to improve the quality of the communications, enable better tracking of open rates and interest, and importantly mailing list management which has allowed us to establish multiple distinct audience groups to ensure targeted and purposeful engagement with the right participants.

Since we began this initiative in August 2024, our dedicated System Operator Updates have delivered more than 20,000 emails and driven a 31% increase in audience growth.

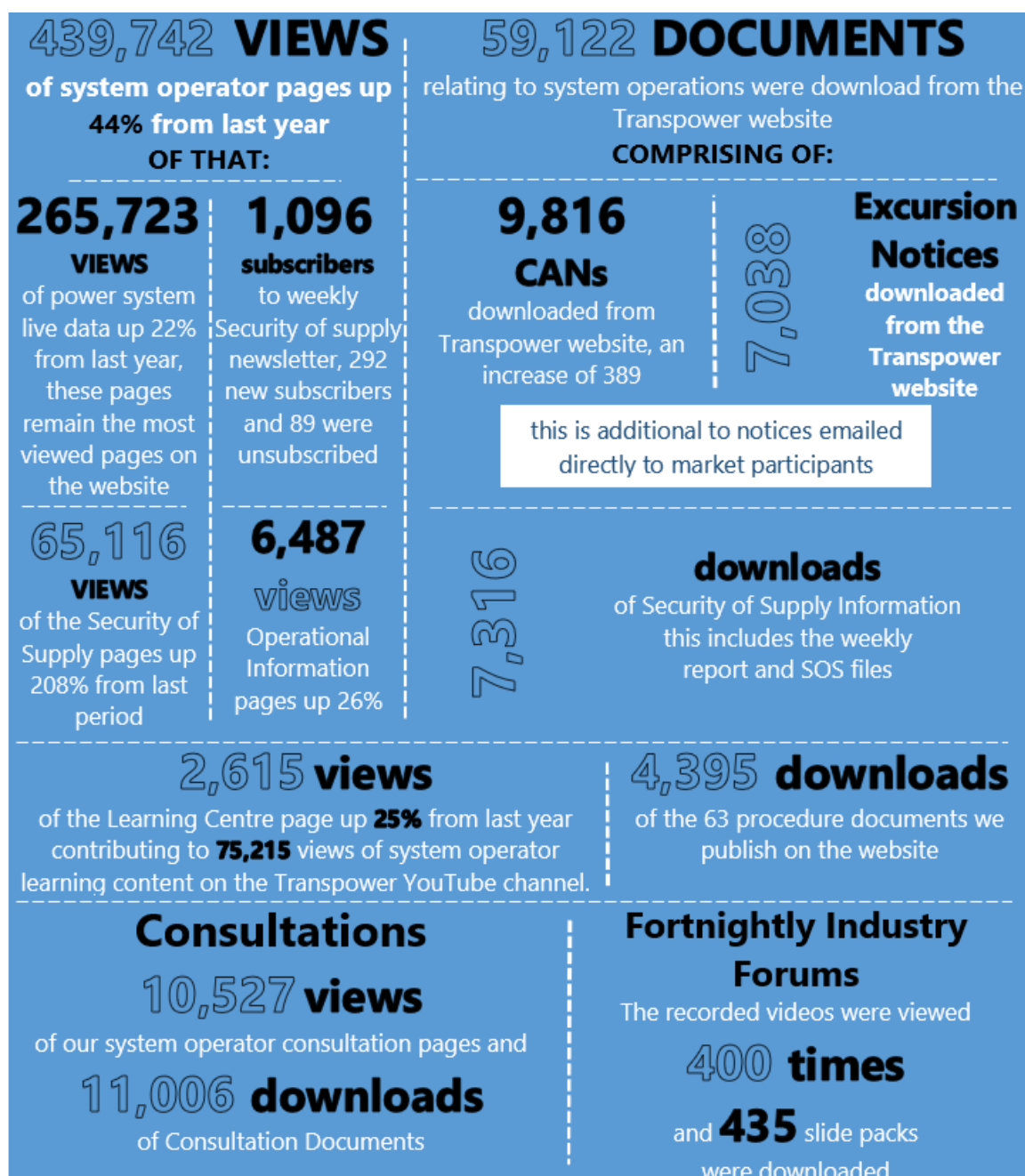
System Operator website

Our website serves as a key platform for engaging with industry partners and stakeholders. It also provides access to operational notices, reports, policies, and other information that supports our role as System Operator.

We've made several enhancements to improve usability and make it easier for visitors to find what they need. For example:

- The "Connecting Generation" pages have been totally rewritten to better reflect the process asset owners must follow. The main Connecting Generation page now guides asset owners/developers through the connection process detailing what is required through each stage of the build/connection process.
- A new Security of Supply landing page has been created to consolidate all relevant information in one place and make it easier for people to find.
- Each week in the Weekly Market Report a Market Insight is written, we have created a full index page of the topics so that the content can better accessed.

The "Invitation to Comment" page has been renamed to "System Operator Consultations" and promoted to the System Operator dropdown navigation allowing easy access to current and past consultations. The following graphic highlights key stats for the System Operator websites over the past 12 months of the reporting period. Live data pages remain the most frequently visited sections of the site. As anticipated, views of security of supply information have increased significantly.



We continue to observe the significant value in direct engagement with participants through our forums, which has been supported by positive feedback from participants. We are regularly introducing key topics through the System Operator Forum or running special or extend forums to cover certain topics of relevance or interest in more detail.

Monthly and quarterly reporting is a valuable mechanism to highlight and provide insight to the significant amount of work the System Operator is delivering not just to the Authority but also available to the industry via the Authority website.

8.1.1 Further opportunities

- On the Generation Connection and System Tests webpages we have implemented an approach to display conditional information based on user selected dropdown fields. Where appropriate this smarter and tidier approach will be extended to other pages on the website.
- We will continue to incorporate feedback relating to industry engagement received in the annual participant survey in future industry engagement activities.
- We commenced (in 2025/26) an initiative to improve the engagement and processes for existing and potential ancillary services providers leveraging the learnings and tools identified through the recent generator commissioning improvements.

