

## UPDATE ON THE AUTHORITY'S WINTER INITIATIVES AND SECURITY OF SUPPLY 2024

## SECURITY AND RELIABILITY COUNCIL

This paper introduces a presentation from the Authority's operations policy team on winter initiatives for 2024 and beyond. This will be a recurring item in the SRC's forward work programme. At the SRC's request, the secretariat will arrange for future such presentations to occur at the SRC's Q4 meeting, to enable more time to advise the Authority ahead of winter.

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

# Update on the Authority's Winter Initiatives and Security of Supply 2024

## 1. Introduction

- 1.1. The SRC has asked the secretariat to provide an update on the Authority's winter initiatives, ahead of winter 2024. To allow more time for the SRC to consider the issues and advise the Authority, future editions of this winter update will be included in the SRC's forward work programme for their Q4 meeting in October/November.
- 1.2. The secretariat will continue to provide links and updates at each meeting, via the regular *Actions and Updates* paper, enabling the winter presentation to focus on current and emerging issues and updates on the Authority's relevant security and reliability workstreams.
- 1.3. Members are encouraged to consider how they want to receive winter updates from the Authority and what they would like the content to include. Pending further guidance from members, the secretariat will continue to work with the Authority teams to develop and refine the material, to best present the most relevant information.
- 1.4. Members of the Policy Operations team will present the material and be available for questions.
- 1.5. Members are encouraged to consider additional areas of focus or methodology, ask questions, and provide feedback.
- 1.6. The presentation is included as Appendix A to this paper.

## 2. Questions for the SRC to consider

The SRC is asked to consider the following general questions.

- |     |                                                                                                                                                                                |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Q1. | What further information, if any, does the SRC wish to have provided to it?                                                                                                    |
| Q2. | For future editions, how would members like the material to be presented to support the best possible understanding of the issues and enable robust and meaningful discussion? |
| Q3. | What advice, if any, does the SRC wish to provide to the Authority?                                                                                                            |

### **3. Appendix A: Update on winter initiatives and security of supply 2024.**

# Security of supply outlook for winter 2024

Presentation to SRC

22 February 2024

# Approach for today

- What do we mean by **security of supply**?
- What is the **current outlook for 2024**?  
Focus is on capacity issues but will also touch briefly on energy issues to provide a holistic picture.
- How is the Electricity Authority supporting **security of supply for 2024**?

# What is security of supply?

- The ability of the electricity supply to **meet demand over time.**
- Enough fuel to **generate electricity over the longer term** ('energy') and
- Availability of enough generation each day to **meet peak electricity demand** ('capacity')
- Other risks also include **plant failure, operator error, cyber and information security, and a lack of investment.**

