Weekly Market Movements - Week Ended 28 January 2024

Overview

Further strong inflows over the last week lead to national storage increasing to 104% of the historic mean, up from 96% last week. However, our latest update to the Electricity Risk Curves has seen an increase in risk levels as discussed further below. In this week's insight, we look at last week's energy prices.

Security of Supply

Energy

Hydro storage moved up again in both islands last week and now sits at 79% of full. South Island storage is 99% of average for this time of year, up from 91%. North Island storage has increased from 144% to 157% of historic mean.

Our January update to the ERCs has seen an increase in risk level. This is mostly associated with updated gas production forecasts that have seen a drop in estimated production resulting in less thermal generation availability across the year.

Capacity

Residual generation margins remained healthy last week, with the lowest residual of 612MW on Monday evening.

Forecast N-1-G margins are healthy throughout the forecast horizon ending mid March. The HVDC outages running from 21 February - 14 March are considered in the margin calculation. The lowest N-1-G margin during this period is 302 MW on 1 March. The latest NZGB report is available on the NZGB website.

Electricity Market Commentary

Weekly Demand

Demand decreased to 738 GWh last week, down 4% from 769 GWh the week prior, likely due to a reduction in irrigation and cooling loads and the Wellington public holiday. Demand peaked at 5,539 MW on the evening of Monday 22 January.

Weekly Prices

The average wholesale price at Haywards last week was $129/MWh, a 51% decrease from $262/MWh the week prior. The decrease was likely attributable to the strong hydro inflows, slightly reduced demand and a stronger week of wind generation. The price peaked at Haywards at $271/MWh on Monday morning. There were several instances of price separation that are discussed further in the insight.

Fast Instantaneous Reserve (FIR) prices spiked to ~$200/MW in the North Island and ~$150/MW in the South Island on Tuesday at 21:30. At this point, due to an outage on the HAY_WIL_LTN1 circuit, the risk was set by the combined output of five windfarms. At ~370MW this was a large risk for the system to cover at the time. At times of lower demand/generation the amount of FIR Net Free Reserve (NFR) available is lower, meaning more reserve must be procured, leading to higher prices.

Generation Mix

The renewable percentage of the generation mix last week was 91% up from 85% the week prior. Wind generation rose from 6% to 9%, whilst thermal was down from 13% to 7%. Hydro generation increased from 61% to 63%. Solar generated 1.1 GWh, just 0.15% of the mix.

HVDC

HVDC flows were all northward last week apart from one period of southward flow early Saturday morning. A total of 76 GWh was sent north.
The outages upcoming are:
Pole 3 outage: 21 February - 25 February
Pole 2 outage: 24 February - 14 March
Bipole outage: 24 February - 25 February

SOSA Generator, Distributor and Demand Response Survey

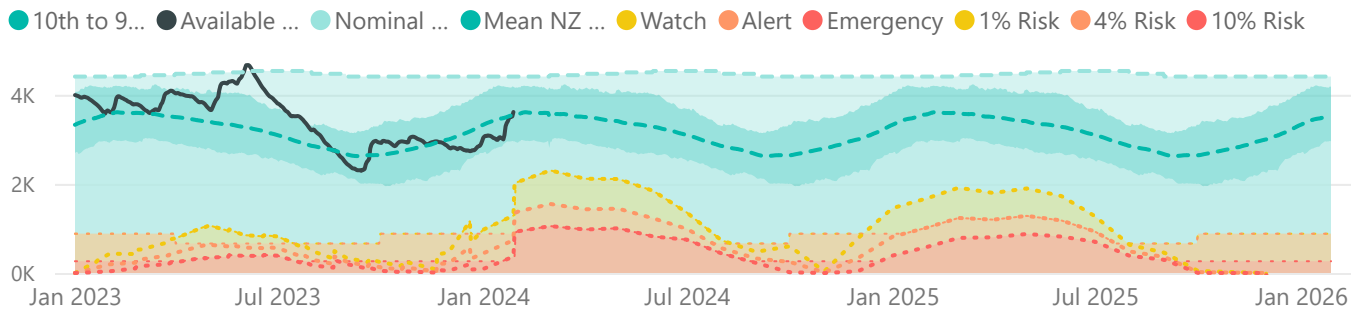
The 2024 Security of Supply Assessment (SOSA) considers existing and future investment in generation, energy storage and demand response capability from electricity generators, distributors and major electricity users. If it applies to you, please fill out the Generator, Distributor and Demand Response Survey, which closes 13 February.