8.2 International engagement

We have included updates on international engagements when available in our System Operator Monthly Performance Reports, and an update from the EGM Operations is now a standing agenda item at the quarterly Authority MOC meetings. We also take the opportunity to review international power system events in order to provide any lessons for the New Zealand context.

Examples of how we are engaging with the industry worldwide:

Our EGM Operations is a member of the APEx Board. This provides direct access to market and system operators from around the world and the sharing of insights and best practise. In September 2024, we attended the APEx conference in Chile with the theme being the integration of renewable generation. Through this role we are now working to pilot an international exchange programme offering study tour opportunities to participating APEx member organisations.

We attended the GE Venova Conference in Boston where we were able to collaborate with the GE Product Team and industry peers from around the world. GE supplies some of our core systems and any innovation or changes they are considering need to be well understood by the System Operator.

We met with representatives from UK consultants AFRY and others to talk through recent developments and lessons learned in market scheduling, with particular interest in probabilistic modelling and sensitivity and scenario analysis.

We attended the Australian Energy Week 2025 which focused on was on accelerating Australia's energy transition through innovation, investment, and collaboration across the entire energy supply chain. While the Australian context for the electrification/decarbonisation transition was different, our electricity market designs were similar and the challenges the Australian industry was working on were very much the same as ours.

We engaged with AEMO and NESO on multiple system operations topics and forums across the year. This included visits to both their control centres to build relationships and view their operations first hand.

As part of our Control Room of the Future initiative we have been connecting with international peers and researchers to understand their plans and thoughts on future control room operations. This has included EPRI, EirGrid, NESO, AEMO, TransGrid and Tennet.

Transpower (including System Operator) hosted a delegation of energy industry experts from India.

The System Operator hosted a delegation from Saudi Electricity Regulatory Authority.

As the industry continues to evolve rapidly, we remain committed to strengthening our global connections and drawing on international insights to better understand and navigate emerging challenges.

In December, Transpower (including a System Operator representative) joined an Australia–New Zealand delegation to the UK, organised by the British High Commission, to explore offshore wind development as a means to strengthen energy sovereignty and stimulate economic growth. The delegation engaged with key UK stakeholders including the Government, Crown Estate, Ofgem, National Energy System Operator, developers, suppliers, ports, and the National Renewable Energy Centre. Discussions covered the crown leasing process, financing mechanisms such as Contracts for Difference (CfD), the OFTO transmission model, community engagement, supply chain development, workforce training, and research and development.

Key takeaways for New Zealand included the importance of CfD-like arrangements to enable project financing, concerns about the effectiveness of the OFTO model, and the need for a forward pipeline of projects to secure supply chain capacity. The visit also highlighted the long-term economic benefits for local regions involved in offshore wind operations, as seen in several UK port towns.

Following on from the UK offshore trip our System Operator delegate took the opportunity to meet with EirGrid, EPRI and NESO to discuss system operations. Topics included control rooms of the future, modelling information requirements, operator training, forecasting, operational challenges of wind and other renewables, and longer-term network development.

We have reviewed two key power system events in Chile and in Spain/Portugal. Our approach has been to keep across events as they arise for any immediate lessons, and to review reports or join webinars on key events. We will be sharing our review of the Spain/Portugal event with the Authority when we complete our final report.

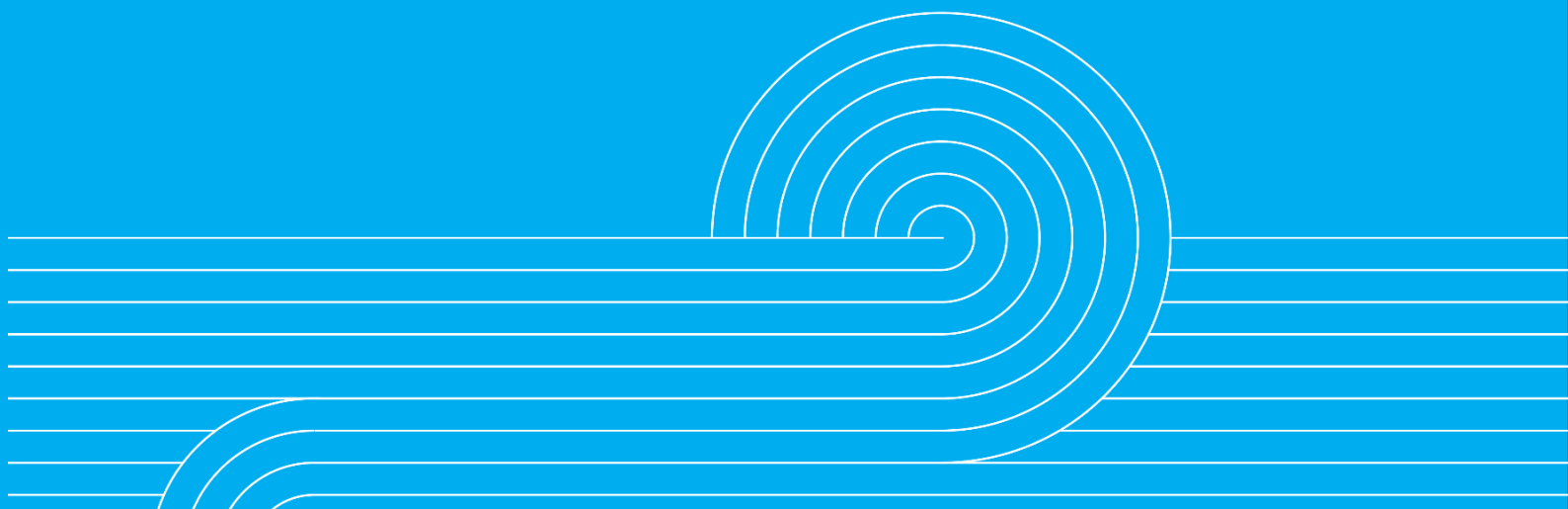


Our international engagements this year re-affirm the challenges many similar jurisdictions are facing dealing with the energy transition, rapid acceleration of new generation technologies particularly solar and BESS, and the increased workload and complexity this brings, and grappling with the implications of DER/CER. It is important that continue to develop our relationships and share information and learnings with other System Operators and related international stakeholders to be well placed to apply best practice in the New Zealand context.