# Energy outlook

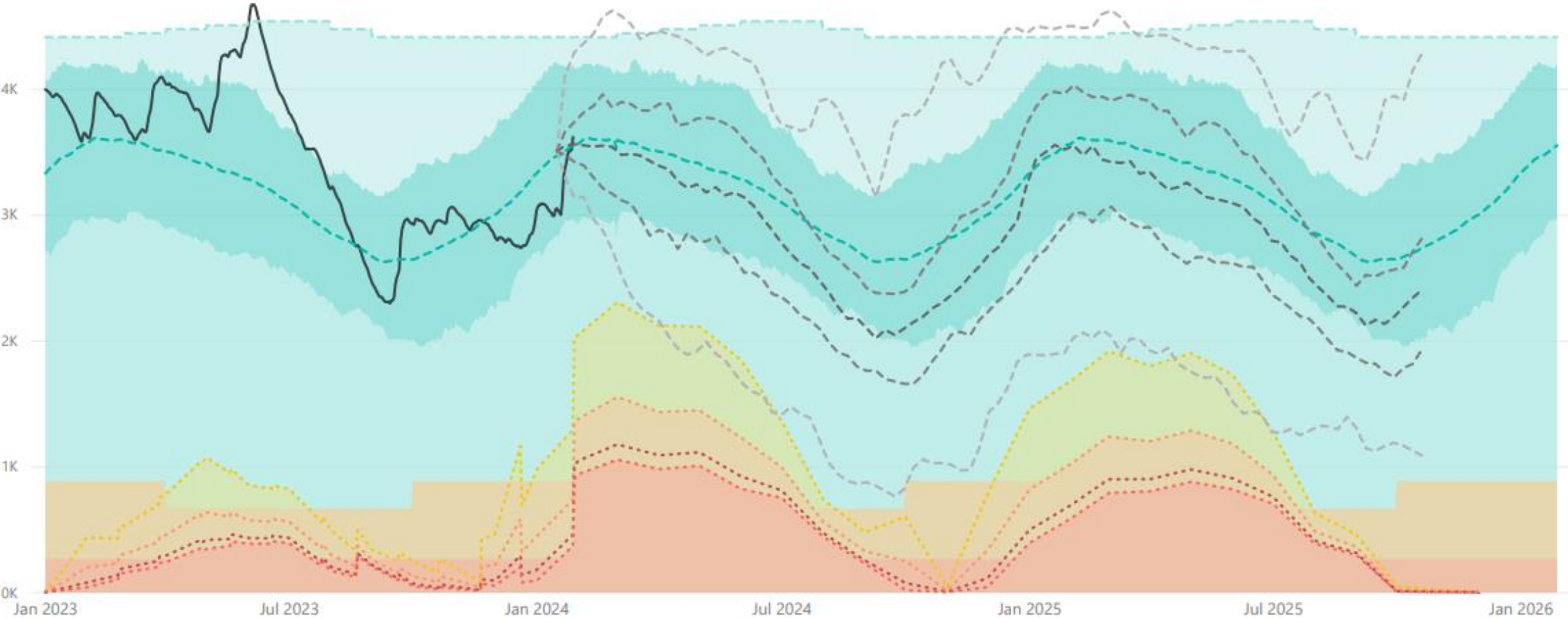
Enough fuel to **generate electricity over the longer term.**

- **Water** – national hydro storage is currently sitting around average (mean) level. Too early to predict the likely impact of El Niño conditions on storage.
- **Gas** – Gas availability is more uncertain this year, but generators have previously indicated they have sufficient gas contracted to run over winter 2024 (or equivalent gas to 2023 as at Jan 2024). Staff are monitoring.
- **Coal** – stockpile is still large. Current stockpile is sufficient to run a single Rankine unit at full capacity for approximately 12 months.

# Energy outlook for winter 2024

New Zealand Electricity Risk Status Curves (Available GWh)

10th to 90th Percentile Available NZ Hydro Storage Nominal NZ Full Mean NZ Storage Watch Alert Emergency 1% Risk 4% Risk 8% Risk 10% Risk





# Regulatory enhancements in the next 12 months

Project (addressing energy risk)	Purpose
<b>Monitoring and market information</b>	
Publishing gas contract disclosure information (quarterly)	Provides information to all participants on gas availability
Annual <a href="#">generation investment survey</a>	Informs the market about committed and planned new generation investment to inform investment decisions
<b>Reviewing policies and standards</b>	
Review of system operator rolling outage plans (SOROP)	To reduce uncertainty and improve co-ordination of rolling outages under more extreme conditions
Review of Security Standards Assumptions Document (SSAD)	To ensure that market settings are fit for purpose and provide the correct incentives for investment. To be prioritised for 24/25
<b>Strategic projects</b>	
Strategic planning for future security of supply with the GIC and MBIE	Ongoing work to support the changing requirements of security of supply as the economy electrifies
<a href="#">Future Security and Resilience (FSR) programme</a>	The FSR project is focused on how to ensure the physical power system remains secure and resilient during increased electrification
Prioritisation and implementation of <a href="#">Market Development Advisory Group (MDAG) recommendations</a>	The MDAG report included a range of recommendations to support security of supply

# Capacity outlook

Availability of enough generation each day to  
**meet peak electricity demand**

# Insights from winter 2023

Informed by Transpower [Winter 2023 Review](#) and the Authority's analysis of the [lessons from winter 2023 and the preliminary outlook for winter 2024 and 2025](#).