New Zealand Energy Risk

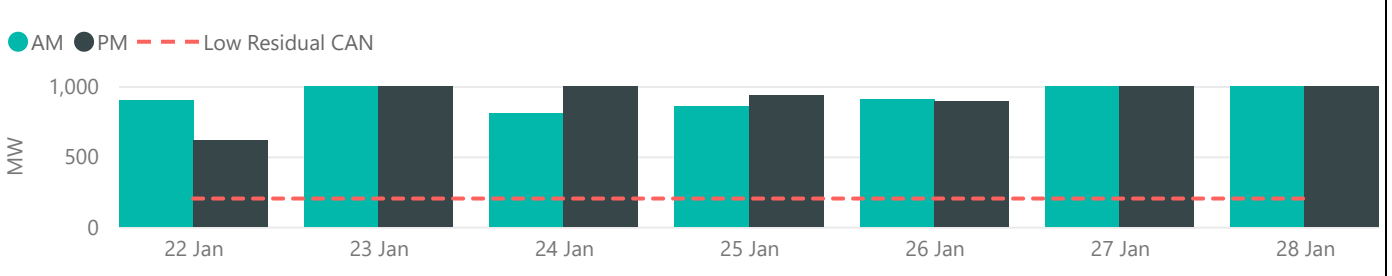
South Island Energy Risk

Normal Watch Alert Emergency

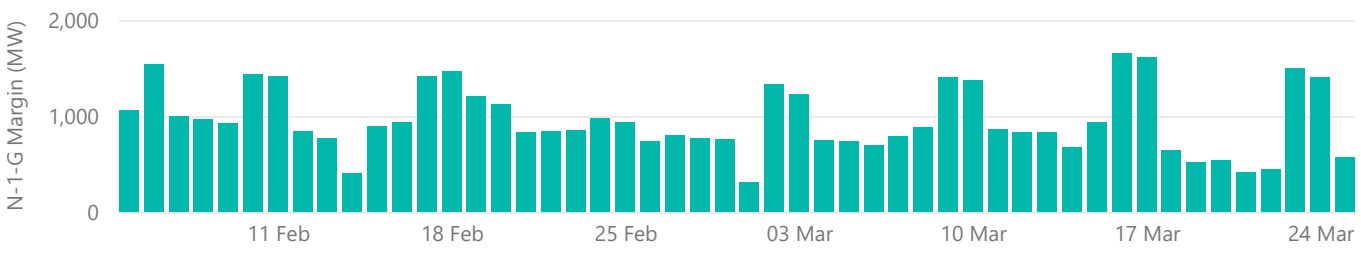
New Zealand Energy Risk Status Curves (Available GWh)



