

SECURITY AND RELIABILITY COUNCIL

AGENDA

Meeting number: 55

Venue: Runanga room, Electricity Authority, level 7, 1 Willis Street, Wellington

Time and date: 8.30 am until 4.00 pm, Wednesday, 20 May 2026

Item / Description	Start time	Length (mins)	Paper Author	Paper	Presenters/ attendance
1 Attendance and apologies	8.30	5	-	-	-
2 Changes to disclosure of interests			-	-	-
3 Members-only session	8.35	15	-	-	-
4 Minutes of previous meeting	8.50	10	-	Y	-
5 Correspondence			-	Y	-
6 Action list, updates & tracker	9.00	20	Secretary	Y	-
7 Security of supply update	9.20	40	EA/SO	Y	EA/SO
8 Wrap-up: on SoS update	10.00	10	-	-	-
Break	10.10	10			
9 Impact of fuel shocks	10.20	60			Andrew Renton / Ramu Naidoo
Navigating NZ's energy transition: maintaining grid stability					
10a Grid stability - 101	11.20	30			System Operator
10b Electricity Authority					Sheila Matthews
10c System Operator	11.50	80			Katherine Moore
10d Australian lessons					Nilesh Modi
Lunch	1.10	20	n/a		Catered
10e Panel discussion	1.30	75			All
10f Wrap-up on grid stability	2.45	10			
11a New secretariat arrangement	2.55	5			Secretary
11b 2026 Gas market report	3.00	15	Concept Consulting		Simon Coates
11c Electricity price forecast	3.15	15			David Weaver
11d Generation pipeline	3.30	10			James Innes
12 Risk radar	3.40	15	secretary	Y	
13 Next meeting + 2026 programme	3.55	5			
Meeting finishes	4.00				

SECURITY AND RELIABILITY COUNCIL

MINUTES

Meeting number: 54

Venue: Frankton, 9.00am until 4.00pm, 23 February 2026

Members Present

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

In attendance

Name	Title	Agenda item(s) attended
<u>Electricity Authority (Authority):</u>		
Sarah Gillies	Chief Executive	Items 9, 10
Hayden Glass	GM, Wholesale and Supply	Items 7, 9, 10
Sam Edens	Quantitative Analyst	Item 7
Julia Hall	Manager, Market Intelligence	Item 7
Natalie Bartos	Manager, Wholesale & Supply	Items 7, 11, 12
<u>Other attendees:</u>		
Rebecca Osborne	Head of Market Services, Transpower	Item 7, 9, 11, 12
Ramu Naidoo	Market Operations Manager, Transpower	Item 7, 9
Tracey Kai	Chief Executive, Electricity Networks Aotearoa	Item 9
Tyler Byers	Stragey Adviser, Transpower	Item 12
James Flannery	General Manager Strategy, Contact Energy	Item 9
Tim Boyce	Head of Wholesale Markets, Contact Energy	Item 9
Roger Sutton	Principal Strategy Advisor, Deta Consulting	Item 9
John Kidd	Director, Enerlytica	Item 9
Alan Young	Associate Director, Enerlytica	Item 9
Tamara Linnhoff	Manager, Electricity Generation, Infrastructure and Markets, MBIE	Item 10
Matt Spake	Senior Policy Advisor, MBIE	Item 10
Maria McInerney	Reliability Analytics Manager, Powerco	Item 10
Adam DuFall	Head of Environment, Powerco	Item 10

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 54th meeting of the Security and Reliability Council (SRC). A quorum was established.
- 1.2. The Chair noted Nanette Moreau, Andre Botha and Steve Duggan and Allan Miller attended remotely.

2. Changes to disclosure of interests

The Chair reviewed the interests register.

- 2.1. The secretariat noted a change to interests for Ben Gerritsen and the Chair.
- 2.2. There were no further changes disclosed. The Chair approved members to act despite those declared interests.

3. Members-only session

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

Jeremy Cain left the meeting at 9:05am, rejoined the meeting at 9:20am.

4. Minutes of previous meeting

- 4.1. Members discussed the minutes of the 23 October 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 10 November sent to the Authority, the Authority's letter of reply dated 19 December and the SRC's email of 8 October to presenters on the inverter standards item at the 23 October SRC meeting.
- 5.2. Member comments included:
 - i. Noting Authority progress modernising inverter standards for low voltage DG and its involvement in and support for work by the EEA and EECA.
 - ii. Authority intention to start a dialogue with the sector on flexible export limits in 2026, with the objective of supporting a more efficient, secure and resilient network including through requirement to install smart inverters.

6. Action list and updates

- 6.1. Noted sector updates including currently strong hydro / coal reserves and LNG developments.
- 6.2. Discussed actions tracker, provided feedback to secretary to address and agreed to discuss tracker at the mid-period meeting.

Action 1: Secretary to address feedback on tracker and add to mid-period meeting agenda.

7. Joint Security of Supply update

- 7.1. The respective Authority and System Operator (SO) staff presented the security of supply update.
- 7.2. The February 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. At a headline level – strong hydro / thermal fuel storage, low prices over summer with no simulated storage trajectories crossing the watch curve. This comparatively good position (relative to 2024 and 2025) is due to improved hydro storage and a better thermal fuel position as well as commitment of a third Rankine, new generation commissioning (in particular geothermal). Noted regulatory initiatives.
- 7.4. In discussion with presenters the SRC:
 - i. Queried plant type for solar projects – whether fixed configuration or tracking and if tracking, what path. Noted significant difference in seasonal output for different plant types depending on latitude. This is of interest to the SRC in terms of solar's combined contribution to energy over the winter period, rather than the whole year.
 - ii. Queried inclusiveness of generation and offtake projections. Noted that limiting to grid connecting generation / offtake misses a huge amount of activity. Observed that it was unclear whether any or all embedded generation / offtake is included in projections and that:
 - ideally projections would be inclusive of embedded plant, but
 - Should, at a minimum, be clear about what is / isn't included
 - iii. Queried degree of coincidence of new offtake (data centre, heat etc) with peak demand. Very important to understand this for both network capacity and generation. Links to discussion about intermittency.
 - iv. Discussed basis for thermal fuel forecasts, for example, assumptions about gas availability, storage and industrial DR contingency (Methanex).
 - v. Noted:
 - The situation is less acute than prior two years but system remains very tight.
 - Less thermal capacity so need to run thermal sooner each year to generate equivalent GWh to prior years and importance of acting early if hydro storage / inflows decline, noting Earth Sciences outlook for low rainfall in major catchments over the next quarter.

- vi. Increasing single-plant risk as thermal fleet diminishes and ages. Noted value of committing to maintenance of third Rankine unit, and coal reserves.
- vii. Discussed how solar nameplate capacity (and intermittent generally) translates into energy / capacity through the day and year. That solar (and wind) is reasonably predictable at a seasonal level, but much less so intra-day or day to day. Noted SO programme of work to improve sophistication of planning and forecasting.
- viii. Discussed increasing need to constrain intermittent generation on and off for grid stability reasons and how stability can be impacted when intermittent released into market. Discussed need for better tools (SO) to manage intermittency and noted:
 - 100MW solar last year, 300MW today, 1000MW next year.
 - Seeing 300MW drop off in wind within half-hour period
 - Need for SO to have appropriate / better tools to understand and manage fluctuations in intermittent production
 - Noted work underway by the SO to improve understanding of grid strength and stability as intermittent grows as a proportion of total generation.

Hayden Glass, Natalie Bartos, Sam Edens, Julie Hall, Rebecca Osborne and Ramu Naidoo left the meeting at 10:25am.

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.
- 8.2. Noted increasing value of this agenda item and clear evidence of information sharing and collaboration between Authority and SO teams.

Sarah Gillies, Hayden Glass (Authority), Rebecca Osborne, Ramu Naidoo (SO), James Flannery, Tim Boyce (Contact Energy), Roger Sutton (Deta consulting), John Kid, Alan Young (Enerlytica) joined the meeting at 10.:40am

9. Theme: declining natural gas production

- 9.1. The chair introduced the item and welcomed presenters from Enerlytica, Contact Energy and Deta Consulting.
- 9.2. Enerlytica presented on recent developments with domestic gas production and the potential for LNG imports. The presentation highlighted:
 - i. the potential for extreme volatility in gas markets over the coming 12-18 months.
 - ii. Domestic production is in terminal decline, with a per-month decline of 1-2% across the 'big-six' producers.
 - iii. Methanex continues to play a critical balancing role, as it has for ~2 decades, however it is unclear how long this can continue for.

- iv. The high scenario for domestic natural gas production is still too low to meet domestic demand.
 - v. Potential for LNG to soften the impact of declining domestic production and to play a bigger role than 'just' dry year cover, and for global LNG oversupply to drive prices down
 - vi. Noted NZ would be a taker (for plant and LNG price) so needed to ensure compatibility with preponderance of LNG transport and regas plant on the world market. Suggested global oversupply could see landed LNG prices fall but prices would be volatile and subject to geopolitical risk.
- 9.3. Deta presented on potential for gas to electricity / other fuels, what is being observed in the market and impediments to conversion from gas. The presentation highlighted:
- i. Mapping shows 3000MW of boiler capacity across New Zealand, comprising approximately 25% of industrial gas demand
 - ii. Earlier forecasts that this would halve in the five years to 2030 (as firms respond to decarbonisation pressure, incentives (government investment in decarbonisation or 'GIDI' fund), energy security risk and carbon pricing) have not materialised.
 - iii. While some conversion is occurring, high electricity prices, low carbon prices, average electricity emissions factors and withdrawal of the GIDI fund all impede conversion.
 - iv. Suggested there is a good 'NZ inc' case for retaining thermal boilers when converting so these could be operated and reduce demand in tight supply situations. Noted this often not attractive to customers (for environmental and commercial reasons, including disadvantage caused by average emissions factors for electricity) but a good case for doing so in some cases and a need to support this outcome.
 - v. Concerned customers are burying their heads in the sand - as still able to access gas, no sense of urgency and a growing perception the government will come to the rescue with LNG.
- 9.4. Contact Energy presented its views of the gas market, its evolving generation portfolio and outlook for the electricity market. The presentation highlighted:
- i. Contact's last baseload gas plant, TCC, has been retired (so gas requirements are reduced) but remains nervous about the gas outlook.
 - ii. TCC retirement has freed up gas for residential and other users who don't have the ability to flex or convert from gas. Noted expense involved for residential consumers to convert from gas, that this likely out of reach for the average consumer.
 - iii. Main investment focus is on renewables and batteries, with a mix of new geothermal, enhancing existing and potentially new hydro, solar and wind.

- iv. See need for greater flexibility in use of contingent hydro storage, think LNG is about more than dry-year insurance but concerned about impact on existing 'insurance assets' such as Whirinaki.
 - v. Expressed sympathy for customers 'burying heads in sand', the lack of a clear energy policy / strategy complicates decision making for all parties – not just in relation to gas / LNG but in general.
- 9.5. A wide ranging and energetic panel discussion with presenters:
- i. Noted the striking contrast between the bleak production outlook (Enerlytica) and lack of awareness / action by commercial and small industrial users to convert to electricity / alternatives.
 - ii. Noted reliance on gas powergen has reduced as new generation (in particular geothermal) comes online but, retirement of CCGT plant means thermal capacity is as much a problem as gas shortages.
 - iii. Discussed concern that ongoing policy debate about and uncertainty over the role of LNG and recovery of LNG terminal costs will be recovered as these incentives to invest in security and reliability.
 - iv. Discussed value of flexibility and the growing opportunity provided by DER. However, remonstrated about commercial / technical / regulatory impediments to realise value offered by DER. Agreed on need for join up between regulators, in particular the Commerce commission and Authority.
 - v. Expressed doubt that LNG will be in-market by winter 2027. Discussed that in setting the expectation LNG will be in-market we create uncertainty cost and risk complacency and inertia.
 - vi. Discussed the economics of LNG – both fuel only and 'all-in' infrastructure plus fuel. Speculated that global over-supply might lead to fall in LNG prices but on an all-in basis, LNG may be less economic than diesel or black pallets (torrefied wood).
 - vii. Discussed need to plan security of supply for a no-LNG scenario in 2027 (or at all) and to encourage a range of fuel and energy options. Noted lack of natural gas in the South Island had led to more sophisticated energy choices, with a mix of coal, gas, electricity, diesel and biomass used and on-site back up.
 - viii. Expressed concern that a lack of leadership combined with elevated sovereign risk is impacting investment efficiency across the board. Discussed the need for a national energy policy and strategy and an electrification strategy and plan that industry (suppliers and users) can work to and communicate clearly to customers / the public.

Sarah Gillies, Hayden Glass (Authority), Rebecca Osborne, Ramu Naidoo (SO), James Flannery, Tim Boyce (Contact Energy), Roger Sutton (Deta consulting), John Kid, Alan Young (Enerlytica) left the meeting at 1:00PM

Wrap-up discussion on declining gas production

- 9.6. 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.

Action 2: write to regulators outlining the need for inter-regulator coordination to help realise value offered by DER.

The SRC broke for lunch at 1.10pm

Sarah Gillies, Hayden Glass (Authority), Tracey Kai (ENA), Tamara Linnhoff, Matt Spake (MBIE), Maria McInerney, Adam DuFall (PowerCo) joined the meeting at 1.35pm

10. Tree regulations

- 10.1. The Chair introduced the item and welcomed the presenters from MBIE, the ENA and Powerco.
- 10.2. The presentations and points of discussion included:
- i. 80% of outages during severe weather events and 25% of all power outages are caused by trees contacting power lines.
 - ii. Tree damage, particularly during severe weather events, often results in very long duration outages and presents safety risk for field crews seeking to restore power.
 - iii. The cost to consumers of inadequate vegetation management and tree related outages and loss of service are significant:
 - \$70m per annum for distributors to trimming / cutting trees (borne by electricity consumers). This cost is increasing year on year..
 - plus the cost to restore service and remediate network damage (estimate not provided to SRC)
 - plus the cost of lost service, estimated at \$470m for one extreme weather event (Cyclone Gabrielle), 80% of which can be attributed to trees contacting power lines
 - iv. The cost to consumers, both residential and business, is likely to increase:
 - as the frequency of severe weather events increase. Note: a separate presentation by the SO highlighted weather events now cause the majority or large and very large loss of supply events, with Cyclone Gabrielle the single largest event.
 - as forest planted on converted farmland mature (grow taller) and encroach on powerlines (which mostly predated forestry planting), a major and increasing cause of supply loss in severe weather events.
 - reliance on electricity, and therefore the cost of non-supply, by residential, commercial and agricultural users is increasing.
 - v. MBIE is currently undertaking a closed consultation on revisions to tree regulations to give effect to policy decisions by Cabinet in 2025. This is described as “phase two” of MBIEs tree regulation reform initiative.

- vi. Distributors (and the ENA) acknowledge effort by Government to address concerns while balancing competing interests. However, while any change is welcome, distributors are disappointed – as they do not think the balance has been struck, noting that:
 - Distributors (and therefore electricity consumers) will continue to bear most of the financial burden of action or inaction by tree-owners.
 - The proposed regulations provide little incentive for tree-owners to mitigate those burdens as they are – mostly – able to externalise the costs their actions create onto distributors and in turn electricity consumers.
 - There are workability concerns about the risk assessment distributors are required to take before trimming or cutting trees.
- vii. While this was a constructive discussion and SRC welcomes reform to tree regulations, it is disappointing that phase two of tree regulation reform appears to have left fundamental problems unresolved necessitating a phase three.

Sarah Gillies, Hayden Glass (Authority), Tracey Kai (ENA), Tamara Linnhoff, Matt Spake (MBIE), Maria McInerney, Adam DuFall (Powerco) left the meeting at 2:50PM

Wrap up on tree regulations

- 10.3. 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.

Action 3: secretary to prepare letter to MBIE/Minister.

Rebecca Osborne, Ramu Naidoo and Tyler Byles (SO) joined the meeting at 3:00PM

11. SOSFIP review outcomes

- 11.1. The Chair introduced the presenter, linking this presentation to prior briefings by the SO and noting impending decision on the SOSFIP review by the Authority.
- 11.2. The presentations and points of discussion included:
 - Increase to the buffer to account for Waiau catchment low constraint range, up to 103 GWh
 - Clarified that it can only bring forward (not delay) contingent storage access
 - Noted the 'Tekapo shadow constraint' has been addressed, with the change expected to be in place by 1 May.

12. Early view of SO strategy

- 12.1. The Chair introduced the presenter, linking this presentation to prior request by the SO to discuss its new approach to strategy setting with the SRC.

12.2. The presentations and points of discussion included:

- Shift from annual refresh to multi-year review linked to SO service provider agreement (SOSPA) contract reset.
- Aim to lift focus and time horizon, think more about system operations generally than the SO's current role and do more to involve stakeholders in strategy formation.
- Current strategy, which has a ten year horizon and is intended to inform next SOSPA reset, contains several macro themes relating to system operation challenges.
- Intent for an in-depth discussion with SRC before the quarter two SRC meeting as part of the SO consultation with relevant stakeholders.

Action 4: secretary to set up in-depth session.

13. Risk radar

- 13.1. The Secretary presented a refreshed view of system performance and security of supply risk.
- 13.2. Members provided feedback to that the Secretary will address ahead of the next SRC meeting.

Action 5: Secretary to account for members' feedback.

14. Purpose and scope of next meeting

- 14.1. The Chair led a discussion on the purpose and scope of the Q2 2026 meeting (May) and the outlook for the remainder of 2026.

The meeting ended at 4:00pm

**SECURITY AND
RELIABILITY
COUNCIL**

10 March 2026

Erik Westergaard
Acting Chair, Electricity Authority
Electricity Authority
PO Box 10041
Wellington 6143

Dear Erik,

Advice from 23 February 2026 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, the system operator, and reliability of supply issues.

Thank you for the Authority's response to the SRC's 10 November 2025 advice. The SRC is encouraged by your actions with EECA modernising inverter standards for small scale DG and plans for flexible export limits.

The SRC is disappointed that reform of tree regulations appears to miss the mark, allowing commercial forest owners to externalise the cost of their action/inaction to electricity users. Those costs are significant and increasing and weigh on the wider economy.

We are concerned to ensure the System Operator has the tools needed to safely integrate the large increase in solar generation.

The February SRC meeting

The February SRC followed the Government announcement that New Zealand would procure LNG importation facilities with the objective of meeting dry year risk. While having more fuel supply options should improve system security and reliability, the SRC strongly encourages the Authority and participants to plan on a no-LNG scenario and to avoid complacency.

There is a strong expectation that LNG facilities will not be operational until 2028 at the earliest, and a possibility remains that LNG will not proceed. Developments in the Persian Gulf since the February meeting bring reliability and cost risks into focus.

The focus of the February SRC meeting was two-fold, with in-depth discussion of:

1. the implications of declining gas production for the electricity system
2. efficacy of current, and proposed reforms to, tree regulations.

In addition, SRC received:

- a joint security of supply briefing from the Authority and System Operator:
- a briefing from the System Operator on its SOSFIP and strategy reviews.

The SRC acknowledges and thanks all the presenters to its February meeting.

Advice

This letter summarises the SRC's February meeting and its recommendations to the Authority. Our recommendations are to:

1. **prioritise** regulatory enablers for the safe integration of scale solar into the electricity system. Utility-scale solar grew 300% last year and is forecast to repeat that in 2026, reaching 1GW installed capacity.
2. **accelerate efforts to improve** visibility of embedded generation and demand and account for this in system planning and forecasting.
3. **counter and resist** complacency over gas decline. Indigenous gas is in terminal decline; ignoring this risks very serious consequences for energy users and puts at risk the performance and reliability of the electricity system and economy.
4. **proactively engage with the Government** on the need for and formulation of a clear, coherent and converged national energy policy.
5. **advocate for electricity consumers** on tree regulation reform. Current reforms do not go far enough and expose electricity consumers to growing costs and risks associated with the choices made by forestry operators and other tree owning entities. This is an ongoing and worsening issue.

The recommendations above are primarily to the Authority. However, the SRC intends to convey its recommendations on gas supply and tree regulations directly to Minister Watts.

1. Security of supply outlook

The February 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.

In discussion with presenters, SRC noted:

- the positive spring energy situation, with strong spring inflows, large coal stockpiles, moderate gas stores and indications the regulatory approvals will be forthcoming for the agreement to preserve a 3rd Huntly Rankine unit and coal stocks.
- the security of supply situation is less acute than 2024 and 2025 but remains tight. In particular, retirement of TCC (Taranaki combined cycle) leaves New Zealand short of long-duration thermal generation and exposed to plant failure. This is a plant (not fuel) risk that necessitates running thermals earlier if hydro storage / inflows drop.
- implications and risks associated with the ten-fold increase in utility scale solar over three years, reaching 1000MW in 2026. Agreement on the urgency of providing the system operator with the tools to plan and manage system capacity and stability.
- noted continued maturation of generation and demand forecasts. Emphasised the need to build on this including accelerating transparency over embedded plant, noting importance of both to capacity and stability management, and generally improving understanding of demand and supply changes.

- the risk of complacency. 2026 risk may be less acute than the last two years, but medium-term risk remains elevated, enduring seasonal risks persist and new risks exist, including from reducing thermal capacity and increasing intermittency.

The SRC discussed the value these joint updates provide, noting a tangible improvement in engagement, quality of information provided and evidence of growing collaboration between Authority and system operator teams.

The SRC recommends the Authority:

1. **prioritise regulatory enablers** for the safe integration of scale solar into the electricity system. Utility-scale solar grew 300% last year and is forecast to repeat that in 2026, reaching 1GW installed capacity.
2. **accelerate efforts** to improve visibility of embedded generation and demand and account for this in system planning and forecasting.

2. Navigating NZ's energy transition: declining natural gas production

The SRC is focussing on gas supply because gas is an input to electricity production and electricity is a complement to and partial substitute for gas. The consequences of falling gas supply impact electricity system performance and reliability, including through:

- less and more expensive fuel for power generation, undermining its historical role in long-duration firming (dry year cover) and to a lesser extent peaking; while
- increasing electricity demand as gas users convert to alternative energy, including electricity; and
- impacting *some* electricity distribution networks, and the overall electricity transmission system as gas users convert to alternative energy, including electricity.

There is near consensus that indigenous gas production is in terminal decline. Whether that unfolds over five, ten or twenty years is not yet known. In contrast, it is increasingly clear we can expect increasing supply and price volatility, supply shortfalls and supply (wells fail, are decommissioned) and demand shocks (large users exit).

While drilling and other tactical initiatives should be pursued to limit economic damage, and LNG may play a role, none appear likely to alter the need for a transition away from gas for many or most current users. In contrast, SRC hear reports of large commercial and small-mid size industrial users 'burying heads in the sand' about gas supply decline and a sense of complacency that government would solve the problem.

However, increasingly evident is the need for clear, coherent and joined-up all-energy policy that factors in the interdependencies between and convergence of electricity, gas and liquid fuels. This would help participants, users and regulators plan for and navigate:

- an orderly management of gas decline, limiting economic and societal damage
- decarbonisation of electricity supply and efficient electrification of the economy.

In the absence of such policy clarity, New Zealand risks missing opportunities and sleepwalking into avoidable catastrophic energy crises.

The SRC recommends the Authority and government:

3. **counter and resist** complacency over gas decline. Indigenous gas is in terminal decline; ignoring this risks potentially catastrophic consequences for energy users, puts at risk the performance and reliability of the electricity system and economy.
4. **proactively engage with the Government** on the need for and formulation of a clear, coherent and converged national energy policy.

3. Reform of tree regulations

Electricity Networks Aotearoa (ENA), Powerco and MBIE presented to the SRC on the growing impact of poor tree management on electricity networks and users and steps currently underway to reform tree regulations.

While the SRC has not seen the exposure draft of new tree regulations the key provisions were introduced and critiqued by respective presenters. Based on presentations and discussion it was evident to SRC that:

- trees have a major impact on reliability of power supply - with 80% of power outages during severe weather events are due to trees contacting power lines
- the cost to electricity users of tree management and tree related damage is very material and include:
 - o lost service, likely to exceed \$100m per annum on average
 - o tree trimming / cutting costs, \$70m and growing per annum
 - o cost to restore power supply and remediate tree related network damage.
- those costs are increasing as forests on farm conversions grow, severe weather events increase and reliance on electricity increases.
- MBIE's 'phase two' reforms, while welcome, do not go far enough. ENA is concerned even after proposed reforms are implemented:
 - o distributors (and therefore electricity consumers) will continue to bear most of the burden of action or inaction by tree-owners
 - o tree-owners have little incentive to mitigate those burdens
 - o workability issues limit the benefits available from reforms.

The SRC recommends:

5. the Authority **advocate for electricity consumers** on tree regulation reform. Current reforms do not go far enough and expose electricity consumers to growing costs and risks.
6. the government **pursue further reform** to mitigate the growing cost of and risk to reliability of supply, in particular from commercial forestry and tree owning entities.

7. The SRC's next meeting

The SRC's Q2 (May 2026) agenda is still being finalised. The following themes are being considered:

- Integrating the large increase in solar generation while protecting grid stability.

- Winter 2026 plus gas supply outlooks.

Yours sincerely,

A handwritten signature in dark ink, appearing to read 'H Roy', is positioned below the closing 'Yours sincerely,'.

Hon Heather Roy
Chair of the SRC

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



8 May 2026

Hon Heather Roy
Chair
Security and Reliability Council (SRC)

By email: heatherjroy@gmail.com

Dear Heather,

Re: SRC advice from its 23 February meeting

Thank you for your letter of 10 March 2026. The Electricity Authority Te Mana Hiko (Authority) Board considered the SRC's advice at its 17 March 2026 meeting. This response reflects that consideration.

Prioritise regulatory enablers for the safe integration of scale solar into the electricity system

We are pleased to see this as an area of focus for SRC. The integration of grid-scale solar generation into power system has occurred at a rapid pace. It took several decades to reach 1GW of wind generation; the same level of grid-scale solar generation is expected to be achieved in less than three years. We are also aware of the rapid growth of balcony solar installations overseas, and the potential implications for the power system.