8.2.1 Further opportunities

- Propagate the recent engagements with the like of AEMO (Australia) and NESO (UK) to ensure there is an ongoing relationship that supports information sharing.

9 Project delivery



9.1 Programme delivery

Joint Development Programme

In August 2024, we agreed a refresh of the Joint Development Programme with the Authority, which provides a view of shared change programmes from 2025-29. The updated plan is available on our website.

The Joint Development Programme (JDP), between the System Operator and Authority, spans a period of five years and involves a range of projects related to service maintenance and service enhancement. The programme is updated at least annually and, as such, may change as planning assumptions become more certain over time.

We continued to deliver the investigation and capital expenditure change projects outlined in the JDP and capital work programme, which was agreed with the Authority.

TAS 108 - Extended Reserve Implementation 23/24 – Extended Implementation

The System Operator steadily progressed the transition of North Island distribution businesses to the 4-block AUFLS scheme, and by the target date of 30 June 2025 95.4% of feeders had been completed. Monthly change requests from North Island AUFLS providers were processed following security studies that identified no issues. Non-adherence incidents were minimal and addressed. Quarterly industry meetings supported coordination, and while most providers met transition targets, two had remaining feeders to complete beyond the June 2025 deadline, which was communicated to the Authority.

TAS 109 - Instantaneous Reserves Cost Allocation

This TAS assessed potential upgrades and costs for the System Operator's reserve cost allocation tools in light of possible Code changes. It was delivered in two stages:

- Stage 1: Analysis of generating unit groups (Work Package 1) with an interim report.
- Stage 2: Analysis of voltage dispensations and at-risk HVDC (Work Packages 2 & 3) with a final report.

TAS 112 - FSR Workstream - Part 8 of the Code - Common Quality Requirements

The System Operator FSR team actively supported the Authority across multiple initiatives, including responding to consultation queries, developing options papers, and progressing technical studies (with key details below). Key areas of focus included system inertia thresholds, GXP power factor analysis, and a review of battery energy storage system (BESS) obligations. The team contributed to cost-benefit assessments, drafted and reviewed decision papers and Code amendments, and developed the Common Quality Document Incorporated by Reference (CACTIS). Coordination with the Authority continued through workshops and technical group meetings, culminating in the completion of several reports and the advancement of system strength studies and low inertia analysis to inform future regulatory decisions.

TAS 113 - BESS wholesale market enhancements

Following a reprioritisation by the Authority, TAS 113 was delayed but resumed in November with Phase 1 focusing on assessing operational risks and safeguards for BESS dispatch uncertainty. Over the following months, the team explored options to improve BESS participation, including bidirectional offering and gate closure adjustments, while refining the draft report. After review and feedback, the Authority approved a timeline extension to April 2025. The final report, including separate rough order of magnitude (ROM) assessments for implementation options, was submitted in April, and the project was closed pending confirmation to proceed to the investigation stage under the TAS arrangement.

TAS 114 - Dispatchable Demand Enhancement Assessment (Pre-Implementation)

The initial ROM workshop, planned for mid-March, was delayed to allow time for further discussion with the Authority to clarify the use cases and their intent, SMEs reconvened and complete the ROM session on 4 April. The preliminary draft of the Dispatchable Demand (DD) Enhancement Report was completed for internal review. The outputs from the ROM workshop were incorporated into the report prior to its finalisation in early April.

The final DD Enhancement Report was delivered to the Authority on 29 April, in accordance with project timelines. A change request was subsequently agreed with the Authority to extend the project to allow time for the Authority to provide feedback and for the System Operator to make any necessary revisions to the report which was completed by 26 May 2025.

TAS 115 - 9th August 2021 UTS decision

Transpower initiated settlement activities following the publication of the decision on final prices for 9 August 2021. Testing progressed smoothly, with successful validation of ancillary services, FTR market, and LCE calculations. Coordination with NZX ensured readiness for production implementation, which was confirmed in a January go/no-go meeting. Settlement actions were executed in February, including the issuance of LCE credits and transmission charges scheduled completed in March.

By April, all settlement tasks were completed, and the project close-out report was submitted to the Authority. The process involved thorough testing, stakeholder coordination, and final reporting, marking the conclusion of TAS 115 and ensuring accurate market reconciliation for the affected trading periods.

TAS 117 - Scarcity Pricing

During March, the pre-production implementation of the new scarcity pricing settings was completed. The focus shifted to alarm threshold changes and final testing, with updates to procedures and training materials scheduled for early April. By mid-April, testing and production implementation were successfully completed, ready for the new scarcity pricing settings to take effect on 17 April. Communications were delivered to the market through the System Operator Forum and a Customer Advisory Notice.

The final deliverable an updated scarcity pricing animation, was completed and uploaded to the System Operator website. The project close-out report was submitted to the Authority in June.

TAS 118 - Emergency Reserve Scheme initial scoping

The purpose of this TAS was to enable early System Operator engagement on implementation-planning for a potential Emergency Reserve Scheme (ERS) The System Operator reviewed the Authority's draft consultation paper and provided feedback to the Authority on 19 June 2025 and reviewed and provided feedback on the Authority's RBP Emergency Reserve Scheme Options Report on 27 June 2025. Both reports were discussed with members of the Authority team prior to being shared. No meetings were set by the Authority for discussion of the ERS solution with any other parties. Project Close out report was submitted to the Authority on the 30th of June.

