



Weekly Market Movements - Week Ended 17 March 2024

Overview

National hydro storage continued to decline and is now at 92% of the historic mean. Hydro generators continued to ease off output in response to low inflows and planned HVDC outages, resulting in a 51% hydro generation share, the lowest since April 2022. This led to an increase in North Island thermal generation. Residual generation was healthy last week despite the HVDC outages.

In this week's insight we look at high spring washer prices that occurred intermittently over the past two weeks at Invercargill and Tiwai.

Security of Supply

National hydro storage now sits at 92% of the historic mean, down from 95% a week ago. South Island storage is at 87% of the historic mean, down from 90%, and North Island storage dropped from 150% to 147% of the historic mean.

Capacity

Capacity margins were healthy last week with higher thermal unit commitment coinciding with the HVDC outages. The lowest residual point of 818 MW occurred on Tuesday morning.

Forecast N-1-G margins are high until late April, with some lower margins forecast in May. The lowest N-1-G margin during the forecast period is 208 MW on 10 May. The latest NZGB report is available on the [NZGB website](#).

Electricity Market Commentary

Weekly Demand

Total demand was 747 GWh, up slightly from 743 GWh the week prior. This is higher than what was observed at this time of year over the past three years. Demand peaked at 5,360 MW on the morning of Thursday 26 February.

Weekly Prices

The average wholesale price at Otahuhu last week was \$211/MWh, up from \$176/MWh the week prior. The increased average wholesale price last week was in line with thermal contribution to the generation mix rising as hydro generation dropped.

The Otahuhu price peaked at \$340/MWh on Tuesday 26 February at 7:30am during a morning peak with low wind generation.

There were periods of high reserve prices and inter-island price separation during the two HVDC outages - a planned pole 2 outage that ran from February until 12:30 pm on Wednesday 14 March, and a planned pole 3 outage that ran from 4:30 am to 6 pm on Sunday 17 March.

There was one trading period of price separation between Invercargill and Benmore at 2 am on Wednesday 13 March. This is discussed in our weekly insight below.

Generation Mix

The renewable percentage of the generation mix dropped to 82%, the lowest since September. Wind generation decreased slightly from 12% of the mix to 11%. Hydro generation decreased from 53% of the generation mix to 51%, likely affected by the HVDC outages. This is the lowest hydro contribution since April of 2022, when hydro storage dropped below the 10th percentile of historic storage for that time of year. Thermal generation increased to 16% of the mix from 13%.

HVDC

HVDC flows were more southward than northward over the past week, in line with low South Island hydro generation, high North Island thermal generation and above average North Island wind generation. HVDC flows before 12:30 pm on Wednesday 14 March were limited by a planned pole 2 outage, and flows between 4:30 am and 6 pm on Sunday 17 March were limited by a planned pole 3 outage. The recent series of HVDC outages has now concluded.

SOROP cross submissions close tomorrow (20 March)

Transpower is seeking views from the electricity industry on proposed changes to the System Operator Rolling Outage Plan (SOROP). The period for cross submissions closes tomorrow 20 March. Please see [our website](#) for further details.

New Zealand Energy Risk

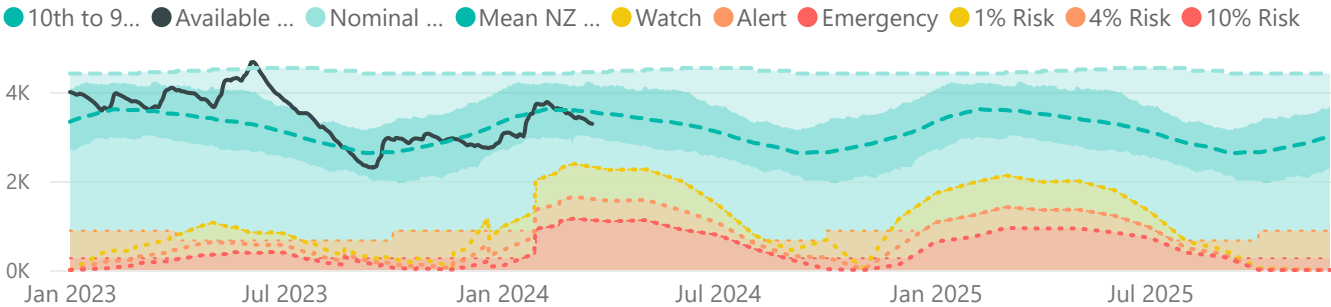


South Island Energy Risk

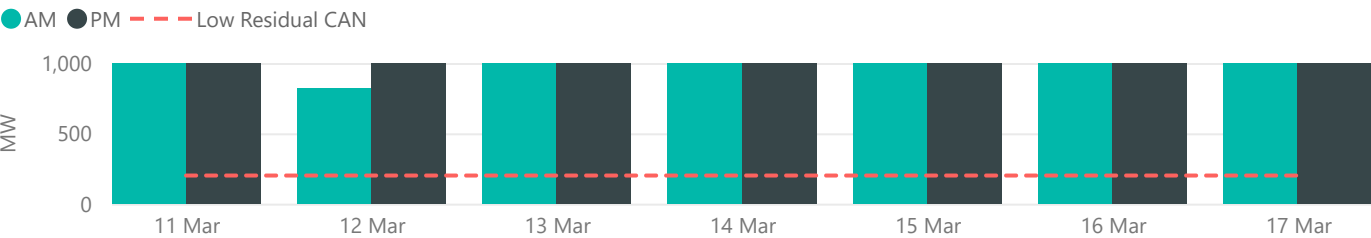


Normal Watch Alert Emergency

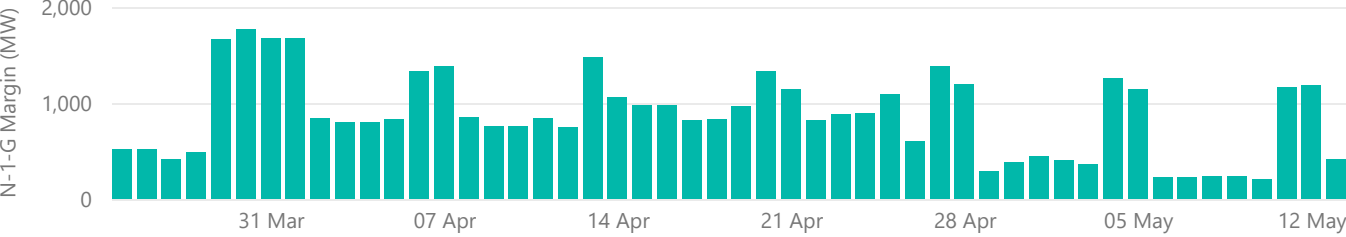
New Zealand Energy Risk Status Curves (Available GWh)



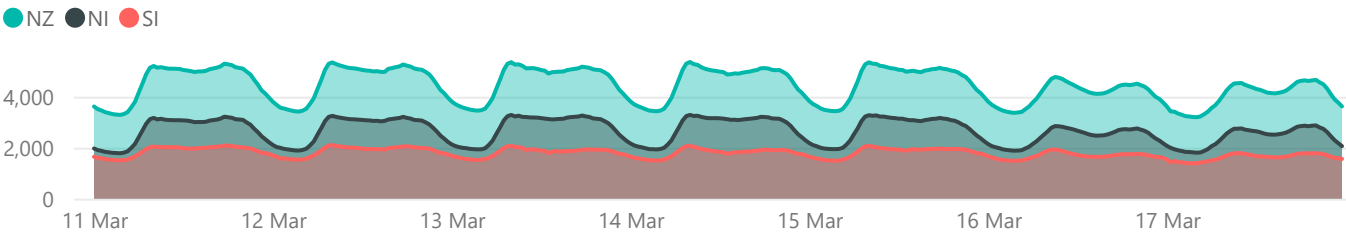
Lowest Residual Points - MW



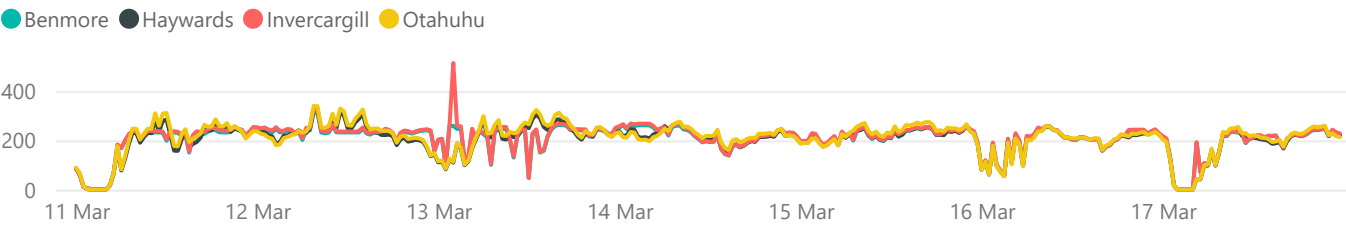
NZGB Look-Ahead (excluding next 7 days)