Ensuring the power system can manage an increasing share of intermittent, inverter-based and distributed energy resource is a strategic priority for the Authority. Our [Future Security and Resilience \(FSR\) programme](#) supports the transition to a system with significant inverter-based resource including how best to manage impacts on the power system, like grid stability challenges including system inertia and system strength.

The FSR programme is comprehensive and addresses the key challenges and opportunities of the transition, including increasing intermittency, a changing generation mix, declining system inertia, the adoption of new technologies, and evolving demand-side behaviour. We welcome the invitation for Authority staff to present at the next SRC meeting to discuss the programme, outline how we are working with the System Operator to address these challenges, and provide an update on progress and recent insights.

Accelerate efforts to improve visibility of embedded generation and demand

In May, the Authority Board will consider a decision paper on a proposal to collect information from distributors on distributed generation and load. Since developers are not all participants and distributors have pre-existing relationships with developers, approaching distributors could be the most efficient way to collect this information.

As distributors are facing significant changes to obligations, we are proposing that the data collection aligns with Part 6 obligations coming into effect on 1 December 2026. Aligning the implementation date of the information notice with the [Network connections project: stage one reforms](#) will be more efficient and allow a more reasonable time for distributors to develop their systems. Within this notice we provide for the sharing of data with the System Operator, with the aim of reducing inconsistencies across organisations, reducing regulatory burden, and improving efficiency.

We continue to investigate additional options for improving pipeline information. We are also exploring with MBIE legislative changes that would expand the Authority's powers to obtain information from non-participants.

Resist complacency over gas decline

We appreciate the SRC's insights on declining natural gas production. It is not the Authority's role to lead discussions on a transition away from gas or decarbonisation of the economy, but we acknowledge the impact that reduced gas production is having on industrial and commercial customers that rely on it.

The Gas Industry Co (GIC), as regulator for the gas sector, leads the discussion on the future role of gas, including in supporting electricity supply. The GIC has recently released its [gas supply and demand study](#), which models scenarios to cover both declining indigenous supply and use of supplemental LNG.

The role of the Authority is to ensure that the sector has the most up-to-date information and projections for fuel sources and generation plant at all times. We will continue to make changes that improve thermal fuel transparency, including working with the System Operator to ensure assumptions around LNG and gas in the Security of Supply Assessment (SOSA) are appropriate.

The System Operator has recently published the [draft 2026 SOSA](#) for consultation. The SOSA contains both very low and high gas supply sensitivities. The very low gas scenario assumes domestic gas only and that future drilling campaigns have no returns. The high gas scenario assumes availability of gas through an LNG import terminal. We consider these scenarios provide a useful projection of a wide range of potential gas scenarios.

With recent global events, the imported gas situation remains volatile, uncertain and complex. We are closely monitoring developments and will act where required to support the appropriate flow of information to and from the sector.

Proactively engage with the Government on the need for a national energy policy

While developing a national energy policy is not within the Authority's remit, we engage regularly with the Government on its priorities and expectations for the sector, and we are required to have regard to any Government Policy Statements on electricity.

We take a whole-system view to carrying out our work to administer the Code, promote market development, and inform and educate. We will continue to engage actively with the Government, for example, supporting MBIE's work to strengthen the current regulatory framework to manage dry year risk.

Advocate for electricity consumers on tree regulation reform

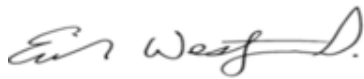
We acknowledge the SRC's continued concerns about the significant impact poor tree management can have on the reliable supply of electricity to consumers. We have received similar feedback from our regular engagements with the ENA and distributors.

We have strongly supported the need for reform of the 2003 regulations, including writing to MBIE previously in support of the SRC's advice and raising the topic when engaging with MBIE. We encourage the SRC to consider the exposure draft and provide any additional feedback.

Despite our support of reform, we do not possess regulatory levers to incentivise tree-owners or forestry operators to act nor to address any inaction. We believe the sector was given appropriate opportunities to give their evidence-based views on MBIE's proposed reform of the regulations, so it is now for the Government to decide whether further action is required and what form that may take.

Thanks again for the SRC's advice. The Board highly values the role SRC plays in contributing to the Authority's work.

Yours sincerely,

A handwritten signature in dark ink, appearing to read 'Erik Westergaard'.

Erik Westergaard
Chair (Acting)
Electricity Authority Te Mana Hiko

1 April 2026

Hon Simeon Brown
Minister for Energy
By email: s.brown@ministers.govt.nz

Dear Minister Brown,

Security and Reliability Council advice

The Security and Reliability Council is established under the Electricity Industry Act 2010 to provide independent advice to the Electricity Authority on the performance of the electricity system and system operator and on matters of reliability of supply. Members are appointed by the Authority for their technical experience and expertise in electricity system performance.

At its February meeting the Council investigated two important topical issues which we resolved to share our advice about with you. We hope you will find it helpful.

Tree Regulations

The SRC spoke with representatives from Powerco, Electricity Networks Aotearoa (ENA) and officials from MBIE about changes to tree regulations. As you are likely aware, inadequate tree management imposes large and increasing reliability risk and financial cost on electricity consumers.

It was clear electricity networks appreciate efforts by officials to reform the tree regulations but equally clear the reforms have not gone far enough. They leave insufficient incentive for responsible tree management by commercial tree owners and externalise the cost and risk of their actions/inaction to electricity consumers. Those costs and risks increase as recent forestry conversions mature, severe weather events increase and reliance on electricity grows.

The SRC provided advice to the Electricity Authority that these risks must be addressed. We encourage you as responsible Minister to work with officials and electricity networks to reduce the cost and risk described above, and improve accountability for institutional tree owners. For example, a 'quick win' could be to require commercial forest owners to bear the cost of tree maintenance to protect electricity lines.

Gas Supply

The Council also discussed the implications of New Zealand's declining natural gas supply. Gas is of special interest to the Council due to strong and increasing interdependencies with the electricity system; gas is a fuel for generation; electricity is a substitute for many gas uses.

In our March advice, the SRC recommended the Authority *proactively engage with the Government on the need for and formulation of a clear, coherent and converged national energy policy*. We hope this recommendation is acted upon by both the Authority and the Government.

We share below what the SRC heard from sector experts followed by several observations from the SRC:

1. domestic natural gas production is likely in terminal decline - whether over five or ten years, or longer, is not yet clear but we should expect increasing supply and price volatility and 'shocks' as wells fail and large users exit.
2. drilling, biogas and other initiatives (including LNG or increased underground gas storage) can soften these effects and 'buy time'; but are highly unlikely to enable a 'business as usual' scenario of low cost, abundant gas supply.
3. while very large gas users are reducing reliance on gas, we heard many smaller industrial and commercial users are burying their heads in the sand – in the hope the government will solve the supply problem.
4. large scale transition from gas to electricity and alternatives is a practically complex, and financially challenging undertaking that will take time. New Zealand has not planned for and is not prepared for this challenge; the risks of that unpreparedness grow with each passing month.
5. gas and electricity industry stakeholders seek clear and coherent policy and leadership from central government and regulatory agencies and to support their planning a 'path of least regret' and orderly transition as gas supply declines.
6. there are competing interests - and areas where shareholder interests and the public interest are not aligned; government has a key role mediating misalignment.

Regarding point 5, the SRC discussed where and how policy clarity and leadership from central government and regulatory agencies could enable the electricity and gas industries to get on with planning for an orderly transition – and is able to share these thoughts.

The SRC knows gas supply is an area of focus for government. We are not aware of such focus on the demand-side, preparing and planning for the physical transition from gas. This is especially concerning due to the risk of shocks, potential for a faster than forecast supply decline and the current tightness of the electricity system.

One of the SRC's roles is to flag future risks to the performance and reliability of the electricity system; we are concerned that declining gas supply:

- reduces fuel for peaking and firming generation while simultaneously increasing demand for electricity
- presents a serious risk to security of supply, potential for localised network stress and unnecessary costs, if not planned for and managed well
- these risks can be managed - if planned for, but that planning does not appear to be a current priority. This exposes the electricity users to unnecessary risk and cost.

As reflected in our advice to the Authority, technological progress and electrification are eroding traditional boundaries between electricity, gas, liquid and solid fuels. This 'convergence', and the pace of change, necessitates joined-up strategy, policy and regulatory thinking across the entire energy system.

The SRC appreciated hearing your plans and aspirations for the energy sector when previously for Minister Energy and Resources. We would welcome the opportunity to meet again and to discuss the matters covered in this letter, and other electricity system performance and reliability matters.

We cordially invite you to meet with us at our next in-person meeting, 20 May in Wellington, or an alternative suitable time.

Yours sincerely

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

Hon Heather Roy
Chair of the SRC

cc: Sarah Gillies, Electricity Authority; Tamara Linnhoff, MBIE

Attachment: SRC's March 2026 advice to the Electricity Authority

SECURITY AND RELIABILITY COUNCIL

ACTION LIST

The following are the current SRC actions for completion.

	Action	Date for completion	Status
1	Secretary to address feedback on trackers and add to mid-period meeting agenda		Completed
2	Write to regulators outlining the need for inter-regulator coordination to realise DER value		Not progressed
3	Secretary to prepare letter to MBIE/Minister		Completed
4	Secretary to set up an in-depth discussion (regarding SO Strategy)		Completed
5	Secretary to account for members' feedback (regarding Risk Radar)		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.

The appendix is a snip of the recommendations tracker covering 2025-2026 recommendations. This will mature further with each meeting.

Shortly after the February SRC a joint letter from regulators (EA, Commerce Commission, EECA) was published calling on distribution networks to utilise non-network solutions to support growing demand. This letter addressed the issue covered by Action # 2 (which was not progressed). The regulators' letter and feedback are available here: [Feedback on joint regulators' open letter to enable more efficient networks | Electricity Authority](#)

1.1 From the Authority

- 1.1.1 Here are links to the Authority's [news](#) and [projects](#) page, announcements and current projects can be found.
- 1.1.2 Members should already receive the EA's newsletter (Market Brief) notices and have access to Energy News articles. For those who do not, please use [this link](#) to sign up to receive Market Brief via email.
- 1.1.3 The Authority is consulting on plans to complement its grid connection pipeline with distribution level equivalent information on future connection by generation and offtake plant. [Improving visibility of developments on distribution networks | Electricity Authority](#)
- 1.1.4 On 20/21 May the 'Industry Exercise' to practice and prepare for a high-impact event. This builds on previous years and provides participating organisations with the opportunity to:

- practise operational and communications processes for a high-impact event

- get familiar with System Operator processes and communications
- identify opportunities to strengthen how we work together during a major power system event.

- 1.1.5 Members may be interested in the recent EA and System Operator webinar on space weather and the potential impacts on the power system. [Watch the space weather webinar and register for the Industry Exercise | Electricity Authority](#)

1.2 In the news, interesting publications

- 1.2.1 [Schnieder Electricals' survey](#) of 288 senior business leaders shows 39% of NZ businesses are not investing due to the high cost of domestic energy – electricity and gas costs (pre-Iran war). This accords with sentiment from presenters at the February SRC (declining gas production item).
- 1.2.2 The Energy News article discusses falling futures prices [Renewables boom, HFOs drive futures prices lower | Energy News](#) with reductions of 25%, 26% and 23% for 2027, 2028 and 2029 respectively, suggesting the protracted period of elevated wholesale / futures prices may be easing the as generation build catches up. Other factors may influence these reductions e.g. reducing reliance on thermal, LNG expectations.
- 1.2.3 The OECD released its 2026 Economic Survey of New Zealand early May, stating electricity prices are “structurally too high”. It recommends “introducing a transparent Firming and Flexibility Market that ensures a portfolio of independent and reliable non-gas supply, New Zealand can break the gas–electricity price link that is driving up prices. This approach would take advantage of the country’s natural resources, encourage competition, cut emissions, and strengthen energy security.” Summary report here [New Zealand brochure 2026 EN-WEB-final.pdf](#)
- 1.2.4 The Energy News article discusses OMV New Zealand’s 24 April notification to the government that Maui is expected to cease production by the end of 2026. [Māui closure brings NZ gas crisis forward - GIC | Energy News](#)
- 1.2.5 Maui’s closure has exacerbated concerns around energy prices and fuel availability. A mixture of BusinessDesk and Energy News articles on the topic below.
- [Methanex response to Maui field closure](#) Maui ceasing production by the end of 2026 mean Methanex could “no longer run our plants”
 - This Business Desk (paywall) article [The Gas Trap](#) discusses the ‘trap’ gas-dependent industries are caught in, with gas running out faster than they can transition away for it.
- 1.2.6 This [Energy News article](#) discusses the [Electricity Authority’s decision](#) that the System Operator caused an under-frequency even on 11 July 2025 by not applying established operating procedures and deciding not to instruct Transpower (HVDC asset owner) to apply required HVDC control settings.
- 1.2.7 The appendix contains a snip of the recommendations tracker, the full document is available in the resource room.

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 System operator security of supply updates

- 1.4.1 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."*
- 1.4.2 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.
- 1.4.3 Please use this link to access the latest security of supply information from the system operator. [Security of supply | Transpower](#)
- 1.4.4 If members have concerns, or require further information, about the system operator security of supply updates, they can raise these with the secretariat.
- 1.4.5 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>

1.5 System operator weekly market movements

- 1.5.1 Link to Transpower's [Market Operations Weekly Report | Transpower](#).
- 1.5.2 The report provides an overview and update on security of supply (energy and capacity), generation breakdown and risk curves, amongst other information.
- 1.5.3 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.

1.6 New Zealand Generation Balance - NZGB

- 1.6.1 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 \(transpower.co.nz\)](#).
- 1.6.2 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).

1.7 Scheduled generation outages

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

1.8 Load Duration Curves

- 1.8.1 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|m|do
- 1.8.2 If members have further feedback or suggestions about the data and how it is presented, they can raise these through the secretariat.

Q1. Does the SRC have a preference for how information in this paper is presented?

Appendix: SRC recommendations tracker (2025 Q2 – 2026 Q1)

Year	Quarter	SRC Recommendation	EA Response	Tracking	Resolved	Update Expected	Advice in question	Notes
2026	Q1	Prioritise regulatory enablers for safe integration of scale solar into the electricity system	Future Security and Resilience (FSR) programme focused on the transition. EA will present at the next SRC meeting on this	YES	☐	Sept-26	Mar-26	
2026	Q1	Accelerate efforts to improve visibility of embedded generation and demand, and account for this in system planning and forecasting	Collecting data from EDB's, proposing this happens with other scheduled changes 1 Dec 2026. Data will be shared with SO. Also exploring other options to improve pipeline information.	YES	☐	Dec-26	Mar-26	
2026	Q1	Advocate for electricity consumers on tree regulation reforms.	Submitted, and other parties were given the opportunity to share views on MBIE's proposed tree regulation reform. Nothing further the EA can do, as it is now for government decision on further reform options	NO	☐		Mar-26	
2026	Q1	Counter and resist complacency over gas decline	Not authority's role, ensuring sector has most up to date information. Working with SO around LNG and gas assumptions in SOSA, including a low gas scenario. Closely monitoring developments of recent events to help support the sector	NO	☐		Mar-26	Also written to Minister
2026	Q1	Proactively engage with the Government on the need for and formulation of a clear, coherent and converged national energy policy.	A national energy policy isn't within EA remit, will continue to engage with government and employ a whole-of-system view to carry out their work	NO	☐		Mar-26	Also written to Minister
2025	Q4	Understand Generation build critical paths, understand impediments, and act to address potential bottlenecks, i.e. network connections	Recently conducted a survey on barriers to investment. Intend to run annually.	YES	☐		Nov-25	
2025	Q4	Improve/Mature the generation pipeline so it is factual, robust and lives up to it's potential	Improving visibility of DG and load, with Code amendments to require publishing of network connections for large DG and large Load	YES	☐		Nov-25	
2025	Q4	Recognise the outsized role the certain electrical standards have on the electricity system and act now to realise opportunities to improve	A recent review found DG technical standards could be improved. Authority involved and Working with EEA to raise standards, supports EECA to regulate product smartness. 2026 Dialogue on 'flexible export limits'	YES	☐	2026	Nov-25	
2025	Q4	Closely monitor integration of EV charging and progress enabling V2G opportunities	PIP only monitors engaged innovators - currently 2 V2G trials Counties DSO and Queenstown Electrification Accelerator. Record is kept of V2G installations, must meet latest code reqs as it is DG.	NO	☐		Nov-25	Monitor
2025	Q4	Take account of the observations in the SO self assessment, including value of interdependent review of the SO performance each contract period	EA Market Operations Committee support SRC recommendation for independent assessment of SO. Recommendations have been incorporated in the SO 2024/25 annual review	NO	☐		Nov-25	Annual review completed
2025	Q3	Scrutiny to generation build critical paths	Improving Gen Build dashboard, current focus DG and expand information gathering	YES	☐	May SRC	Sept-25	
2025	Q3	Address capacity and energy risks arising from increased intermittency	Focus market participants access best information, Centralised forecaster intermittent generators, establish Emergency Reserve	YES	☐	2026 May		
2025	Q3	Act to address potentially system level risk areas	Information gathering enable more effective data sharing with SO	NO	☐			
2025	Q3	Increase understanding of cyber security, incl encourage DPMC consultation and Self-Assess	Falls outside of current functions, is encouraging participants to engage with DPMC and Self-Assess	NO	☐	NO		Completed deep dive, wrote to DPMC
2025	Q2	Encourages authority to consider issues and potential solutions for reliance on slow start thermal plant during high hydro storage/inflow conditions	Authority board engaging with GIC on joint opportunities. Consult early 2026 for additional incentives for resources committed when high-risk periods	YES	☐			
2025	Q2	Authority work with SO and Genesis to understand timelines	Engaging with SO on SOSFIP review (shadow constraint being	YES	☐	SOSFIP decision		
2025	Q2	Appreciate insight on SO concerns regarding contingent storage use	SO will outline concerns in early august meeting	NO	☐			
2025	Q2	Authority should have vision for medium and long-term role of consumer DER to manage peak demand and capacity issues	Released green paper on decentralisation, this paper to be fountain for discussions. Outcome consultation shape DER vision and work programme	NO	☐			
2025	Q2	EA should engage with SO to ensure assets connection assessment requirements proportionate to risk being managed and timeframes for connection requests supports	Encourage incl. of smaller generators in regional resilience. Authority Future Security and Resilience and Common Quality technical group team engaged with SO as connection assessment information reqs	NO	☐			

Security of supply update

SRC 20 May 2026

Agenda

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

ELECTRICITY AUTHORITY UPDATE

Current situation

Current Situation

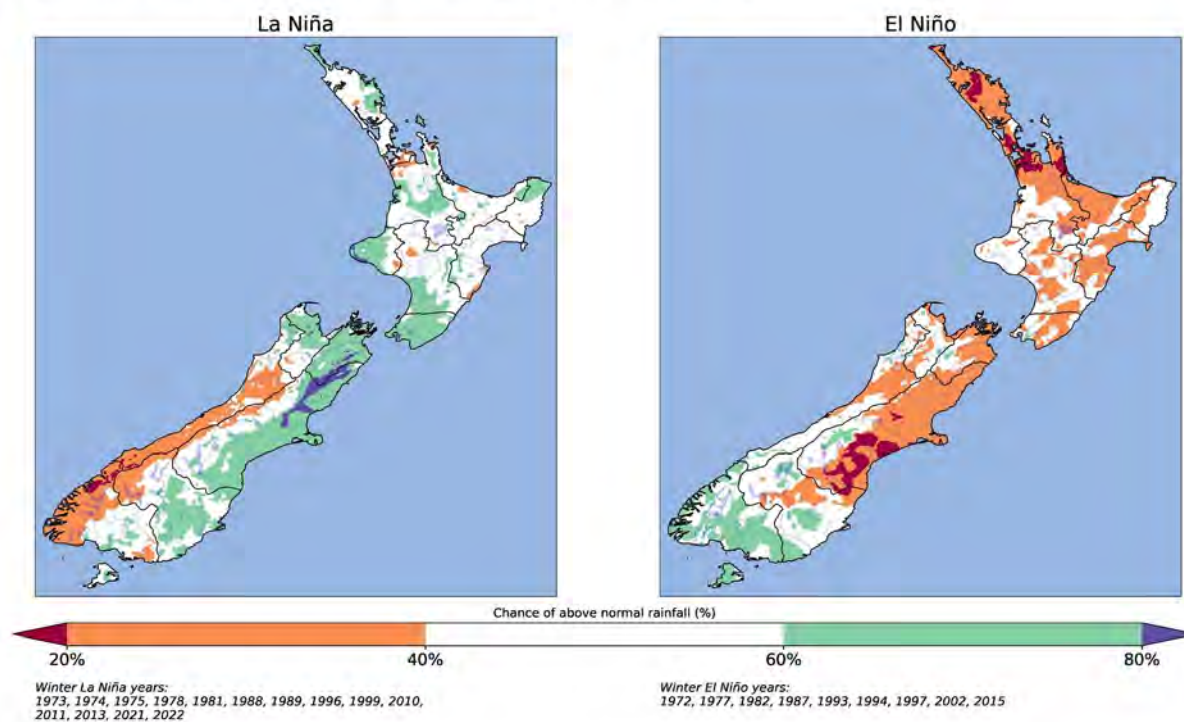
- **Strong hydro storage** - 112% of mean and 84% nominally full as of 9 May
- **Strong thermal storage** - 1,166kt coal (26 April) + 6.2PJ in Ahuroa as of 7 May
- **Low thermal generation**

Future prices winter quarters have been decreasing since their mid-March peak :

- Ōtāhuhu June 2026 currently ~\$97/MWh compared to mid-March peak of ~\$220/MWh.
- Ōtāhuhu September 2026 currently ~\$135/MWh compared to mid-March peak of ~\$223/MWh.

El Niño winter impact on rainfall

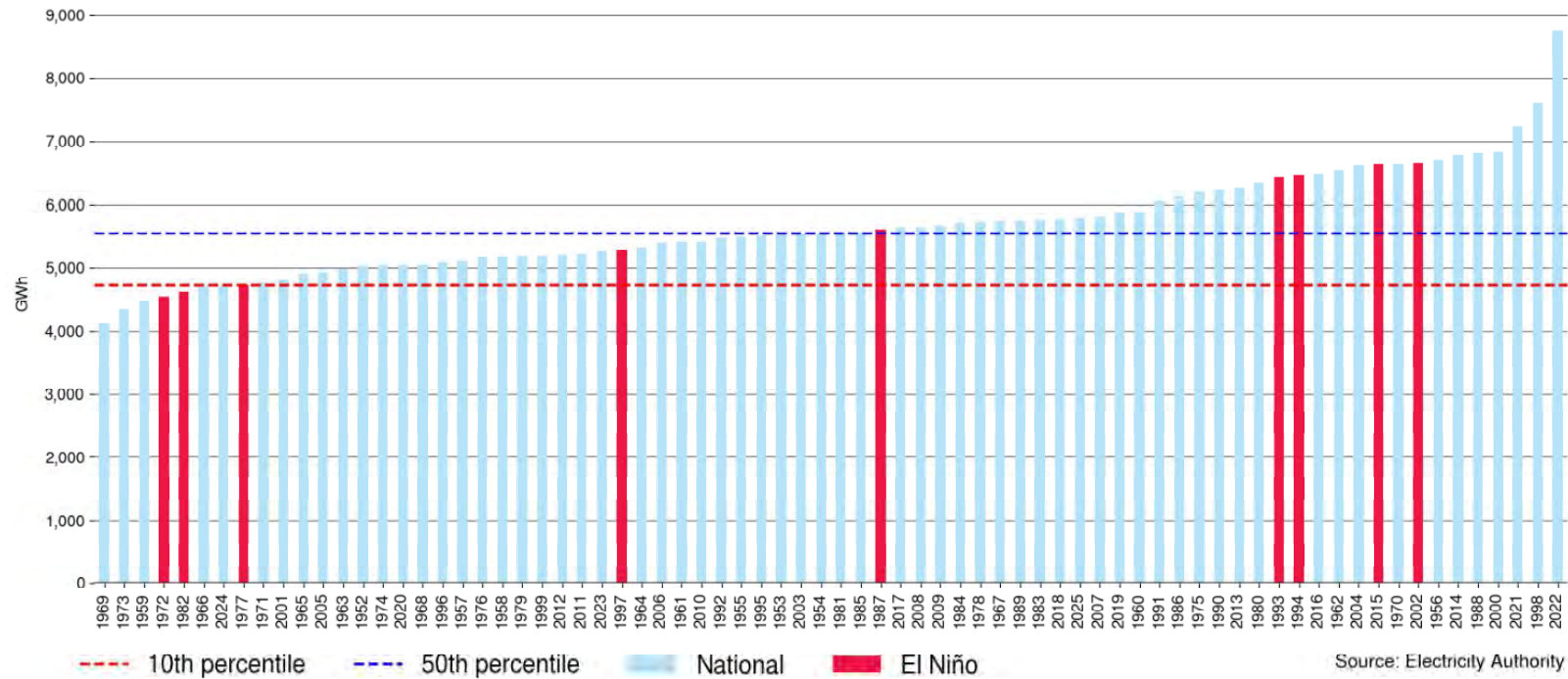
Chance of above normal winter rainfall during La Niña & El Niño



Data: NIWA Virtual Climate Station Network (VCSN). Anomalies are calculated with reference to a 1991-2020 climatology. Winter refers to the meteorological season which runs from June-August.