TAS 119 - Implementing the hybrid forecasting arrangement - expert advice support

This TAS supported the successful implementation of the Authority's new hybrid forecasting arrangement, effective from 31 July 2025. Through to June 2025, the System Operator provided technical input to finalise the Authority's contract with DNV Services and offered advice throughout the intermittent generation forecaster procurement process.

Engineering and Technology Excellence Awards

The awards evening was held by Transpower on 15 October 2024. Four System Operator initiatives were selected as finalists. Technical implementation of Real Time Pricing won the Investment in our industry future category for Making a significant investment in the engineering and technology future of the industry. It also won the supreme award against some very strong competition. This was great recognition for the project team's work on a challenging and important multi-year initiative, and of the Authority's wider role in developing and deciding to implement what was the biggest change to New Zealand's electricity market design since the market began.



As the electricity sector transition accelerates more strategic, longer-term joint work programme planning, leveraging the respective expertise across the Authority and System Operator (cognisant of our roles) can best support positive outcomes for Aotearoa's consumers and economy into the future. Implementing the SOSPA 3 contractual agreement to reset System Operator Strategy and the JWPT terms of reference will be an important contributor to achieving those outcomes.

9.1.1 Further opportunities

- We will work with the Authority to review and update the Joint Work Planning Team (JWPT) Terms of Reference to incorporate the agreed functions as outlined in Schedule 7 of the new SOSPA v3 and ensure the attendance and processes of the JWPT are support both organisation needs.

9.2 Development of the electricity system and market

We have continued to work with the Authority to advance its Future Security and Resilience (FSR) programme. We supported the Authority in their response to queries, and the assessment of submissions for the Frequency and Voltage Management consultation process. This also included supporting the development of a Cost Benefit Analysis tool to help inform the decision paper for these consultations.

"SO has the right vision and understanding of supporting NZ energy system change is adapting as required."

Market Participant

Our activities in support of the Authority included:

- Completed the BESS AOPO's literature review to assess BESS obligations in international jurisdictions and provided preliminary feedback on the Authority's BESS regulatory roadmap paper.
- Completed the GXP Reactive Power Assessment analysis and report to support the voltage options paper.
- Supported to the Authority in drafting the options decision and Code Amendment consultation paper covering options addressing voltage management issues, and options regarding information sharing requirements
- Completed the draft Connected Asset Commissioning, Testing and Information Standard (CACTIS) which draws together some technical requirements that are currently part 8 technical codes and some requirements which are currently part of the System Operator's guidelines. If

this is incorporated into the Code, it will help clarify requirements for connected asset owners and ultimately support system security as we see diverse generation and demand-side technologies join the power system.

- Completed draft report for phase 1 of the system strength investigation initiative with the focus on identifying system strength-related operational issues that the New Zealand power system will likely face with a continued uptake of IBR and discussion of various mitigations that can be applied to resolve the issues.

We have also worked with the Authority to help prioritise FSR work for next year and identify areas we can assist with.

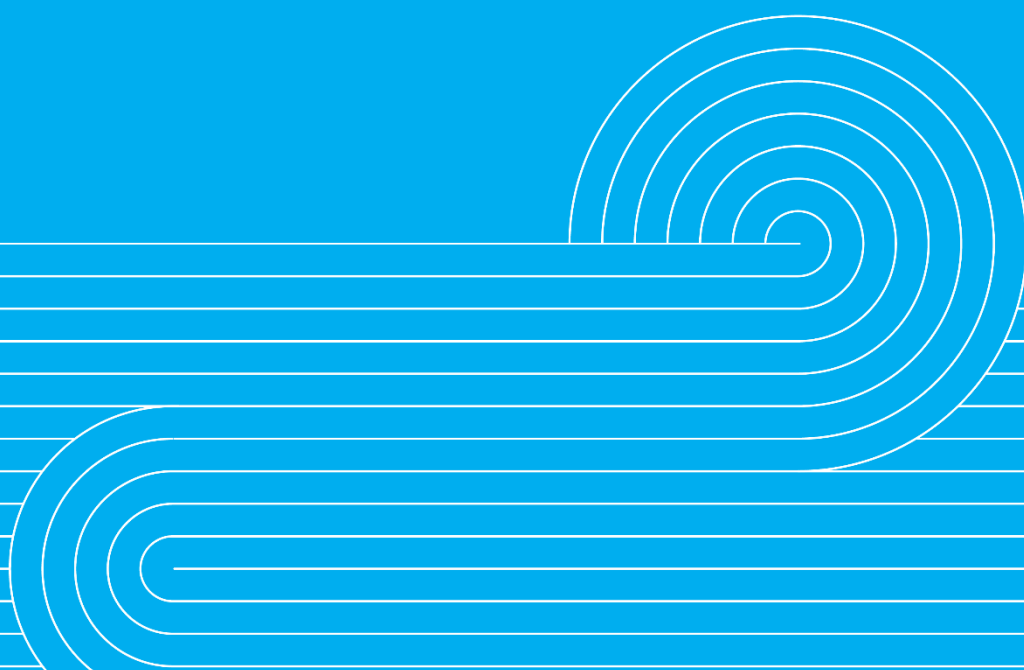


We recognise the significant value in collaboration with the Authority during programme planning. This was highlighted by the last JWPT meeting of the review period, with a focus on forward requirements rather than just retrospective review.

9.2.1 Further opportunities

- We will continue to engage with the Authority's FSR and Operational Policy teams to align market development initiatives with power system needs, where they arise. The FSR Roadmap provides a foundation for planning investigations and developing operational responses in various workstreams such as frequency management (including inertia), asset owner common quality requirements, system strength, and development of distributed energy resource (DER) integration into the power system. Each of these technical workstreams will need to consider market developments that incentivise desirable operational and investment decision-making.
- We will work with the Authority to further strategic initiatives such as a frequency management strategy and development of more sophisticated power system health monitoring, as well as continuing our engagement with the wider industry on distribution system operation (DSO).