- Winter 2023 passed with no loss of supply incidents due to peak coordination issues
- High hydro storage increased the challenge of meeting peak demand due to low thermal unit commitment
- The system experienced six record demand peaks in winter 2023
- High thermal fuel availability provided resilience against asset failures (Huntly unit 5 and Stratford peaker)
- The industry worked together to meet the challenges of winter 2023. This includes:
  - The Authority and the system operator working together to improve market information (four winter 2023 initiatives)
  - Generators planning outages to avoid peak demand periods
  - Industry responded to low residual Customer Advice Notices (CANs) by committing more generation and cancelling outages
  - SolarZero aggregation trial supported by the system operator and the Authority
  - Improved visibility of discretionary demand
  - Pan-industry exercise to test industry response to a generation shortfall scenario

# Preliminary outlook for winter 2024

Informed by recent Transpower [Winter 2024 Outlook](#) report and the Authority's analysis of the [lessons from winter 2023 and the preliminary outlook for winter 2024 and 2025](#).

- We expect the coordination challenges for winter 2024 and 2025 to be similar to last winter.
- El Niño conditions may or may not increase coordination challenges – too early to predict the likely impact on storage, although storage is currently sitting at around average for this time of year.
- We expect to experience high demand peaks again this winter. El Niño winters tend to bring more southerly winds which bring colder weather.
- Huntly unit 5 has returned to service in January, and the Stratford peaker is due back May 2024. Coal stockpile is high and generators have previously indicated they have sufficient gas contracted to run over winter 2024 (or have equivalent gas to 2023 as at Jan 2024). [Contact has announced](#) that it has sufficient gas contracted and available operating hours to operate its Taranaki Combined Cycle (TCC) power station across winter 2024.
- Tauhara commissioning not due until Q3 2024. This increases the challenge for winter 2024.
- Overall, the availability of thermal generation for winter 2024, combined with the expected commissioning of an additional 58MW of firming generation and the expected availability of (an average of) 167MW of discretionary demand indicate that residual may continue to be tight but manageable for winter 2024.
- Industry will need to continue to work together to meet the challenges for next winter.

# Industry actions can help reduce risk

Short term mitigation options are limited to those that can be implemented in time for winter 2024 and largely relate to the use of existing assets and processes.

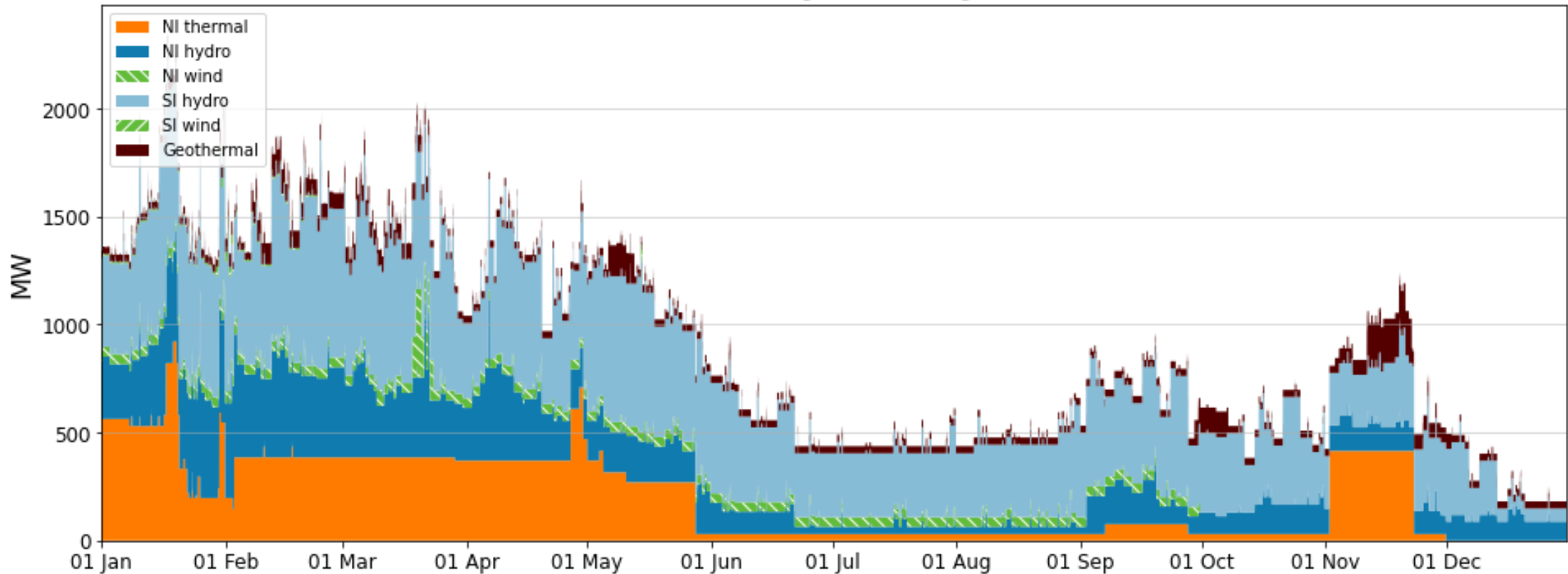
In the immediate future, battery energy storage systems (BESS) and demand response are the most likely source of new flexible capacity. The Authority has released a [demand-side flexibility survey](#) to further understand and quantify the level of available demand-side flexibility.