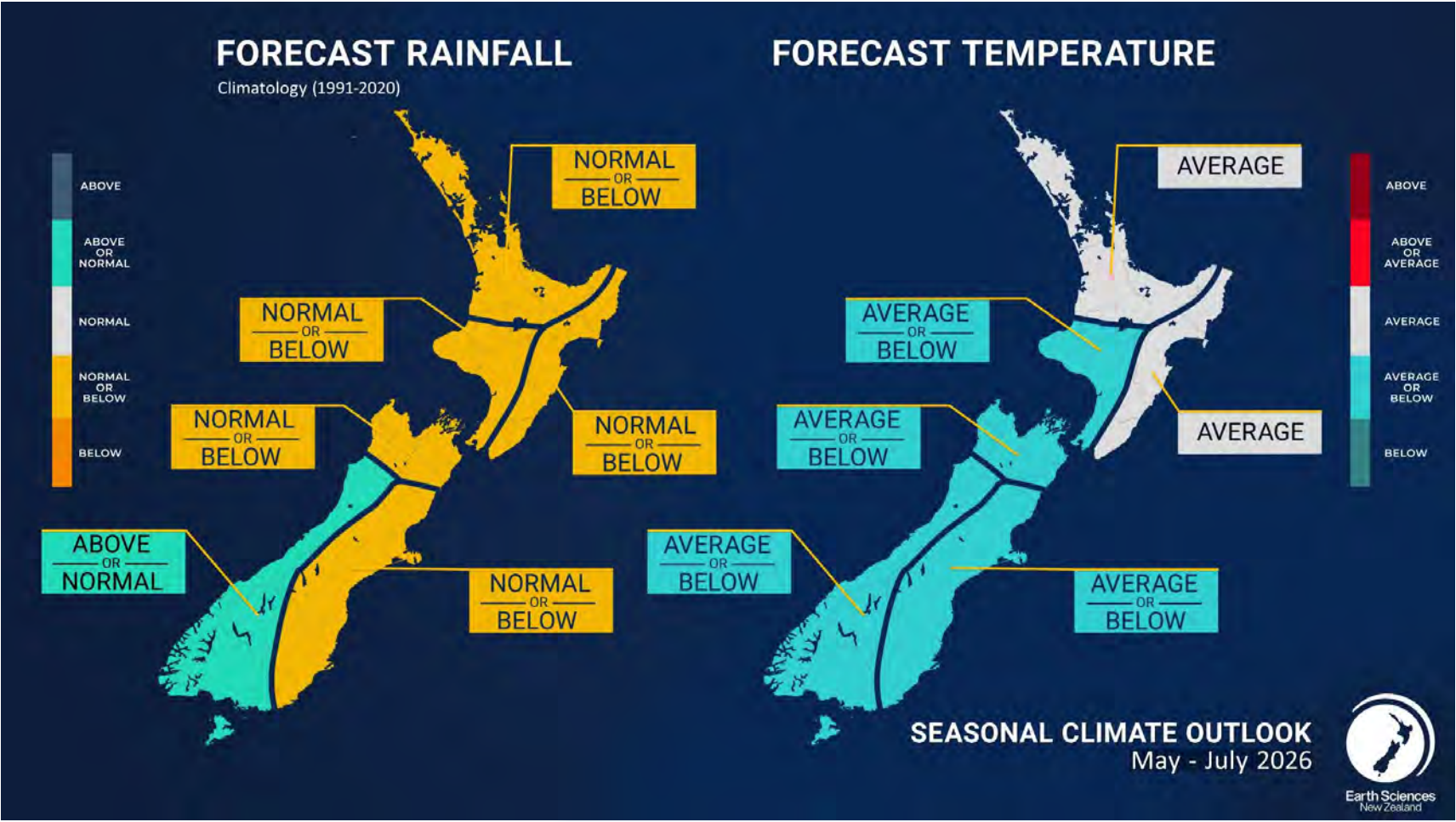
- ESNZ forecasting 80% probability of El Niño conditions developing for June – August 2026

Historic June-August national hydro inflows



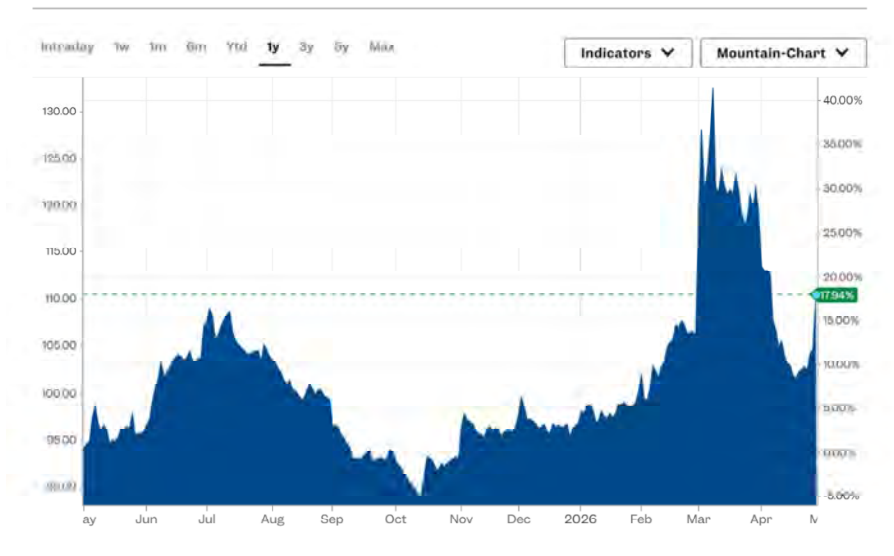
- South Island catchment lakes tend to show stronger inflows
- But impact on national inflows is variable

Expecting a colder winter

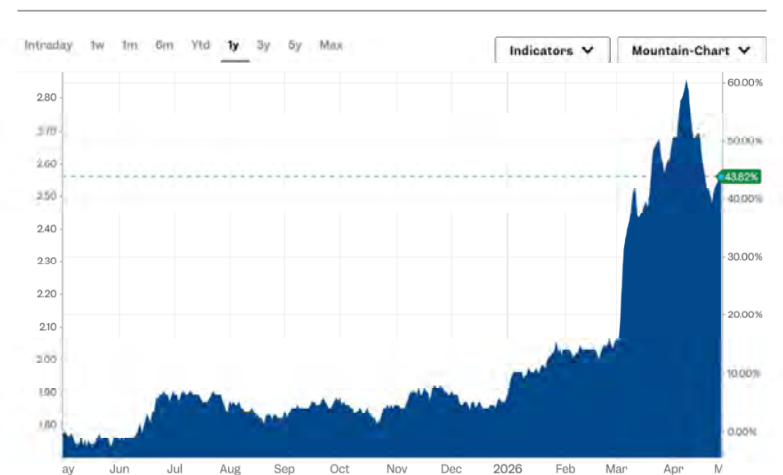


International thermal fuel prices have risen

Coal



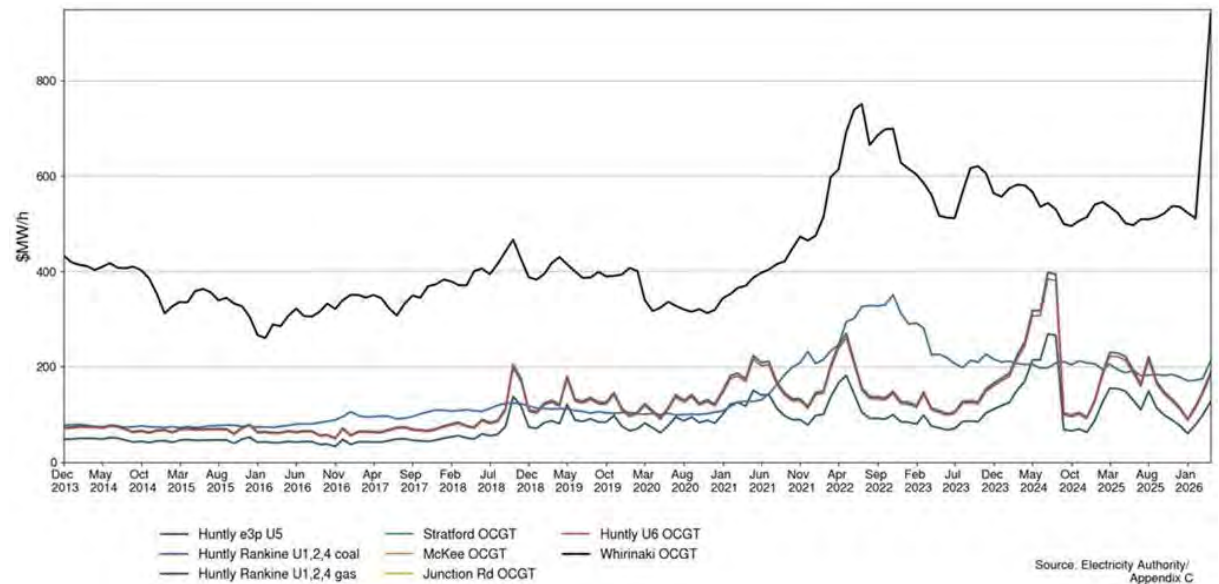
Diesel



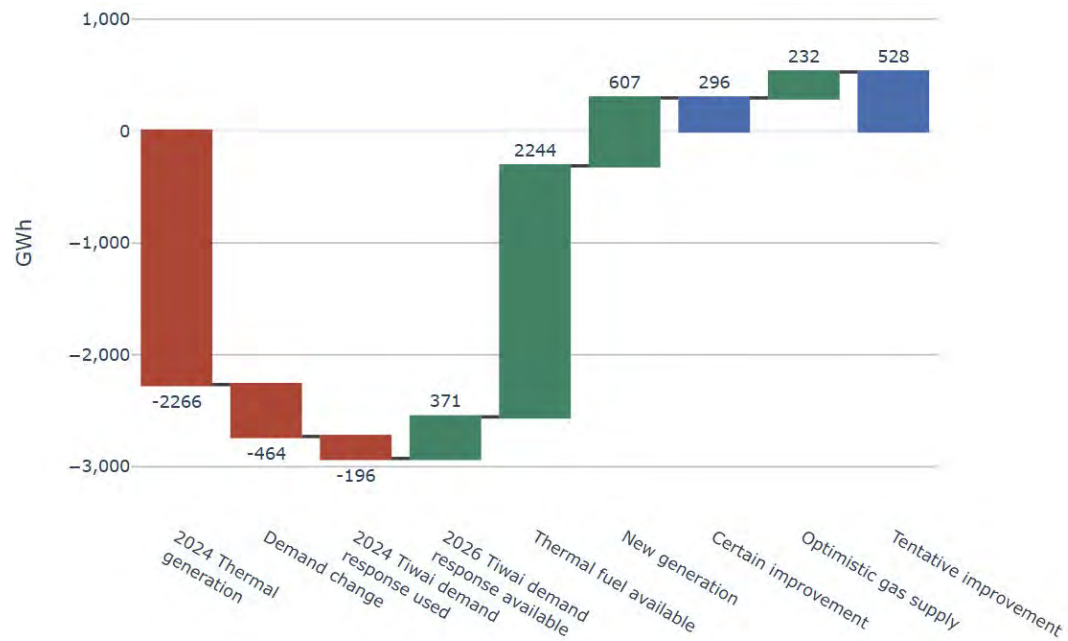
Diesel prices

- SRMC of Whirinaki, using diesel, has increased by ~\$236/MWh to ~\$940/MWh following ongoing international supply issues
- Whirinaki usually runs as plant of last resort

Estimated monthly SRMC for thermal fuels



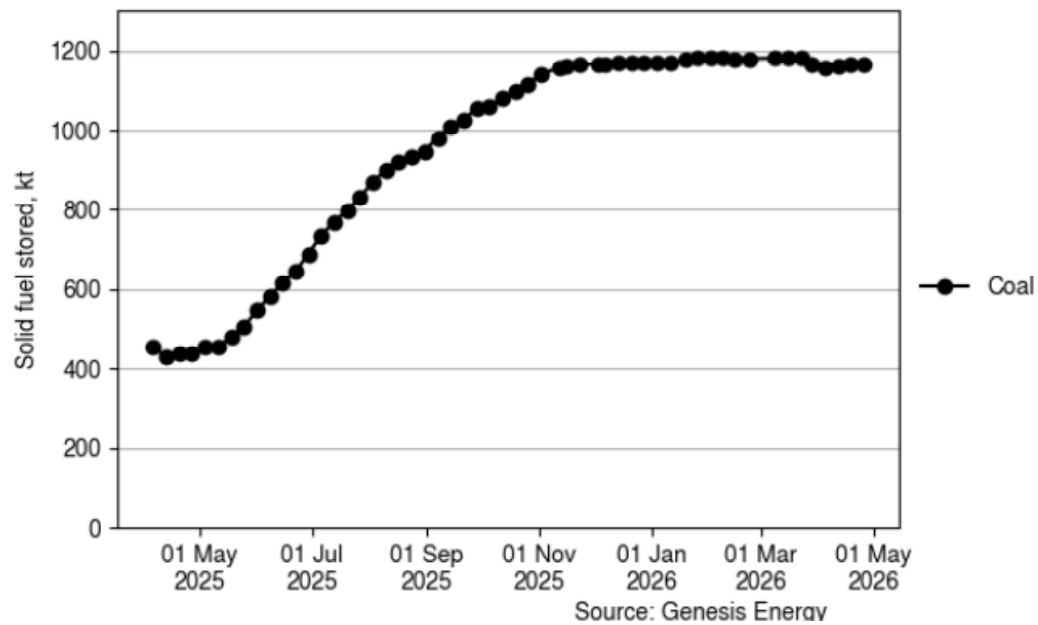
Energy position to firm a dry 3 months vs 2024



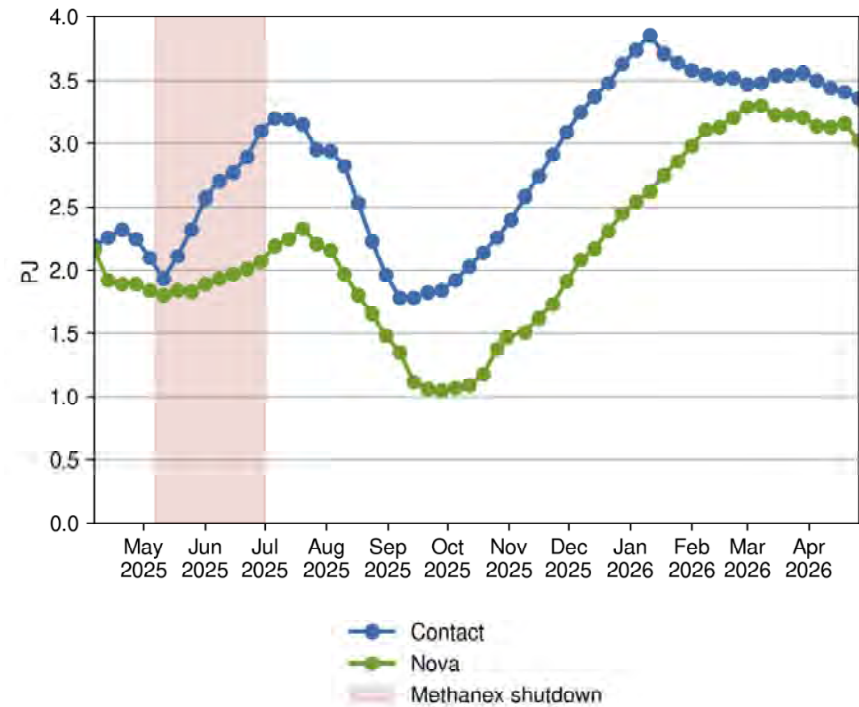
- Better placed to firm a dry 3-month period than in winter 2024
 - Current thermal fuel availability + new generation is greater than the thermal generation used in winter 2024 + changes in demand

Strong coal and gas storage

Coal



Ahuroa gas

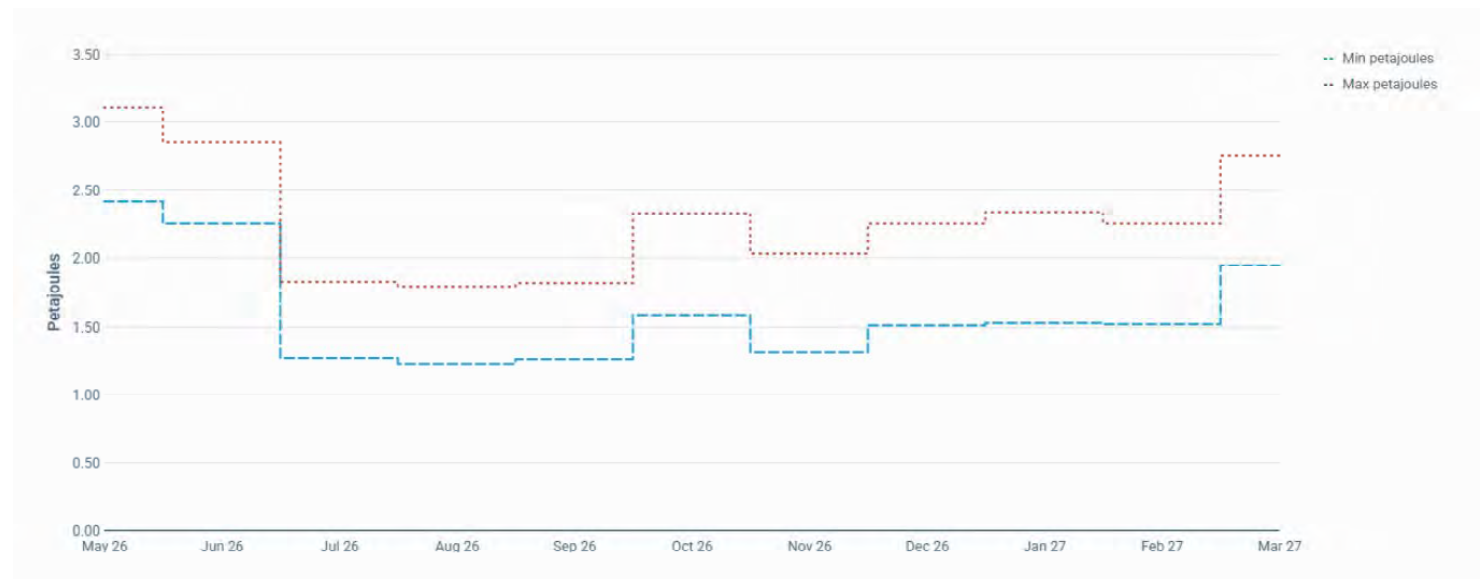


Contracted gas positions

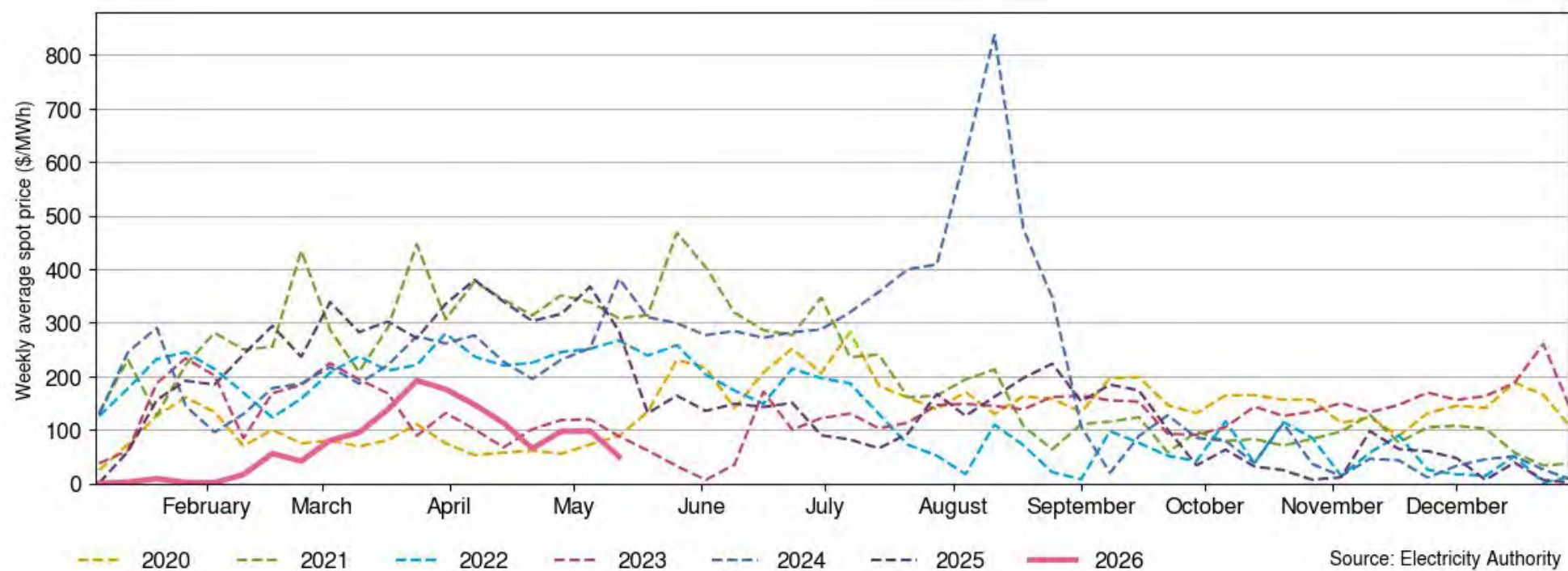
May minimum: 2.42 PJ
 June minimum: 2.25 PJ
 July minimum: 1.25 PJ

Recent running of Huntly 5
 was averaged a burn of
 50TJ/day, then the above
 amounts give

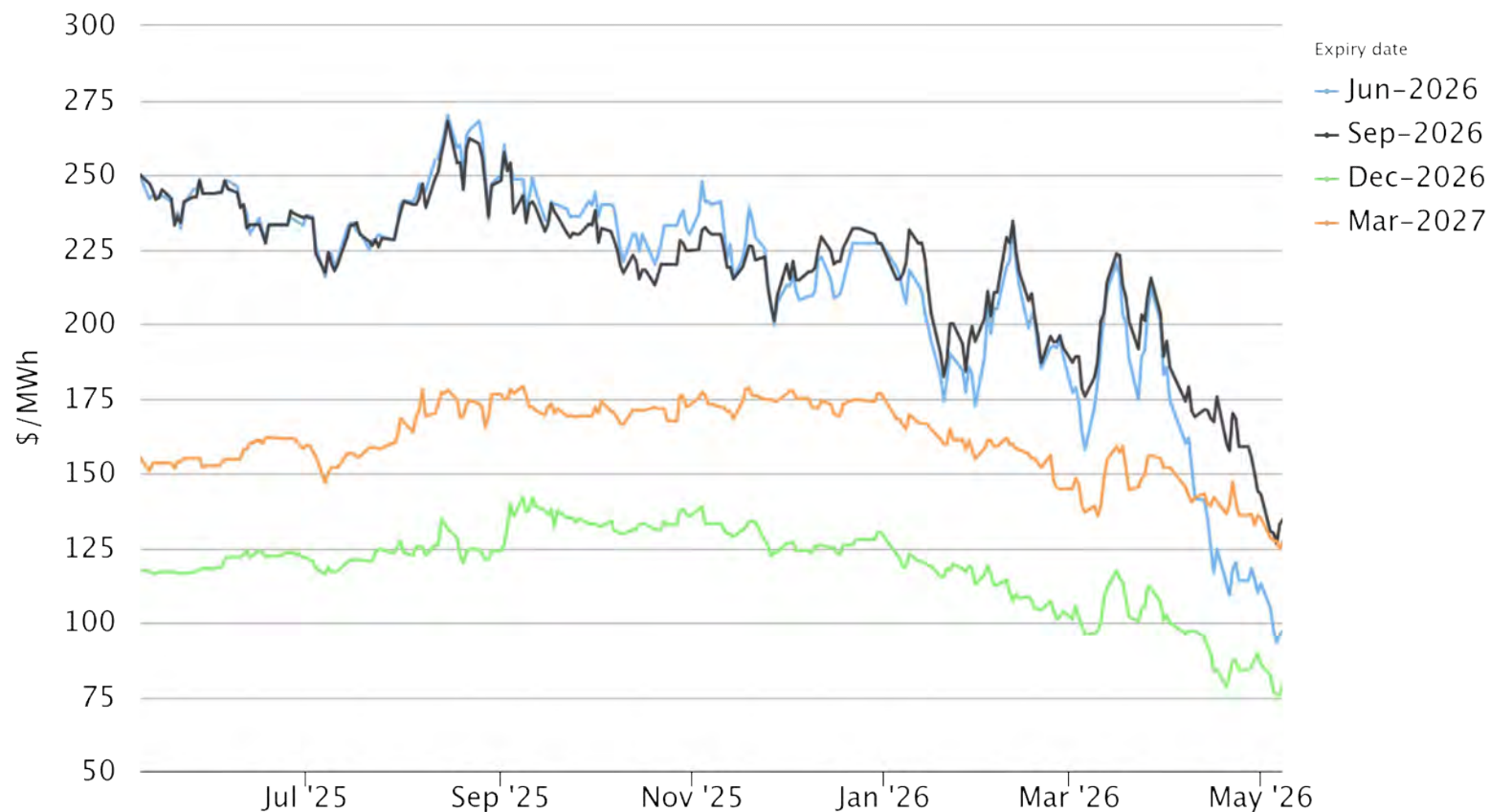
May minimum: 48 days
 June minimum: 45 days
 July minimum: 25 days



Prices remain low due to strong hydro storage



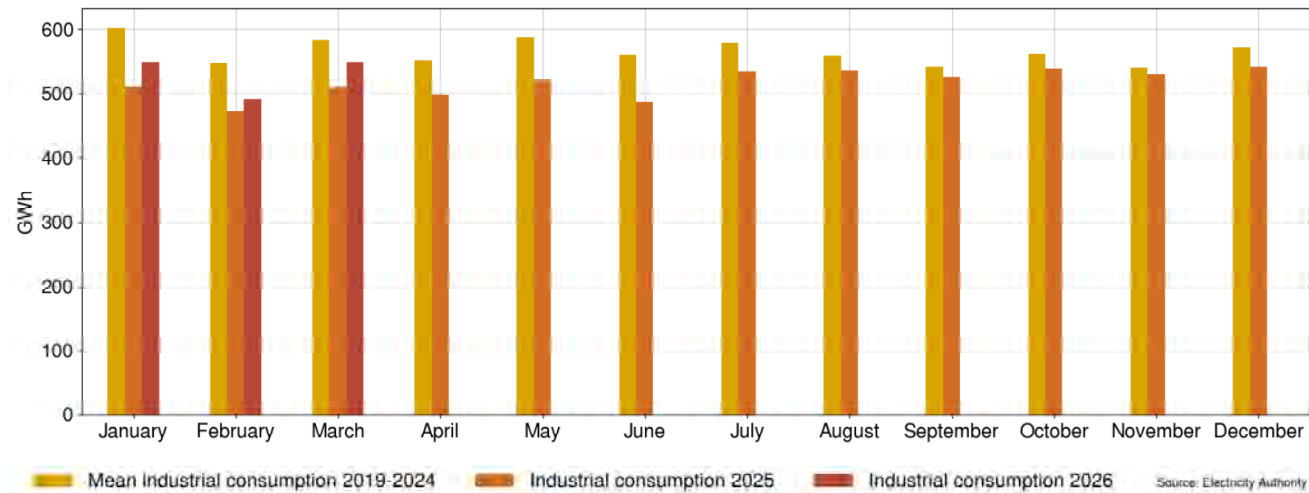
Ōtāhuhu Winter 2026 Forward prices have fallen after a mid-March spike (following conflict in Iran)