10 Risk and assurance



10.1 Risk assessment

A key aspect of risk and assurance is communicating and building Authority and stakeholder confidence in our underlying work. This year, we improved transparency and will work with the Authority, and industry as needed, to provide a suitable level of detail. We developed a System Operator-specific Risk Appetite Statement and Matrix, which addresses the consequences for three main exposure categories: service delivery, customer, and stakeholder engagement. We have also developed our risk register to identify key risks, and provide greater transparency of our risk mitigations, and the opportunity for Authority review, test and input. This register will support discussions with the MOC about our top concerns, potential consequences and preventative/mitigative controls in place.

We completed our annual review of the all the critical controls, performed as two six-monthly control self-assessments:

- November 2024: 24-hour real-time operations, business support, incident preparedness and response, power systems planning and support, and delivery of critical tools
- May 2025: People management, Stakeholder management, monitor and evaluate potential operating environment, connected asset and system monitoring, and change management.

We identified 11 component actions with a maturity rating of 2, indicating improvement is needed in these process areas. Much of this work is already underway or planned, while some actions require recruiting to fill key roles and strengthen expertise. These steps are necessary to maintain standards in a rapidly changing environment. Additionally, one process action received a maturity rating of 1, highlighting the need to establish a system health monitoring framework for tracking processes, resources, and technology to advance FSR maturity.

In addition to showing how effective our controls are, it reveals shifts in risk size as market generation changes and new participants enter. This will guide future business assurance audits.

As part of our ongoing engagement with the Authority, we prepared three risk deep dives for the Authority's MOC.

- The System Operator-specific Risk Appetite Statement and Matrix. Feedback at the meeting focused on the context and use of the matrix.
- A risk deep dive paper on system stability, in particular emerging risks to system stability driven by inverter-based resources (IBRs), which behave differently from traditional synchronous generators.
- A paper on cyber security assurance, which provided a comprehensive update on Transpower's cybersecurity posture, detailing threat intelligence sources, international and domestic cyber trends, and assurance activities.

We have updated our risk register after conducting internal and joint System Operator-Authority workshops to identify new risks. These exercises confirmed that our current risk framework covers the main threats we face, while also highlighting the change in size of the risks and their potential impacts. This year, we aim to improve the register by clearly outlining our mitigation actions and controls.



The structured workshops provided an excellent opportunity to share our thinking and to provide confidence in the work we already have underway.

10.1.1 Further opportunities

This year we will work on:

- progressing the actions identified to manage risk around the transition.
- finalising the format of the risk register to present a clearer picture of how we are managing our risks.
- obtaining Authority and industry feedback on the risk register, taking into account their perspective of the environment.

10.2 Business continuity plan testing

The business continuity plan (BCP) is written to enable the System Operator to be prepared in the event of any unplanned interruption to our System Operator service and minimise the disruption to the industry. Each year we must carry out a simulation to test the effectiveness of our business continuity plan.

In June, we ran a scenario-based business continuity exercise for Transpower's System Operator team, simulating a cyber-attack on both Northern and Southern datacentres with immediate to long-term impacts. The main aim was to test the Incident Management Team (IMT) under the Coordinated Incident Management System (CIMS) framework using staff who had not previously applied their training in practice.

The workshop provided participants with experience in their roles, the tasks required, and the coordination necessary within the IMT and across the broader business group and industry. While participants showed theoretical knowledge, the exercise identified areas for improvement in practical application, especially during the initial scenario stages. Key observations included the need for clearer IMT role guidance, enhanced BCP kit usability, and more structured communication protocols.

We have identified several actions to enhance materials for IMT participants with limited practical experience. The workshop successfully strengthened Transpower's preparedness for real-world disruptions and built a more cohesive, confident response team.

10.2.1 Further opportunities

- Consider holding the workshop exercise more frequently for staff who had not previously applied their CIMS training in practice.

10.3 Business assurance audits and plans

We completed four business assurance audits this year were:

- **Generation Commissioning Process Requirements:** The audit outcome was effective, with three low risk (priority 3) findings:
 - Develop a decommissioning guideline
 - Create ICCP tag templates, implement System Operation checklist for Monday.com, and updated internal procedures to reflect the changes

- Explore options to provide asset owner access to view their project information in Monday.com
- **Manage a National SCADA EMS failure:** The audit outcome was effective, with one low risk (priority 3) findings for action:
 - Consider implementing joint training in the response to a SCADA EMS failure for the relevant personnel

We are not pursuing this recommendation due to challenges in coordinating training for both Systems Operator and Grid Owner staff. Our joint procedure development and dual sign-off ensure suitability, while ongoing team training equips staff to handle SCADA failures effectively.

- **Electricity Risk Curves (ERC) Modelling:** The audit outcome was effective, with four low risk (priority 3) findings for action:
 - Investigate, and if feasible implement an alternative backup SST model and further develop and test the internal ERC model.
 - Investigate, and if feasible, implement a tool for external data collection to increase efficiency of data transfer between participants and the System Operator.
 - Increase the automation of the internal additional data collection and processing and automation of additional solve verification checks.
 - Include the ERC forecasting model's acceptable supplier disruption within the Tool Support register.
- **Manage security constraints:** The audit outcome was effective, with three low risk (priority 3) findings for action:
 - Investigate the feasibility of updating the market operator interface to remove the ability to select superseded or deactivated constraints based on the risk impact and potential cost
 - Review the PR-OC-204 procedure document and outline the RACI of each team's involvement in the process for various stages/triggers of manual constraint development. Where possible, and it makes sense to, add examples of communications to the procedure document.