- **Increased thermal commitment**
- **Increased demand response** – Transpower and the Authority are working together to facilitate demand response trials (eg SolarZero trial) and reduce barriers to entry (eg [dispatch notification enhancements](#)). The Authority has released a [demand-side flexibility survey](#) to further understand and quantify the level of available demand-side flexibility. Survey closes on 1 March 2024.
- **Outage planning/flexibility** – planning outages out of winter peak load periods or having flexibility to shift outages.
- **Thermal fuel availability**
- **Accurate, up-to-date information** – up-to-date bid and offer information up to 7 days in the future, up-to-date outage information in POCP (Planning Outage Coordination Process)

# Generation outages

Planned (confirmed and tentative) outages entered into POCP already for this year. Can change a lot due to unplanned outages and as other information for planned outages is confirmed and entered. However, this gives an indication that generators are trying to schedule outages to avoid winter months. [Link to EMI report](#)

Total MW loss due to generation outages in 2024



# Regulatory enhancements in the next 12 months

Project (addressing capacity risk)	Purpose
Making the four winter 2023 security of <a href="#">supply initiatives permanent</a>	To continue to provide market information to participants on potential capacity issues and to assist with peak coordination
<a href="#">Potential solutions to peak electricity capacity issues</a>	Interim and long-term solutions to manage peak demand periods and the need for increased flexibility, which will help to address unit commitment challenges
Promoting demand response	Removing barriers to participation in the wholesale and ancillary service markets
Ensuring efficient participation of battery energy storage systems (BESS)	Removing barriers to participation in the wholesale and ancillary service markets
<a href="#">Demand-side flexibility survey</a>	To further understand and quantify the level of available demand-side flexibility to inform current and future policy solutions
Ancillary Services review – cost allocation and technical review)	Determining how existing ancillary services may need to change in the future, including how intermittent generation should best contribute to funding of ancillary services
<a href="#">Improving intermittent generation forecasting</a> for better market information	Accuracy improvements to existing intermittent generation forecasts will provide better information to thermal assets, demand response, and batteries about when they will be needed.
Updating regulatory settings for <a href="#">distribution networks</a> : <ul style="list-style-type: none"> <li>Regulatory settings to support non-network solutions and flexibility services</li> <li>Develop regulatory ‘sandbox’ guidelines to facilitate trials of new technologies and business models</li> </ul>	A programme of changes to the Code and other regulatory settings that will encourage the uptake of distributed energy resources and help to develop a broader set of flexibility markets

# Improving communications, industry awareness and coordination

## Pan-industry exercise 2024

- Planning has commenced with the system operator. Participants have been contacted to 'save the date' for 1 May 2024.
- Key observations from last year's exercise:
  - Participants demonstrated a positive level of readiness to respond to stakeholders during a grid emergency event.
  - Participants benefited from seeing each other's posts in the social media simulator.
  - Transpower is regarded as the source of truth during grid emergency events. Therefore, clarity in the system operator's communications is important.
  - Medically dependent consumers are a high priority and were at the forefront of retailer communications.
- Opportunities for improvement:
  - Encourage participants to develop communication templates that can be easily modified and used when needed.
  - Opportunity for distributors to establish lines of communication with retailers during events to make sure consumers are receiving the information they need.
  - Further education and clarification from the system operator to assist participants (eg factsheets).
- This year we will remind participants of the lessons from last year so that we can incorporate these into the 2024 exercise. We are also planning to include more industry participants, add more complexity to the scenario, and add more elements of surprise.