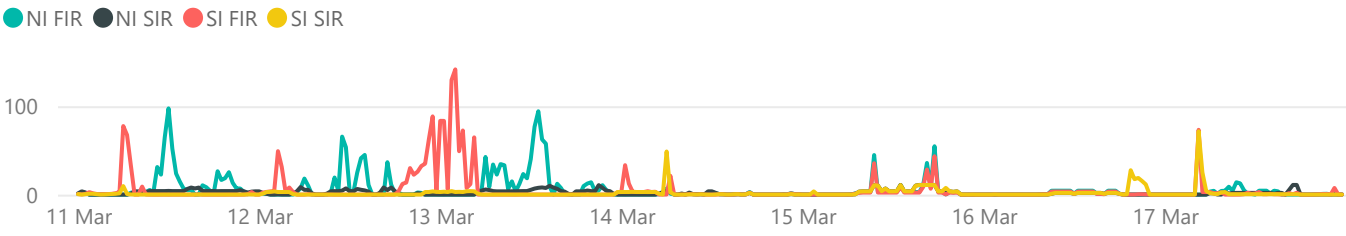
National Demand by Trading period - MW



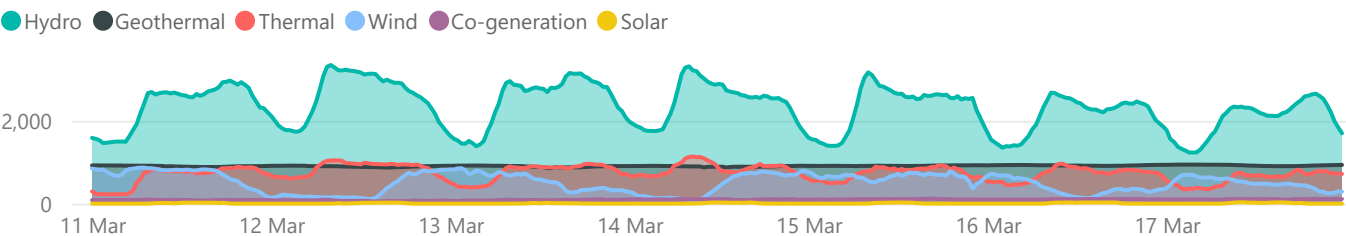
Energy Prices - \$/MWh



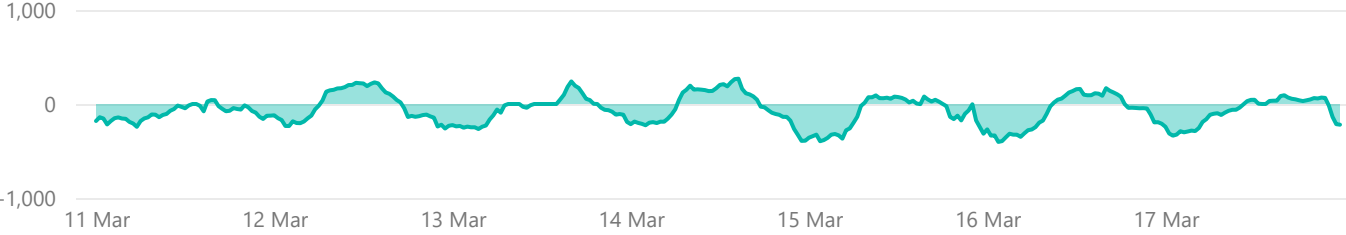
Reserve Prices - \$/MW



Generation - MW



Net HVDC Transfer - MW

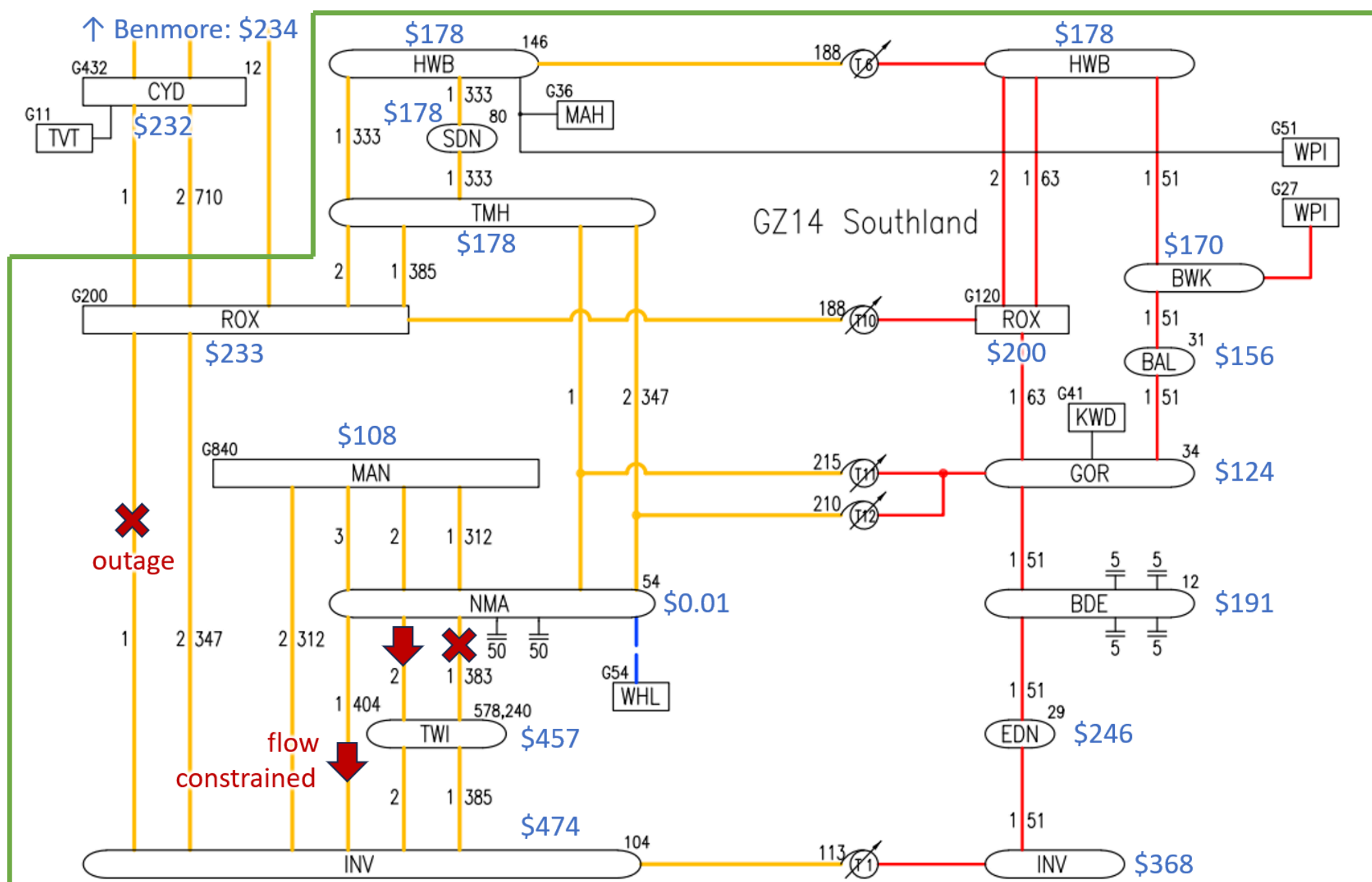


Weekly Summary Insight - High spring washer prices at Invercargill and Tiwai

During the week of 4 March, and again on Wednesday 13 March, there were some periods of price separation within the South Island. The price at Invercargill was roughly double the price at Benmore for some trading periods.