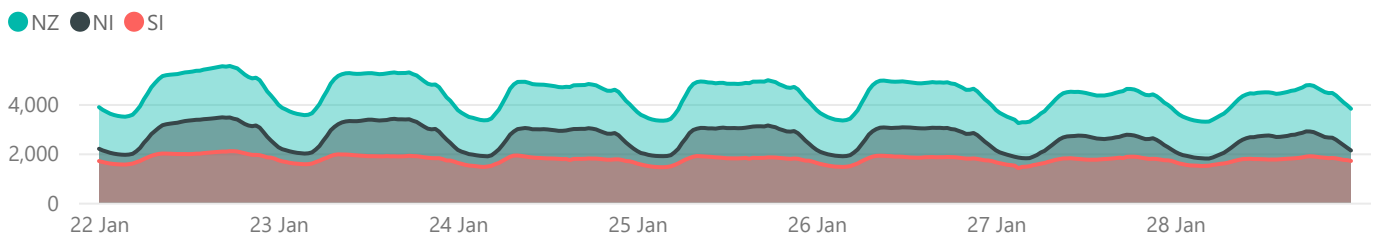
Lowest Residual Points - MW



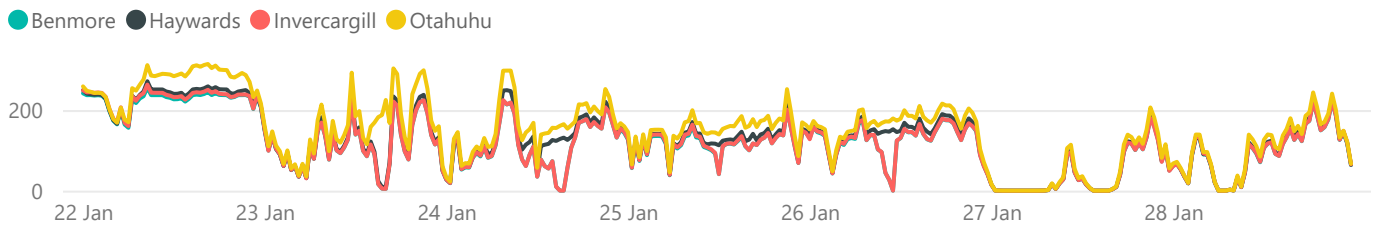
NZGB Look-Ahead (excluding next 7 days)



