Weekly Market Movements - Week Ended 3 March 2024

Overview

National hydro storage continued to decline, and is now 95% of the historic mean. Hydro generators continued to ease off output in response to low inflows and the ongoing planned HVDC outage. This lead to an increase in North Island thermal generation. Residual generation was healthy last week despite the HVDC outage. New Zealand's first utility scale battery at Rotohiko offered injectable reserves in the market for the first time last week.

In this week's insight we look at the price inversion that occurred on Thursday 29 February.

Security of Supply

Energy

National hydro storage now sits at 95% of the historic mean, down from 98% the previous week. South Island storage is at 91% of the historic mean, down from 93%, 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 outage. The lowest residual point of 850 MW occurred on Wednesday morning.

Forecast N-1-G margins are healthy throughout the forecast horizon to late March. The HVDC outages running from 21 February - 14 March are considered in the margin calculation. The lowest N-1-G margin during the forecast period is 206 MW on 29 April. The latest NZGB report is available on the NZGB website.

Electricity Market Commentary

Weekly Demand

Demand remained low last week with continued summer conditions. Last week demand decreased from 759 GWh the week prior to 750 GWh. Demand peaked at 5,332 MW on the evening of Monday 26 February.

Weekly Prices

The average wholesale price at Otahuhu last week was $210/MWh, up from $204/MWh the week prior. The increased average wholesale price last week was in line with thermal contribution to the generation mix rising as hydro and wind generation dropped.

The Otahuhu price peaked at $562/MWh on Monday 26 February at 10:30am over a period of low wind generation during the HVDC pole 3 outage. With pole 3 on outage, there was no HVDC risk subtractor which increased the amount of North Island reserves required to cover an unplanned pole 2 outage. This lead to a North Island price spike for fast instantaneous reserve.

Generation Mix

The renewable percentage of the generation mix dropped further below the annual average to 83%. Wind generation decreased from 9.5% of the mix to 8.5%, and hydro decreased from 56.4% to 55.2%. This was almost entirely replaced by thermal generation which increased to 14.9% of the mix from 13.5% the week prior.

HVDC

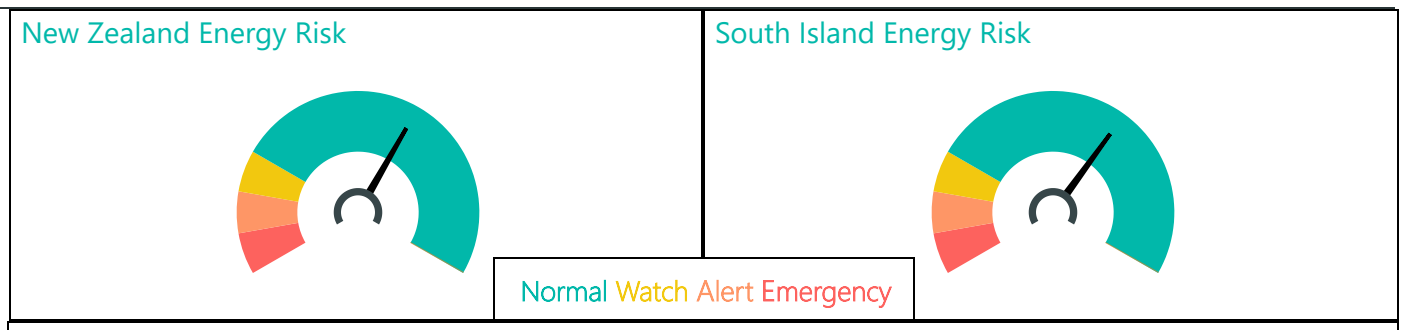
All weekday daytime HVDC flows last week were northward. Flow was mostly southward over nights and the weekend, when North Island demand was lower and there was reasonable North Island wind and thermal generation.

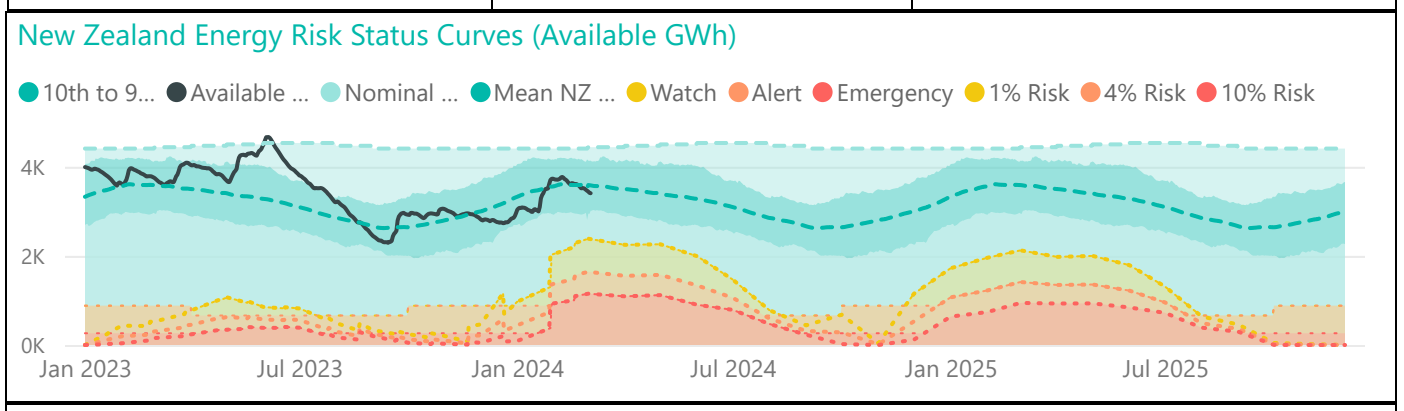
The planned HVDC Pole 3 and Bi-Pole outages have both concluded. Pole 2 went on outage on 25 February and will remain on outage until 14 March. For further details see the Customer Advice Notice.

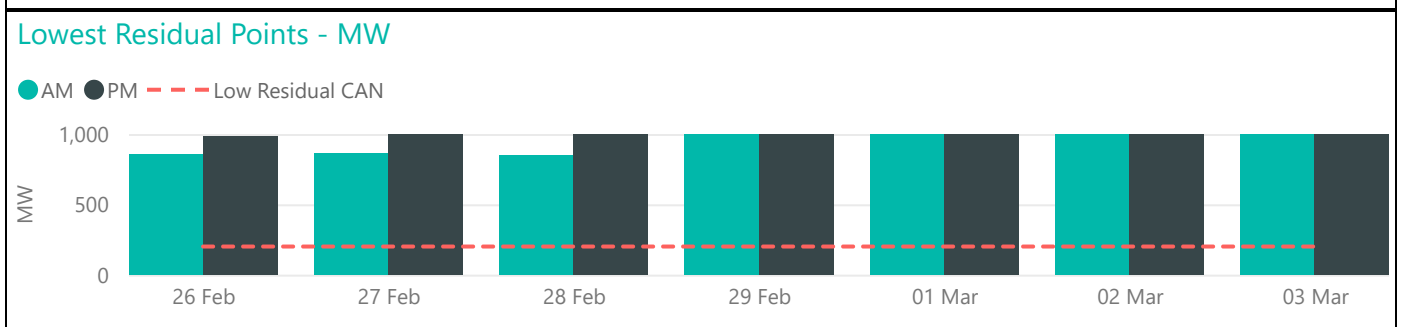
Following the recent Pole 3 outage, we discovered a defect that needs to be repaired. This means an additional outage is required. We have scheduled this for Sunday 17 March between 4.30am and 9pm. We have issued a Customer Advice Notice advising the market.

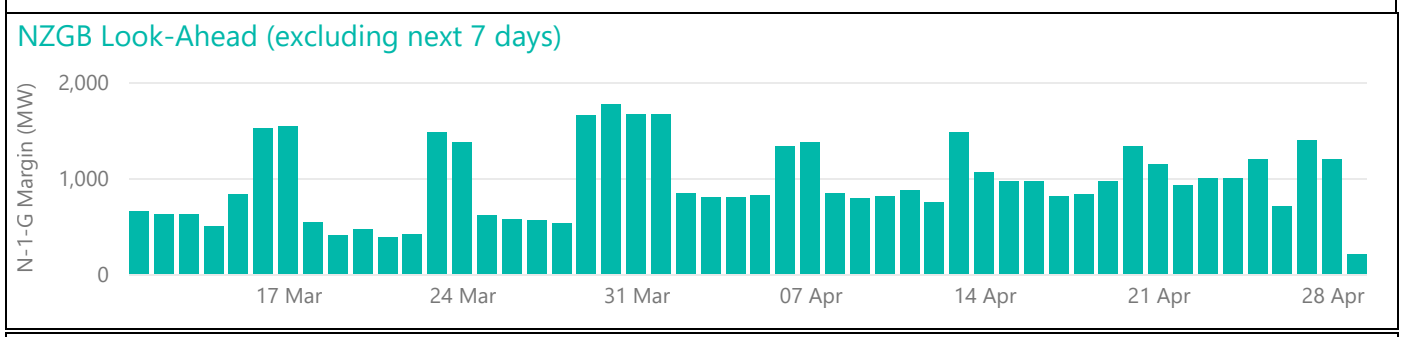
SOROP Consultation closes tomorrow (6 March)

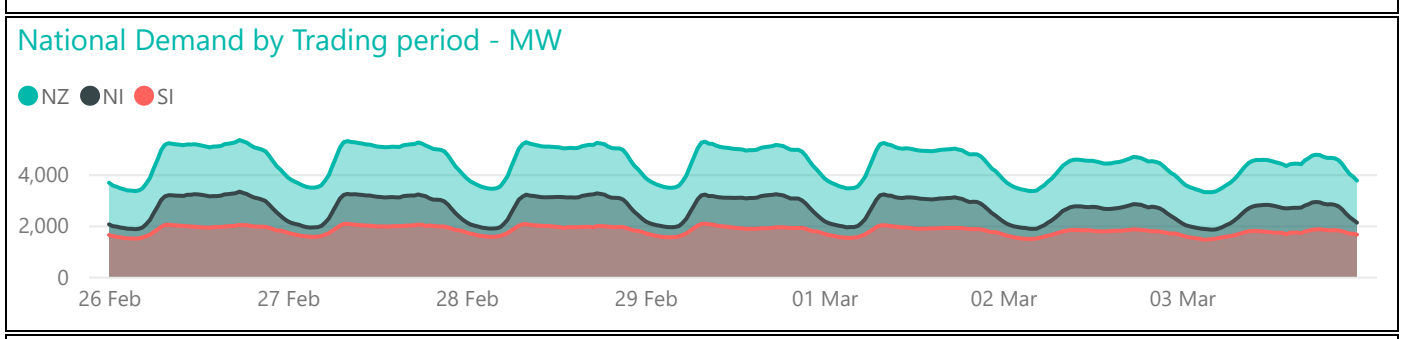
Transpower is seeking views from the electricity industry on proposed changes to the System Operator Rolling Outage Plan (SOROP). The consultation closes tomorrow (6 March). There is then a two-week period for cross submissions until 20 March. Please see our website for further details.