The high Invercargill (INV) prices were due to a spring washer effect, which arose due to constrained transmission in the lower South Island. One of two NMA_TWI lines had a planned outage. A constraint was put on the combined southward (towards INV and TWI) power flow on the remaining NMA_TWI line and the INV_NMA line, to ensure that the INV_NMA line would not be overloaded if the NMA_TWI line tripped. This constraint became binding and limited the power flow from the North Makarewa substation (NMA) to INV. There was also a planned outage of one of the INV_ROX lines. The constraint and outages are shown on the diagram below.



The diagram above shows nodal prices in the lower South Island for the 13:40 Real-Time Dispatch (RTD) schedule on 13 March. This is adapted from the South Island Power System diagram, which is available with a legend [here](#). The Roxburgh substation (ROX) is the only point of connection between the lower South Island and the rest of the national grid, as shown by the green outline. Because the marginal generator for this RTD schedule was outside the lower South Island, additional power to supply INV needed to be supplied via ROX and then transmitted from ROX to INV. Power will flow via all available paths in inverse proportion to their impedance, so some of the power sent from ROX to INV will flow via NMA. This would have violated the combined power flow constraint on the NMA_TWI and INV_NMA lines if the amount of power entering NMA was not reduced. This reduction was achieved by curtailing generation from White Hill Wind Farm (WHL). This caused the price at NMA to drop to \$0.01, which was White Hill's offer price.

The requirement to curtail generation meant that supplying additional power to INV required both buying that additional power and buying power to replace the generation that was curtailed. Because nodal prices are equal to the marginal cost of supplying additional power at a node, this increased the price at INV to roughly double the price at Benmore for this RTD schedule.

These factors were the cause of the price separation for all of the RTD schedules where there was a large price separation between Benmore and Invercargill during the week of 4 March and on 13 March.