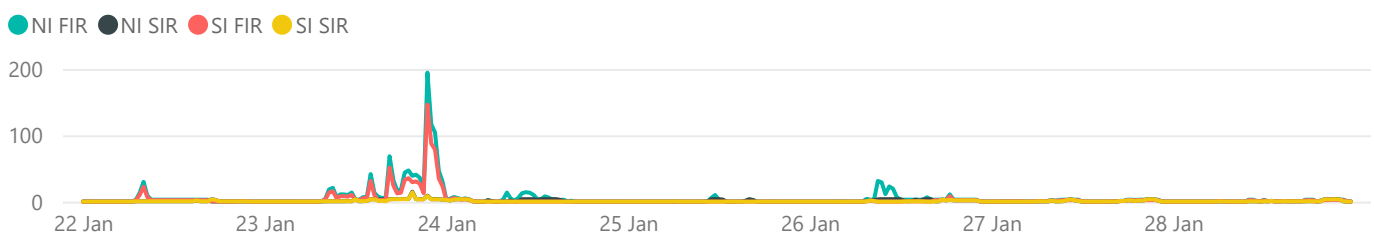
National Demand by Trading period - MW



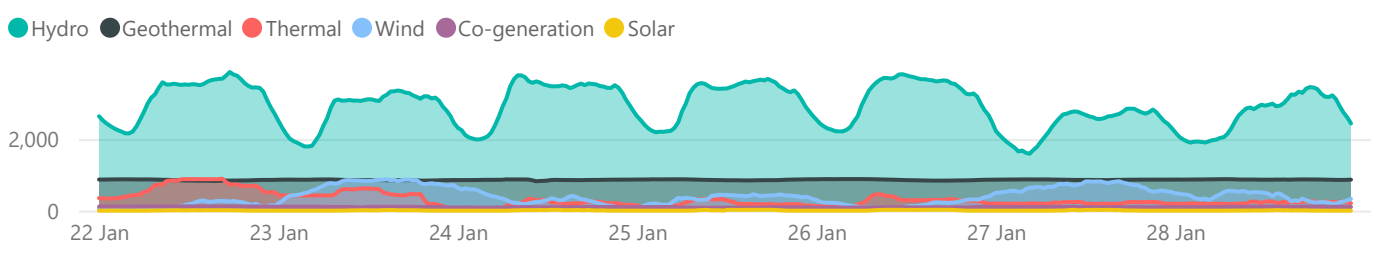
Weekly Prices - $/MWh



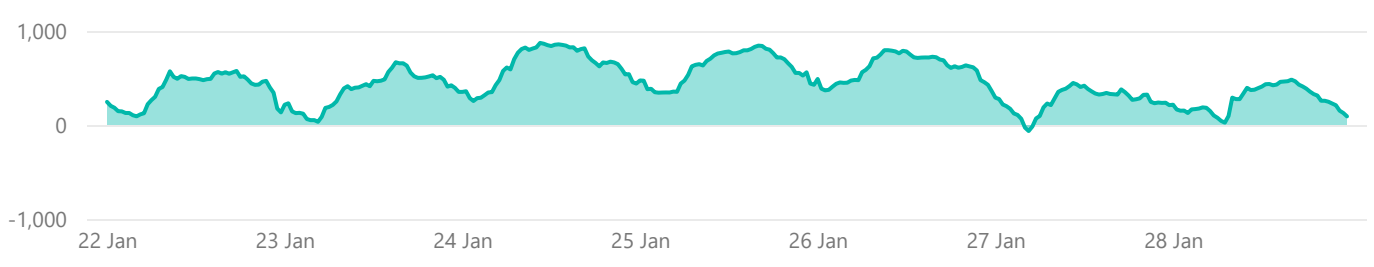
Reserve Prices - $/MW



Generation - MW



Net HVDC Transfer - MW



Weekly Summary Insight - Deeper Look at Price's from Last Week

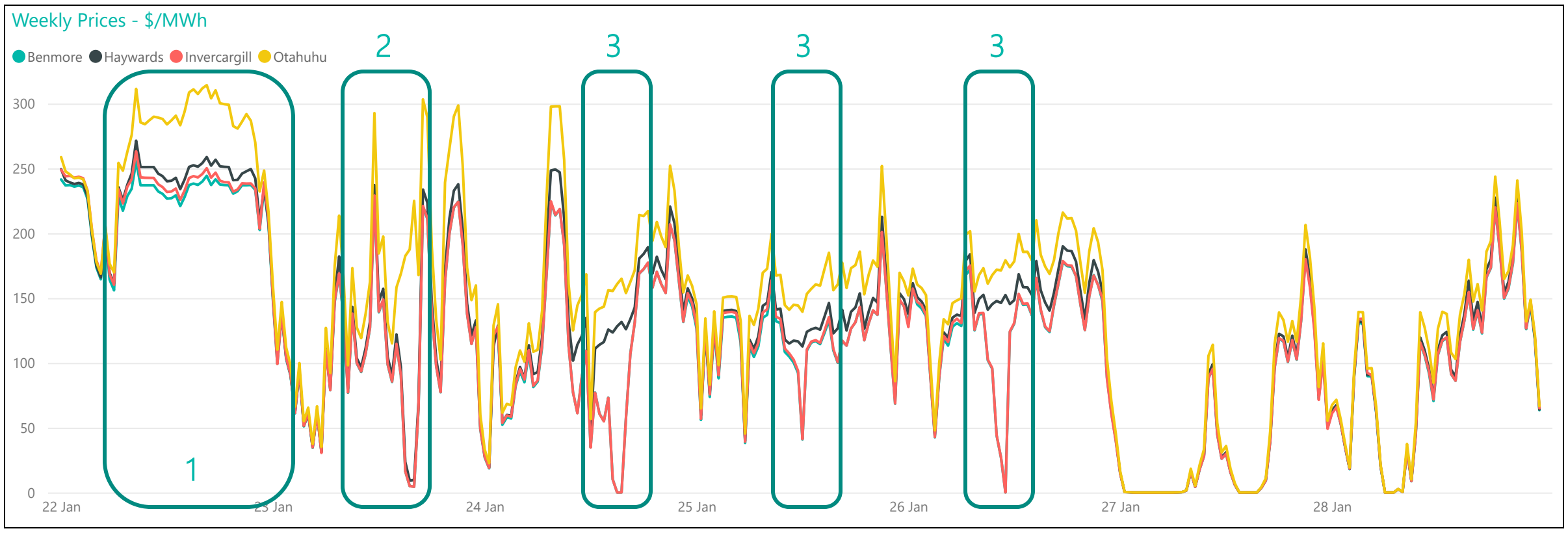
There were a few periods of energy price separation last week as shown in the graph below. We discuss the reasons for these.

1 - This may appear to be the effect of a binding constraint, but is in fact due to losses. North Island GXP prices showed a smooth transition from lower to higher prices the further north the GXP is. The level of losses incurred on Monday was increased by the planned outages of ATI_OHK and HLY_SFD. Both circuits are part of the 220kV backbone grid. Losses are increased as the remaining circuits carry an increased amount of power.