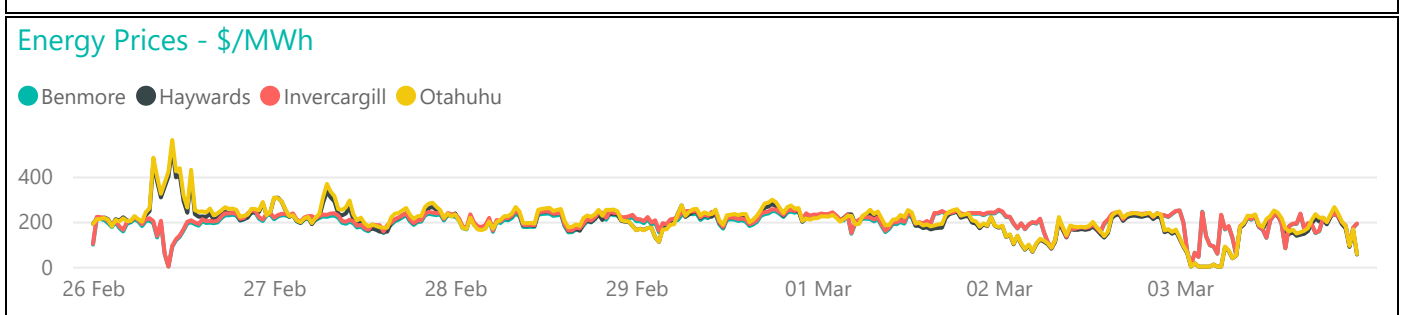


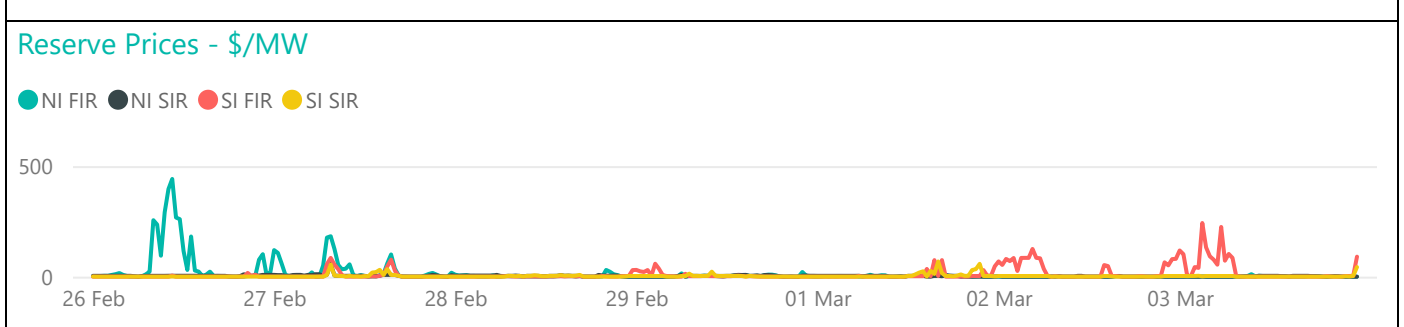


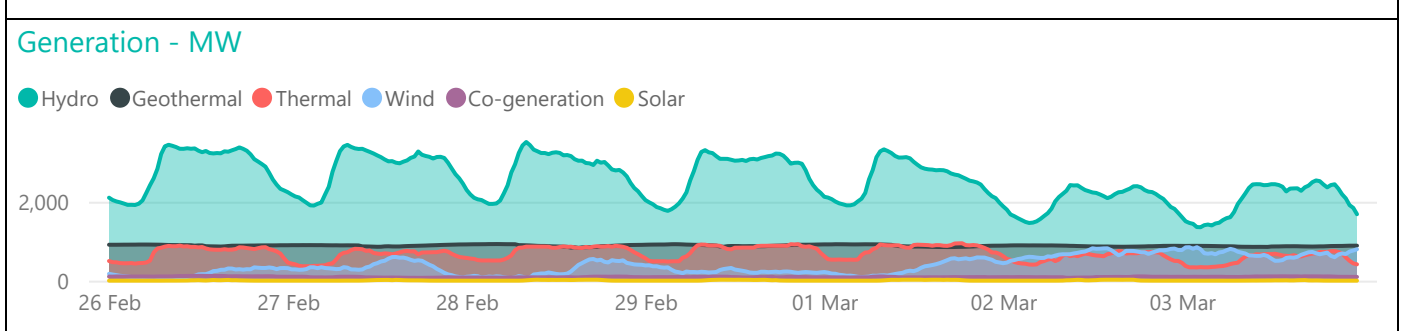


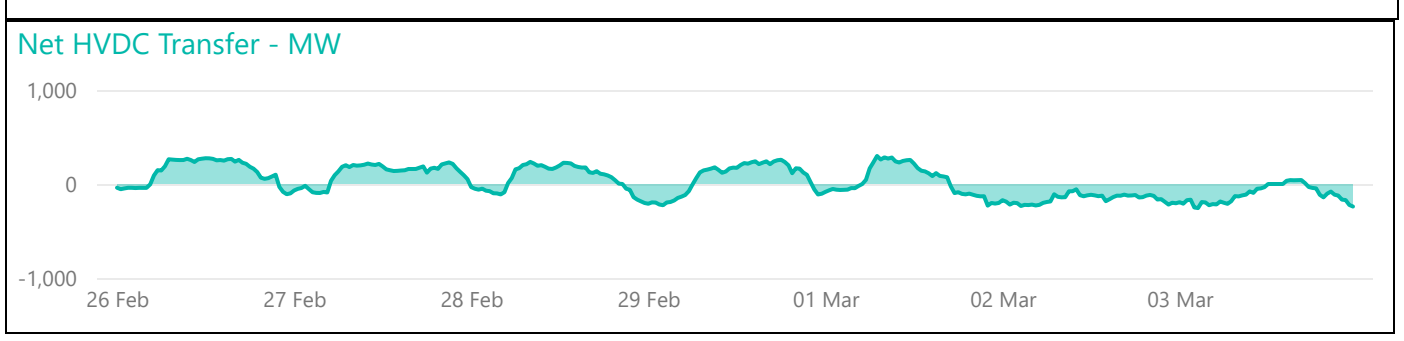












Weekly Summary Insight - Real Time Price Inversion

This insight looks into a price inversion that occurred in the Real-Time Dispatch (RTD) schedules over the period 10:15am-10:25am last Thursday 29 February. A price inversion is when the price in the island that is sending electricity over the HVDC link is higher than the price in the receiving island. Usually the sending island price is lower than the receiving island price.

This insight expands on concepts from last week's insight. As a refresher:

- The sending island is the island which electricity is transferred from via the HVDC link
- The receiving island is the island which electricity is transferred to via the HVDC link
- Reverse reserve sharing is when reserve is shared from the receiving island to the sending island (in the reverse direction of HVDC energy transfer)
- Round power is the ability for the HVDC system to have the separate poles operating in opposite directions

The HVDC is running in monopole operation during the maintenance outages from 21 February - 14 March. Currently only Pole 3 is operating. When in monopole operation, the maximum amount of reserve which can be shared in the reverse direction is more limited, due to an inability to operate in round power. The amount of reverse reserve sharing available is defined as:

Reverse reserve sharing limit = Scheduled HVDC transfer - 65 MW (made up of 30 MW modulation risk and 35 MW modelled pole minimum)