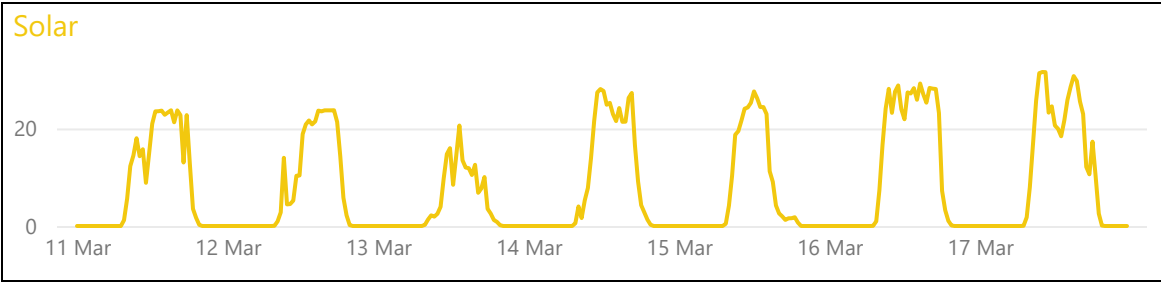
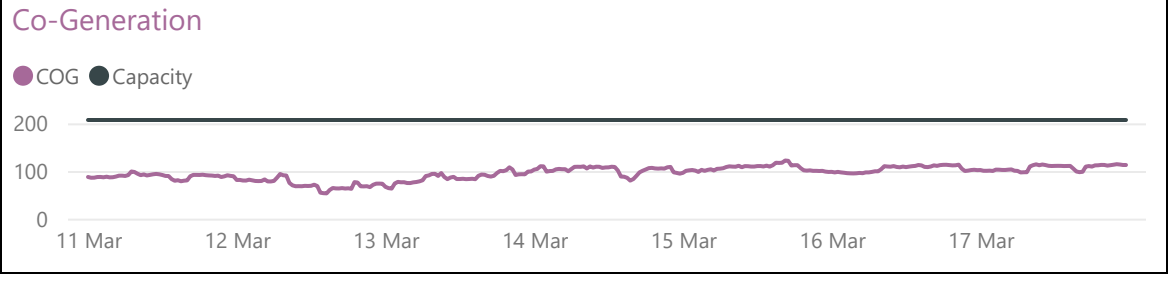
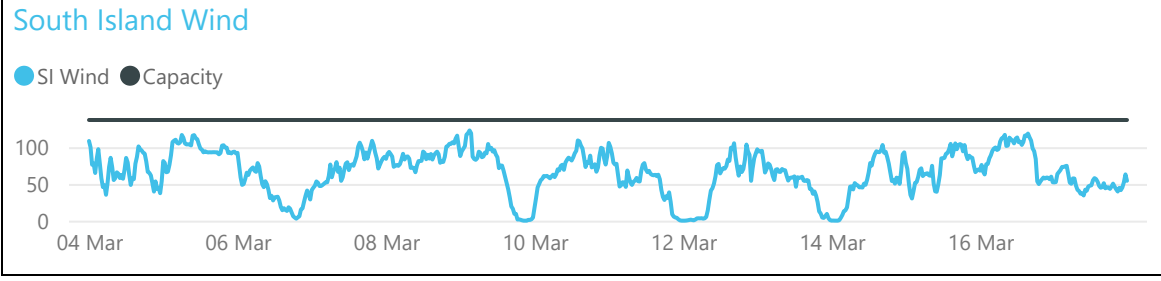
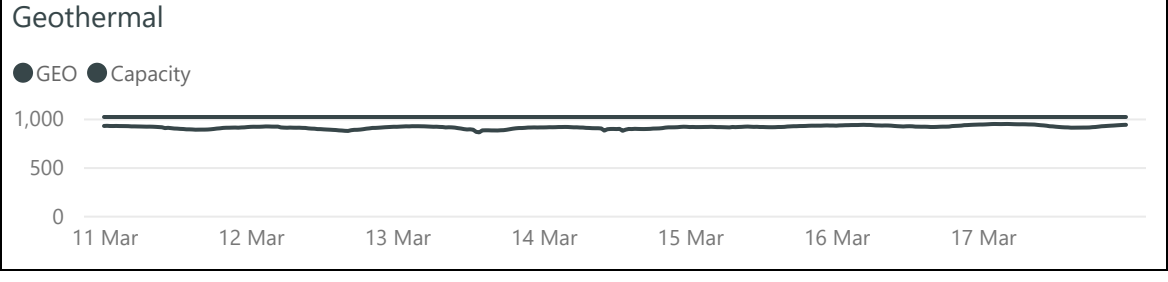
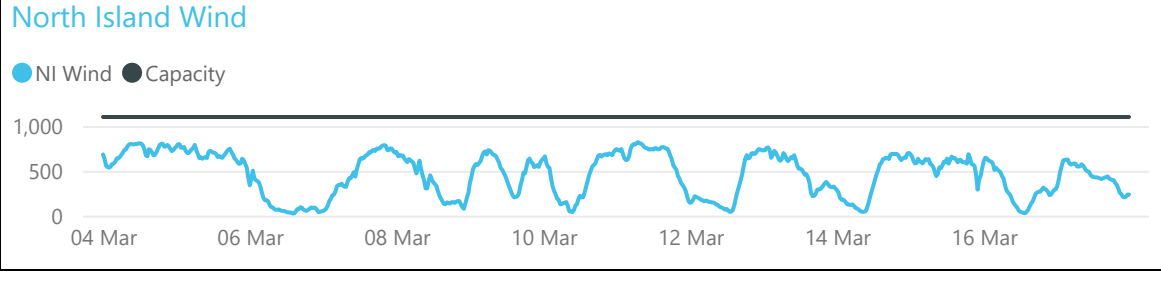
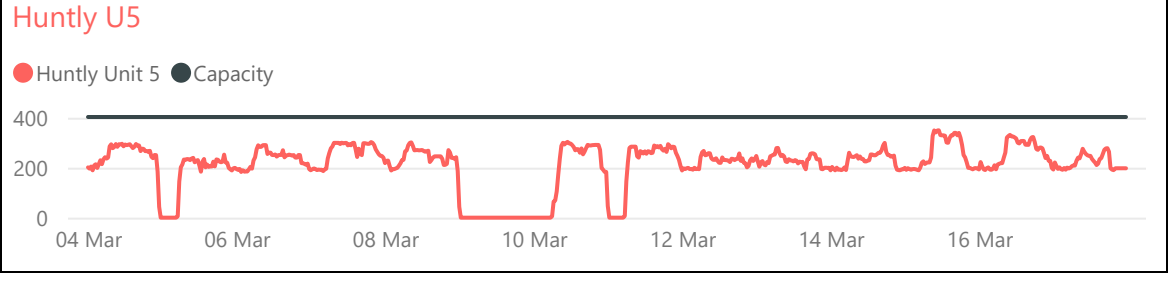
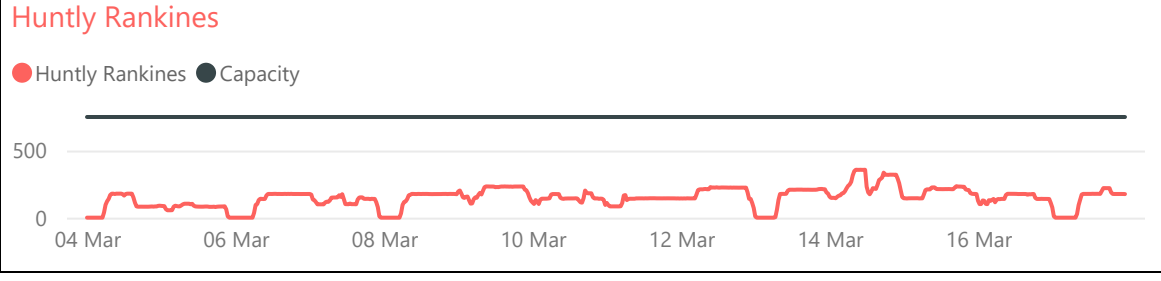
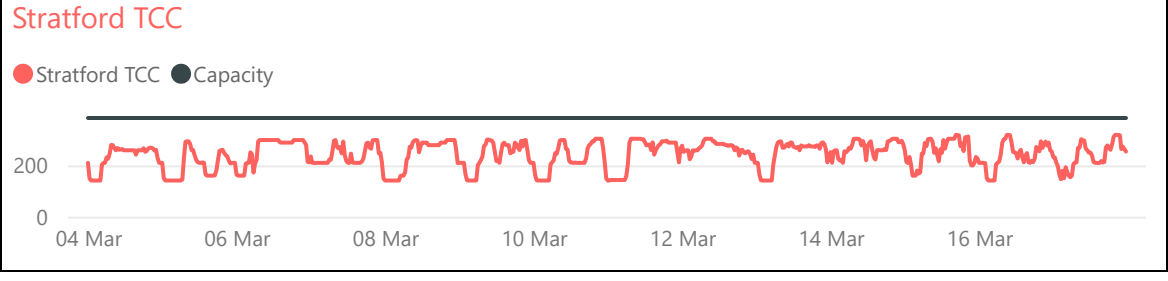
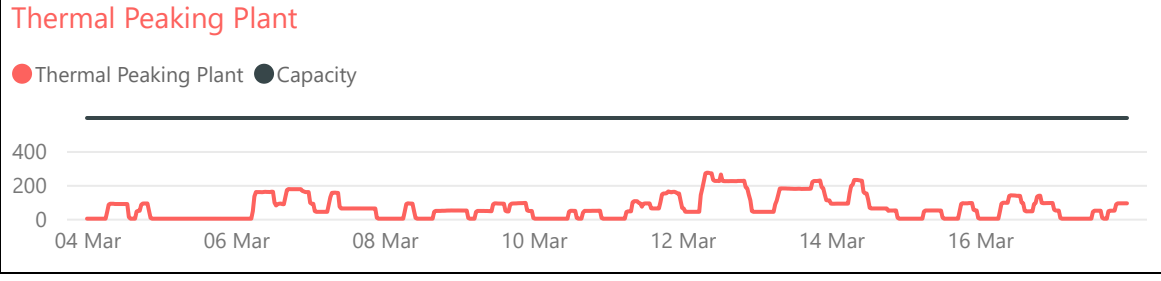
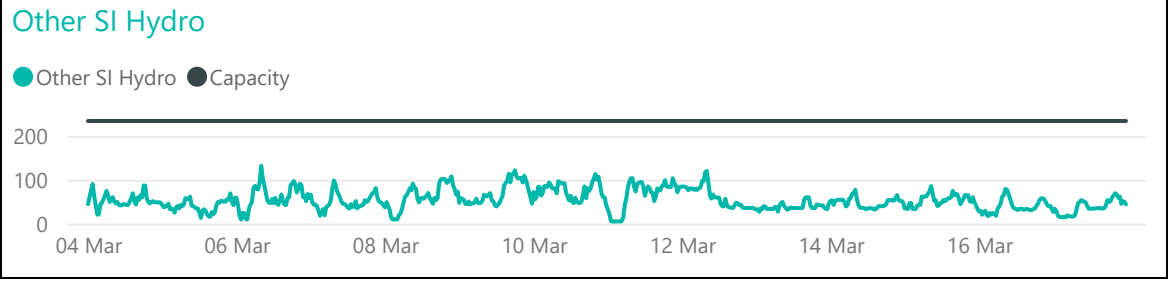
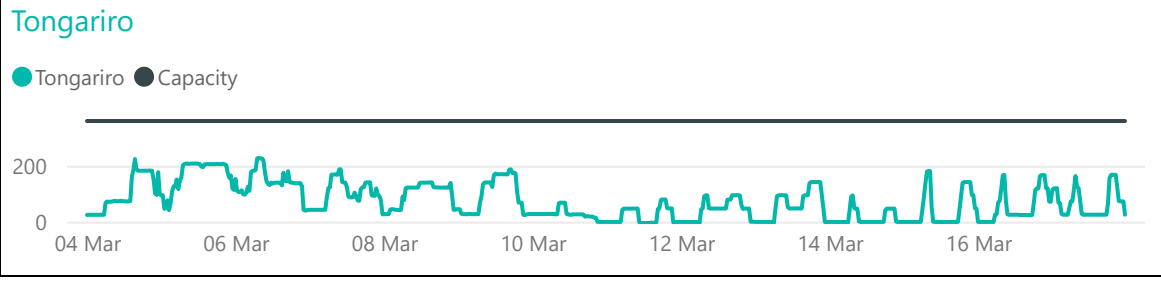
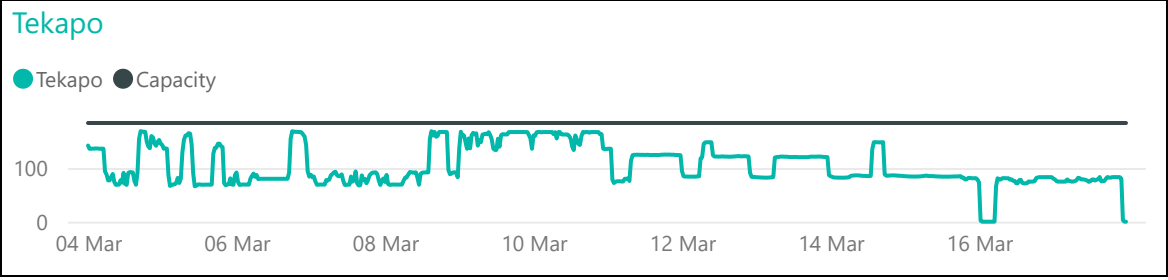
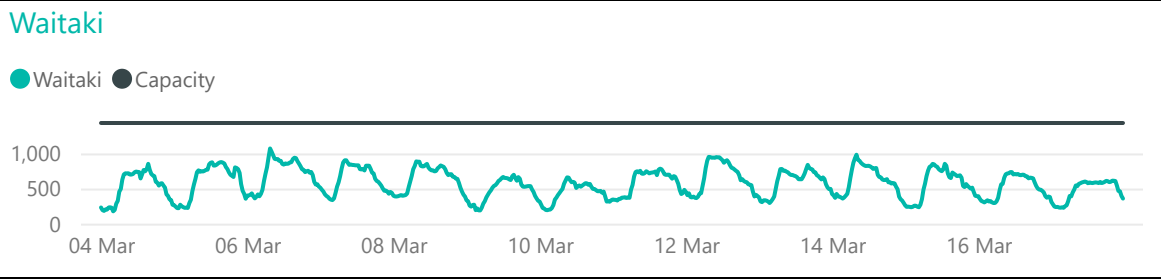
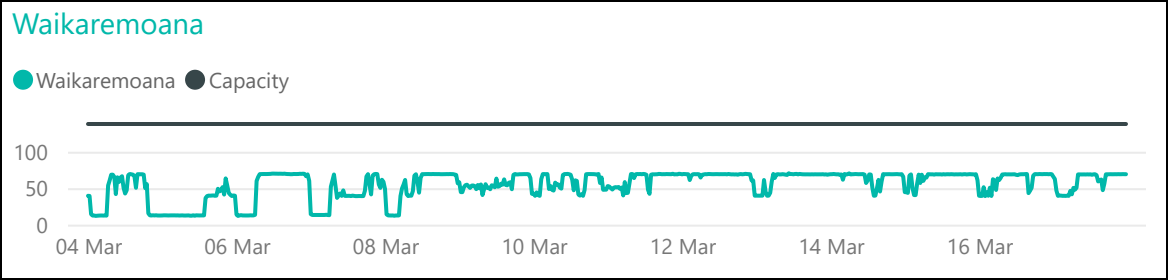
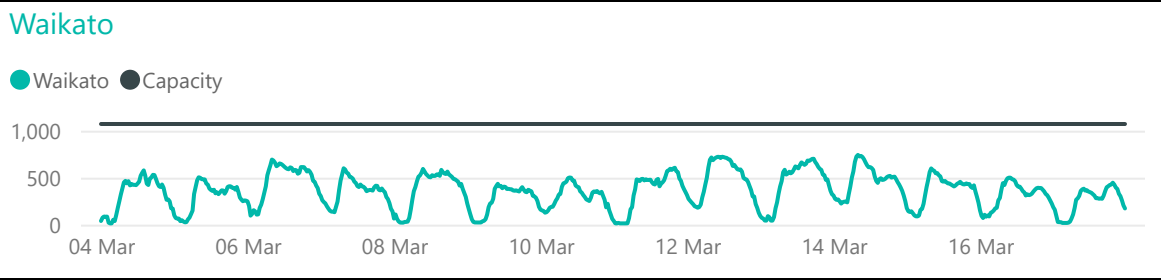
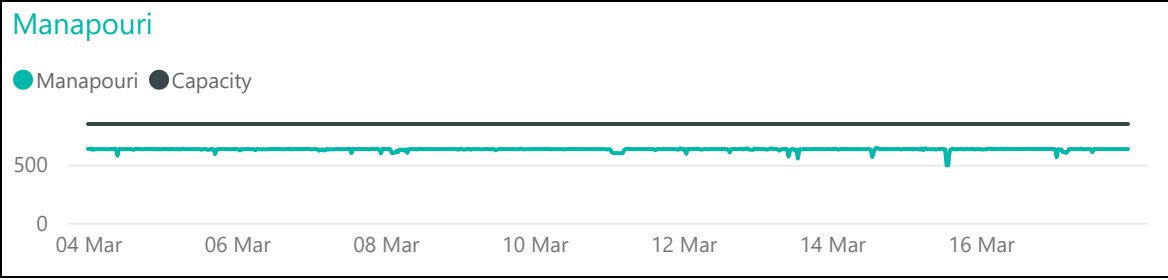
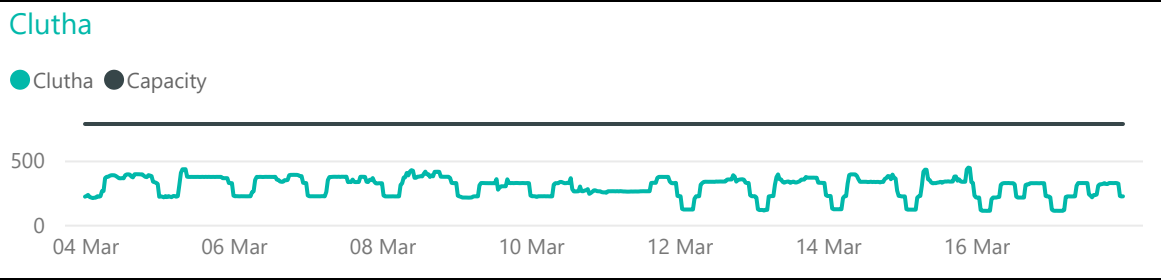
These prices were consistent with the constraints on the transmission system. They reflected the high value of additional generation (or reduced load) at Invercargill and Tiwai during this time and the low value of additional generation at North Makarewa.