# Appendices

# Sources

## Electricity Authority

- [Potential solutions for peak electricity capacity issues](#)
- [Generation investment survey](#) (2023 update)
- [Demand-side flexibility survey](#)
- [Code amendment omnibus two](#) (includes information on proposed permanent Code amendment to clarify the use and availability of discretionary demand control)
- [Review of low residual and insufficient generation events](#)

## Transpower

- [Winter 2023 Review](#)
- [Winter 2024 outlook](#)
- [Whakamana i Te Mauri Hiko Monitoring Report](#) (October 2023)
- [Electricity Risk Curves](#) (January 2024 update)

# Glossary

## Security Standards Assumptions Document (SSAD)

The setting in the SSAD form the basis of the system operator's evaluation of security of supply margins. The standards represent an efficient level of reliability – that is, where the expected cost of shortage is equal to the expected cost of new generation.

## System Operator Rolling Outage Plan (SOROP)

The SOROP sets out the thresholds at which the system operator will implement rolling outages and the actions that the system operator and other industry participants must take in the event of rolling outages.

## Future Security and Resilience (FSR)

The FSR project is focused on how to ensure the electricity system remains secure and resilient in the coming decades.

## Planned Outage Coordination Process (POCP)

POCP is a tool to enable Asset Owners (eg generators, grid owner, direct connects) to provide information on their outages to the system operator. Industry participants can upload and view outages in order to manage and coordinate outage requirements of plant and equipment connected to the grid.

## New Zealand Generation Balance (NZGB)

This application forecasts whether there will be enough generation capacity to securely meet projected load on the power system. It provides industry participants with a means of assessing the potential impact of planned outages on the generation balance and communicates any potential generation balance shortfalls over the next 200 days.