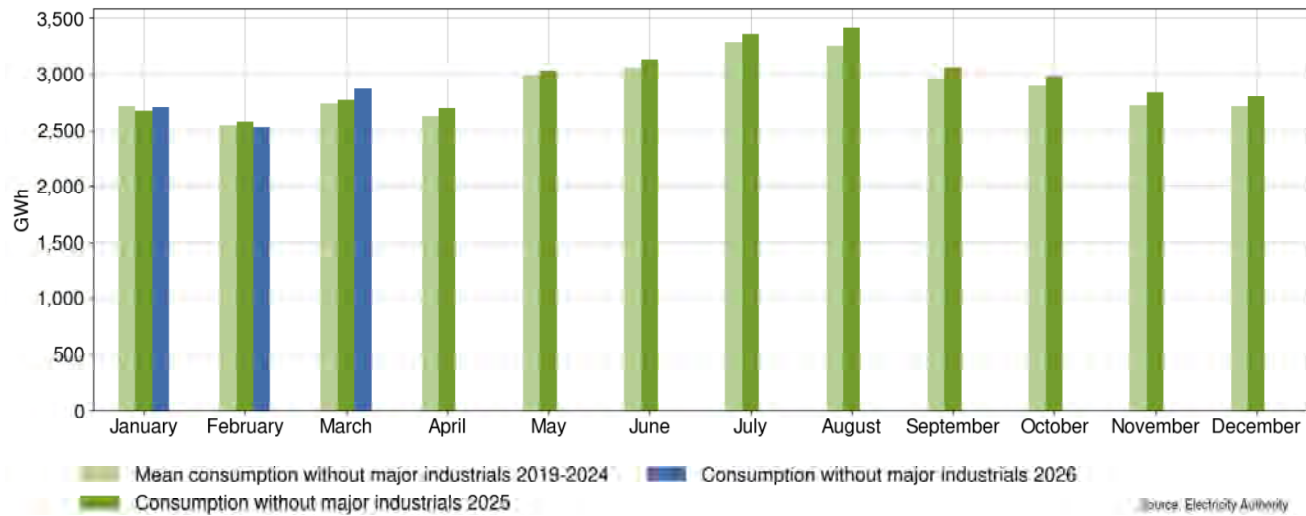
emi.ea.govt.nz/r/hhaon

Growing residential demand and industrial demand up from 2025

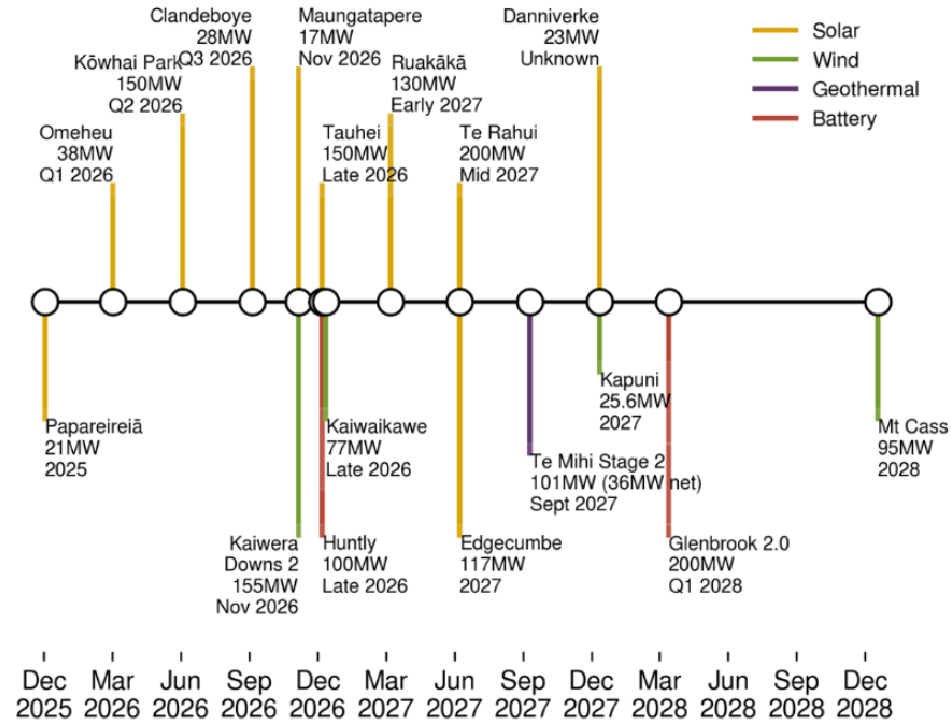
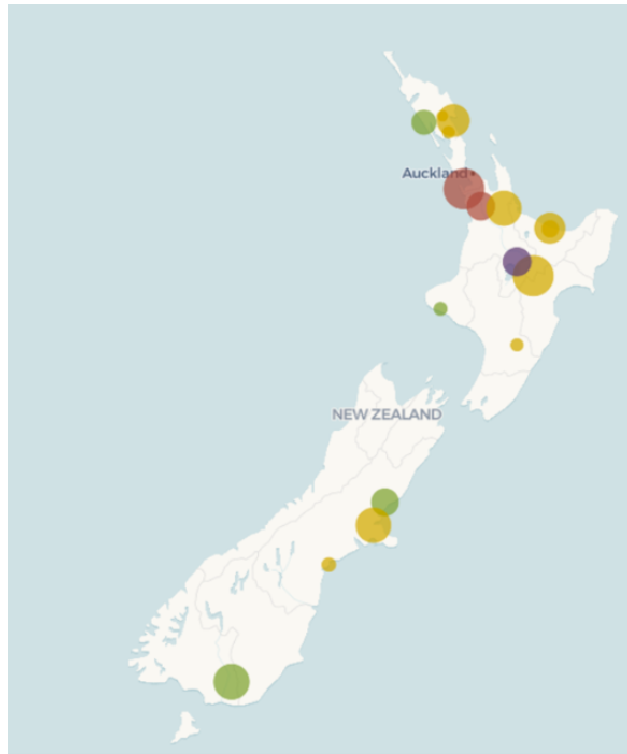
Industrial



Other



Projects under construction



1,230MW Major gentailers
398MW other developers

874MW Solar
353MW Wind
101MW Geothermal (36MW net)
300MW Battery

New projects since the February update:
Danniverke – 23 MW (Unknown timing)
Kapuni – 25.6 MW (2027)
Edgecumbe – 117 MW (2027)
Mt Cass – 95 MW (2028)
Glenbrook 2.0 – 200 MW (Q1 2028)

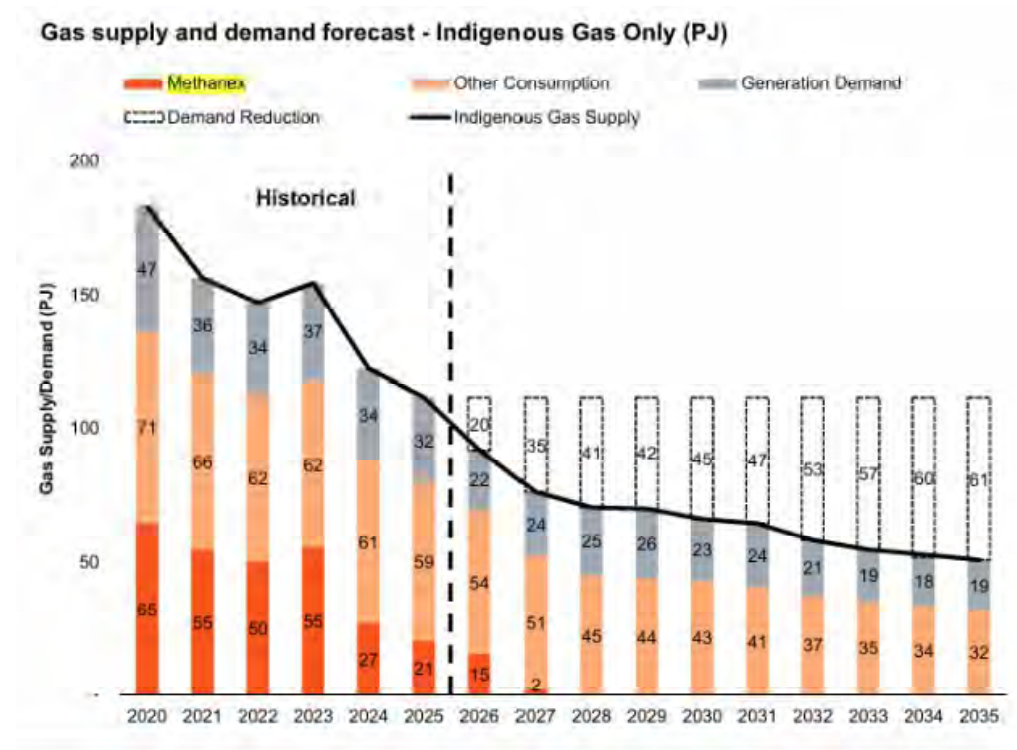
Methanex exit

Methanex has confirmed it will close its plant if OMV shut down Māui by the end of the year.

Highlights from PWC report for GIC

-The departure of Methanex **removes up to 95 TJ per day of current contractual flexibility**, leaving the Ahuroa Gas Storage (Ahuroa) facility as the primary balancing mechanism (up to 65 TJ per day). This loss contributes to **sharper price swings** and heightened seasonal and dry year supply constraints.

-**Gas-fired generation** operates at **constrained levels**, targeting morning and evening peaks and winter security, with limited daytime or overnight running. The **Huntly Rankine units run harder on coal and biofuels** to meet minimum backup generation requirements. This requirement increases over the decade as electrification drives higher electricity demand.



Source: [2026-Gas-Supply-and-Demand-Study.pdf](#)



System Operator update

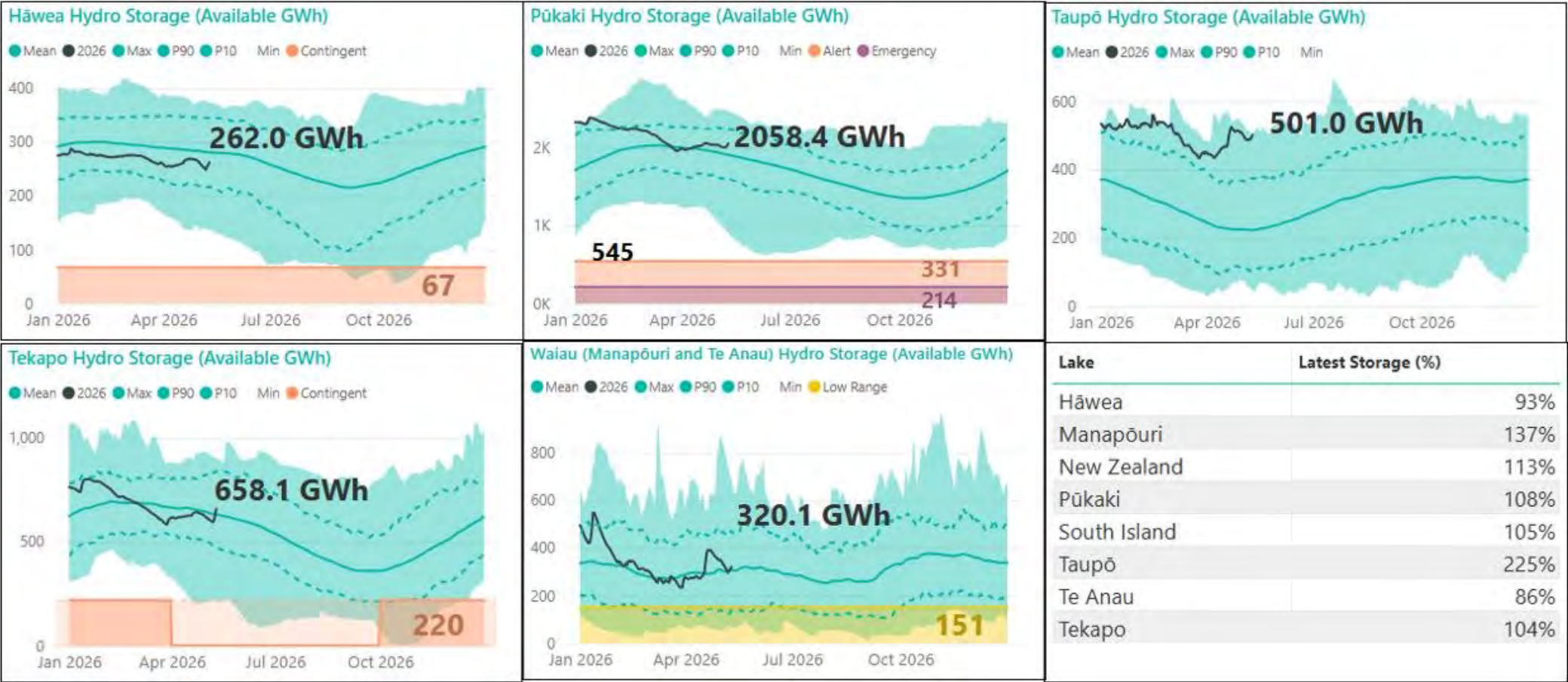
Security of supply outlook



IN-CONFIDENCE: ORGANISATION

Hydro storage by catchment

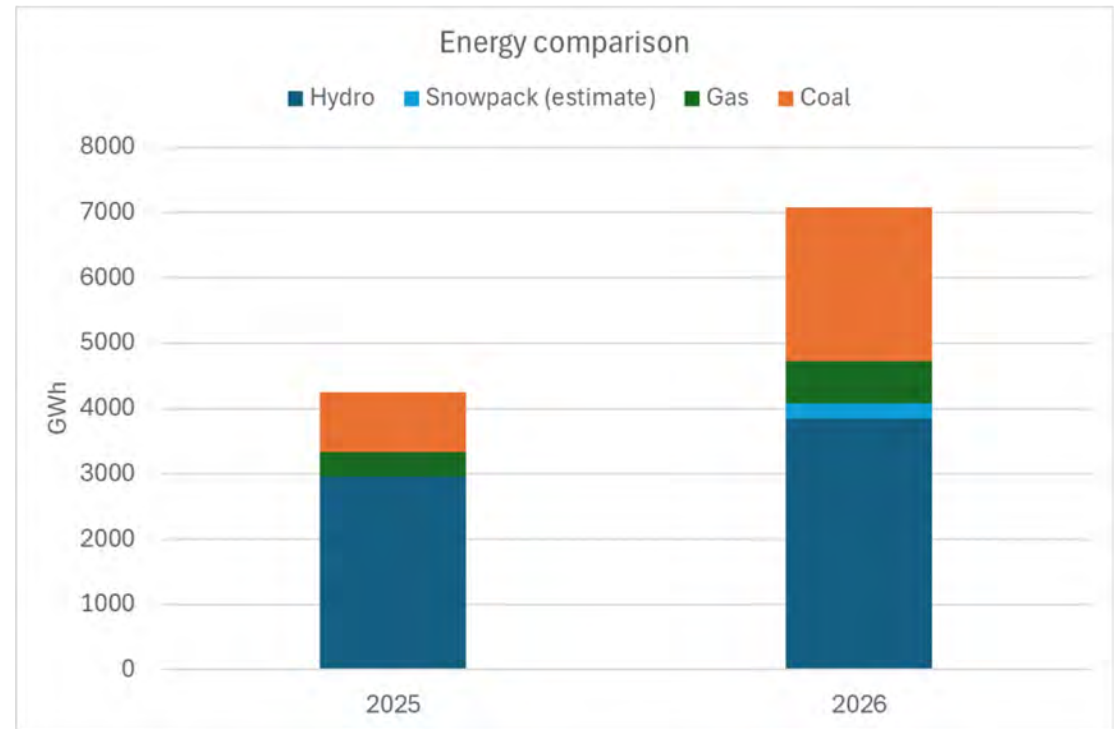
10-May



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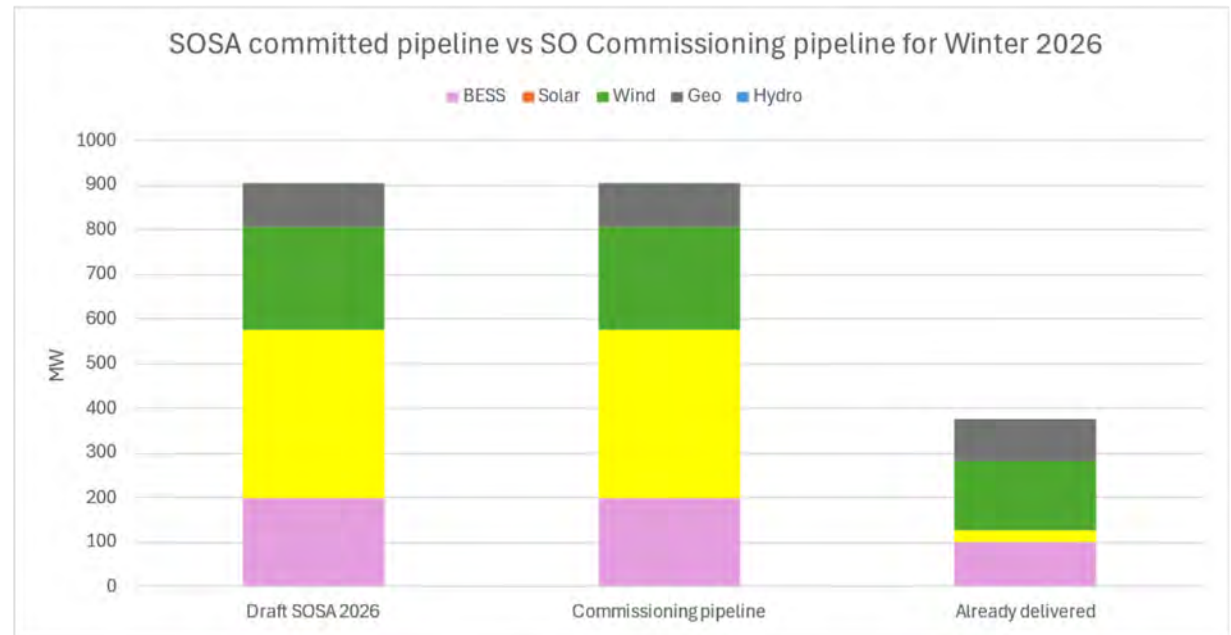
Stored fuel position

- Better fuel position than same time last year
- Largely due to high coal stockpile at Huntly
- AGS is near full
- Increased inflows resulting in above average hydro storage levels across most major catchments



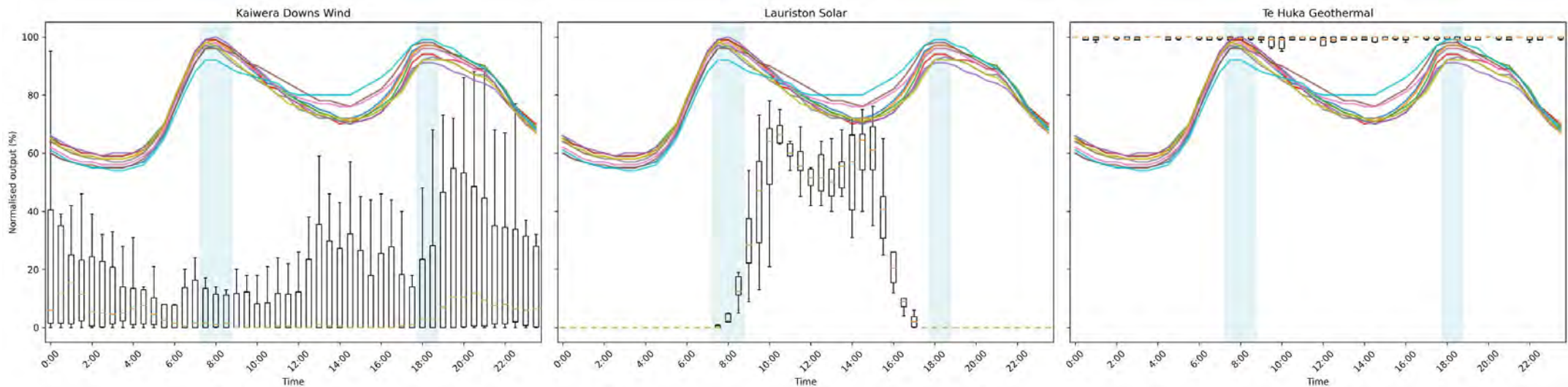
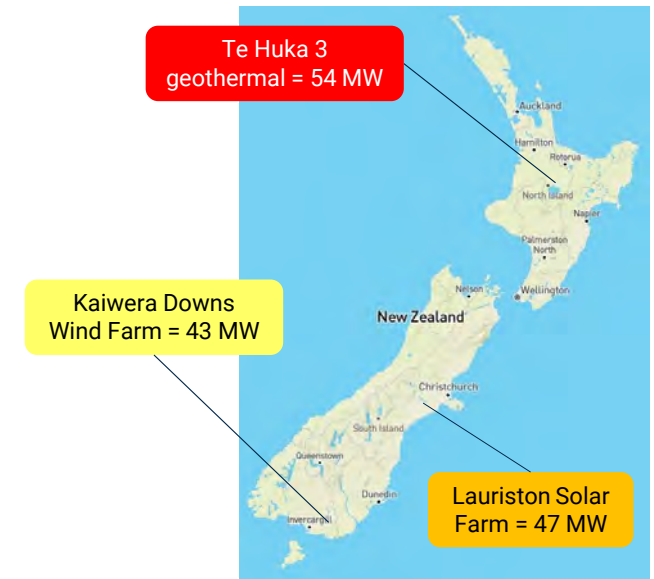
New supply

- Draft SOSA 2026 assumed ~900 MW of new supply committed for Winter 2026
- Capacity is in the commissioning pipeline but not all delivered ahead of winter
- Remaining generation expected delivery by mid/end Winter 2026
- TCC decommissioning removes 330 MW from the generation stack. Reduces net increase in new supply already delivered to ~50 MW.
- Not all capacity is equal – See next slides



Renewable contribution example: Peaks

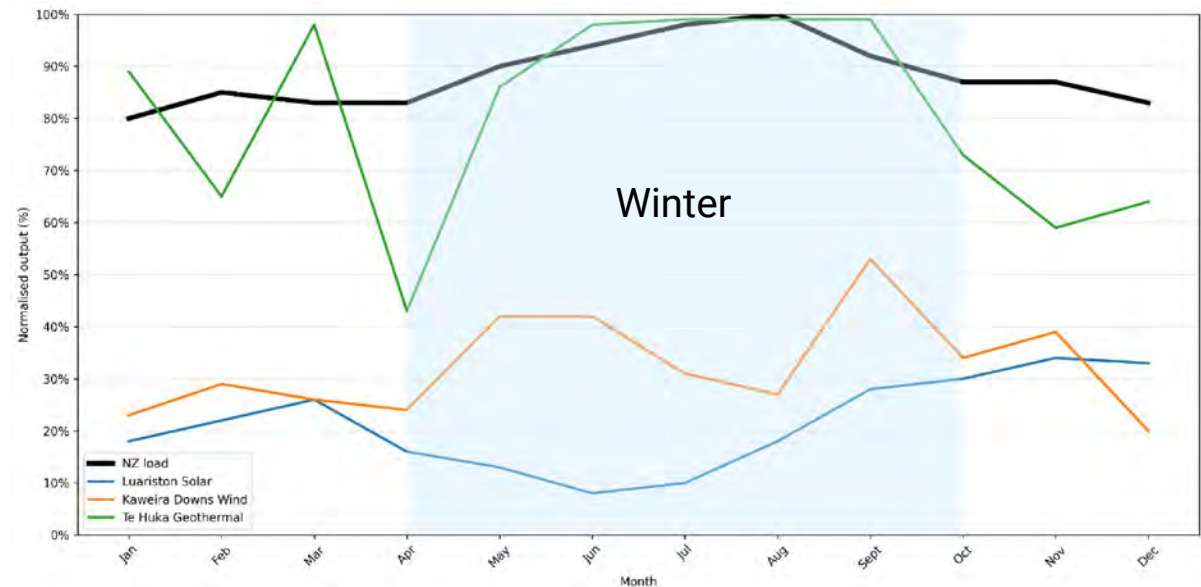
- Projects can have similar installed capacity but not the same contribution during tight system conditions.
- Our system's peak electricity consumption is in winter.
- Contribution of these generators during 10 highest winter peak load days of 2025 shown below.
- Wind: Variable contribution, Solar: Will be low, Geothermal: Likely to be high contribution



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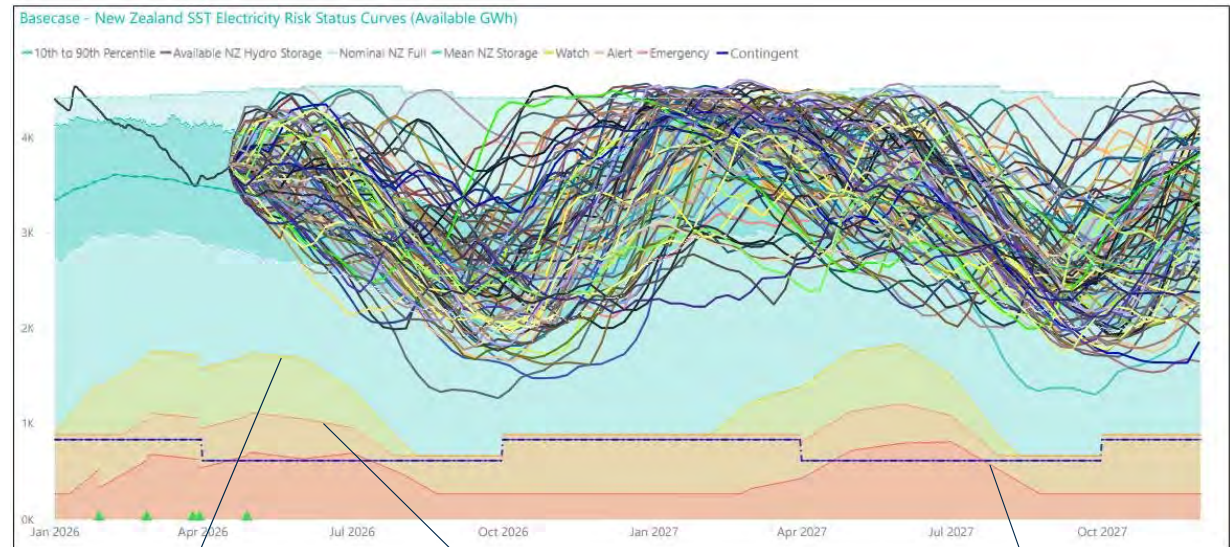
Renewable contribution example: Energy

- Energy can be considered as the average load/supply over a period (e.g. week/month/season/year).
- Chart shows monthly average load and monthly average contribution of these generators during 2025 (relative to maximum output).
- Winter energy contribution is:
 - Greatest for geothermal (on average ~87% of its installed capacity is available)
 - Wind is next highest contributor (~37%)
 - Solar is least of the three (~15%).
- Wind and solar more “reliable” contributors of energy over month, than capacity over a half-hour.