For a simpler introduction to the spring washer effect, see this short playlist on our YouTube channel: [The Spring Washer Effect: introduction \(youtube.com\)](#)



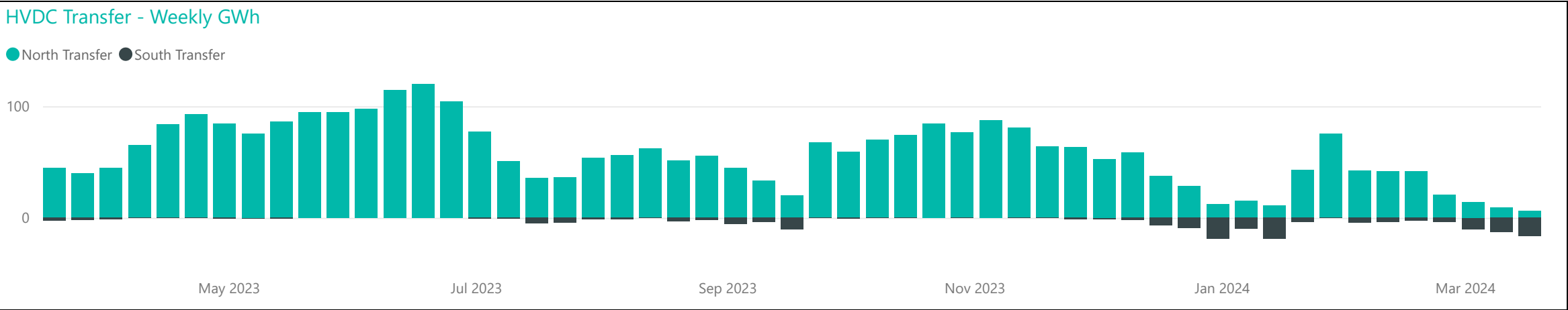
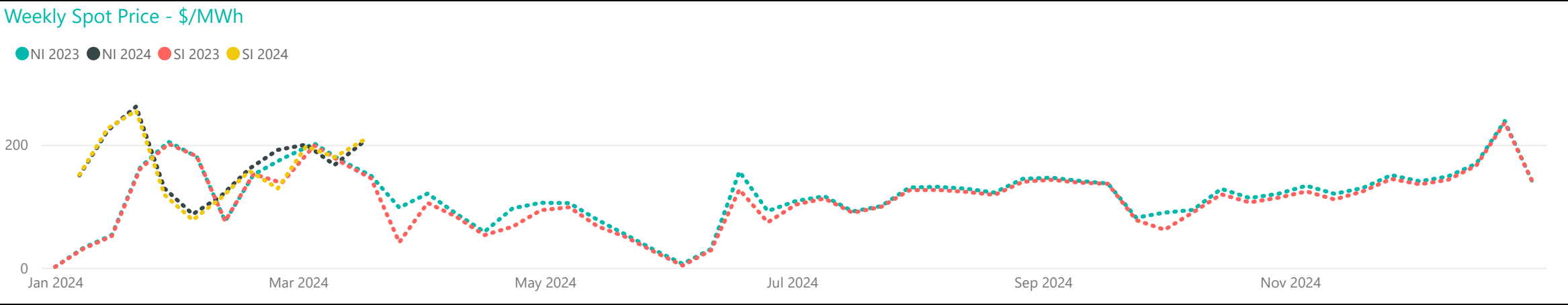
Generation Breakdown - Last Two Weeks