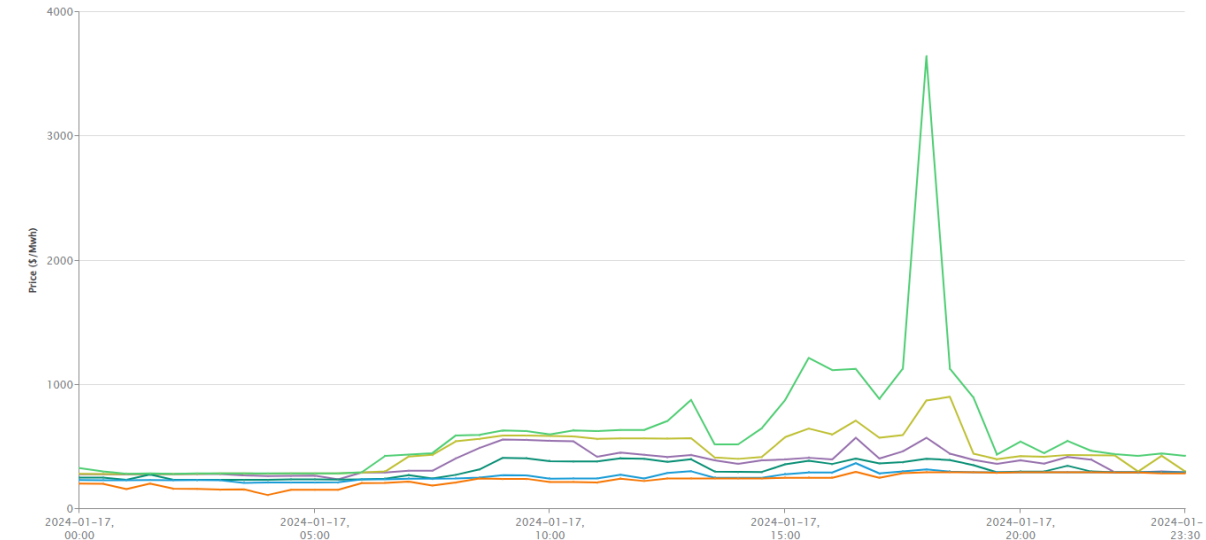
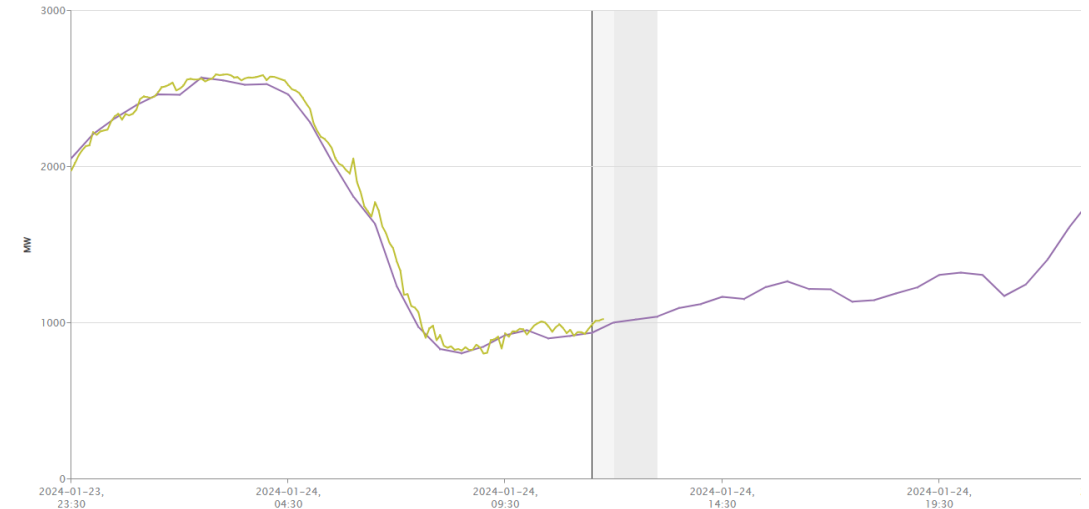
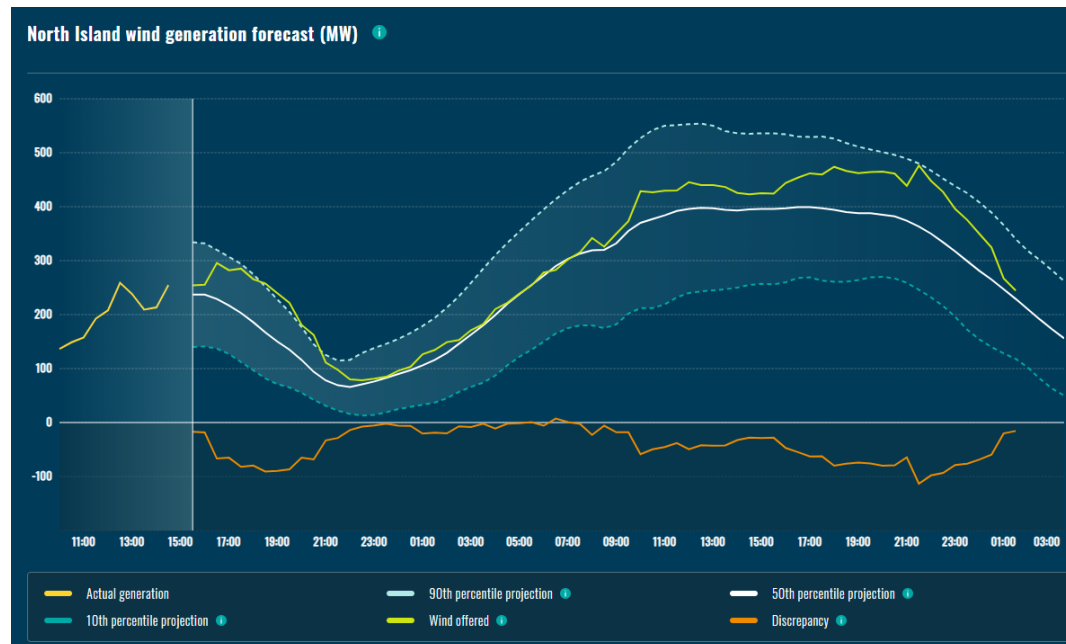
# Permanent implementation of winter 2023 initiatives