Energy Security Outlook (ESO)

- Latest ESO update published on 28 April.
- Low energy risk over the next 12 months with no SSTs crossing any of the risk curves.
- Contributing factors: increased coal stockpile, gas storage and hydro storage.
- TCC CCGT (330 MW) not available. Contact indicated decommissioning of the plant has begun.
- May 2026 will include the new ERCs and SSTs under the new SOSFIP:
 - Contracted ERC+SST
 - Updated Alert Buffers
 - Watch adder



Watch

Based on 1% risk. SO triggers additional reporting.

Alert

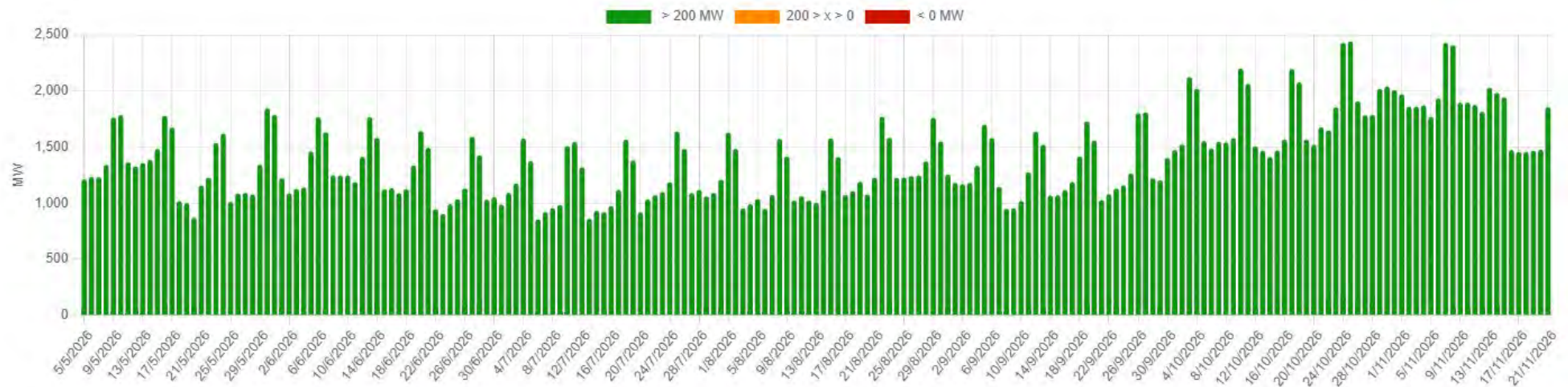
Based on 4% risk with floors for CS. Triggers access to CS in Pukaki, Hawea and Tekapo.

Emergency

Based on 10% risk with floors for CS. Triggers OCC (with other conditions). OCC provides access to additional CS in Pukaki.

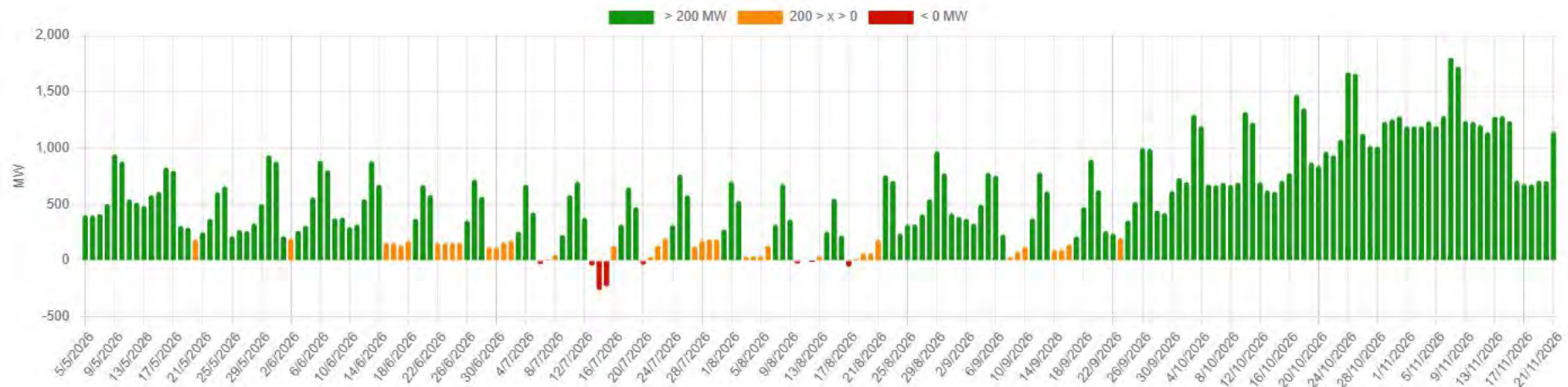
NZGB update: Base capacity and high demand

- Generation capacity available to meet peak demand
- N-1 margins are looking healthy out to Nov 2026 provided:
 - Capacity not on outage is offered into the market over peak load periods
 - No other plant fails



NZGB update: Colder weather and loss of largest risk

- Impact of downside risks:
 - Colder weather = higher demand (P99)
 - Unplanned outage of the largest risk (Large thermal unit or HVDC pole)
- Increased risks in winter to supply peak load and cover reserves



Looking ahead to Winter/Spring 2026

• Winter 2026:

- Current fuel stocks are healthy but need to remain so heading into winter
- Energy risks are normal provided plant and fuel supplies remain available
- Capacity risks normal provided plant committed into market during tight capacity conditions
- Unplanned outages (especially large thermal plant and/or HVDC) will increase energy and capacity risks
- Delays in new plant coming online will also increase risks

• Spring 2026:

- Additional (large) solar and wind projects expected to start coming online during/late winter. Large SO workload to model these in the systems.
- Increased planned outages of firm generation + more intermittent generation + cold snaps can result in increased capacity risks.
- OMV signalled Maui production could potentially be ending by end 2026/early 2027 – Likely coupled with a Methanex exit – Reduced gas flex in the market

• Beyond 2026:

- Draft SOSA 2026 indicates security margins remain above security standards until three-to-five years out.
- Bringing additional generation online earlier will help reduce exposure to downside risks support increased demand growth and lift margins in the mid-term above security standards.

Draft SOSA 2026 - Summary

Draft Security of Supply Assessment (SOSA) 2026 – At a glance

1. What is the SOSA?

- Assess three security margins over the next 10 years and compare against the security standards
- Standards represent an efficient range – Expected cost of shortage equals cost of reserve resources
- New Zealand Winter Energy Margin - Do we have enough national energy to get through extended dry winters? [Standards: 14% to 16%]
- South Island Winter Energy Margin - Can the South Island meet its winter energy needs, given both supply and inter-island transfer limits? [Standard: 25.5% to 30%]
- North Island Winter Capacity Margin - Do we have enough generation to meet North Island peak winter demand? [Standards: 630 MW to 780 MW]

2. How do we assess the margins?

- Survey participants and investors on future pipeline projects
- Forecast electricity demand for next 10 years
- Consult on assumptions and sensitivities to key inputs
- Use Security Standards Assumptions Document which specifies the methodology and some key assumptions
- Develop other inputs and assumptions as required (eg. gas forecasts, coal estimates, plant availability)
- Assess margins for Reference case ●, Expected Future case ● and sensitivities ●

3. Key findings from Draft SOSA 2026

New Zealand Winter Energy Margin (NZ-WEM)	
●●● Short-term (2026-2028)	Adequate but fragile energy margin: Margins above standards if projects are delivered on-time but fall below the lower standard if gas supply is lower than expected. Project delays, low thermal support, high demand, or weak renewable output increase risks of margins falling below standards. Deliver projects on time and add flexible supply to reduce risks.
●●● Mid-term (2029-2031)	Emerging energy gap in 2030s: Margins fall below the standard by 2031 even with planned projects, with lower gas bringing this forward. Risks from delays, reduced thermal support, high demand and weak renewables increase exposure, requiring earlier project delivery, ensuring thermal generation availability and developing a more diverse supply pipeline.
●●● Long-term (2032-2035)	Pipeline-dependent adequacy: Margins stay above the standard only if future pipeline delivered, but strong demand growth and weaker thermal, gas, or renewables can still drive shortfalls by ~2035. Reducing risk requires expanding and diversifying the future pipeline, with less reliance on weather-dependent generation.
South Island Winter Energy Margin (SI-WEM)	
●●● Short-term (2026-2028)	Strong but adequacy sensitive to risks: Margins remain above the standard under expected conditions with committed project delivery. Delays, reduced thermal support, higher demand, or low gas can drive shortfalls by 2027–2028, so timely delivery and firm backup are critical.
●●● Mid-term (2029-2031)	Adequate but exposed to risks: Margins remain above the standards if committed and consented projects proceed on-time but can still fall below the lower standard if gas supply is lower than expected. If new supply projects are delayed or if demand is higher and gas, thermal, or renewables underperform then shortfalls emerge. Expanding and diversifying supply is key.
●●● Long-term (2032-2035)	Robust but demand-sensitive adequacy: Margins remain above the standard if committed, consented and unconsented projects are delivered. Strong demand growth with weaker gas, thermal, or renewables can still erode margins, so expanding the future project pipeline is key to manage this risk.
North Island Winter Capacity Margin (NI-WCM)	
●●● Short-term (2026-2028)	Adequate but capacity risks exist: Margins remain above the standard in the short term with committed projects. Peak risks from low wind, limited thermal support, and higher demand require timely delivery and strong winter thermal commitment.
●●● Mid-term (2029-2031)	Emerging capacity shortfalls: Margins sit between standards if committed and consented projects proceed but fall below by ~2029 if they don't. High demand, weaker thermal/gas, and project delays increase risks, so more flexible peak capacity is needed.
●●● Long-term (2032-2035)	Enduring peak capacity risk: Margins remain above the standards if committed, consented and unconsented projects are delivered. High demand, low gas, and operational constraints mean peak risks persist, so expanding flexible, fast-response resources is critical.

Overall implication: Maintaining security of supply over the next decade requires strong delivery discipline, earlier commitment of additional consent ready projects in the short and mid-term to reduce downside risks, ensuring thermal generation and fuel availability and active development of a more diverse and flexible future pipeline.

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SO initiatives

- Submitted on Meridian Fast Track application on access to Pukaki contingent storage (through to 2028) to highlight trade-offs of efficiency vs security - *Complete*
- Special Winter Industry Forum update to provide industry a refresher on information to understand and respond to potential peak risks - *Complete*
- Difference bids refresher workshop (with a live test) with EA and EDBs on 5-Oct - *Complete*
- Engaging with generators to understand operational constraints – *Ongoing*
- SOSFIP updates to be implemented for May Energy Security Outlook – *In progress*
- SOSA 2026 (*In Progress*):
 - Submissions due 14-May
 - Cross-subs due 21-May
 - Final SOSA 2026 publish by 30-June
- Providing input into the EA's SSAD review – *In progress*
- Updating analysis on wind/solar/hydro correlations and risks with latest supply pipeline – *In progress*
- Development work on Emergency Reserve Scheme (ERS) - *In progress*
- Supporting government work on dry-year frameworks (together with EA) - *In progress*



ELECTRICITY AUTHORITY UPDATE

Regulatory action underway

Near-term regulatory action underway

Initiative	Wholesale market	System security	Flexibility
Tools and incentives to manage risk			
Standardised super peak product	✓		✓
Standardised demand flexibility product	✓		✓
Wholesale products for long duration firming	✓	✓	✓
Resources to ensure system security			
Future Security and Resilience (FSR)*		✓	
Battery Energy Storage System (BESS) enhancements*	✓	✓	✓
Multiple Frequency Keeping (MFK) review*		✓	✓
Emergency Reserve Scheme		✓	✓
Frameworks and settings			
Security standards review	✓	✓	
Support Government's energy package (dry-year framework)**	✓	✓	

*Detailed update on these initiatives to be provided as part of maintaining grid stability deep dive

**Government initiative, supported by the Authority and System Operator

Industry Liquid Fuels for Transport

- As NEMA Electricity Sector Co-ordinating Entity Transpower proactively sought information from participants as to their weekly liquid fuel use to undertake “keeping the lights on” and “fixing if broke” functions to provide a prompt response to Government should they require information as part of fuel management plan
- Over period of 3 weeks have received feedback from all major generators, Transmission, and most distribution companies.
- Range of fuel supply methods including central bulk bowser, retail purchase, universal fuel cards, and more
- Use approximately 750,000 litres of liquid fuels majority diesel for vans, trucks, utes, etc
- Like covid includes organisation and key service providers and contractors such as oil filter specialists, traffic management, vegetation, etc
- Cost increases across the board are the single largest risk to be managed and options to mitigate customer impacts are a trade off against increase asset failure risk such as deferred maintenance etc.

Impact on Security of Supply

- System Operator is closely monitoring any potential impacts on SOS and get updates from generators.
- Capacity: Contact's Whirinaki diesel generator (156 MW) is a key contributor during capacity constrained periods.
 - Contact have not indicated any potential risk to it's operation during peak load periods. They are closely monitoring.
 - We reflect peak capacity risks using NZGB which shows the ability to supply peak load periods over the next 200 days.
- Energy: The key risk here is the ability to import coal from Indonesia for Genesis's Rankine units.
 - Our latest update from Genesis is that this ability is not restricted but is more expensive.
 - Counteracting impacts is a large stockpile in place (~1.1 MT). This is enough to run a Rankine unit continuously for ~405 days (or all three for ~4.5 months).
 - Some domestic supply (~10kT per month)

Current stability phenomena

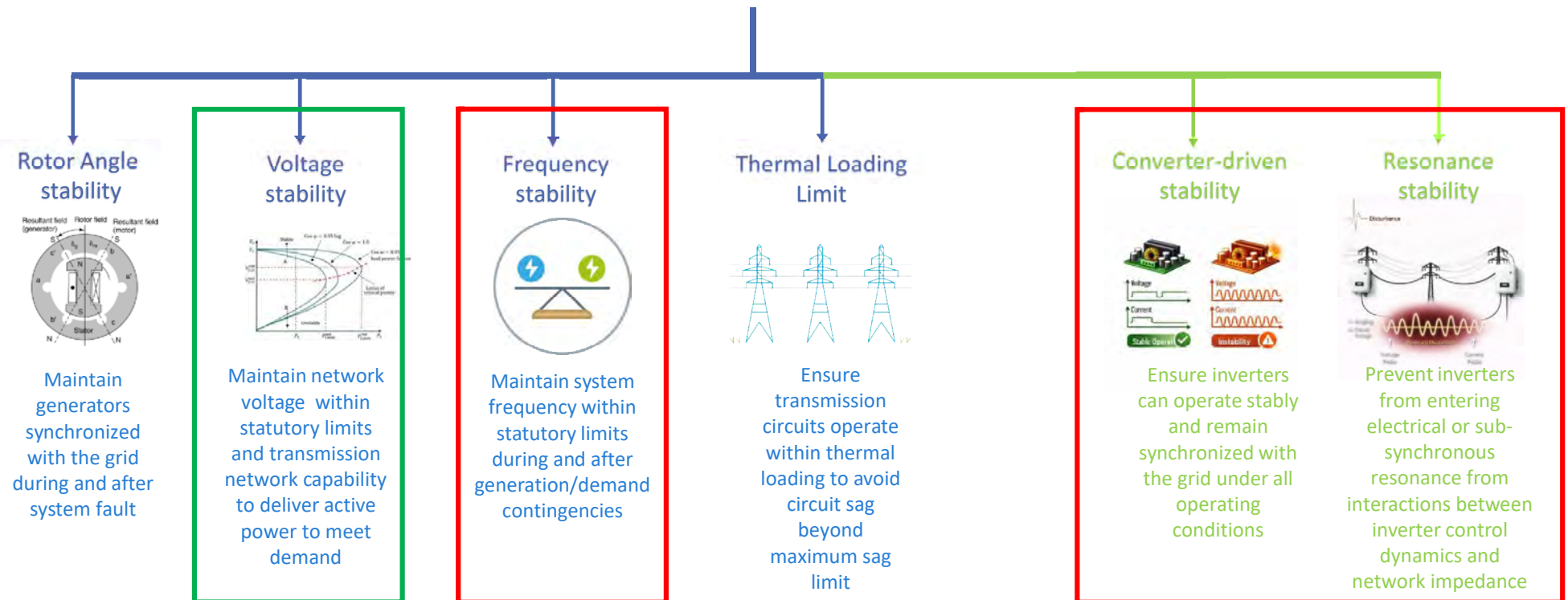
Emerging stability challenges

Energy transition
&
electrification

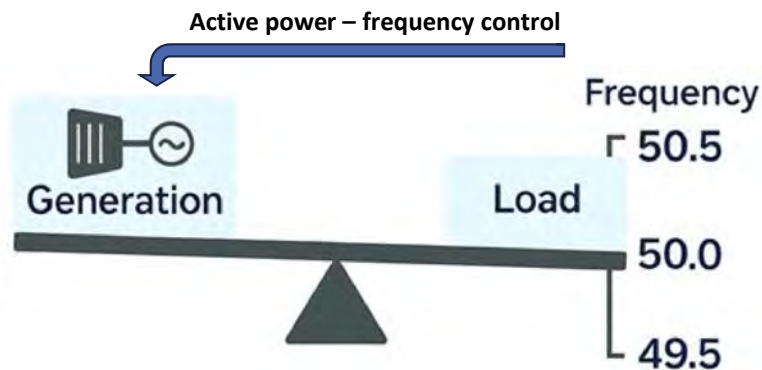
Power System Stability Classifications

Stability Classifications

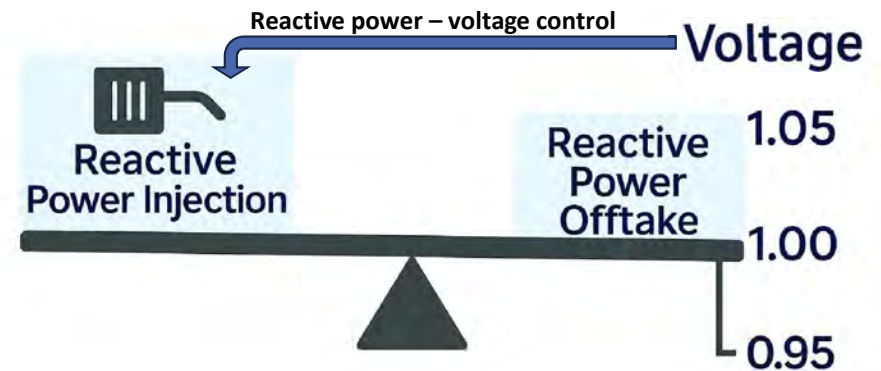
Power system stability classifications



Active and reactive power control to maintain frequency and voltage



Inertia from synchronous machines slows the rate of change of frequency for a given generation-load imbalance



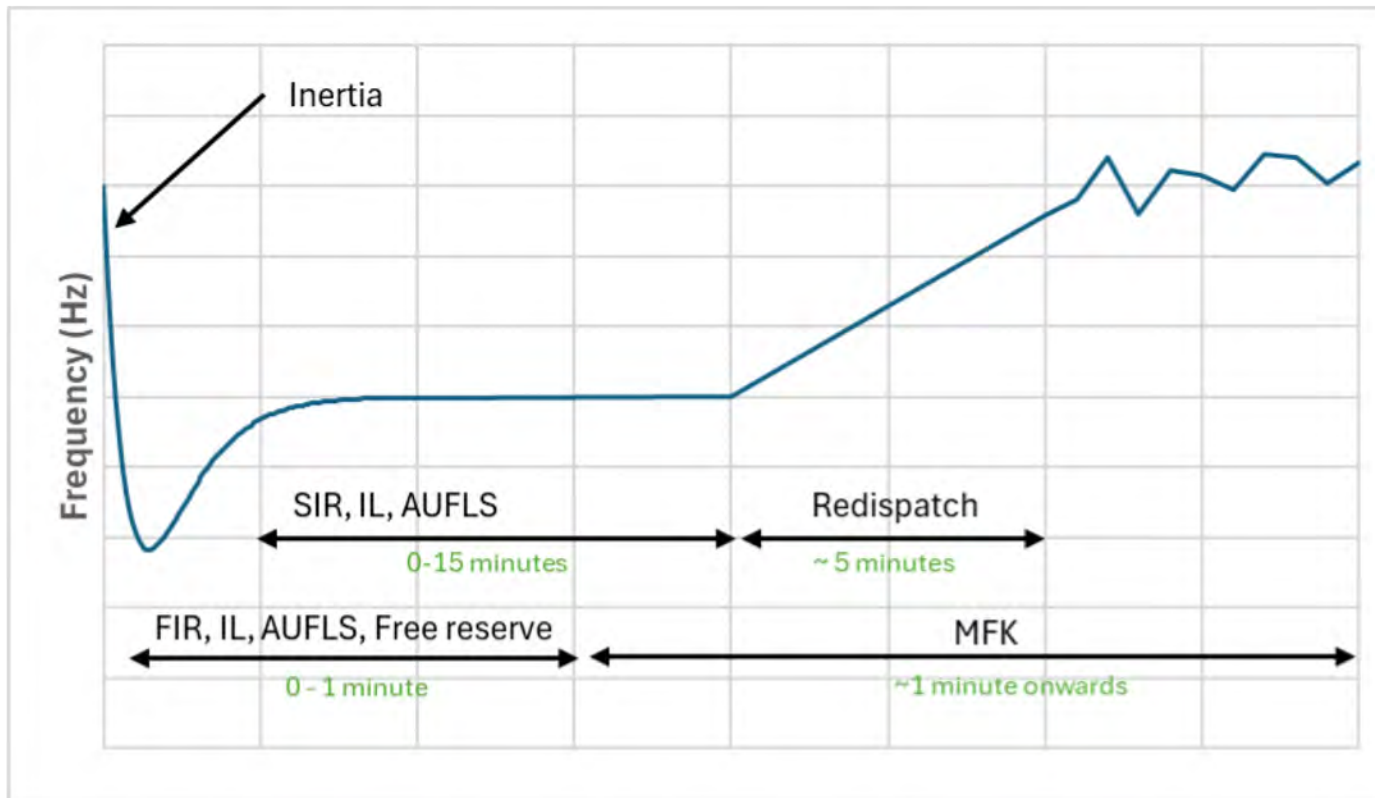
System strength from synchronous machines reduces the voltage deviation for a given change in reactive power

- Synchronous machines naturally provide stabilisation characteristics for both frequency and voltage
- Reduction in the **overall** proportion of synchronous machines creates **frequency stability challenges**
- Reduction in **regional** proportion of synchronous machines creates **voltage control / converter driven stability challenges**



Classification

Frequency Stability



Frequency stability is the power system's ability to keep a constant 50 Hz, both during normal operation and following disturbances like load or generator changes.