Measured in MW and displayed at trading period level for last 14 days

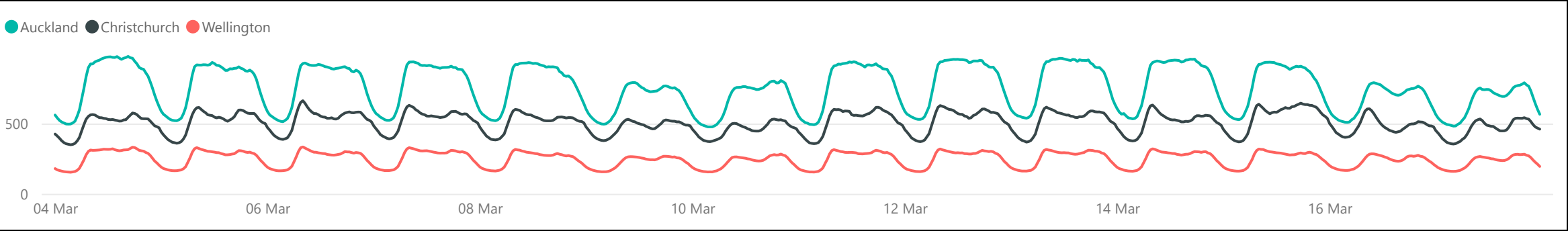




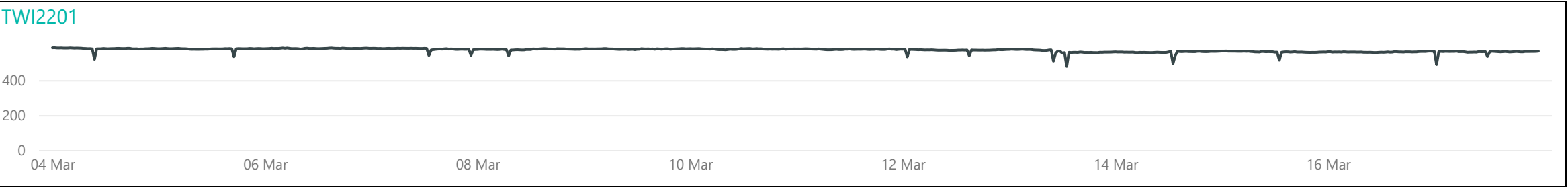
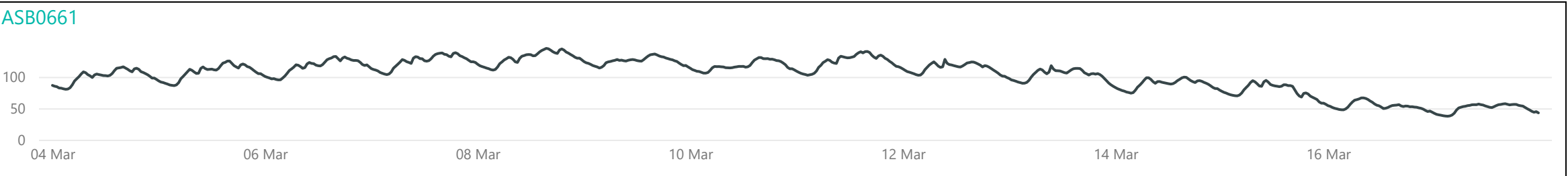
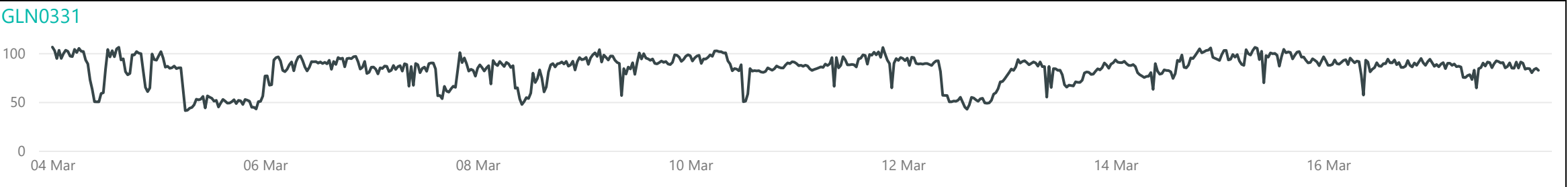
Weekly Profiles