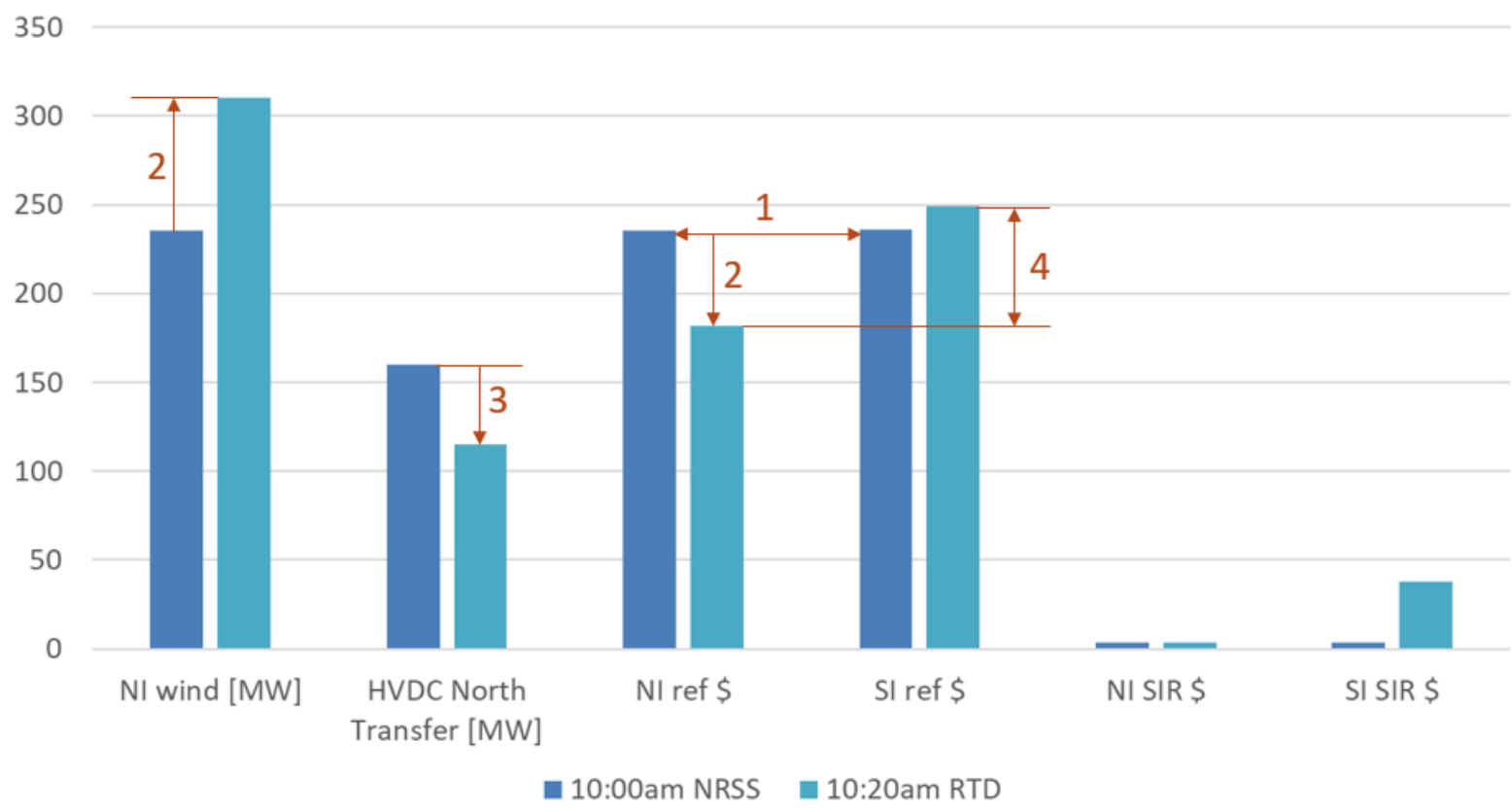
When the 10:00am Non-Responsive Schedule Short (NRSS) was solved, for the 10:00am trading period:

- NI reference price (at Haywards) ~= SI reference price (at Benmore) (Point 1 in the figure below)
- NI SIR price ~= SI SIR price (SIR - Sustained Instantaneous Reserve)
- 160 MW energy sent from SI to NI via HVDC, leaving 95 MW available for reverse reserve sharing
- 60 MW SIR reverse reserve sharing scheduled from the NI to SI

When the 10:20am RTD was dispatched:

- NI wind had increased by 85 MW from the 10:00am NRSS forecast, lowering the NI reference price as more MW energy could be dispatched in the NI at lower prices (Point 2)
- The increase in lower priced NI generation meant less energy was dispatched in the SI. So HVDC transfer from SI to NI decreased to 115 MW, leaving only 50 MW available for reverse reserve sharing (Point 3), when 60 MW was scheduled in the NRSS
- This lower HVDC transfer (and lower reverse reserve sharing) resulted in an additional 10 MW of SIR needing to be purchased in the SI. The reverse reserve sharing limit became a binding constraint.

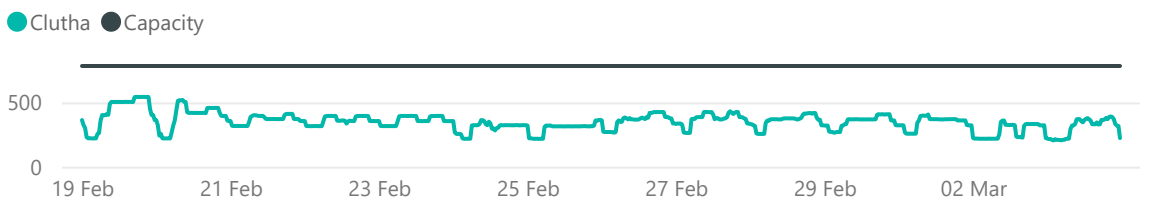
As a result, SI energy and SI SIR prices increased, raising the SI reference price. The increase in SI ref price and decrease in NI ref price was enough to result in a price inversion (Point 4).