SIR - Sustained Instantaneous Reserve
FIR - Fast Instantaneous Reserve

AUFLS – Automatic Under Frequency Load Shedding
MFK – Multi Frequency keeping

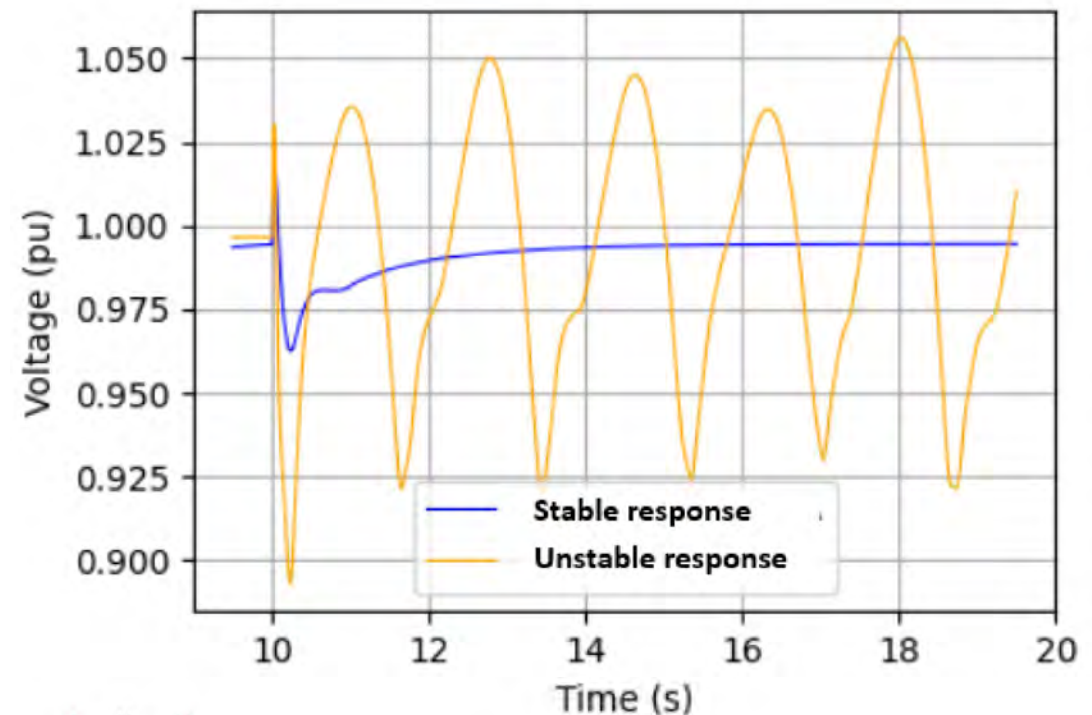
IL - Interruptible Load

Classification

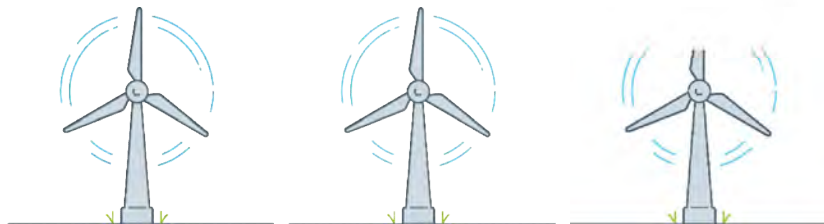
Converter-driven and Resonance Stability

Converter-driven stability deals with inverter control system instability. This is heavily influenced by the technology type behind the power electronics, controller tuning, and the strength of their connection to the network.

Resonance stability deals with sub-synchronous resonance issues, primarily focused on resonance related interactions between generators, reactive power devices or power electronic devices



Example converter driven stability for an IBR connection

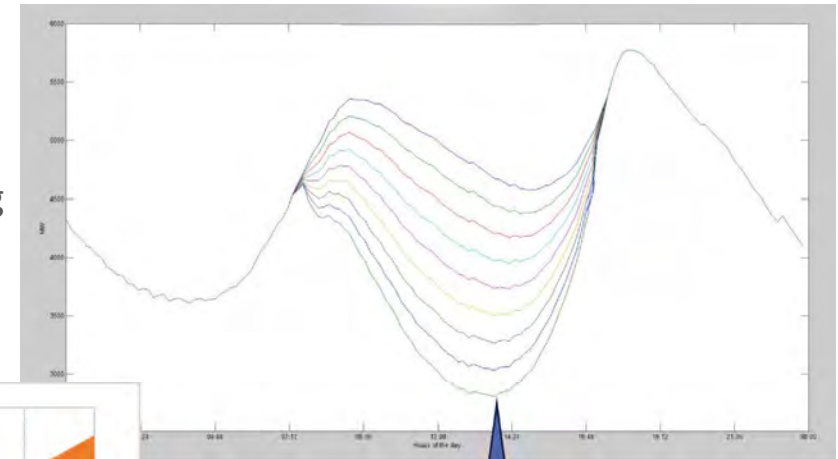
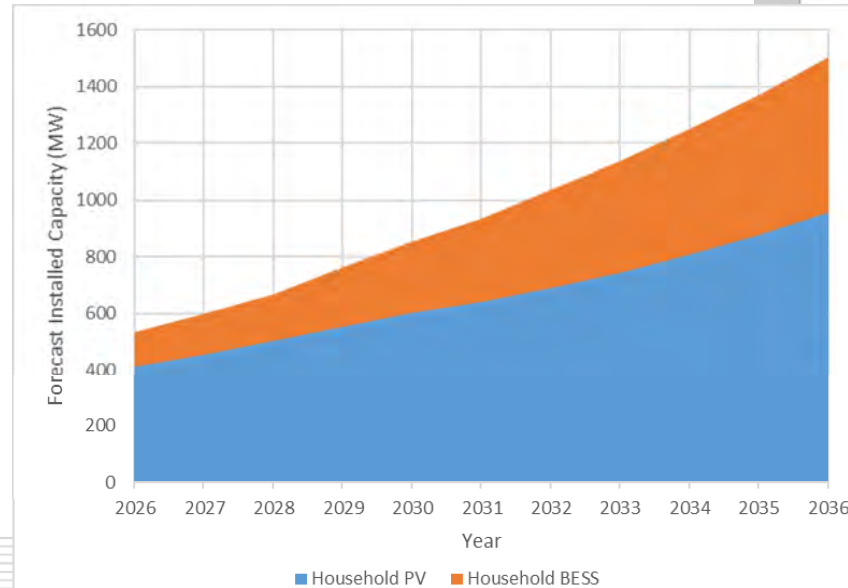


An aerial photograph of a town at night, illuminated by warm lights, situated on a hillside overlooking a large body of water. In the background, a range of mountains with snow-capped peaks is visible under a clear sky. The text "Effects of high penetration of IBR and DER on generation dispatch" is overlaid in white on the lower left portion of the image.

Effects of high penetration of IBR and DER on generation dispatch

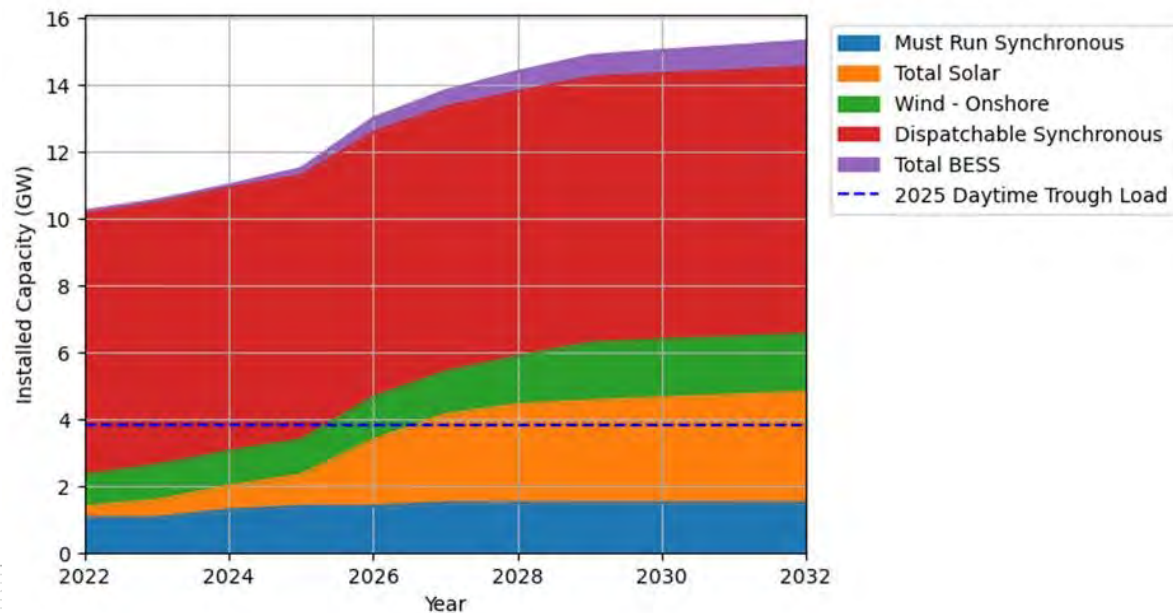
System-wide uptake of intermittent IBR and DER

- Increased DER leads to a decrease in net demand at GXP's.
- Growth of rooftop solar may cause mid-day demand to drop below nighttime levels - a duck curve effect.
- In extreme situations, power can flow back into the grid, causing reverse or bidirectional power flow challenges.
- Ultimately, DER replaces synchronous generation.



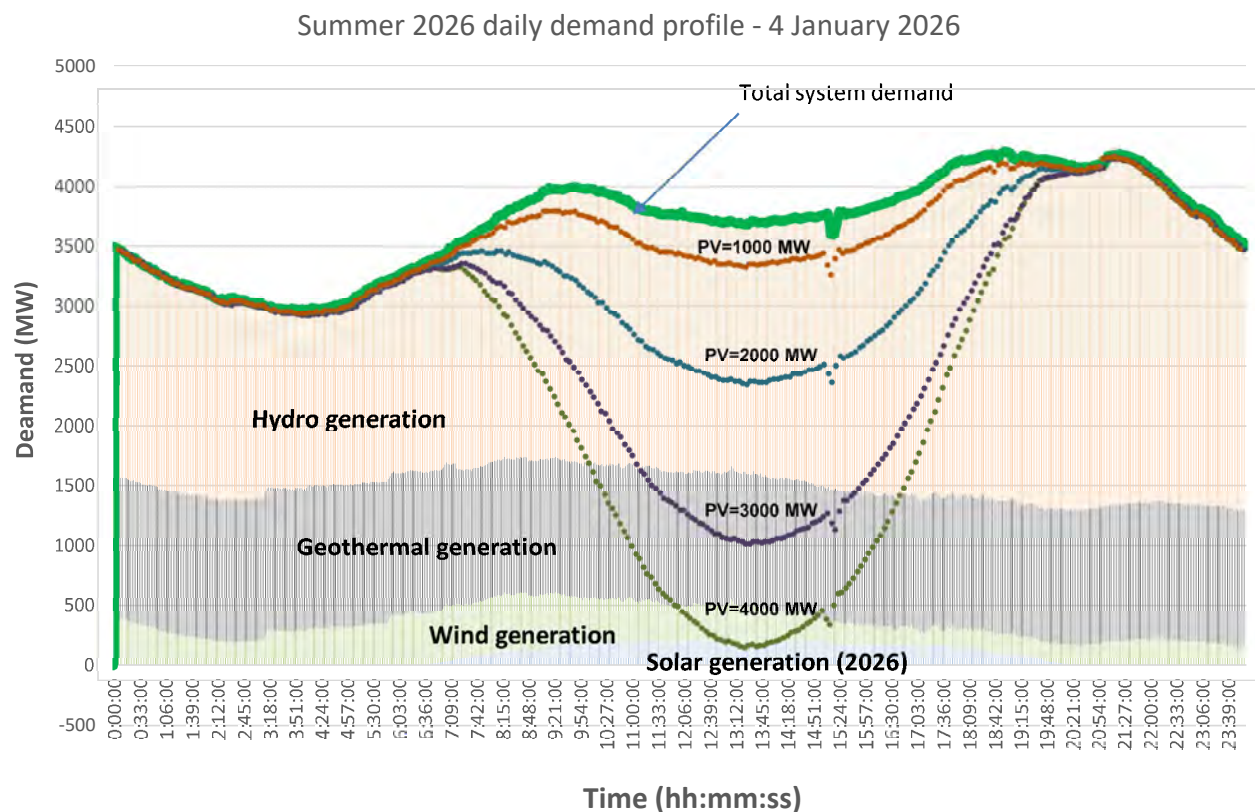
System-wide uptake of intermittent IBR and DER

- More grid-connected IBR results in less grid-connected synchronous generation.
- High wind and solar output at midday causes the most displacement of synchronous generation.
- Increased geothermal generation increases the share of 'must run' generation.
- Solar, wind and must-run synchronous generation **installed capacity** can be more than the day trough demand in 2026.
- In 26/27, 781 MW of solar, 102 MW of wind, 100 MW of BESS and 102 MW of Geothermal will be commissioned.



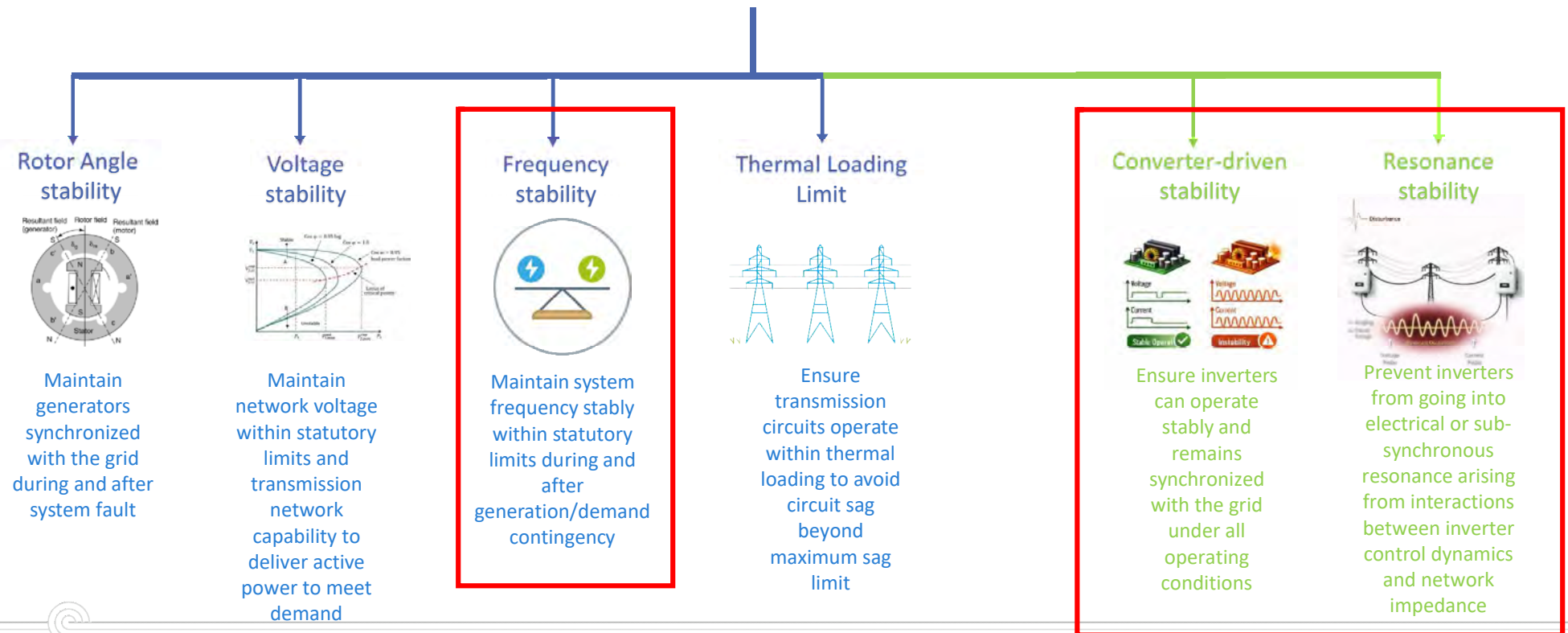
System-wide uptake of intermittent IBR and DER

- More grid-connected PV reduces synchronous generation on the grid.
- PV affects midday generation, while wind impacts during high wind times.
- Peak demand is expected to rise by about 300 MW annually.
- Midday demand forecasted to increase by 20-30 MW annually.
- Remember this number **PV = 2000 MW**.



Stability Classifications

Power system stability classifications



Frequency Normal Band



Future challenges

Intermittency of energy source causes fluctuations in frequency.

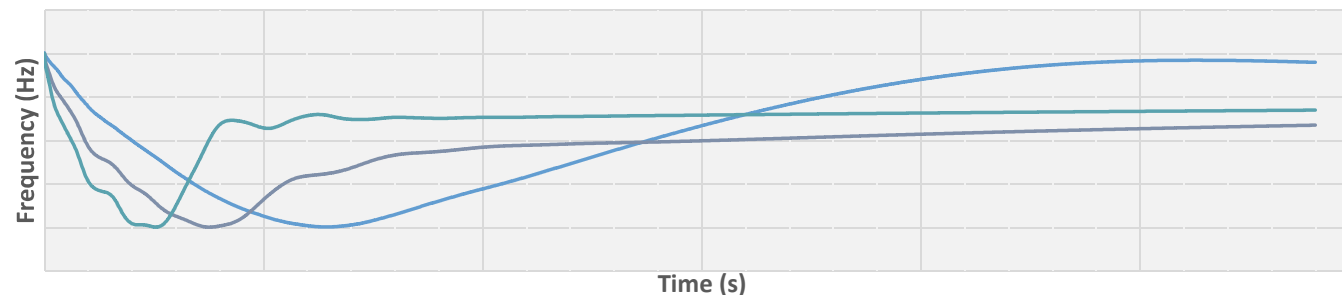
Solar and wind tend to run at maximum output, unable to increase output to regulate frequency.

A system largely powered from geothermal and IBRs will have less 'free' regulation of frequency in the normal band.

Large step changes in loads during data centre AI training algorithm cycles.

Potential intermittent generation challenges from DER solar PV similar to grid-scale solar.

Frequency Contingent Event



Future challenges

Lower inertia due to displacement of synchronous generation with IBRs. System needs to deal with faster rate of change of frequency.

Less free reserve as solar and wind tend to generate at maximum capacity.

Potential over-frequency issues from large loads (e.g. data centres) failing to ride through system disturbances.

Potential ride-through issues with DER, as the tripping of DER for frequency events could impact security.

Upcoming challenges affecting power system stability

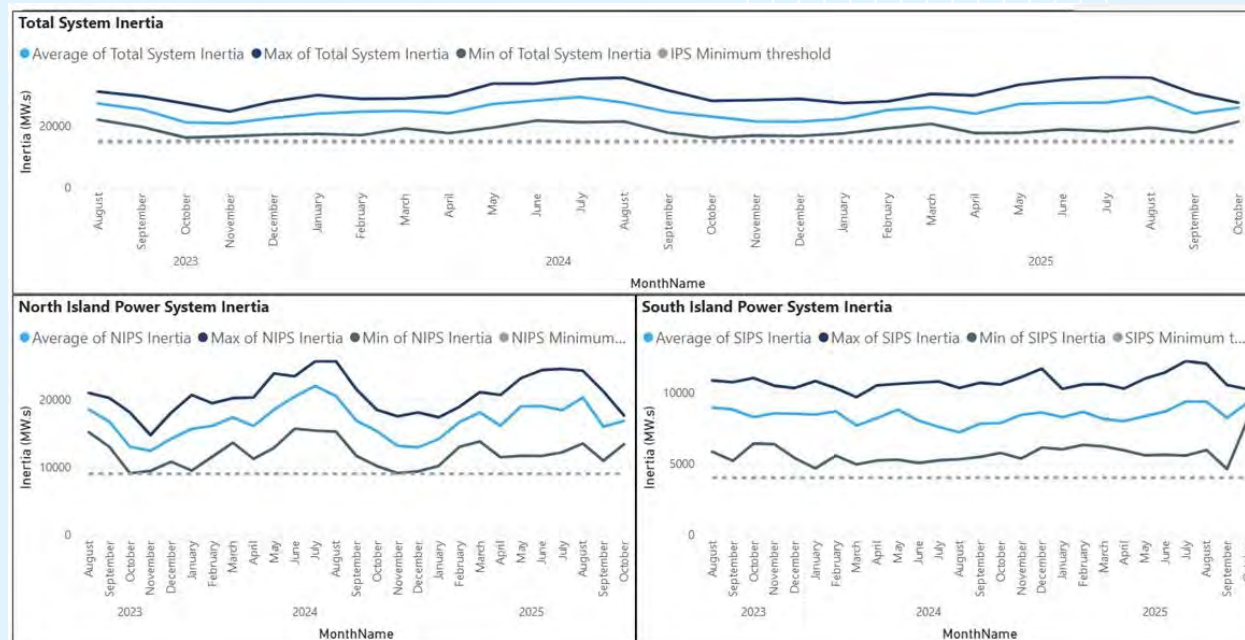
What if we do nothing?

Lowering inertia due to reduced synchronous generation

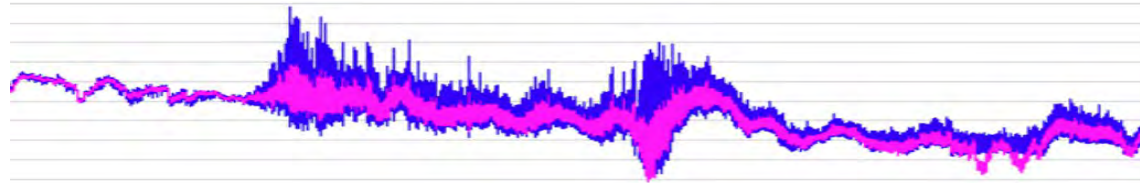
- As inertia drops on the power system, the rate of change of frequency (RoCoF) increases, making frequency security harder to manage.
- If left unmitigated, frequency reserves would be over-procured, increasing the overall quantity to realise an overall faster response on the system.
- Potentially insufficient levels of energy and reserves to securely meet the demand.

Increasing proportion of generation from intermittent sources

As the levels of intermittency on the power system increase, the continuous imbalance of power will affect normal band frequency management.



System Strength



Future challenges

Displacement of synchronous generation reduces overall strength of the power system, particularly for IBR connections.

IBRs, having no or little mechanical limitations, are capable of very fast response both for voltage and frequency control, which need careful tuning.

New load types may introduce or exacerbate control interaction instability. The potential for controller instability in low system strength conditions needs to be monitored closely.

Established analysis techniques for synchronous generator dominated system no longer adequate to identify stability issues in an IBR dominated power system. Continuous development required to remain up to date in a rapidly evolving environment.

Upcoming challenges affecting
power system stability

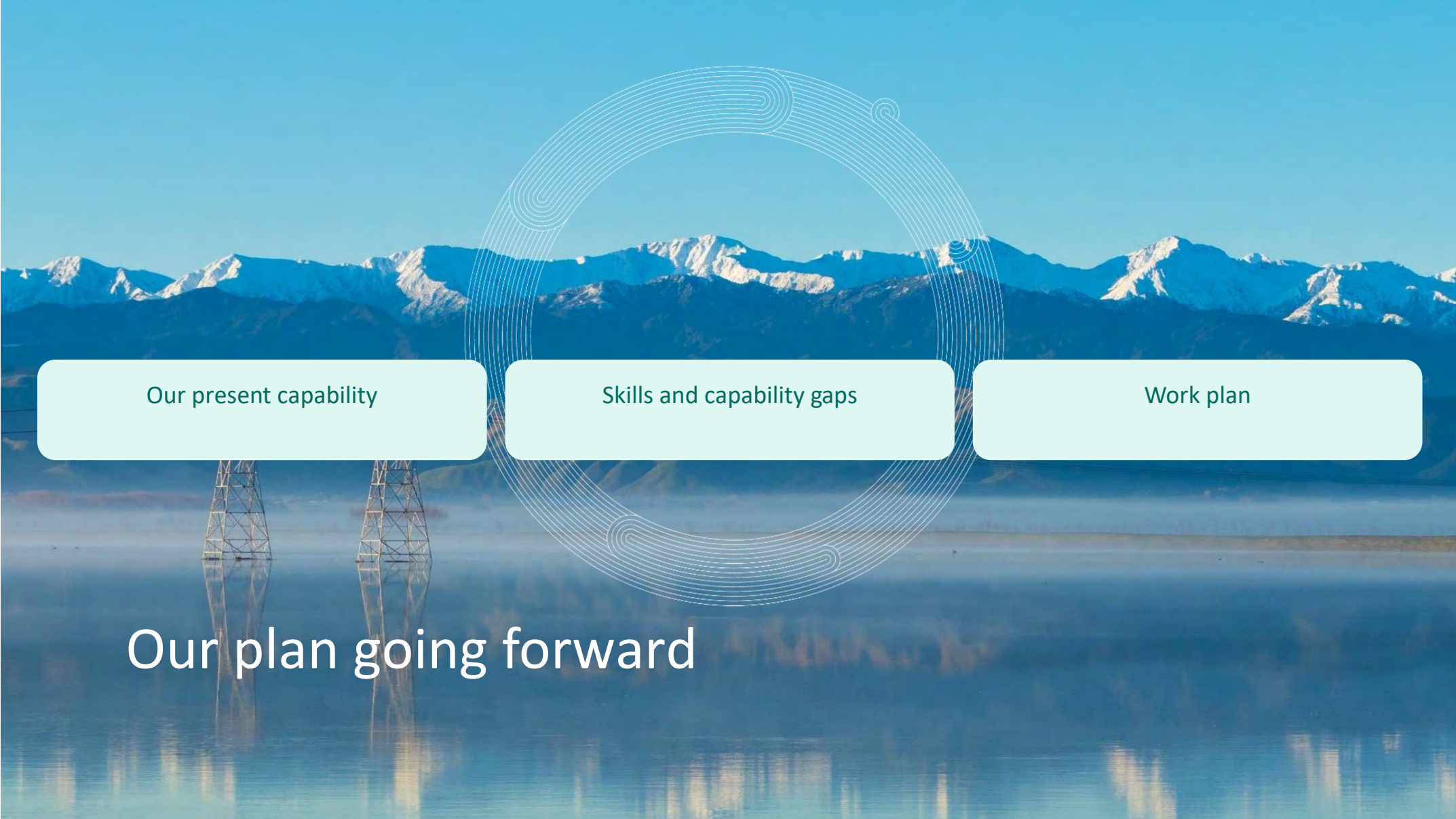
What if we do nothing?

Low system strength IBR connections

IBRs connecting in low system strength conditions, or in close proximity to existing IBR connections, may have challenges maintaining stable voltages and remaining in step with grid voltage. Poorly tuned connections can cause unmitigated oscillations on the power system, potentially involving multiple connections and causing widespread system collapse.

New and rapidly evolving IBR technologies

The continuing advancement of IBR technology mean we have to ensure our stability analysis techniques are fit for purpose to adequately capture fast power electronic based phenomena. This goes hand in hand with deepening our understanding of these issues, upskilling with the rest of the international power system community. Continuous review of processes and requirements imposed on IBRs will mitigate the risk of being caught unprepared for system events which may not be captured by existing analysis tools and processes.