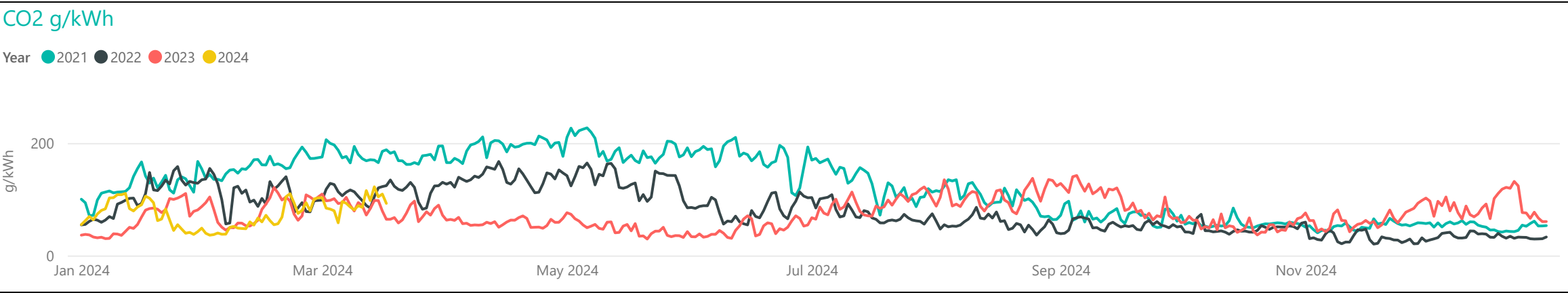
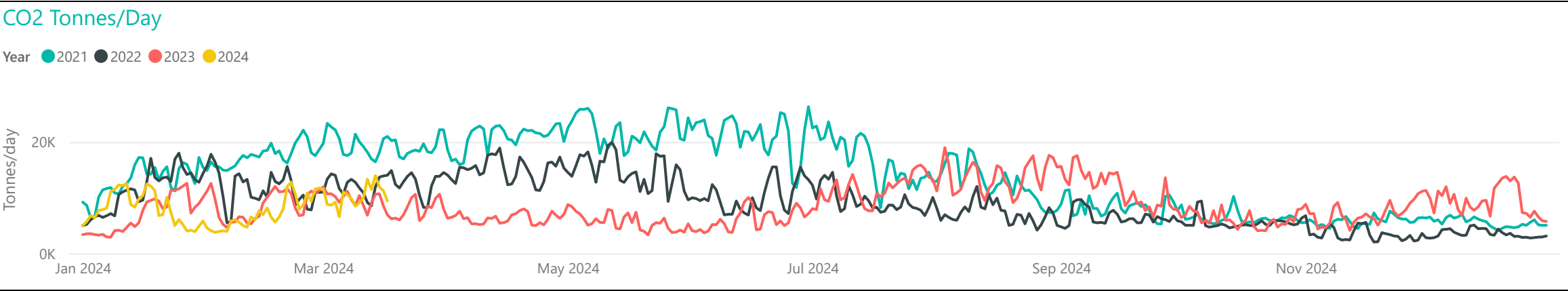
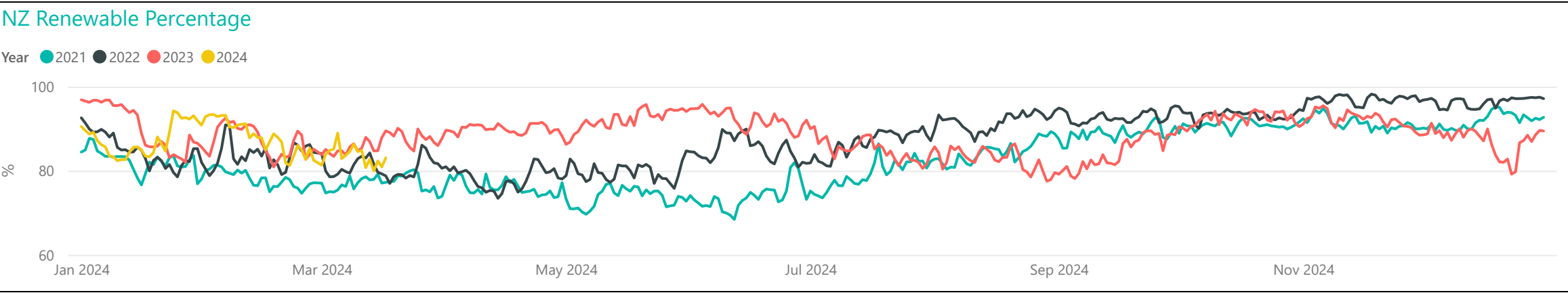
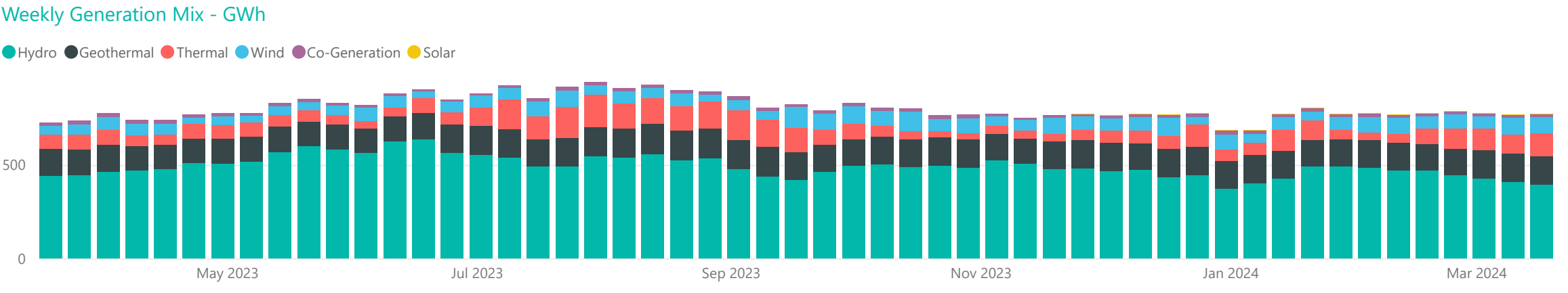
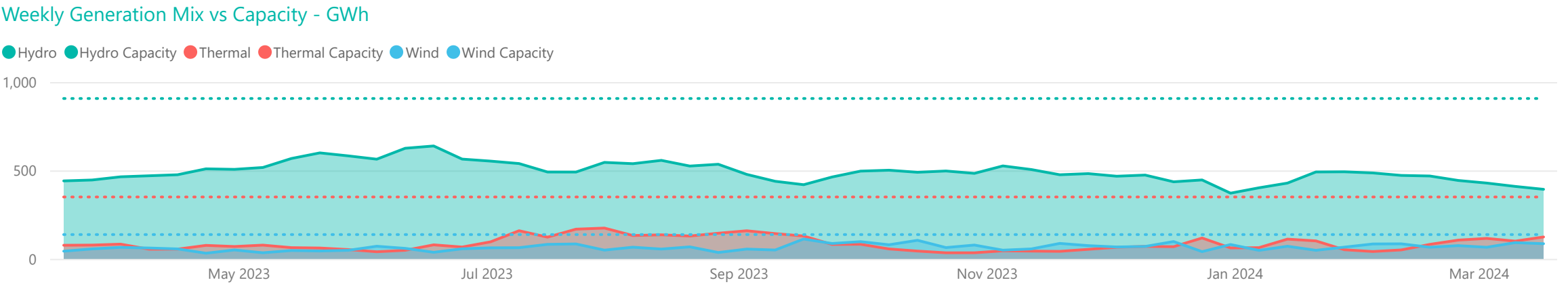
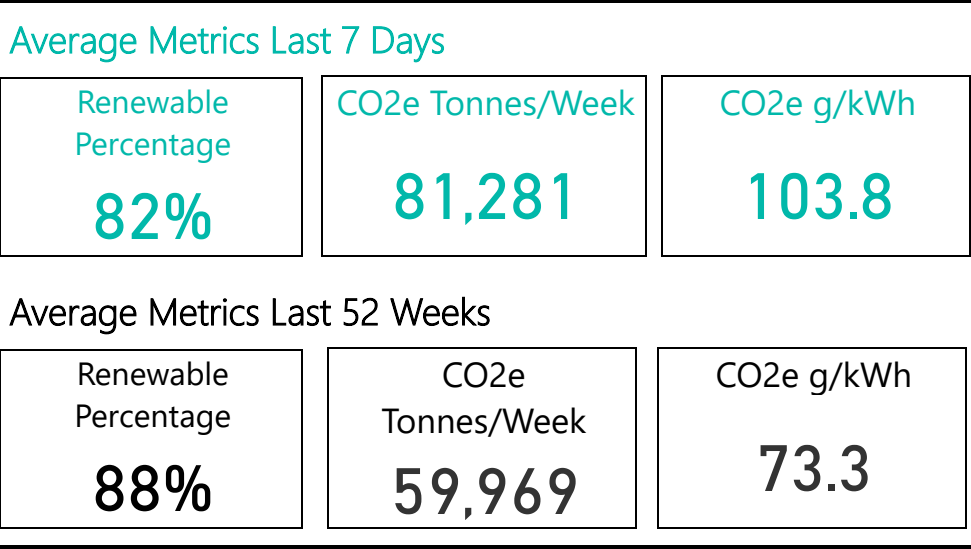
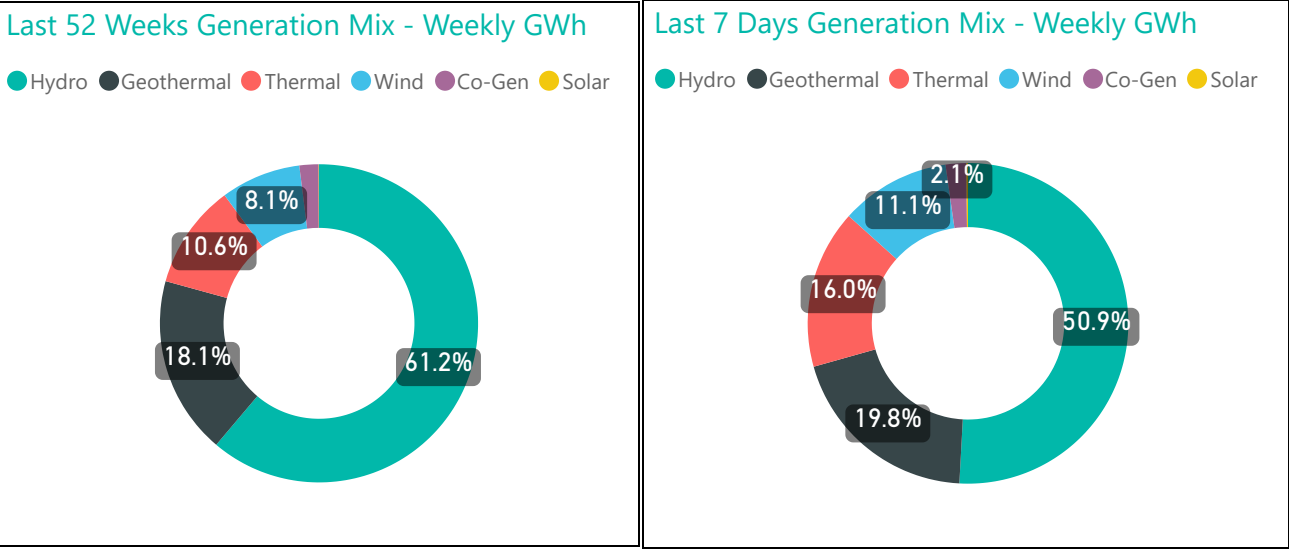
Conforming Load Profiles - Last Two Weeks *Measured in MW shown by region*