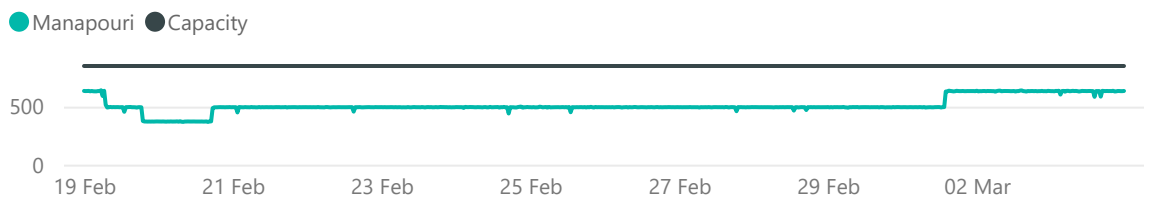
Generation Breakdown - Last Two Weeks

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

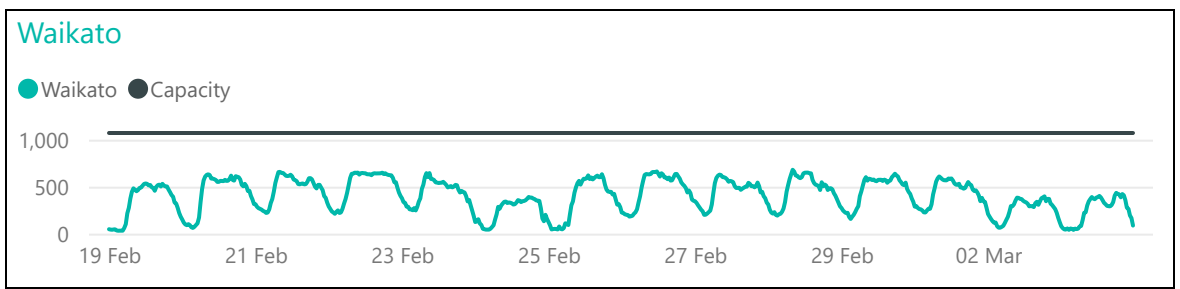
Clutha



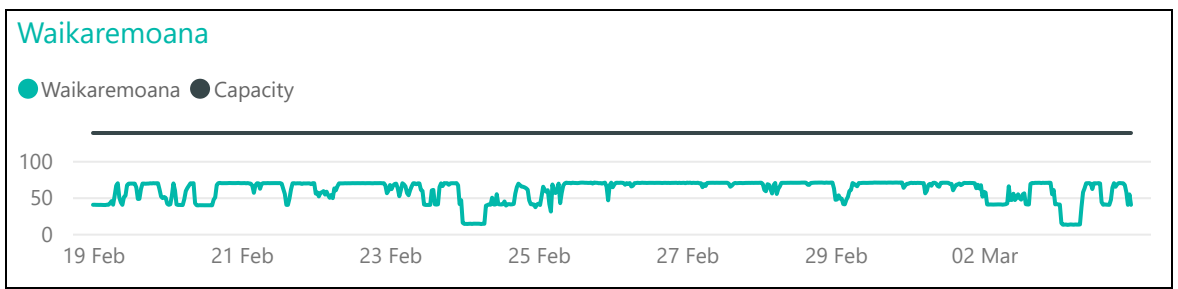
Manapouri



Waikato

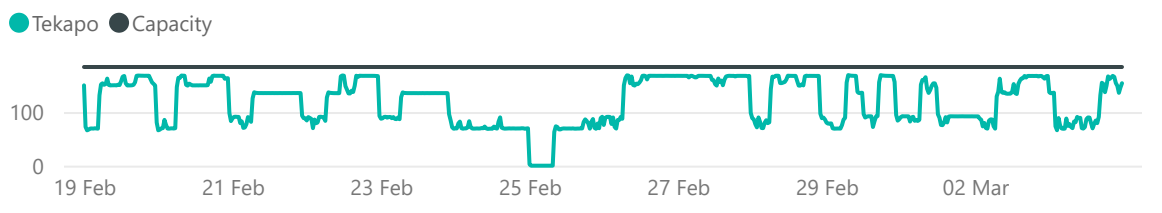


Waikaremoana

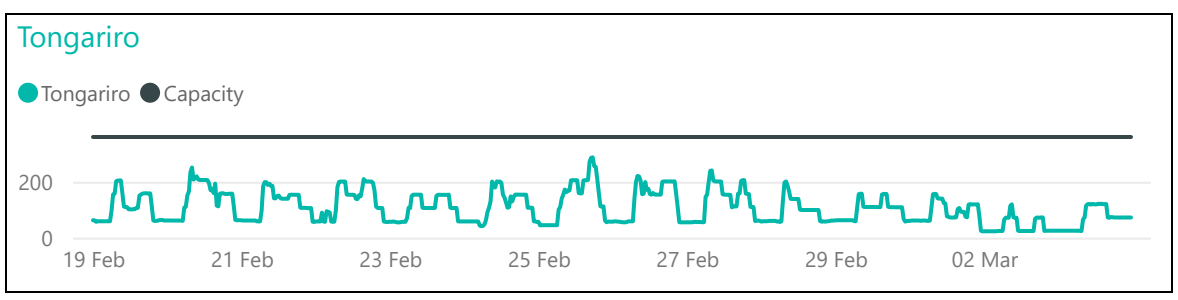


Waitaki

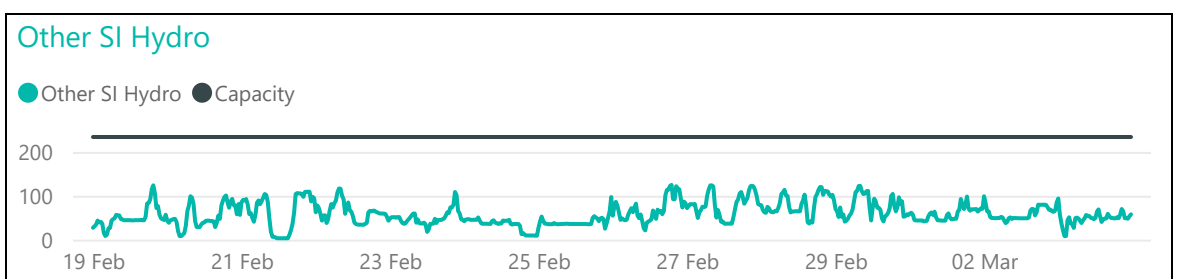
Tekapo



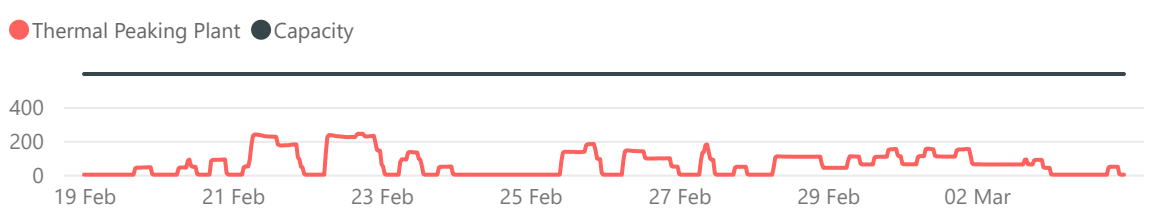
Tongariro



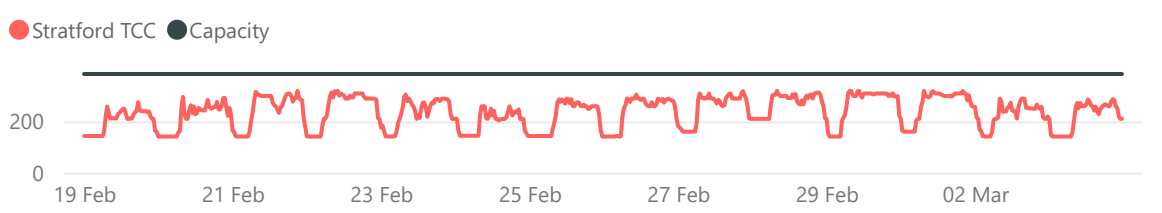
Other SI Hydro



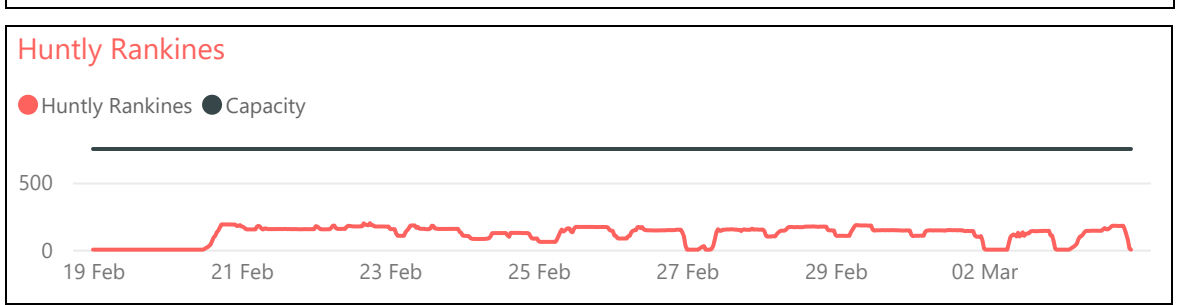
Thermal Peaking Plant



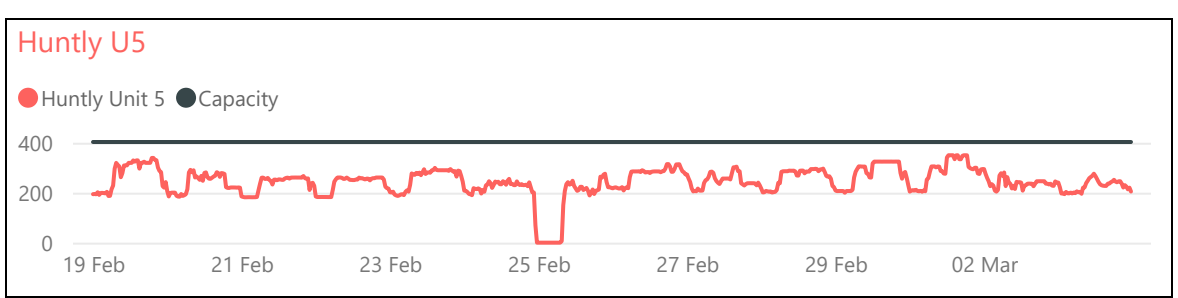
Stratford TCC



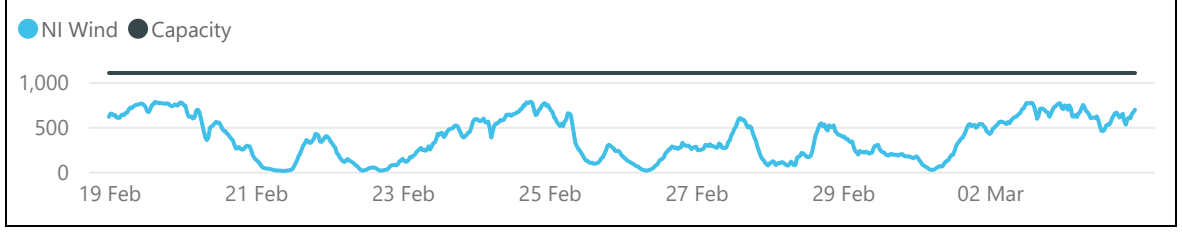
Huntly Rankines



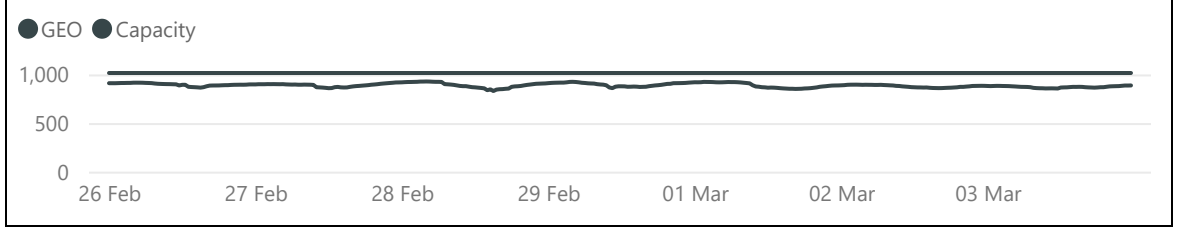