## Permanent implementation of:

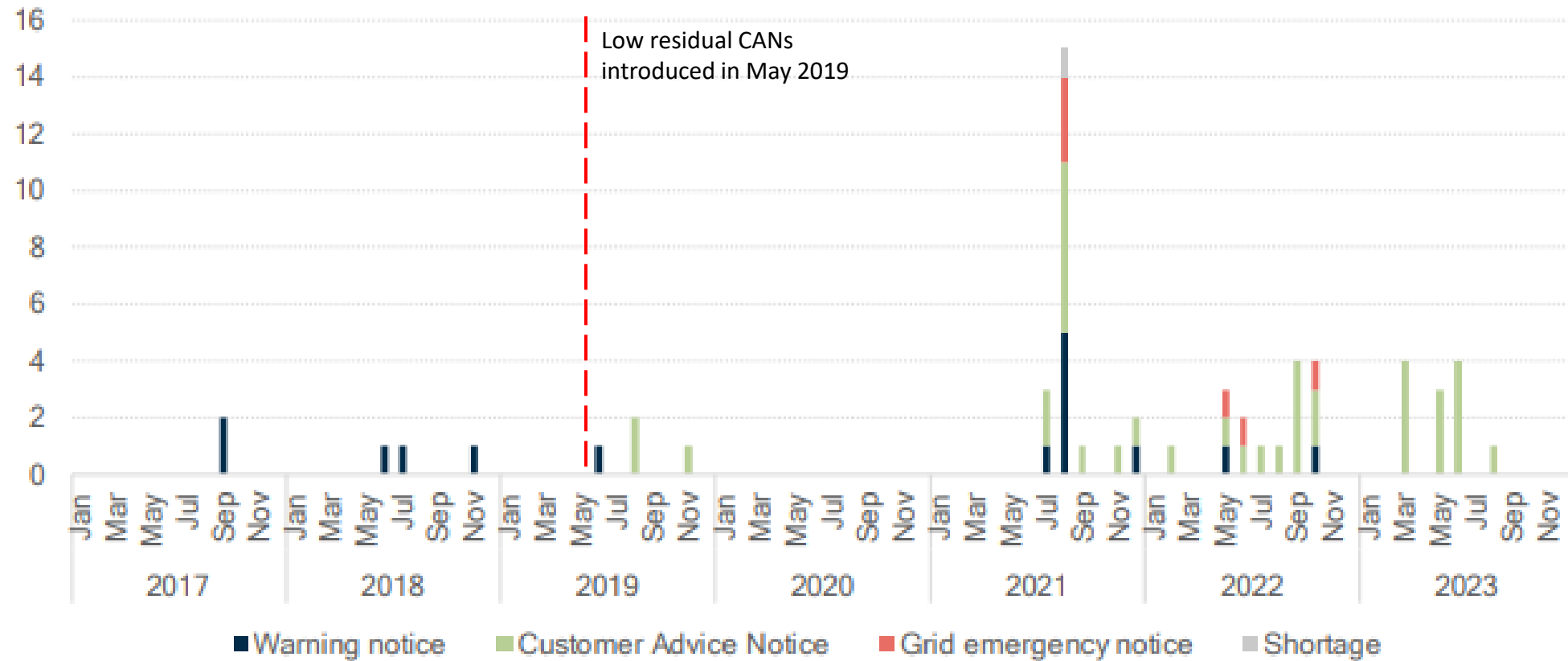
- Option A: Provide better information on headroom in supply stack
- Option B: Provide forecast spot prices under demand sensitivity cases
- Option D: System operator review of wind offers based on external forecast

## Consulting on:

- Option E: Clarify availability and use of 'discretionary demand' control



# Low residual situations review



# Changing nature of security of supply

- Security of supply challenges will **continue and change through the transition**
- Need to manage a number of factors
  - Integration of **more intermittent generation**
  - Retirement or repurposing of **thermal assets**
  - Increase in **demand side flexibility**
  - Moving to a **two-way power flow** as consumers also become generators
  - Changing role of **hydro generation**
- The Electricity Authority is taking a long-term view across **multiple time horizons**

# Long term view

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## Horizon one (12 months)

- Existing hydro and thermal assets continue to firm intermittent generation and provide the bulk of security of supply
- New intermittent generation is developed
- Small scale battery energy storage systems (BESS) enter the market
- Trials of demand side flexibility tools increase commercial interest

## Horizon two (2 to 4 years)

- New intermittent generation is increasingly built with BESS to support firming
- Wider adoption BESS and distributed energy resources reduce the pressure on existing hydro and thermal assets, changing the way they operate in the market
- Increased participation in flexibility markets by generators, industry, and other consumers enhances the economics of these resources

## Horizon three (5+ years)

- Significant investment in new generation and storage options delivers sufficient flexible renewable energy to provide security of supply, changing the role of existing assets
- Hydro generation is increasingly used to firm intermittent renewable generation
- Some limited thermal assets may remain to provide additional support to security of supply