For the 2025-26 System Operator Business Assurance Audit Plan, we have agreed with the Authority on four Business Assurance Audits:

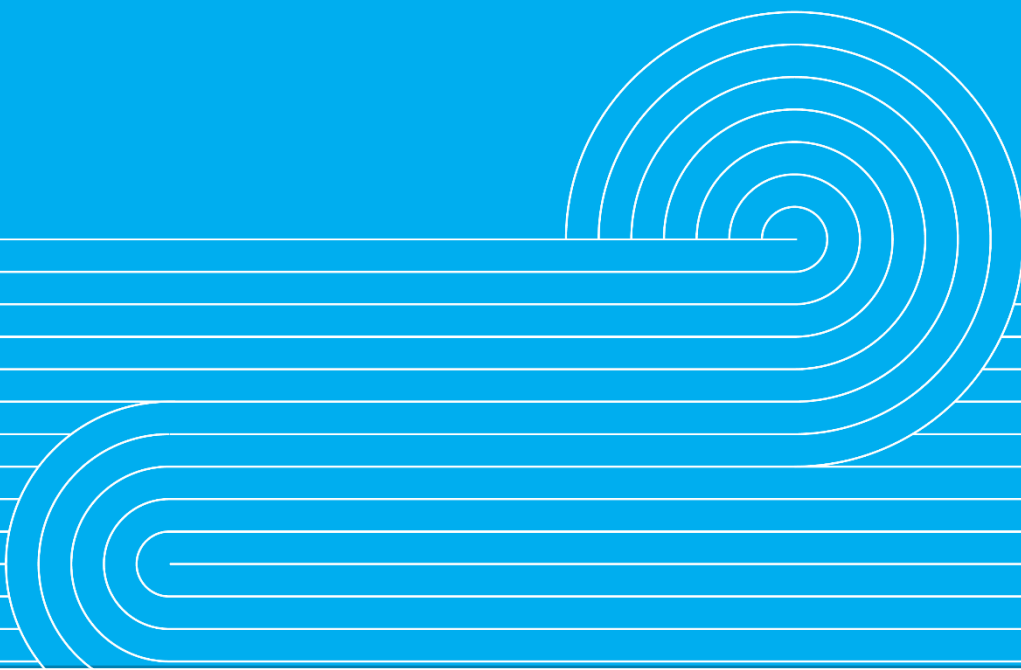
- Preparedness for managing space weather events
- Black Start test planning
- Managing rolling outages during a Security of Supply event
- SFT testing component of the SCADA EMS environment refresh

We will continue to work with the Authority, and industry as needed, to enhance transparency and stakeholder confidence, using our System Operator specific risk framework.

10.3.1 Further opportunities

The 2025-26 System Operator Business Assurance Audit Plan identifies potential audit topics for 2026-27 and 2027-28 to prioritise valuable areas and schedule audits effectively.

11 Performance metric and monitoring



11.1 Performance metrics 2024-25

For the 2024/25 year, the performance measures were updated to encompass seven high-level outcomes that the Authority wants the System Operator to prioritise.

The scores for each of the seven-high level outcomes are determined using both quantitative and qualitative components.

The quantitative component is influenced by one or more performance metrics. The relationship between the metrics and outcomes, along with the weight each metric carries towards each outcome, is agreed annually by the System Operator and the Authority prior to the beginning of the financial year.

The qualitative component is evaluated annually, at the end of each financial year.



Future performance metrics need to be informed by the System Operator Strategy work currently being undertaken by the System Operator. The strategy will connect the investment required to the needs of the System Operator, the industry, and the Authority, which in turn will inform the focus areas required and performance metrics to measure how well we meet those needs. The strategy will include consideration of a long-term horizon to ensure that our short-term goals and metrics are aligned with and enable our longer-term direction.

11.1.1 Outcome score

The System Operator and the Authority have finalised and agreed the Performance Metric and Incentive Agreement outcome score for 2024/25 as follows:

New security and reliability risks are identified and appropriately managed	4.22 O1 Score
Significant events are appropriately scoped, understood, prepared for and managed	4.64 O2 Score
The Authority is supported to evolve and develop the electricity market and power systems	4.27 O3 Score
Relevant market information is made accessible to stakeholders	4.38 O4 Score
Stakeholders are effectively informed on and included in decisions where relevant	4.21 O5 Score
Stakeholders are satisfied with our service	4.57 O6 Score
SOSPA delivery provides value	4.55 O7 Score

Score	Level of performance
1	Poor/unacceptable performance, requires focused improvement
2	Partially meets requirements, some improvement needed
3	Performance of all requirements in line with requirements of the Code and SOSPA
4	Exceeds some aspects of what is required by the Code and SOSPA
5	Consistent delivery of exceptional performance of (or beyond) what is required by the Code and SOSPA

Overall Outcome Score	Performance % Score
4.40	80%

11.1.2 Performance Metrics

Risk register has been updated and tested externally with the Authority and widely among industry participants	4 PM1 Score	On time delivery of significant event reports	4 PM7 Score	Average score from stakeholders on their perception of SO impartiality	5 PM13 Score
% of SMART actions from the control self-assessment with maturity ratings of 1 or 2 will be addressed by the planned due date	4 PM2 Score	Average satisfaction score from stakeholders, as per responses received to transactional surveys taken at forums an...	5 PM8 Score	Number of thought leadership publications on specific areas of system operator work that affect and/or are of interest to the industry	5 PM14 Score
At least one pan-industry event exercise held to test existing controls	5 PM3 Score	All categories of stakeholders are actively engaged by the system operator throughout the year	2 PM9 Score	# of SO Industry Forums held	5 PM16 Score
% of actions from industry exercises which were completed on time	N/A PM4 Score	% of industry submissions, made in response to system operator consultations, which are responded to	5 PM10 Score	% of key SOSPA documents delivered on time to the Authority	5 PM17 Score
Average score of internal process assessments arising from significant events	5 PM5 Score	Stakeholder engagement in project delivery	3 M11 Score		
Percentage of actions from significant events which are closed on time	5 PM6 Score	Average satisfaction score from stakeholders from Annual Survey	5 PM12 Score		