Huntly U5



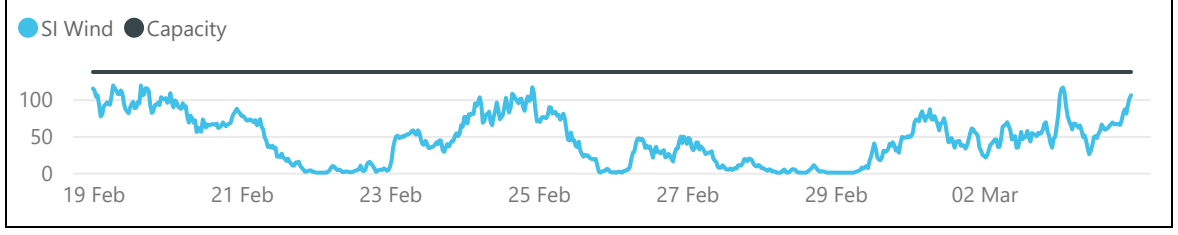
North Island Wind



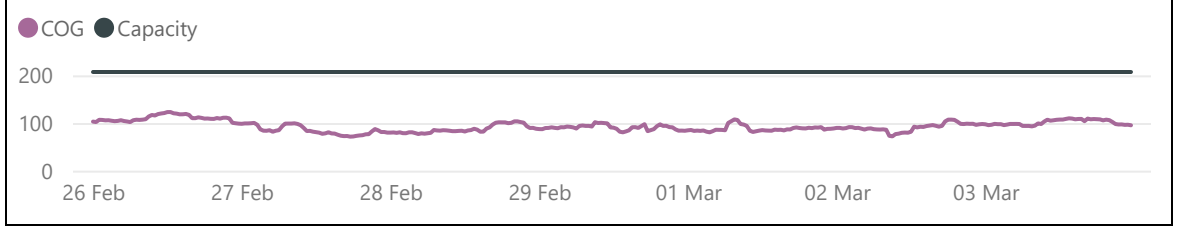
Geothermal



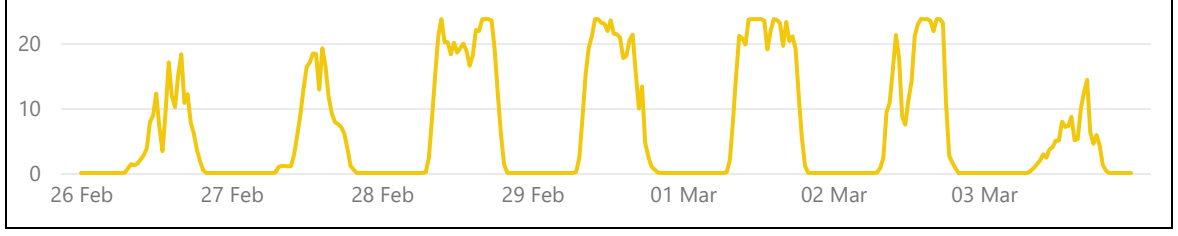
South Island Wind



Co-Generation

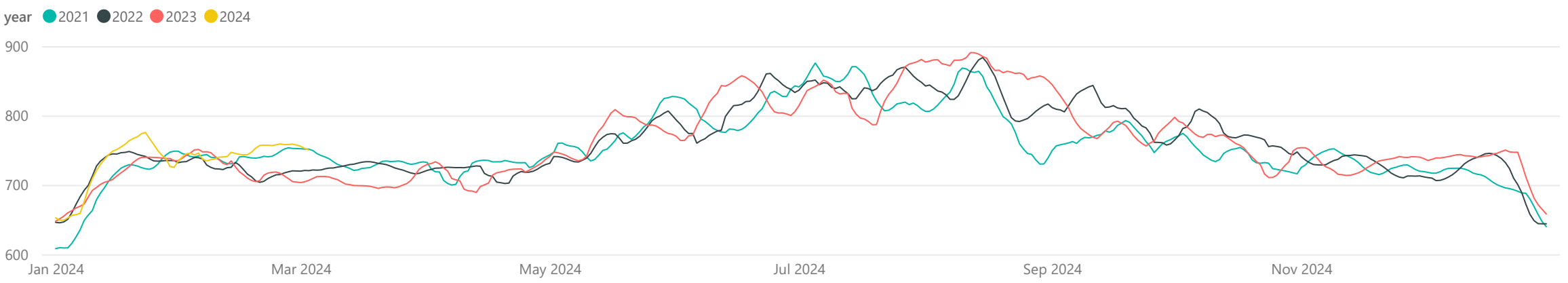


Solar

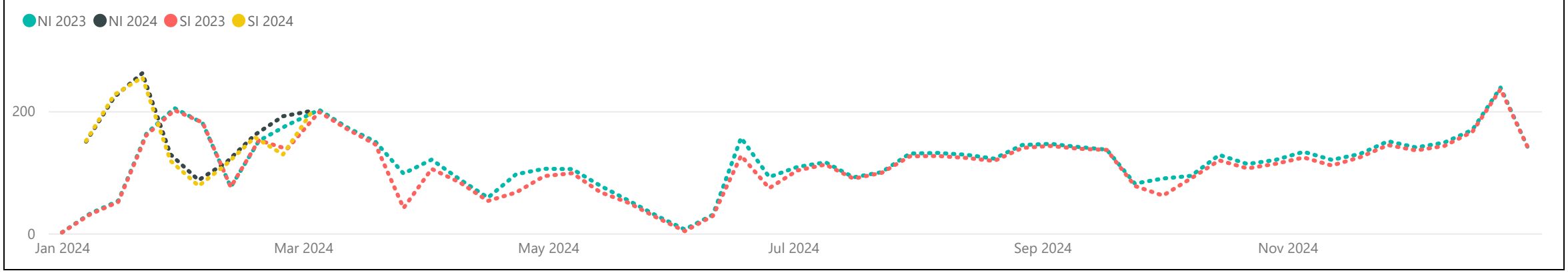


Weekly Profiles

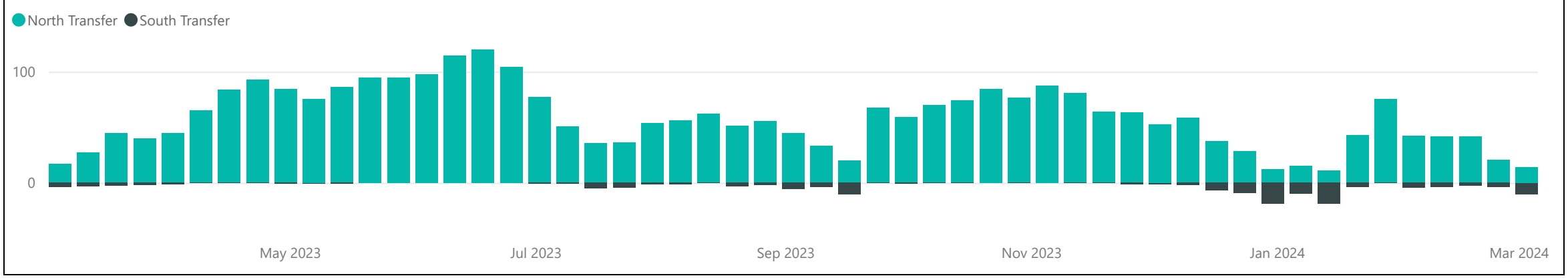
National Weekly Demand - GWh - 7 Day Rolling



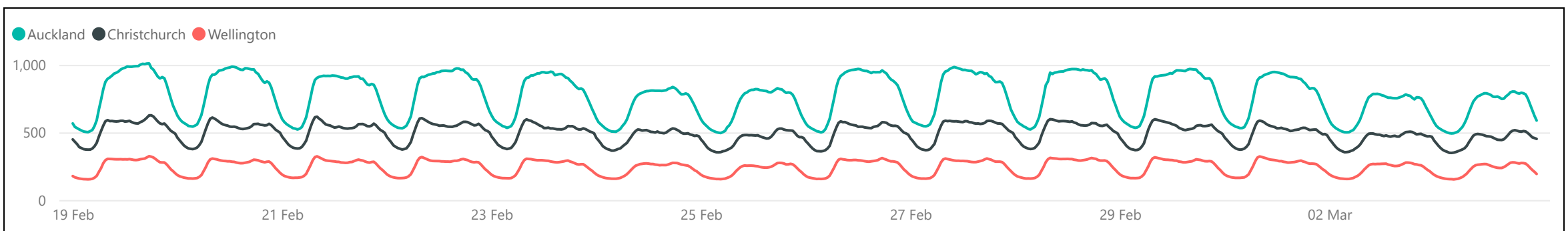
Weekly Spot Price - $/MWh



HVDC Transfer - Weekly GWh



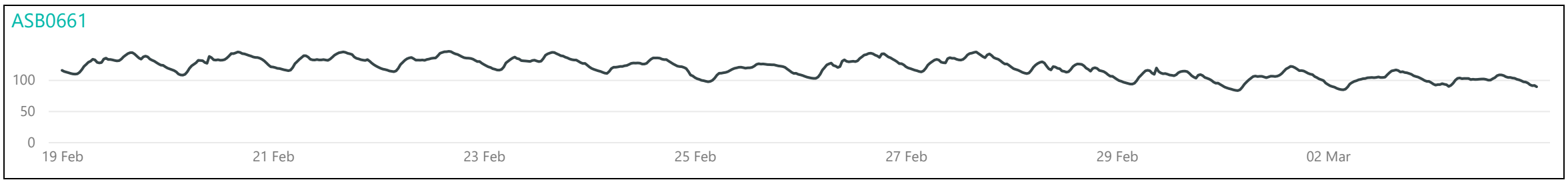
Conforming Load Profiles - Last Two Weeks *Measured in MW shown by region*



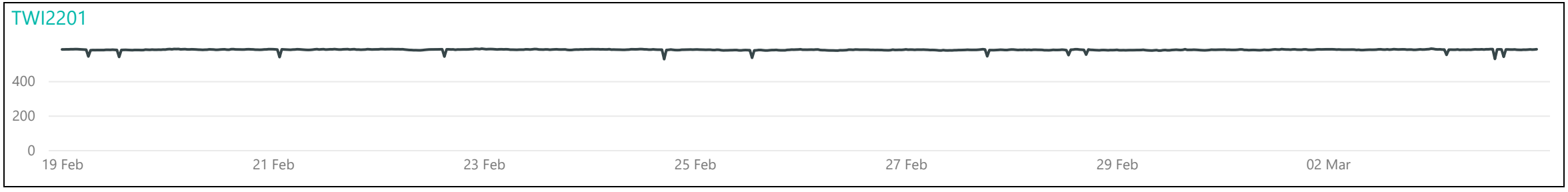
Non-Conforming Load Profiles - Last Two Weeks *Measured in MW shown by GXP*