2 - Due to a combination of planned outages (BPE_BRK1.1, HLY_SFD.1) and high northward flow over the system, the BPE-MTR circuit overload protection schemes (COPS) operated, putting a system split in place on the 110kV network at MTR_OKN1.1. This led to binding constraint being built to protect the BPE_TNG1.1 circuit for the loss of the TKU_WKM2.1 circuit, causing a spring_ washer effect with higher prices in the upper North Island and lower prices in the South.

3 - These three periods of inter-island price separation were caused by the HVDC either hitting it's maximum northward transfer capacity, or setting the risk in the North Island. The maximum transfer capacity of the HVDC was reduced due to outages of HAY_WIL_LTN1, BPE_BRK1 and a synchronous condenser at Haywards. This limit was ~800MW at the times that it bound, although it varies as it is also dependent on the Wellington load and generation. These outages also lead to a reduction in the HVDC risk subtractor and so at times, the HVDC was the North Island risk setter, which leads to price separation as forward sharing of reserves is no longer possible.

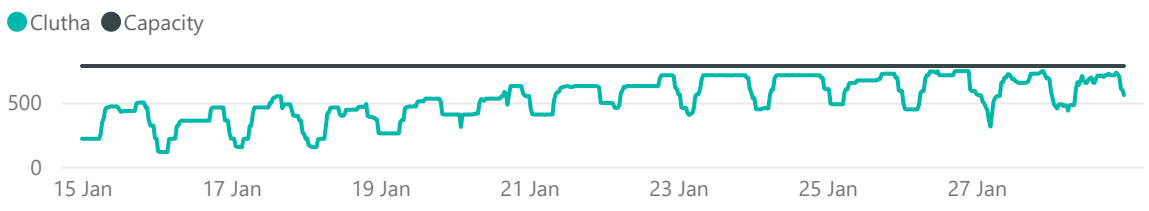
This shows that there are many interacting factors that can impact the energy spot price in the wholesale electricity market.
The SPD diagram can be found here.