Our present capability

Skills and capability gaps

Work plan

Our plan going forward

Summary: power system risks and mitigations

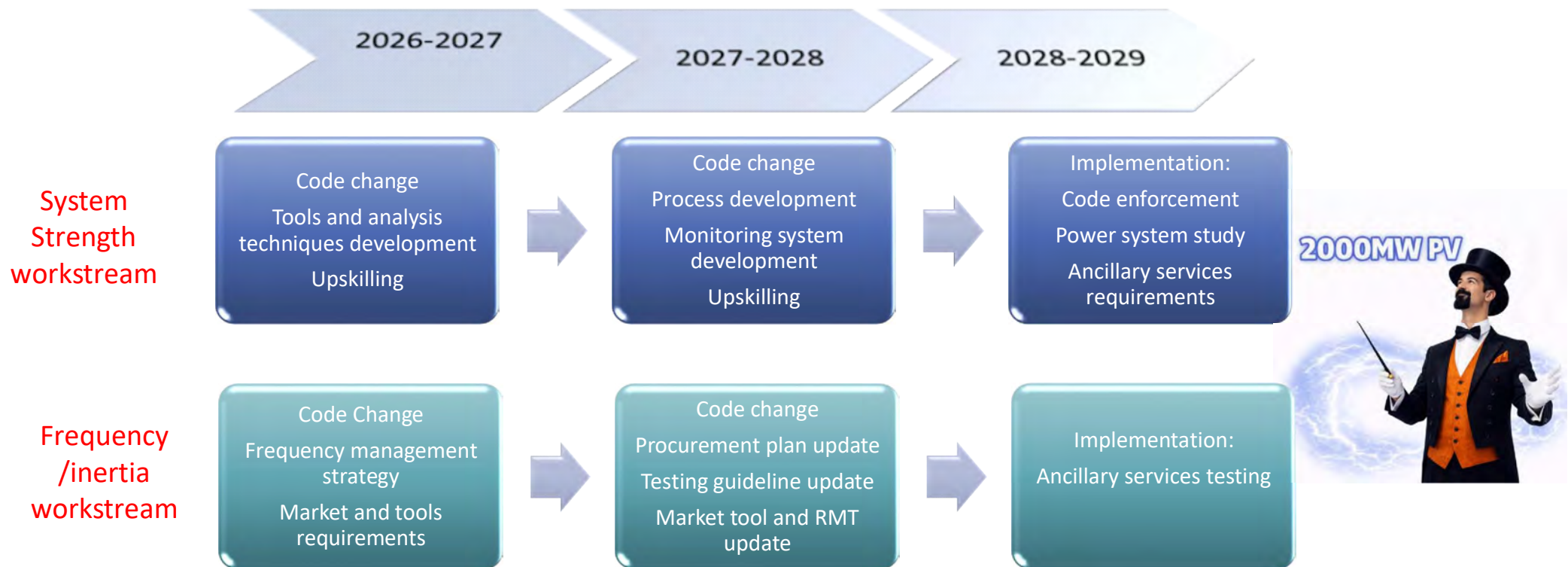
Rotor Angle stability	Voltage stability	Frequency stability	Thermal Loading Limit	Converter-driven stability	Resonance stability
Risks					
Loss of synchronism for generators, with potential tripping, damage and cascade failure	Uncontrollable voltage conditions and unable to transfer electricity leading to cascade failure	Frequency deviates outside statutory limits, with potential tripping and cascade failure	Transmission circuits overload, safety to public with potential tripping and cascade failure	Lack of Fault-ride through, potential tripping of IBR leading to voltage and frequency instability	Poorly-tuned IBRs result in control interaction, oscillatory stability leading to poor power quality. in extreme case, cascade failure
Tools					
SCADA - real-time monitoring of voltage, frequency, circuit loading, and other essential system parameters, enabling informed decisions to ensure secure operation of the power system. Network and asset models - power system data for real-time and offline security assessment. Offline tools like PowerFactory, DSATools, and PSCAD - help engineers evaluate system security for future planning.					
				High-speed monitoring (PMUs) monitor oscillatory stability and fast response phenomena, offering data to engineers for analysis and operational decision-making. <i>Currently not available in control-rooms</i>	

Summary: future needs

Rotor Angle stability	Voltage stability	Frequency stability	Thermal Loading Limit	Converter-driven stability	Resonance stability
Current gap assessment (needs)					
Adequate	Distribution network visibility to mitigate DER risks	Fast frequency reserve and possible tool, enhancements to mitigate frequency stability in low inertia system	Adequate	Increased analytical skills, tools and engineering capability required (SO and Industry) Clear, consistent technical guidelines for studying and testing these issues Increased monitoring equipment for data analysis and online monitoring Detailed asset models to analyse IBR-related issues	

System need and plan

Work planned





Thank you

TRANSPower.CO.NZ



Navigating New Zealand's energy transition

Maintaining grid stability

Security and Reliability Council – Meeting #55

20 May 2026

Purpose

Provide an update to the Security and Reliability Council on addressing grid stability through:

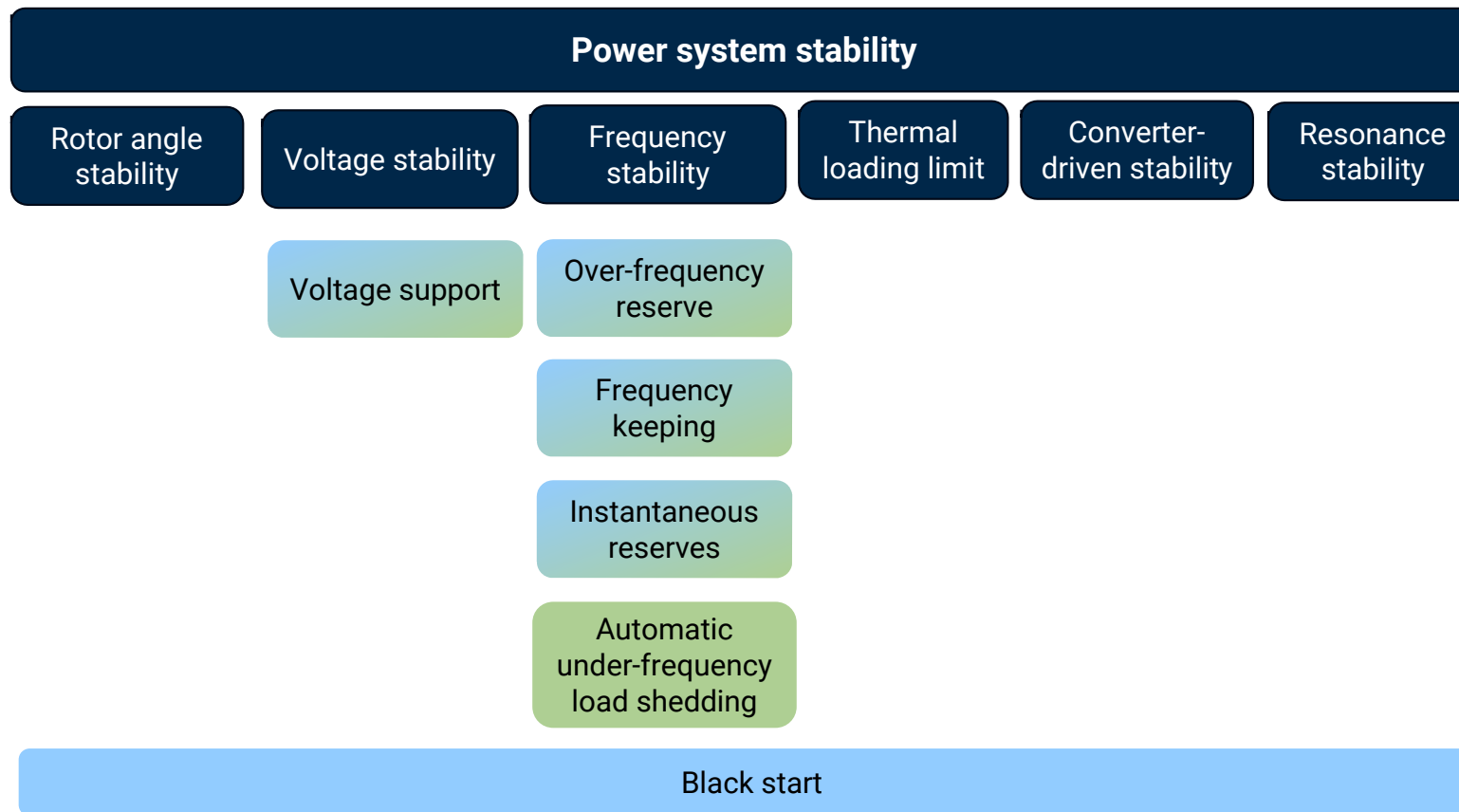
- work under way at the Authority
- work under way with the System Operator
- evidence of emerging risks

GRID STABILITY

FRAMEWORK AND CONCEPTS



Tools to maintain power system stability



Key

- = Ancillary service
- = Rules/standards

Part 8

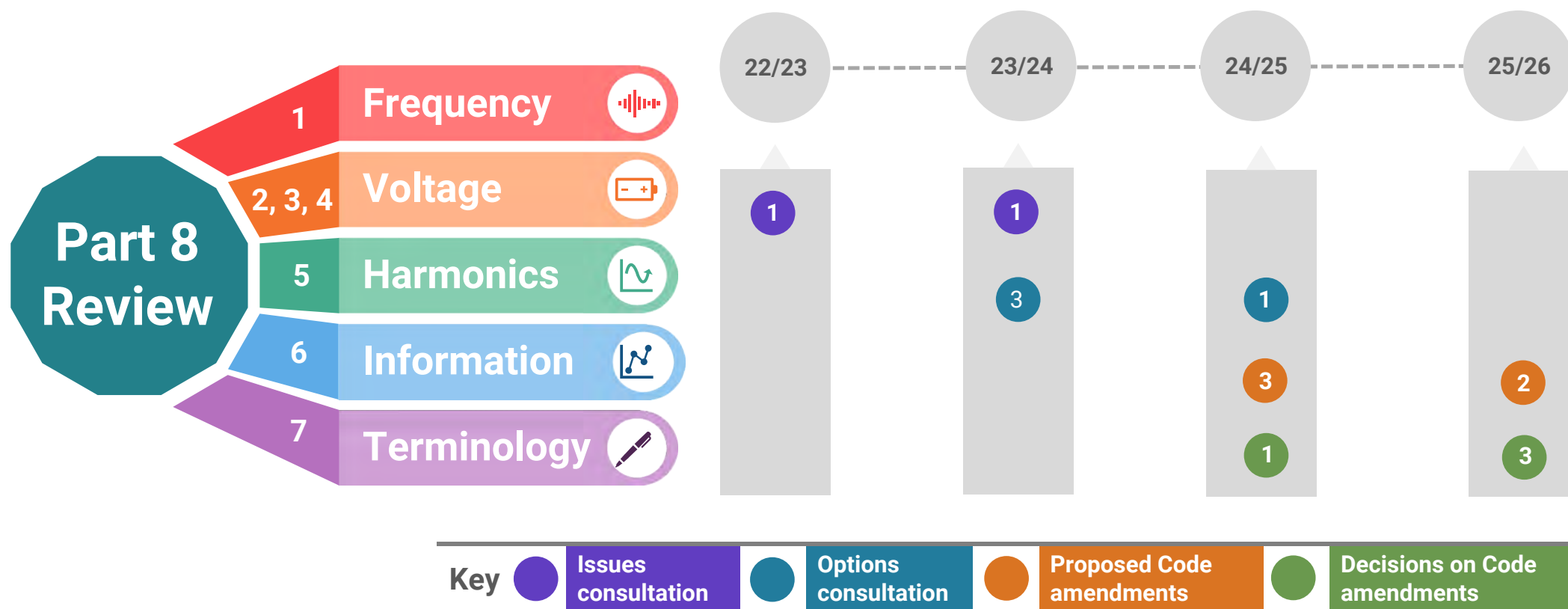
- SO performance obligations
- Asset owner performance obligations (AOPO)
- Ancillary service arrangements
- Technical Codes
- Fault ride through

AUTHORITY INITIATIVES

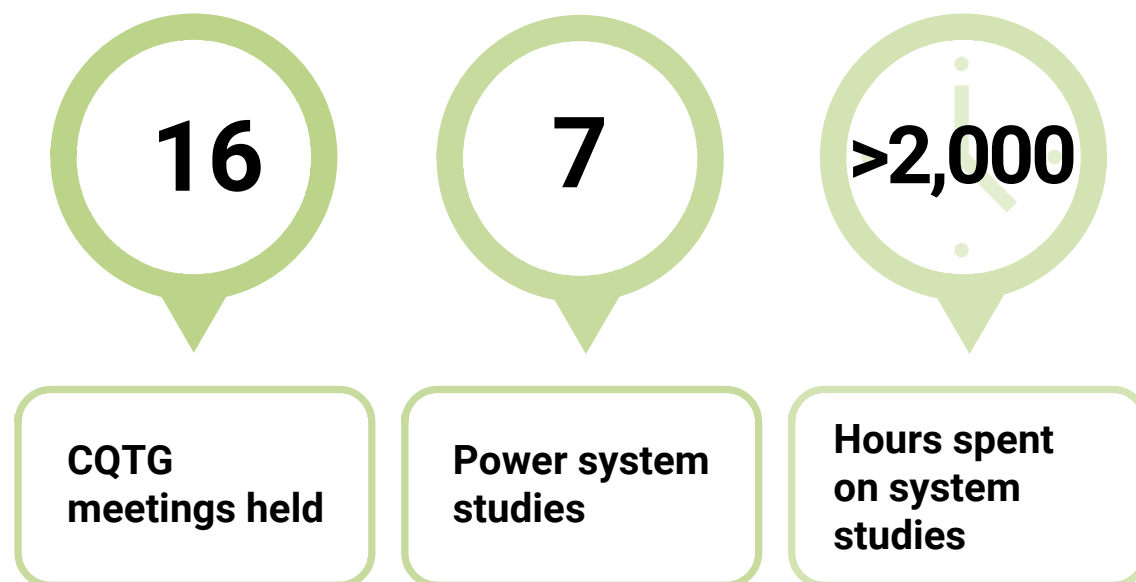
FUTURE SECURITY AND RESILIENCE OPERATIONS POLICY



Future Security and Resilience (FSR) programme – work to date



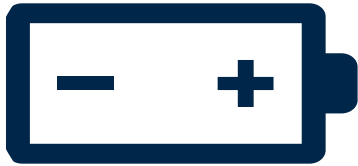
The CQTG & system operator are significant contributors to this project



System studies covered:

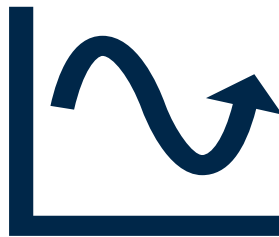
- Defining and developing scope and approach for studies
- Undertaking literature reviews on overseas jurisdictions
- Developing study cases based on 2035, and a baseline of 2023
- Software modelling
- Running studies and analysing results
- Producing study reports, reviewing and updating reports

Operations Policy – Managing peak demand and system variability



Battery Energy Storage System (BESS) & BESS-hybrid enhancements

- Trading arrangements (Part 13)
- Common quality obligations (Part 8)



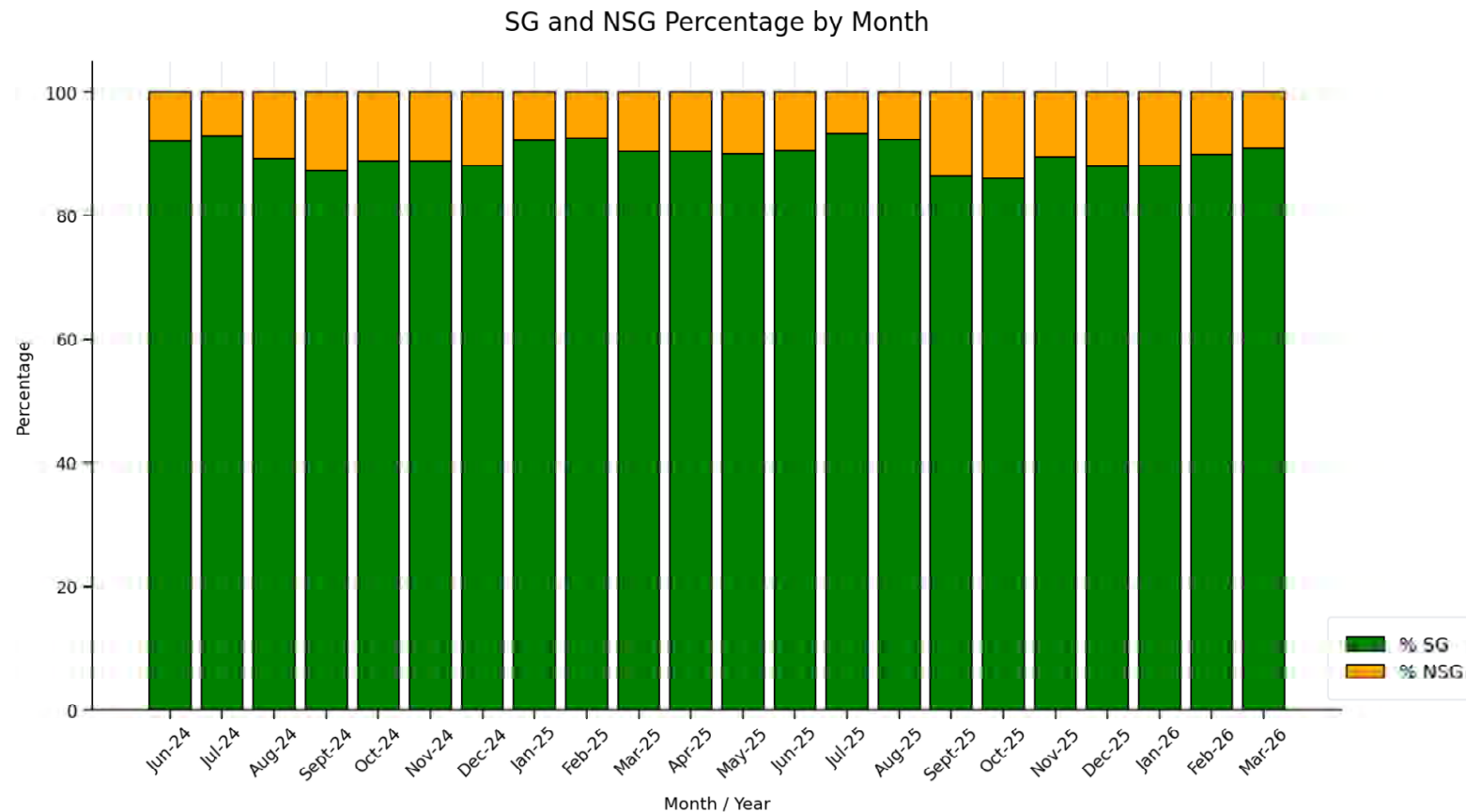
Multiple Frequency Keeping (MFK) Review

- Review MFK performance
- Frequency Strategy

DATA AND INSIGHTS



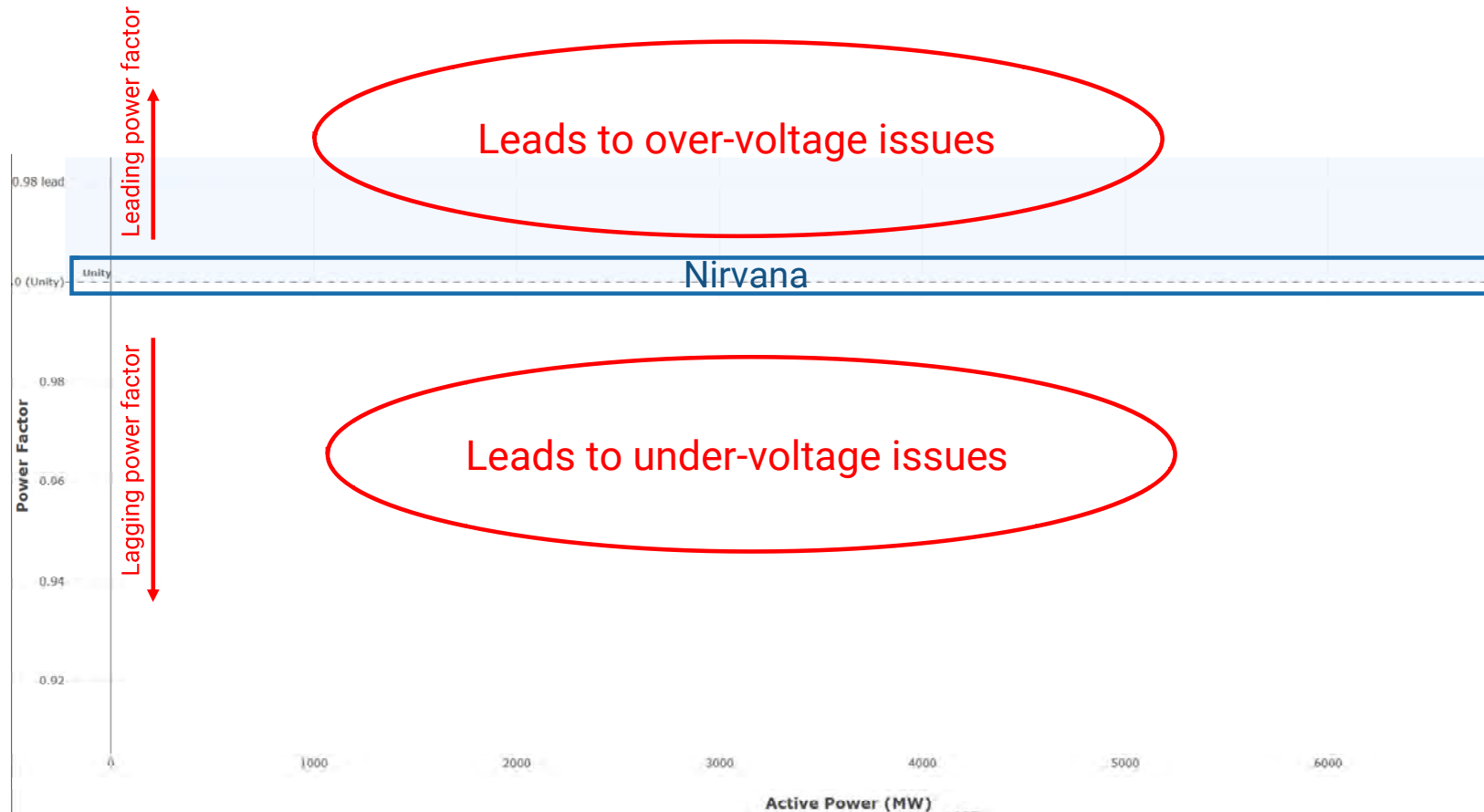
What we are observing- Generation



SG: Average synchronous generation (hydro, geothermal, thermal & cogen): 89.9%

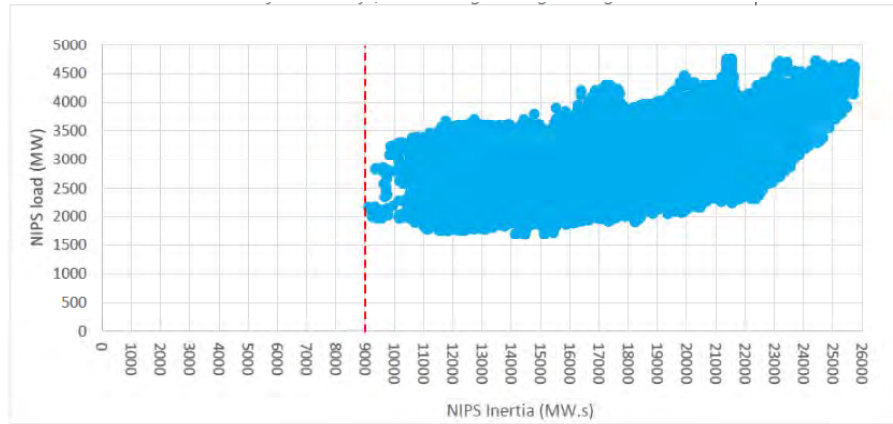
NSG: Average non-synchronous generation (wind & solar): 10.1%

What we are observing- Power factor

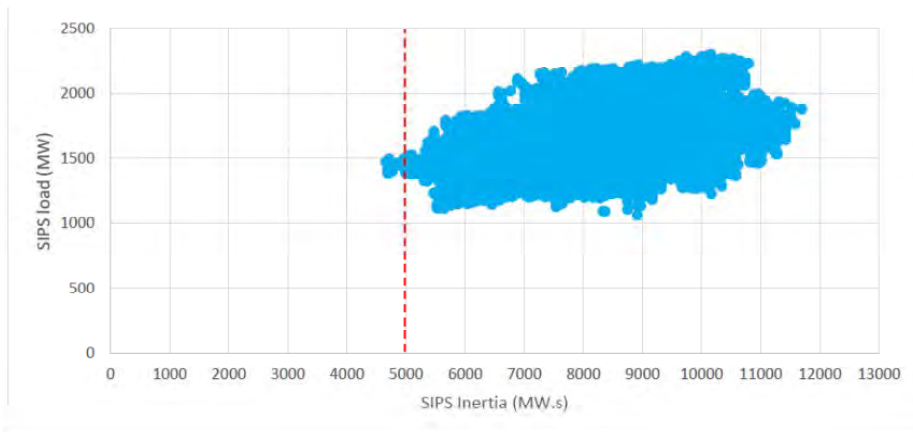


[Link to graph: https://dihume.github.io/nz-power-factor/](https://dihume.github.io/nz-power-factor/)

What we are observing- System inertia (observed in 2024)

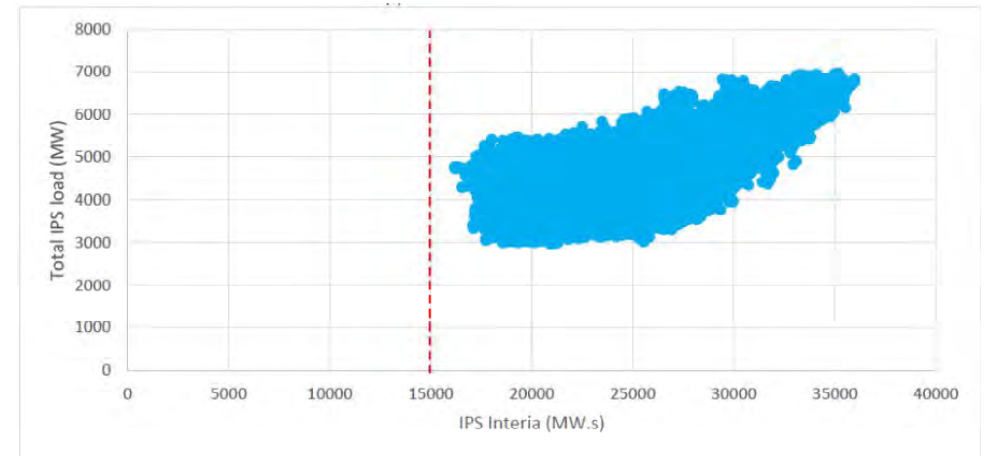


Scatter plot: North island system inertia



Scatter plot: South island system inertia

Link to report: [MINIMUM SYSTEM INERTIA](#)