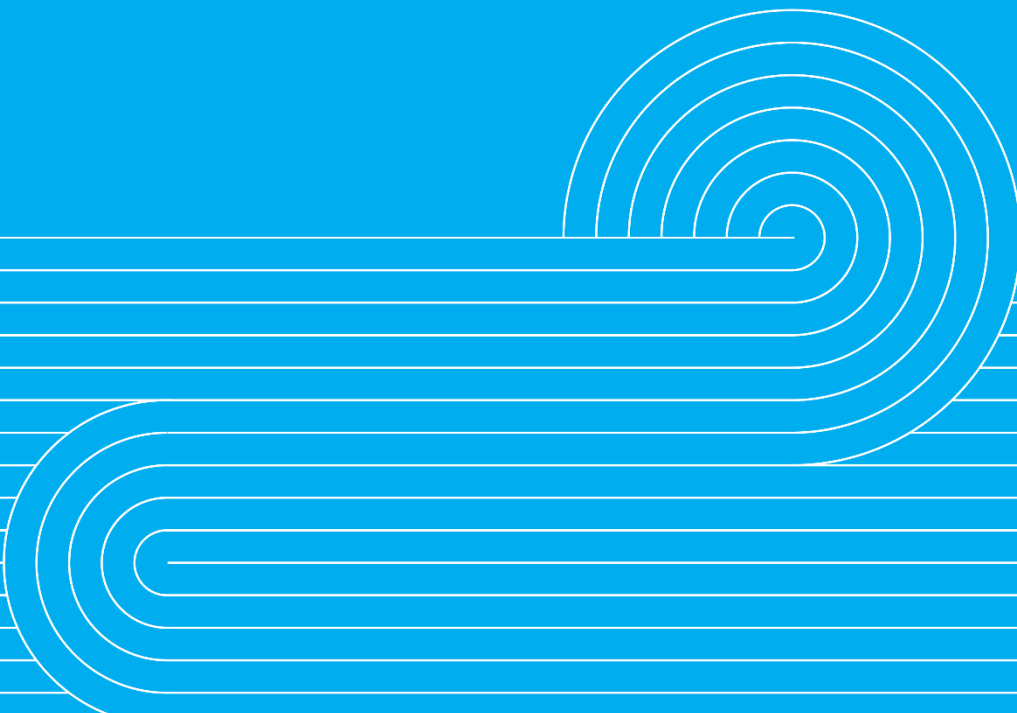
11.1.3 Further opportunities

- We will complete full review of the Performance Metrics in 2025/26 to ensure the measures and outcomes best align with the needs of the industry, the Authority and the System Operator.

11.2 Financial performance

In accordance with previous self-reviews, the 2024/25 financial performance of the System Operator will be submitted to the Authority once the accounts have been audited and subsequently approved for release.

12 Appendices



APPENDIX 1: EDUCATION AND ENGAGEMENT PLAN

Activities 2024-25					
Whole system leadership	Thought leadership publications / white papers	Presentations at, and participation in, industry forums, including FlexForum and Future Networks Forum.	Presentations at conferences, eg CIGRE, IEEE, Energy Trader Forum	Regular industry discussions.	Updates on current work within the Authority monthly report published on the Electricity Authority website.
	- Evolving market resource co-ordination - Winter 2024 Review - Quarterly Security of Supply Outlook	Presented at the ENA FNF Innovation Forum on "How system operations <u>is</u> changing, what we're experiencing and what we think will happen. Covering changes in the power system, regulation, industry role, and expectations for our role - and how we are planning to meet them." A member of the member of the ENA FNF 'Roles and Functions' project'.	Presented out quarterly Security of Supply Outlook at the Energy Trader Forum in December and April	- Electrical Industry Space Weather Working Group (EISWWG) - Electricity Networks Aotearoa (ENA) Future Networks Forum (FNF)	Regularly reviewed any new or additional information would be of use to report. Began including redacted information that was pertinent to the Authority be not appropriate for public release.
Relationship management*	Meeting with new and existing participants.		In-person workshops.		
	We regularly engage with market participants, particularly in the commissioning and ancillary services space. This includes scheduled meetings, collaborative workshops, and targeted discussions to ensure alignment on operational requirements, service delivery expectations, and evolving system needs.		- Partook in the Transpower (lead by Grid Owner) Outage Planning Forum - AUFLS Transition - Quarterly Meetings		
Fortnightly SO industry forums	Extended industry forums (as applicable), eg industry preparation for winter.		Simulation exercises, paper-based and using the System Operator tools.		
	28 Industry forums, including: - Winter preparedness focused forum on 29 April - ESO101 extended forum on - Difference Bid Refresher Winter 2025 on 6 May		- Black Start Exercise – Small event exercise on 18 February - Rolling Outage Exercise – Pan-Industry exercise on 8 April		
Training	Restoration exercises.	Digital/online resources and education tools.	Engagement to increase understanding of the key technical tools and concepts that materially impact market outcomes.		Specific project-related communications for existing and new projects.
	Black start testing - Aviemore Power Station, November 2025 - Clyde Power Station, May 2025	Updated and released new content including: - New SPD101 - Updated ESO101 - New Commissioning Process animation - New SO Generation Commissioning Guideline - Updated Generation Connection Guide	4 March 2025 Industry Exercise Rolling Outage webinar - this covered industry processes for an extended electricity supply shortage 6 May 2025 Difference Bid Refresher - covered Peak Demand Management Vs Rolling Outage Peak, Code obligations, policy changes and the how, what, when and whys of difference bids.		- Launched targeted Operations Customer Portal update emails via Mailchimp to centralise communications and track engagement for maximum impact. - Presented at the Distributor Forum on changes to the Customer Portal
Newsletters	Weekly market insights.		System Operator content in the <i>News From Transpower</i> monthly newsletter		
	We published 50 market insight papers, which were well-received by the industry. Feedback from our Connected Survey and direct engagement highlighted the value of these insights, particularly during the dry year response, when they proved to be a highly useful resource for stakeholders. A total of 117,436 emails were sent with an 23% audience growth over the <u>12 month</u> period.		Each month, we curate key updates for inclusion in the wider Transpower newsletter, covering upcoming and current consultations, events, and significant developments within the System Operator.		