GLN0331

ASB0661



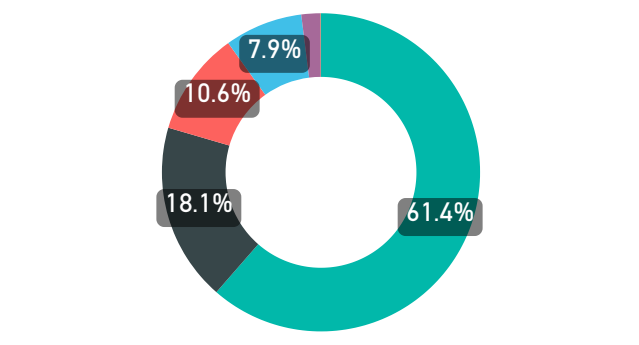
TWI2201



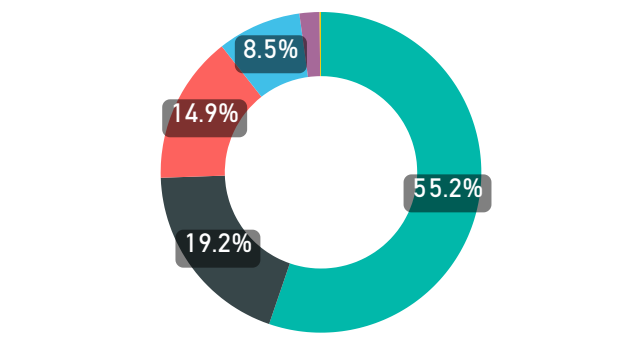
TRANSPOWER

Generation Mix

Last 52 Weeks Generation Mix - Weekly GWh



Last 7 Days Generation Mix - Weekly GWh



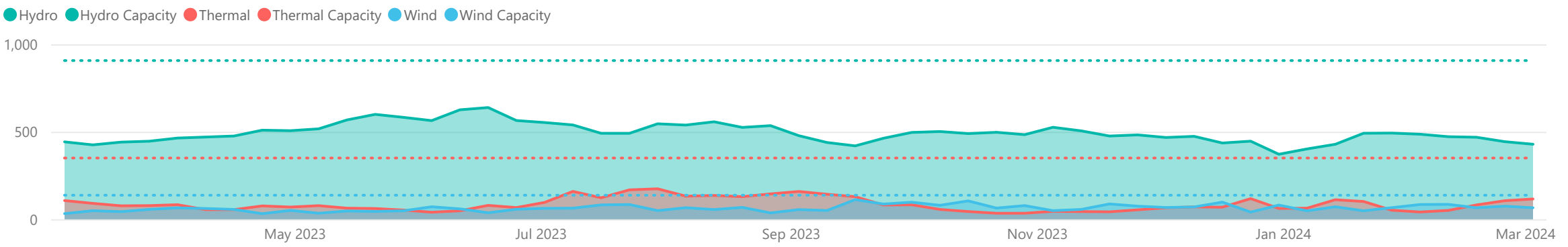
Average Metrics Last 7 Days

Renewable Percentage	CO2e Tonnes/Week	CO2e g/kWh
83%	72,480	92.3

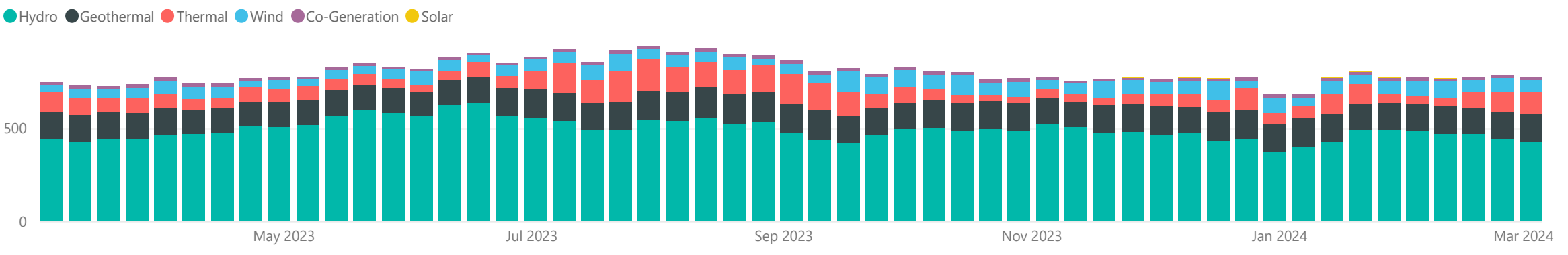
Average Metrics Last 52 Weeks

Renewable Percentage	CO2e Tonnes/Week	CO2e g/kWh