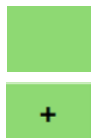
Scatter plot: Combined (North and South islands) system inertia

UPCOMING WORK



Next steps

Challenges & Opportunities	Activity	Year 1 22/23	Year 2 23/24	Year 3 24/25	Year 4 25/26	Year 5 26/27	Year 6 27/28	Year 7 28/29	Year 8 29/30	Year 9 30/31	Year 10 31/32
Accommodating future changes within technical requirements	Review and update Part 8 of the Code			+	+	+	+				
	Review and update Parts 1, 6, 7, 13, 14 of the Code to ensure they align to Part 8	→	→	→				+			
	Identify standards to support technical requirements in the Code	→	→				+	+	+	+	+
	Update the Policy Statement to manage emerging risks	→	→	→	→						
	Update the System Operator's policies, procedures, guidelines and tools		→								
Operating with low system strength	Investigate system strength challenges and opportunities										
	Amend the Code to support performance criteria				→	→					
	Develop suitable market products and tools			→	→						
Balancing renewable generation	Improve market system and generation/demand forecast					+					
	Consider new or revised ancillary services to maintain balancing					→	+				



Task has progressed as planned

+

Task extended



Task brought forward



Task deferred



Large-Scale Solar Farms – Australian Power System Experience

Nilesh Modi

Security and Reliability Council Meeting | 20 May 2026



Australian and New Zealand power system

- Australian NEM: Renewable generation dominated by wind and solar
- New Zealand: Renewable generation dominated by hydro

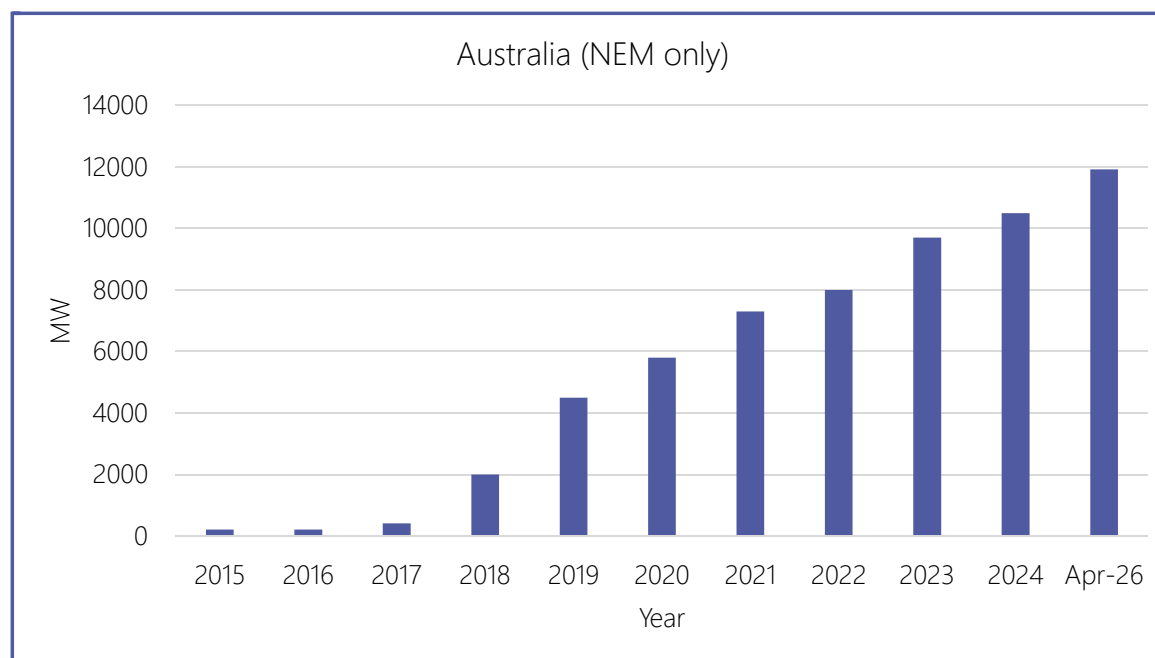
Attribute	Australian NEM	New Zealand
Installed capacity	~90 GW including ~23 GW of rooftop solar PV	~11 GW (as of 2023)
Annual energy	~200 TWh traded through the NEM in FY25	~43 TWh (as of 2023)
Generation mix	Coal, rooftop and utility-scale PV, wind, gas, hydro ~43% Coal, ~16% Gas, ~41% Renewable	Hydro, geothermal, wind, gas, small coal ~5% Coal, ~9% Gas, ~86% Renewable
Transmission length	~40,000 km of high-voltage line; ~5,000 km end-to-end (Port Douglas QLD to Port Lincoln SA)	~11,800 km of high-voltage line; ~1,600 km end-to-end (Cape Reinga to Bluff)
Synchronous structure	One mainland 50 Hz AC system; Tasmania islanded and joined via HVDC	Two separate 50 Hz AC islands joined only by HVDC across Cook Strait

Australia has experienced rapid growth in inverter-based generation connected to long, electrically weak transmission networks, creating system stability challenges that NZ may encounter as large solar develops.



Transmission-connected Solar Farms

- Examples of large (>400 MW) transmission connected solar farms in Australia
 - Aldoga Solar Farm (~390 MW AC)
 - Wellington North Solar Farm (~436 MW AC)
 - Western Downs SF (~400 MW AC)
 - New England Solar (~400 MW AC)

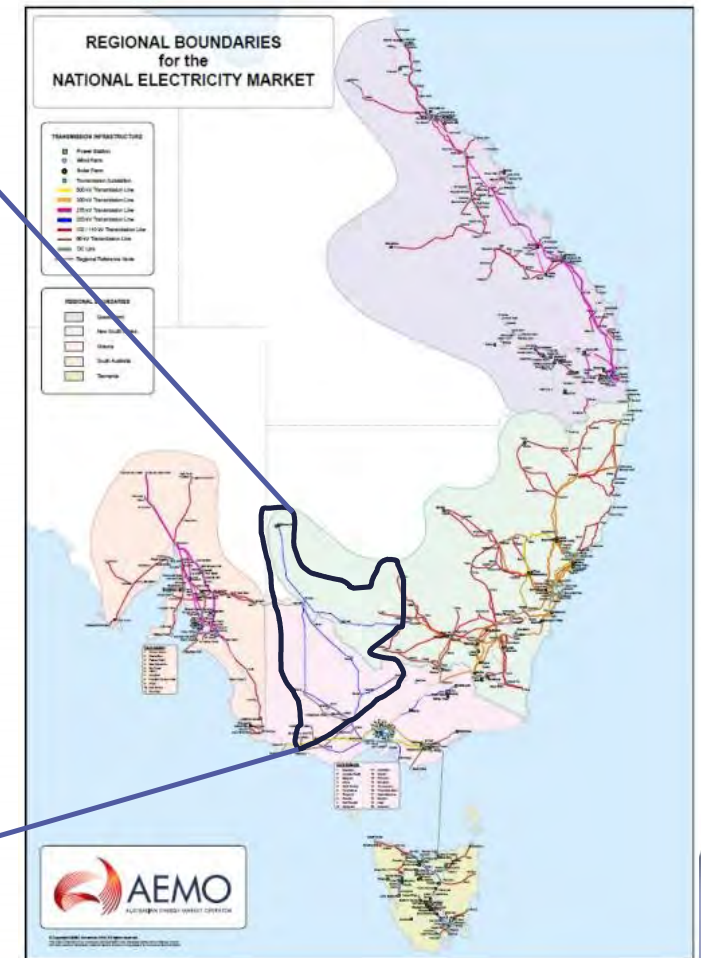
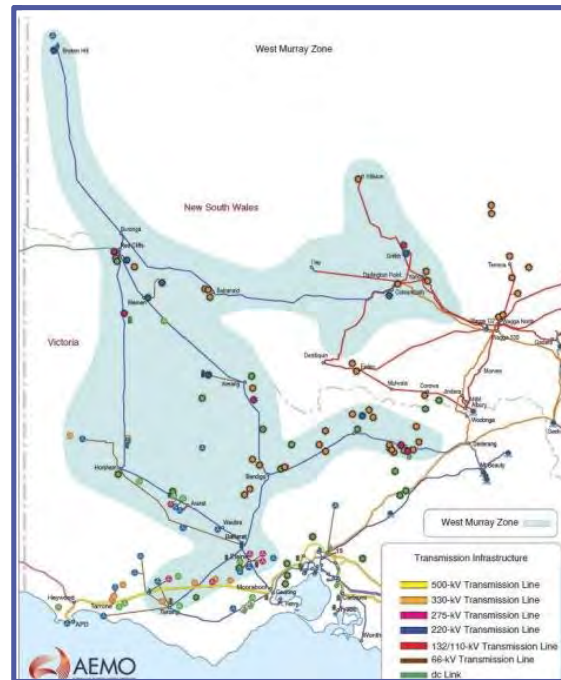


Rapid growth of utility-scale solar capacity since 2017

Source: [AEMO Generation Information Page](#), [Clean Energy Council Reports](#)

West Murray Zone

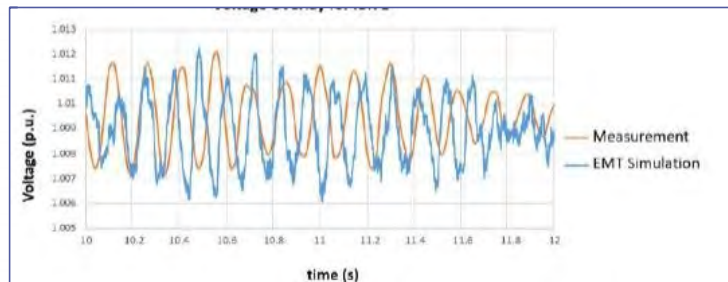
- South-West of NSW and North-West of Victoria
- High concentration of inverter-based resources (wind farm, solar farm, batteries, HVDC)
- 220 kV, largely radial network



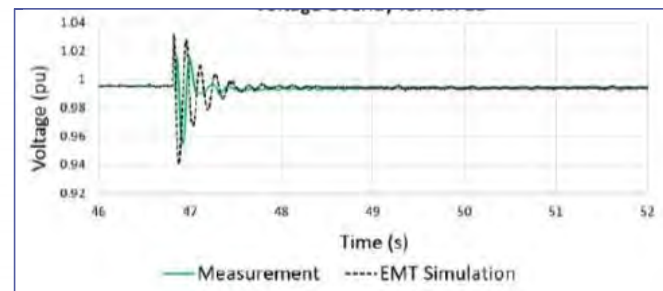


Weak grid and control interaction

- 8 – 10 Hz of voltage oscillations, initially observed in simulation and later confirmed via real-time staged testing.
- About 7 months of constrained generation (output capped to 50%)



Before Solar Farm Tuning



After Solar Farm Tuning

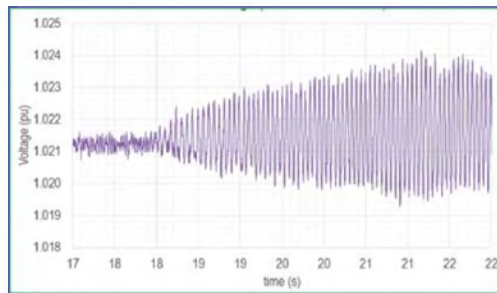
... Solar farms bleeding at a combined rate of \$1 million in revenue lost each day.... (source: pv-magazine)

Risks: Revenue/Finance, Supply shortfall, Power Quality, System Security (resonance, equipment damage, voltage collapse, poor damping)

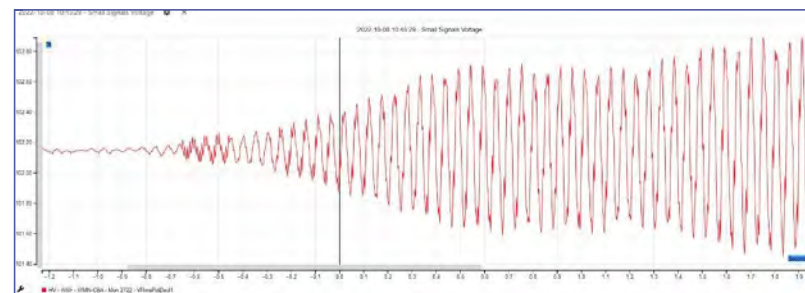


Weak grid and control interaction

- 17 – 19 Hz oscillations, first identified during a system incident investigation.
- Intermittent, duration ranging from a few seconds to several minutes.
- Contained within North-West of Bendigo (VIC) and west of Darlington Point (NSW).



Simulation



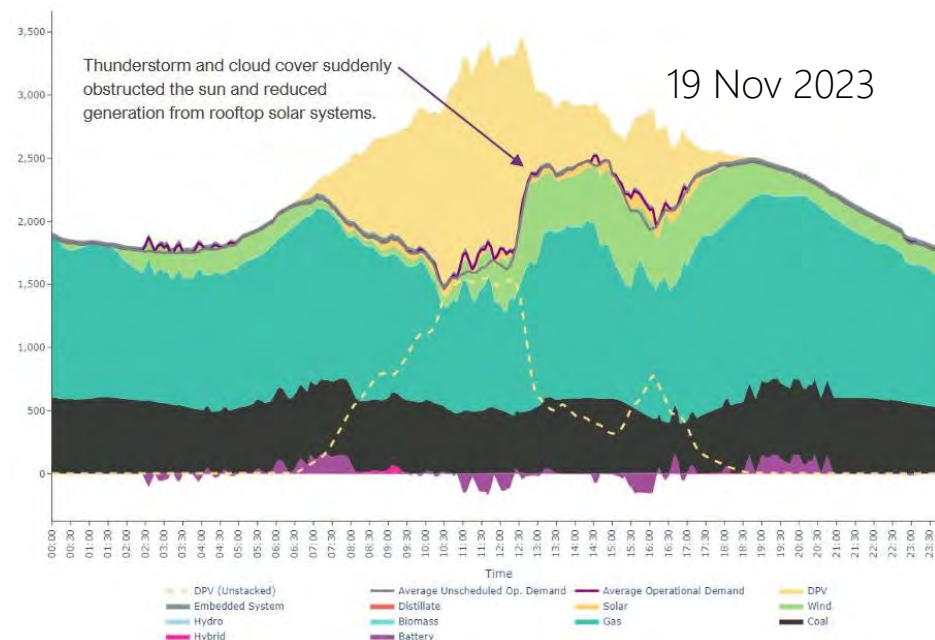
Field Measurement

Risks: Power Quality, System Security (resonance, equipment damage, voltage collapse, poor damping)



Cloud cover

- South-West Interconnected system
- Approx 4GW peak system
- 1600 → 2385 MW increase (equates to 49% increase) over 40 min



Rapid cloud-driven solar ramp resulted in a ~800 MW net change over 40 minutes, stressing frequency control and reserve requirements.

NZ hydro can provide ramping, but simultaneous solar ramps across regions could challenge reserve planning and frequency control procurement.

Risks: frequency control, ramping reserve



Recent power system events

Dominating Category	Details
Fault Ride-Through	Solar farms tripped during transmission faults
Control interaction	Inverter or plant-level control behaviour amplified disturbance
Voltage / Reactive	Solar farm reactive power response contributed to voltage instability

- Multiple transmission-connected solar farms tripped following a 275 kV transmission fault due to protection settings not meeting ride-through expectations.
- Transmission fault resulted in loss of multiple inverter-based resources including transmission-connected solar farms.
- Solar farms exhibited rapid reactive power withdrawal exacerbating voltage depression after network fault.
- Transmission disturbance led to unexpected disconnection of several large solar farms due to control system interaction.

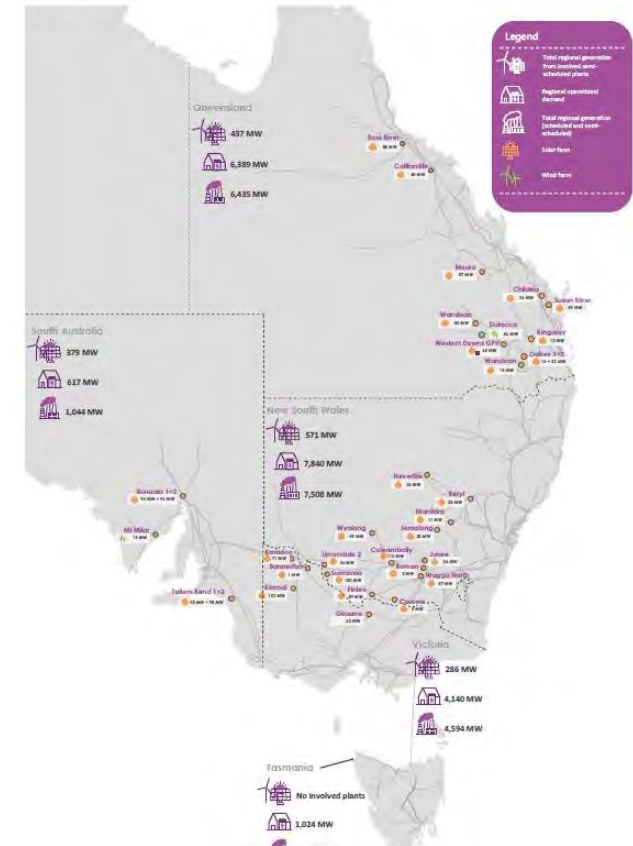
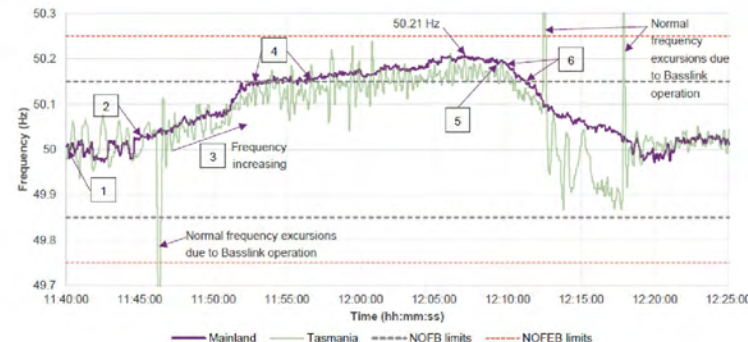
Key takeaway: Many issues emerged after commissioning, highlighting gaps between connection studies, model accuracy, and real-world performance.

Source: <https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-events-and-reports/power-system-operating-incident-reports>



Information technology event

- Self-forecasting errors and frequency excursion on 19 Aug 2025
- Software update, 34 sites affected
- 1700 MW of excess generation led to high frequency (50.21 Hz) event
- Common-Mode failure risk



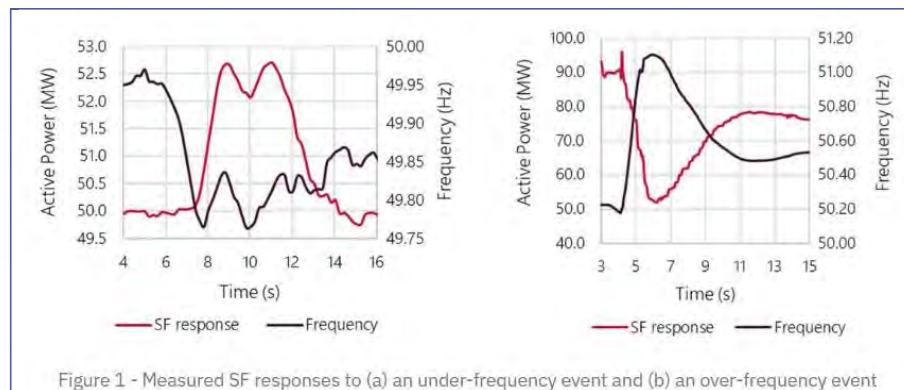
Risk: Common-mode failure

https://www.aemo.com.au/-/media/files/electricity/nem/market_notices_and_events/power_system_incident_reports/2025/self-forecasting-errors-and-frequency-excursion-on-19-august-2025.pdf



Opportunities

- Voltage control through night-mode operation
 - In application at 60MW Chichester solar hub in Pilbara network.
- Fast frequency response from Solar Farms

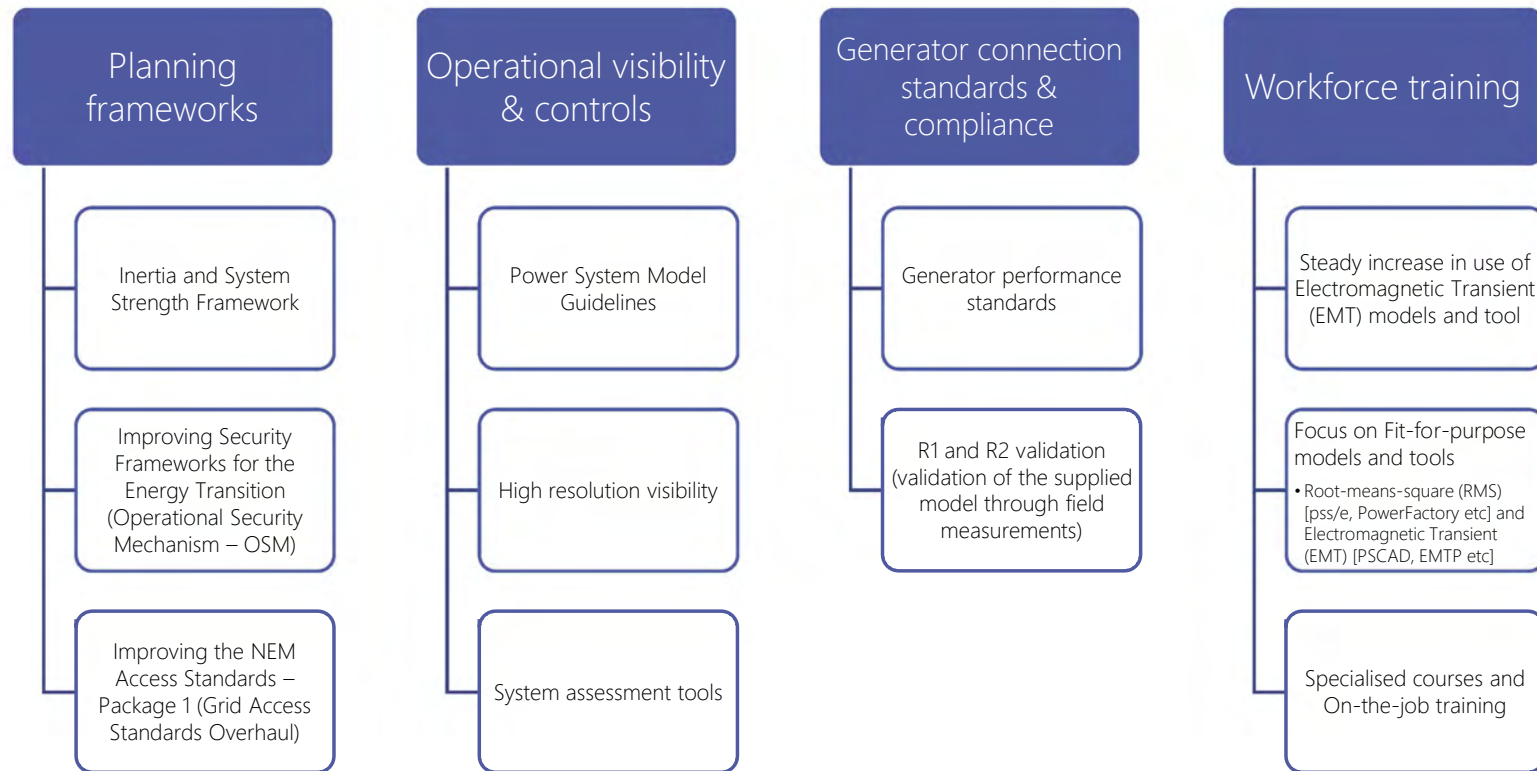


Solar farms can contribute positively to system security (voltage control, fast frequency response) when appropriately specified, tested, and monitored.

Reference: [Fast Frequency Response from Transmission-Connected Solar Farms: Australian Experience](#)



Tools, Processes and Resources



Australia's experience indicates governance and capability must scale at the same pace as renewable deployment.



Summary and relevance to NZ system

High concentration of transmission-connected solar can create localized instability.

- Similar risks could emerge in regions of NZ with limited short-circuit strength or long transmission lines as large solar farm connects.

Inverter control interactions are a real, not theoretical, system risk.

- These risks are difficult to detect in conventional planning studies and require coordinated performance standards, validation, and EMT analysis.

EMT modelling is essential to identify inverter-driven risks.

- As inverter-based solar generation grows, NZ will need earlier and more consistent use of EMT modelling to assess system interactions, not just project-by-project compliance studies.

Post-connection remediation is costly and disruptive.

Addressing system risks after commissioning is significantly more expensive and disruptive than setting robust upfront requirements.



Summary and relevance to NZ system

Solar variability can materially stress frequency and reserves at system scale.

- While hydro provides flexibility, simultaneous ramps from multiple large solar farms could materially affect reserve planning and operational margins.

Solar can support system security but only with deliberate standards and oversight.

- Policy and regulatory frameworks need to ensure new solar plants are designed as system assets, not just energy suppliers.

Digital systems and forecasting are emerging reliability dependencies.

- As solar penetration increases, digital governance, testing, and assurance frameworks become as important as traditional network standards.

Workforce capability must scale with inverter penetration.

- Australia's experience highlights a growing dependence on EMT modelling, Inverter control expertise, Interpretation of high-resolution measurement data.



Thank you!

nilesh.modi@bespokeenergy.au