*This includes (for example) as participants commission and test assets, contract ancillary services, integrate new technologies and participant models, and challenge tools, processes and rules through innovation.

APPENDIX 2: OBLIGATION TO SELF-REVIEW PERFORMANCE

This report is Transpower's review of its performance as system operator from July 2024 to June 2025, in accordance with clauses 7.11 of the Electricity Industry Participation Code 2010 (the Code):

7.11 Review of performance of the system operator

(1) No later than 31 August in each year, the **system operator** must submit to the **Authority** a review and assessment of its performance in the previous 12-month period ending 30 June.

(2) The self-review must contain such information as the **Authority** may reasonably require from time to time to enable the **Authority** to review the **system operator's** performance during the period in relation to the following:

- (a) the **policy statement**:
- (b) the **security of supply forecasting and information policy**:
- (c) the **emergency management policy**:
- (d) the joint development programme prepared under clause 7.7(1):
- (e) the work programmes agreed with the **Authority** under the **system operator's market operation service provider agreement**:
- (f) the **system operator's** engagement with **participants**:
- (g) delivery of the **system operator's** capital and business plans:
- (h) the financial and operational performance of the **system operator**



Meeting Date: 23 October 2025

**SYSTEM OPERATOR PERFORMANCE:
1 JULY 2024 – 30 JUNE 2025**

**SECURITY
AND
RELIABILITY
COUNCIL**

This paper provides the SRC with a copy of the system operator's annual self-review and requests the SRC's advice to help inform the Authority's corresponding review.

1 Background to annual reviews of the system operator's performance

- 1.1.1 The Security and Reliability Council's (SRC) functions under the Electricity Industry Act 2010 include providing advice to the Electricity Authority (Authority) on:
- the performance of the electricity system and the system operator
 - reliability of supply issues.
- 1.1.2 The SRC was given a specific mandate for system operator performance because of the information asymmetry that arises between the Authority and the system operator. As a group with industry and consumer representation, the SRC can bring perspectives to the system operator's performance otherwise unavailable to the Authority.
- 1.1.3 The Electricity Industry Participation Code 2010 (Code) requires the Authority to review the system operator's performance each year. In doing so, it must take account of a self-review that the system operator must perform each year under the Code.¹
- 1.1.4 The system operator has completed its self-review of its performance for the 2024/25 financial year, and the Authority is currently drafting its corresponding review.
- 1.1.5 The SRC's advice is invited by the Authority regarding the system operator's performance in the 2024/25 year. To inform that advice, attached to this paper is a copy of the system operator's annual self-review.

2 Context – previous SRC advice

- 2.1.1 To provide context to this year's review, the SRC's comments and advice to the Authority regarding the system operator's self-review for 2023/24 were:
- a) Overall, we have a high performing system operator
 - b) The Authority should reinforce the need for looking at areas of improvement. The SRC appreciates the level of detail presented but would prefer to see overall direction described by the system operator with clear actions to drive improvement. This could include information on steps to ensure qualified, capable staff and good data analysis.
 - c) The Authority should note some areas of improvement have been highlighted, and continue to encourage system operator to identify areas for further improvement
 - d) The SRC strongly reinforces its previous advice that the Authority should consider an external review or periodic audit for the system operator. The Authority should set terms of reference for such an external review, using the 9

¹ Clause 7.11 of the Code specifies the requirements of both the system operator and the Authority in reviewing the system operator's performance.

objectives noted in the Authority's SOSPA presentation at the SRC's August meeting

- e) The SRC encourages the Authority to continue to work with system operator to refine communications issues and responsibilities during events, with overarching thinking on maintaining public confidence in the system
- f) The SRC commends the system operator for the industry forums it is providing
- g) The SRC is pleased to see a system operator-centric risk matrix in place
- h) The system operator relies on good information disclosure from participants for effective management, and should be clear about when and where it needs more information
- i) The system operator noted the time it takes to assess and model new technology connections. The system operator should work with the Authority to accelerate this process.

3 A point to note

- 3.1.1 In line with previous SRC advice, there are sections on opportunities to improve and lessons learned. The SRC may like to consider whether these meet expectations and if not, what further content would be appropriate.

4 SRC feedback

- 4.1.1 The Authority appreciates feedback from SRC members on any aspects of system operator performance that they may wish to comment on, even if it is not included in either the system operator's self-review, or the Authority's review.
- 4.1.2 The SRC's advice to the Authority on this matter is valuable, as evidenced by SRC advice over the years typically being adopted as recommendations into the Authority's annual reviews.

5 SRC function and role

- 5.1.1 To support the SRC's preparation, the below list sets out how the SRC fulfils its function by providing advice to the Authority on:
 - a) the system operator's performance including against its principal performance obligations, security of supply function and any other function of the system operator important to the performance of the electricity system and/or to reliability of supply
 - b) system operations issues, including industry development needs and priorities relating to system operations
 - c) security of supply issues, including system security assessments and security of supply forecasts
 - d) reliability of supply issues, including planned and unplanned loss of supply and quality of supply issues
- 5.1.2 SRC members are asked to consider whether the report highlights issues in any of these areas and consider what advice about this may be relevant for the SRC to give to the Authority.

5.2 Questions for the SRC to consider

5.2.1 The SRC may wish to consider the following questions.

- Q1** What aspects, if any, does the SRC wish to highlight of the system operator's performance as strengths or having markedly improved?
- Q2** What concerns, if any, does the SRC have about the performance of the system operator?
- Q3** What aspects, if any, of the system operator's functions would the SRC like the system operator to give greater weight to in its dealings with stakeholders?
- Q4** What further information, if any, does the SRC wish to have provided to it by the secretariat?
- Q5** What advice, if any, does the SRC wish to provide to the Authority?

6 Attachments

6.1.1 The following item is included as an attachment to this paper:

- System operator annual self-review and assessment: 1 July 2024 – 30 June 2025. Pages 2-7 of this document contain an overview and the SO's actions to address recommendations from the previous annual review.