88%	59,595	73.0

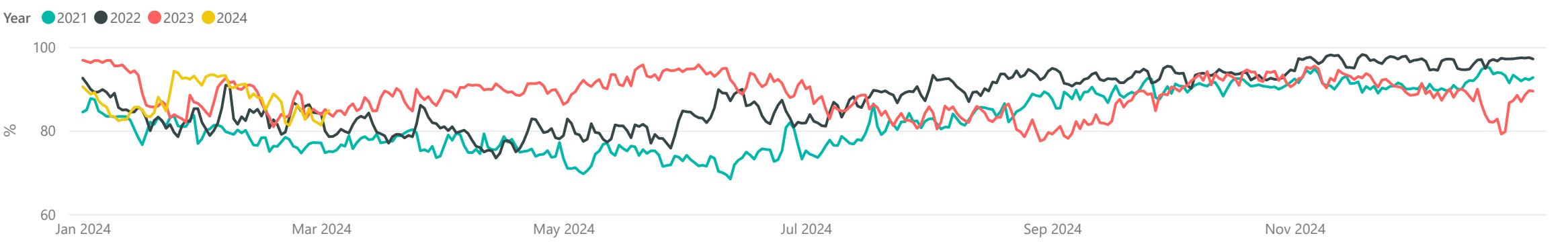
Weekly Generation Mix vs Capacity - GWh



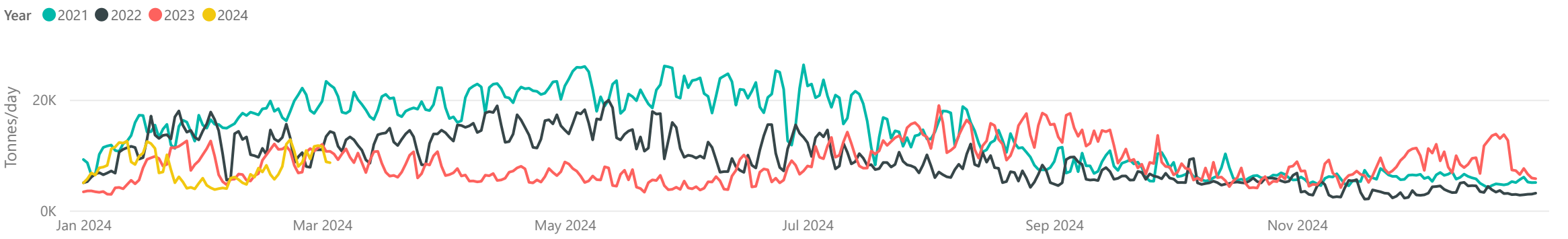
Weekly Generation Mix - GWh



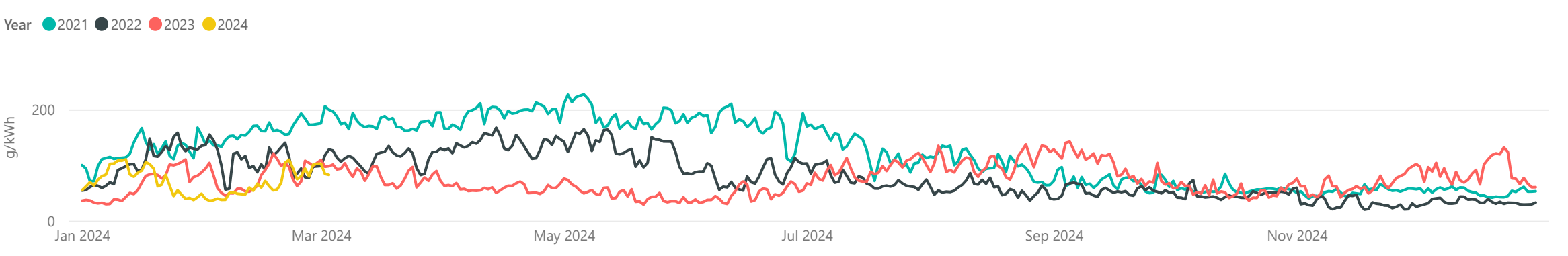
NZ Renewable Percentage



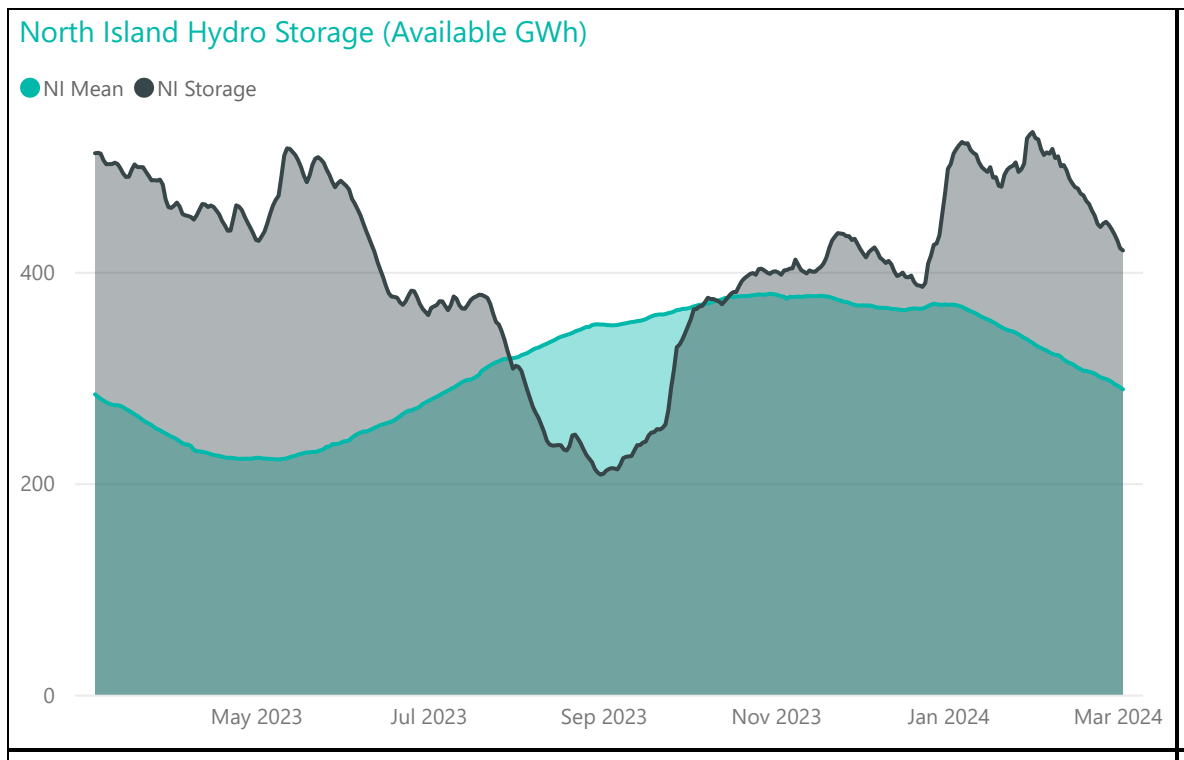
CO2 Tonnes/Day

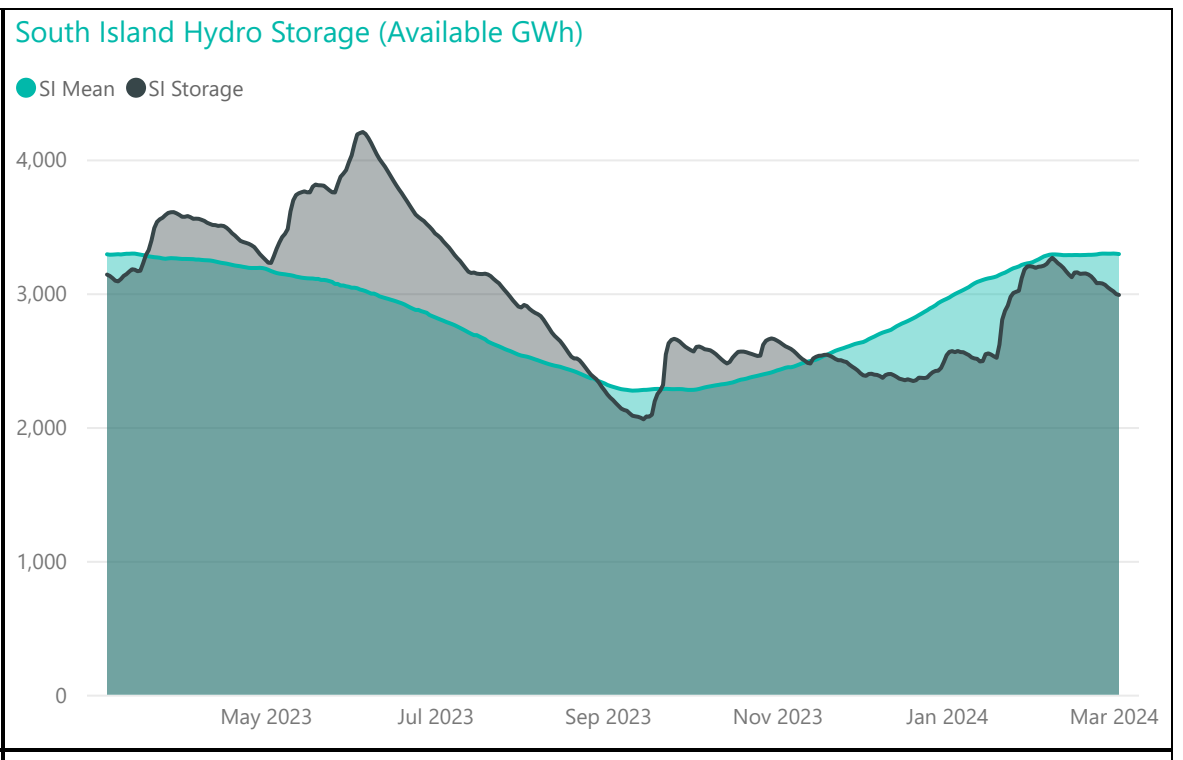


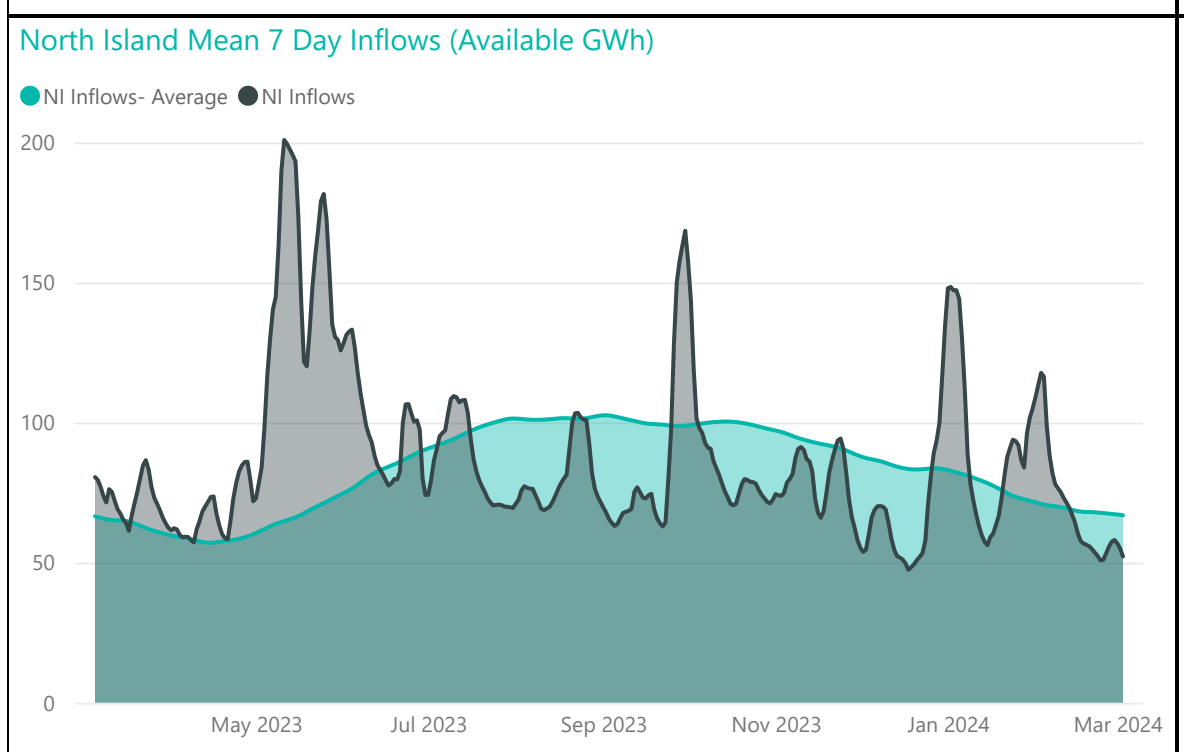
CO2 g/kWh

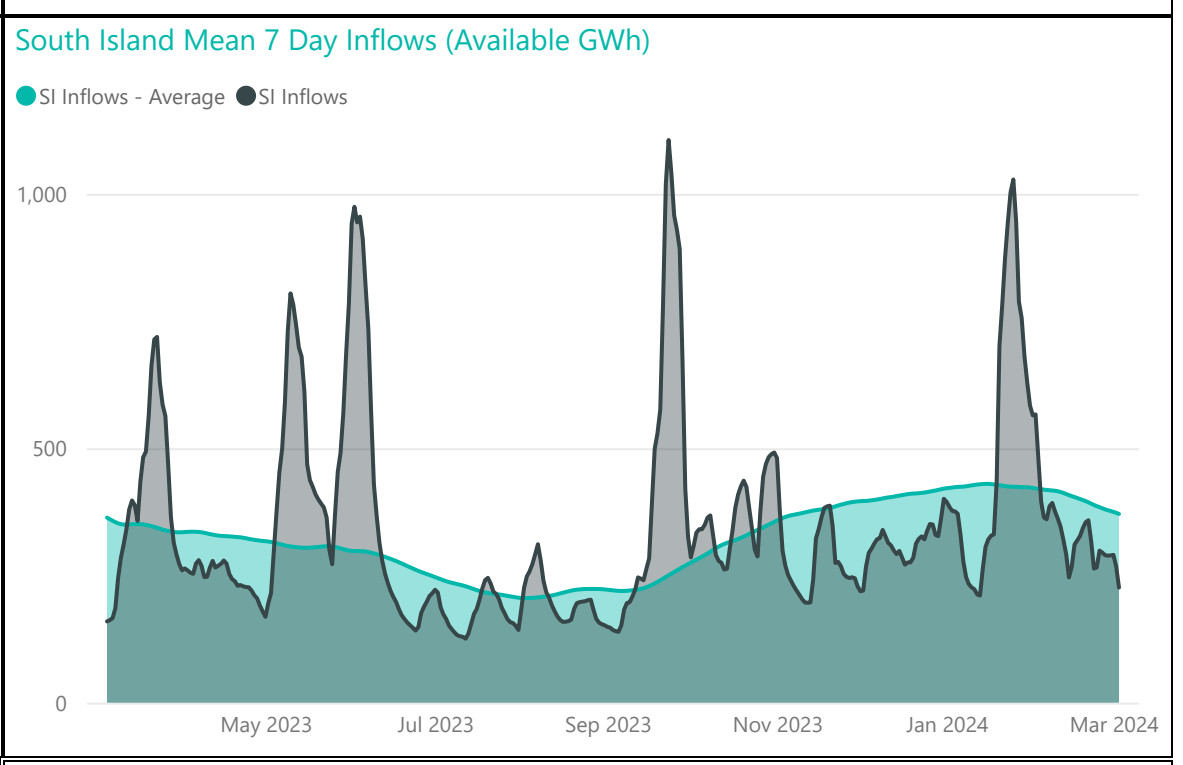