Non-Conforming Load Profiles - Last Two Weeks *Measured in MW shown by GXP*

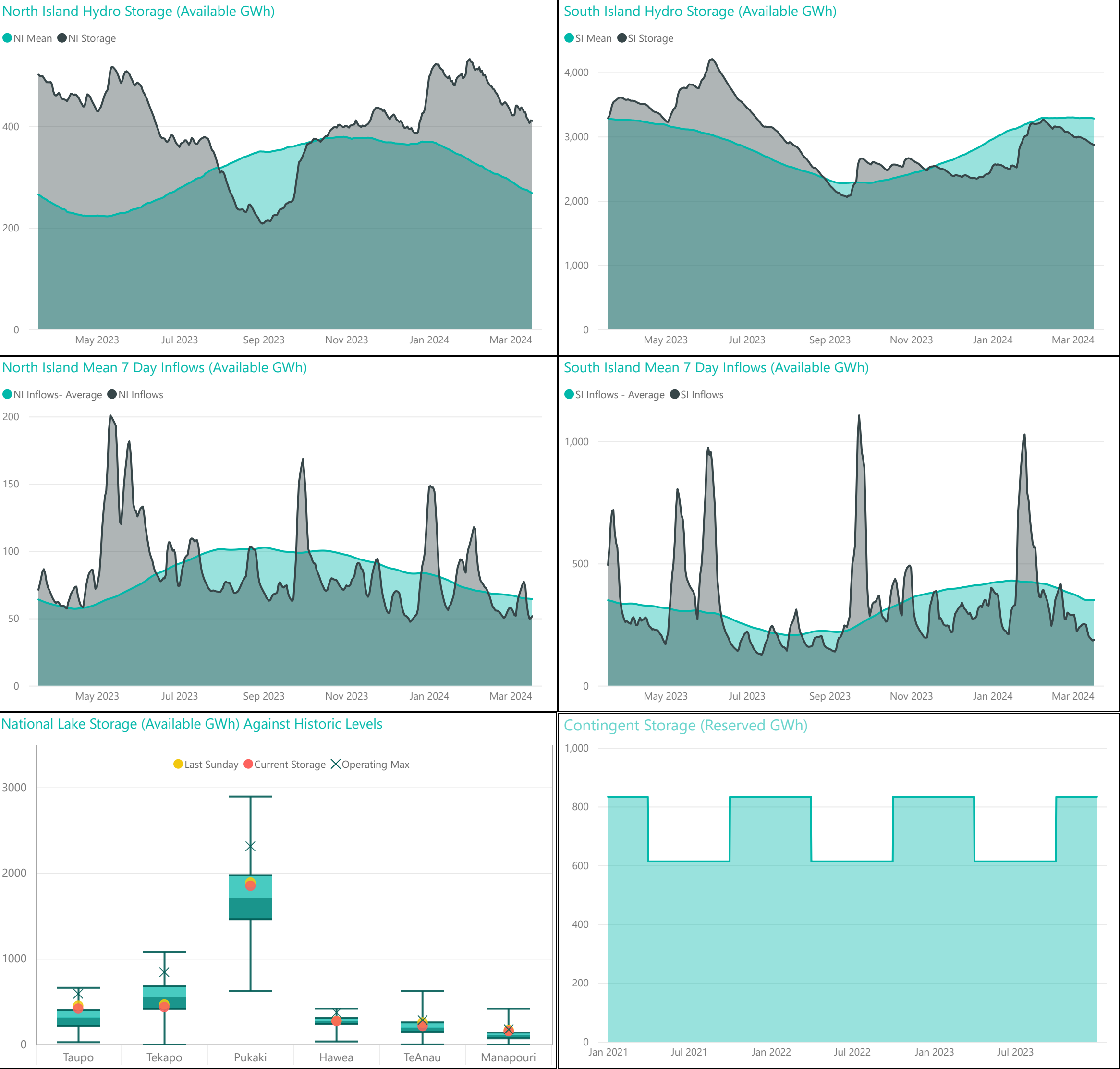


Generation Mix





Hydro Storage



For further information on security of supply and Transpower's responsibilities as the System Operator, refer to our webpage here: <https://www.transpower.co.nz/system-operator/security-supply>

For any inquiries related to security of supply contact market.operations@transpower.co.nz

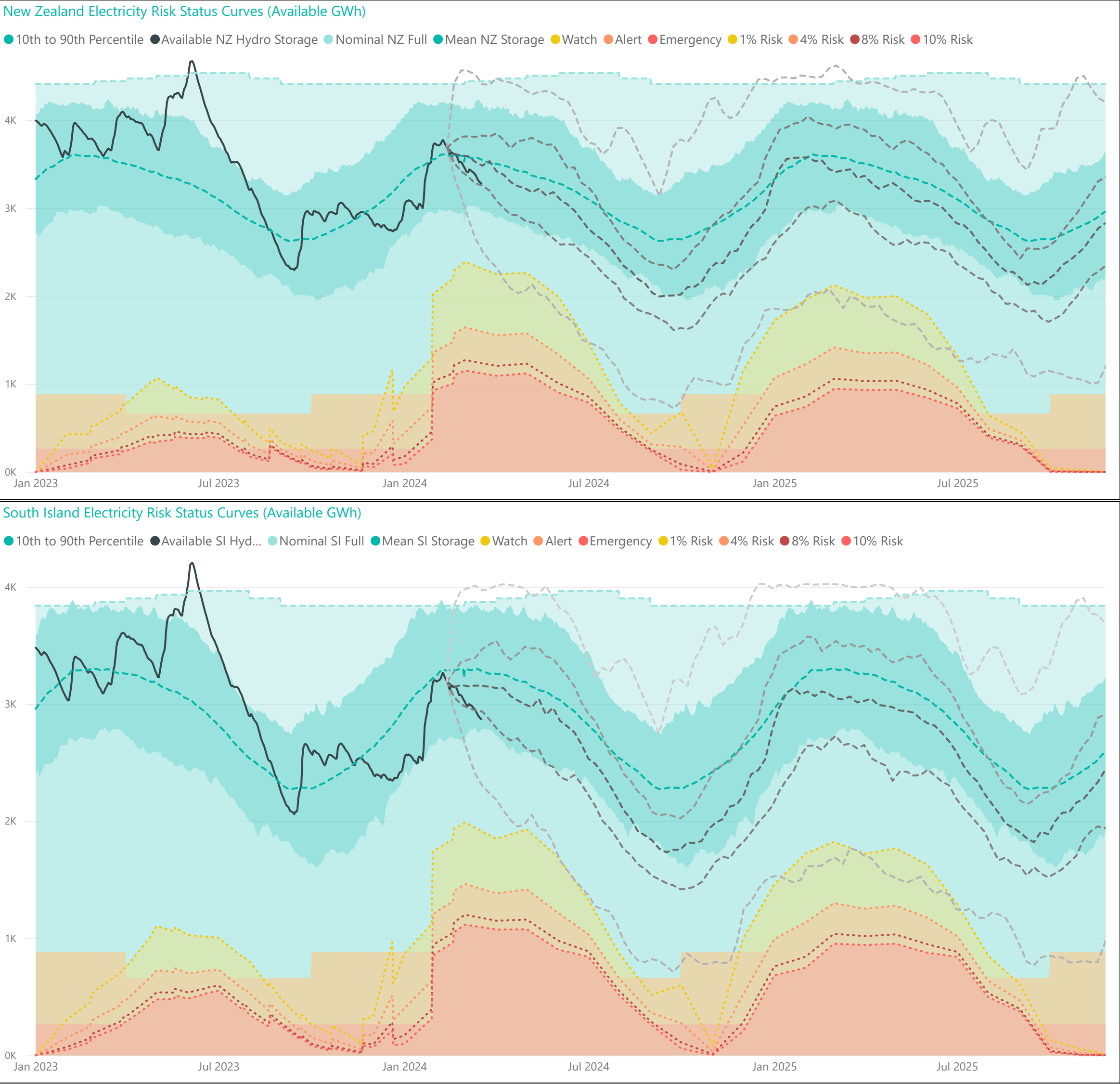
Hydro data used in this report is sourced from [NZX Hydro](#).

Electricity risk curves have been developed for the purposes of reflecting the risk of extended energy shortages in a straightforward way, using a standardised set of assumptions.

Further information on the methodology of modelling electricity risk curves may be found here: <https://www.transpower.co.nz/system-operator/security-supply/hydro-risk-curves-explanation>



Electricity Risk Curves



Electricity Risk Curve Explanation:

- Watch Curve - The maximum of the one percent risk curve and the floor and buffer
- Alert Curve - The maximum of the four percent risk curve and the floor and buffer
- Emergency Curve - The maximum of the 10 percent risk curve and the floor and buffer
- Official Conservation Campaign Start - The Emergency Curve
- Official Conservation Campaign Stop - The maximum of the eight percent risk curve and the floor and buffer

Note: The floor is equal to the amount of contingent hydro storage that is linked to the specific electricity risk curve, plus the amount of contingent hydro storage linked to electricity risk curves representing higher levels of risk of future shortage, if any. The buffer is 50 GWh.

The dashed grey lines represent the minimum, lower quartile, median, upper quartile and the maximum range of the simulated storage trajectories (SSTs). These will be updated with each Electricity Risk Curve update (monthly).