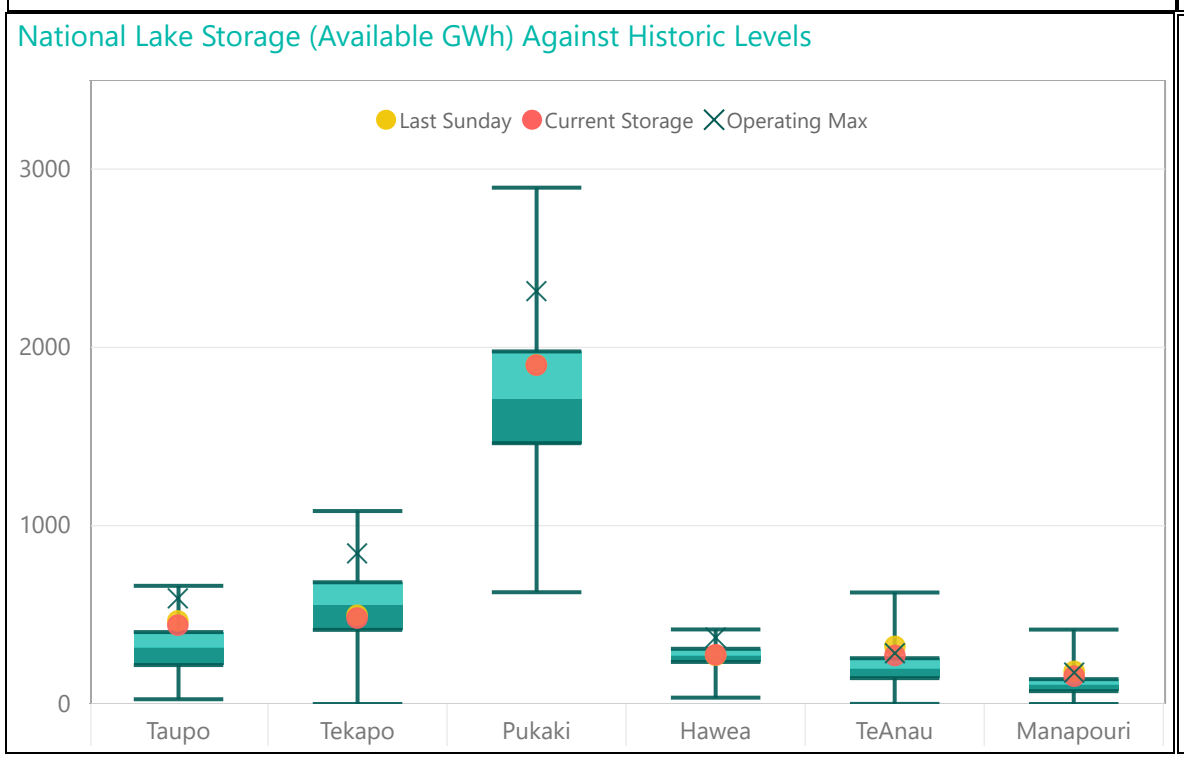
Hydro Storage

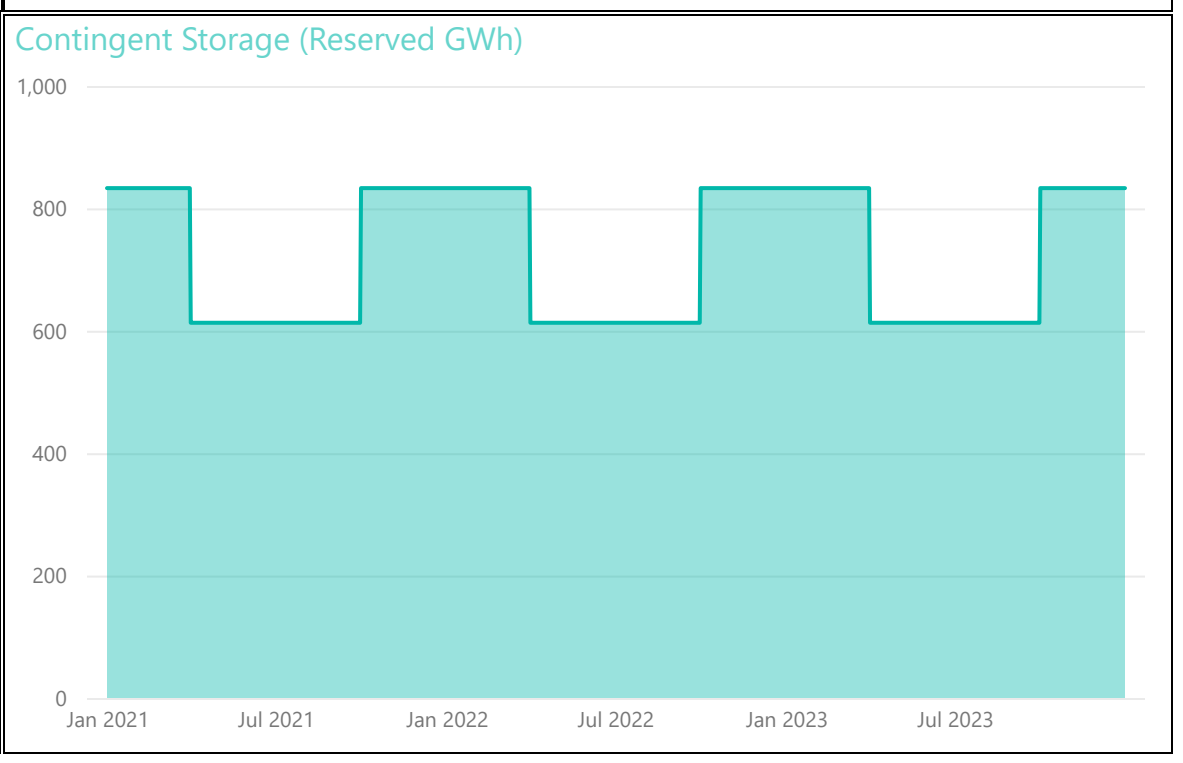












For further information on security of supply and Transpower's responsibilities as the System Operator, refer to our webpage here: https://www.transpower.co.nz/system-operator/security-supply

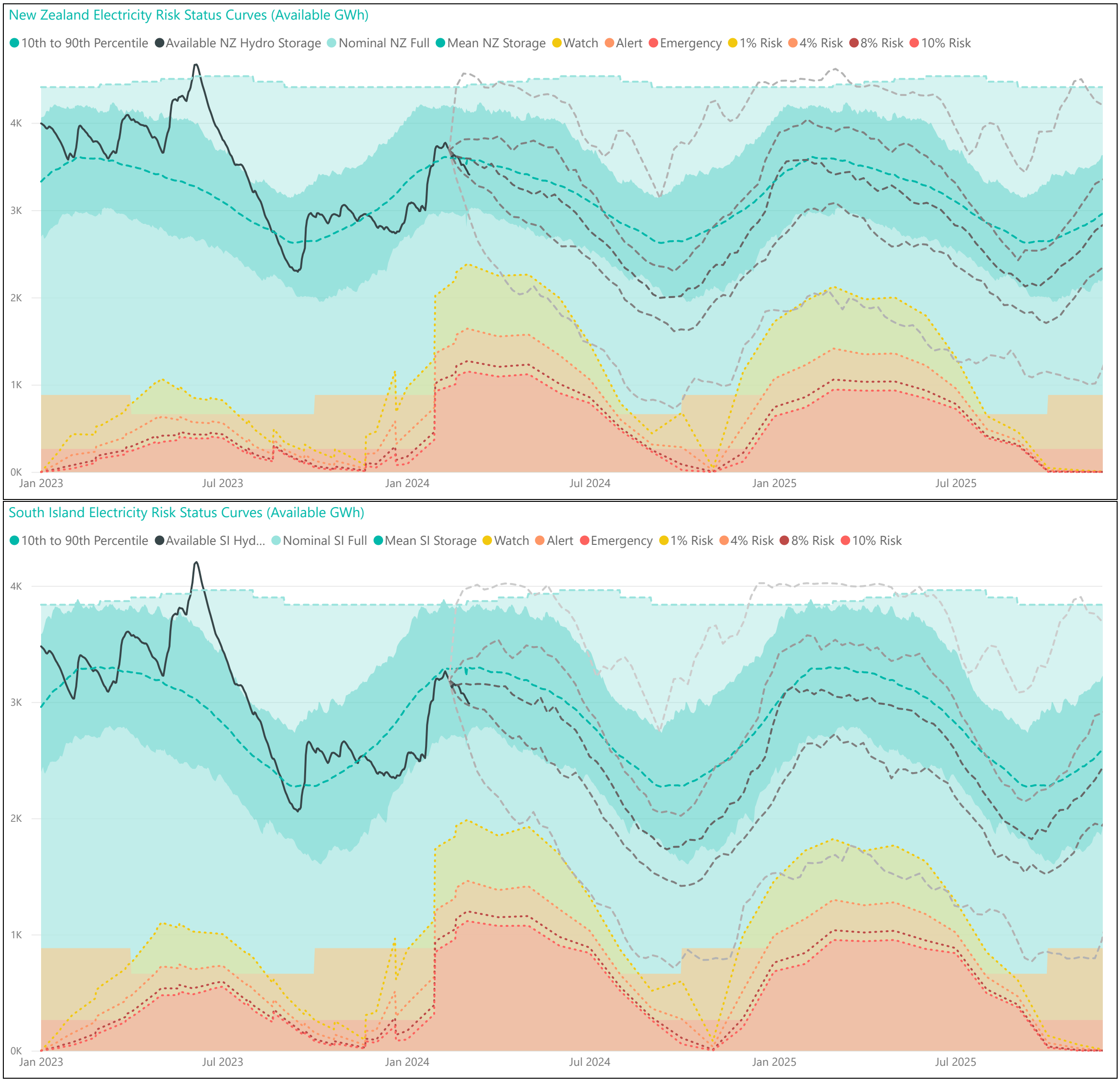
For any inquiries related to security of supply contact market.operations@transpower.co.nz

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).