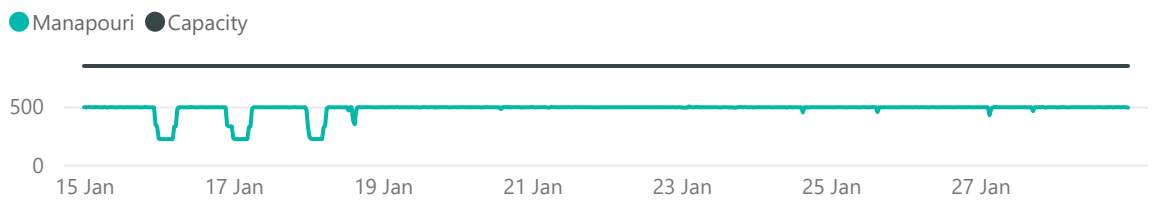
Generation Breakdown - Last Two Weeks

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

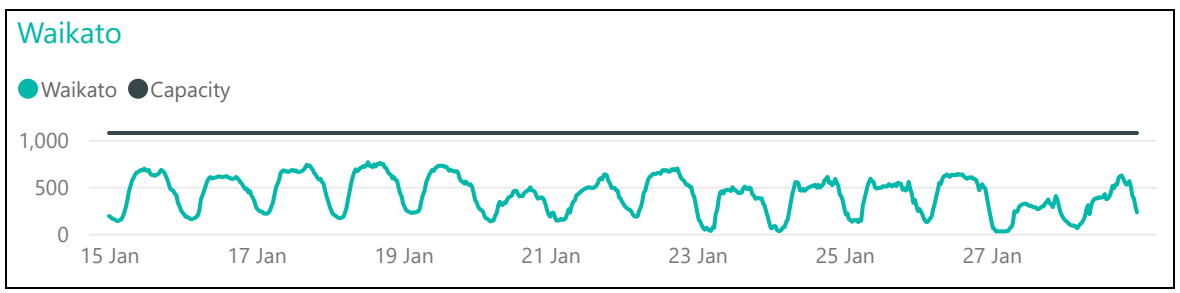
Clutha



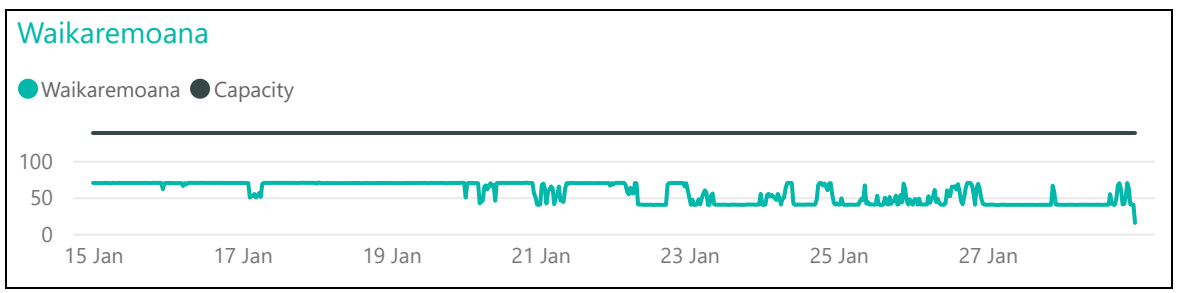
Manapouri



Waikato

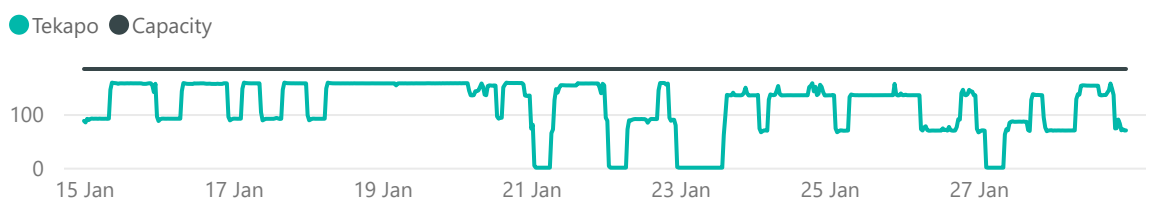


Waikaremoana

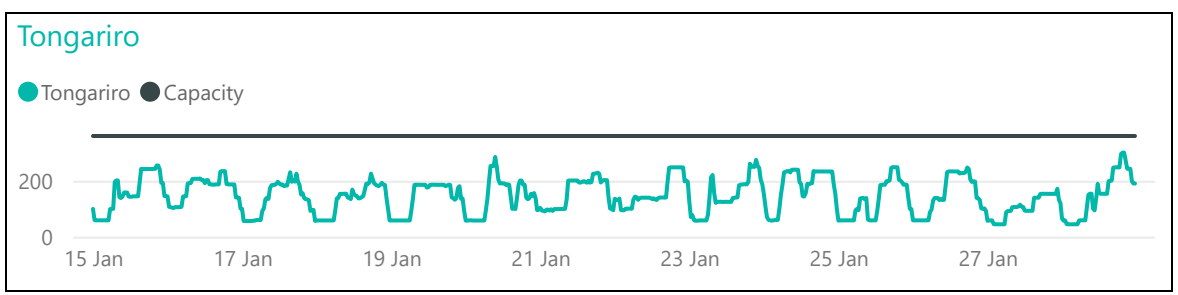


Waitaki

Tekapo

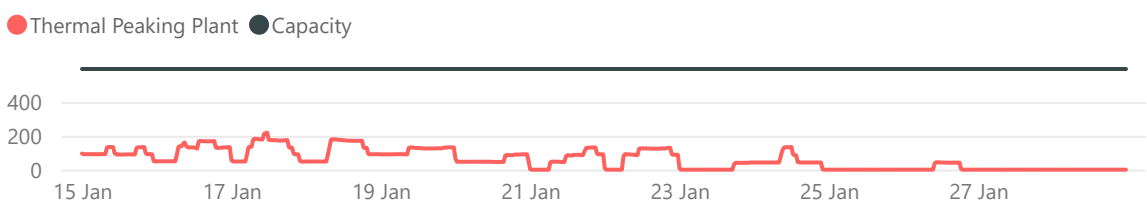


Tongariro

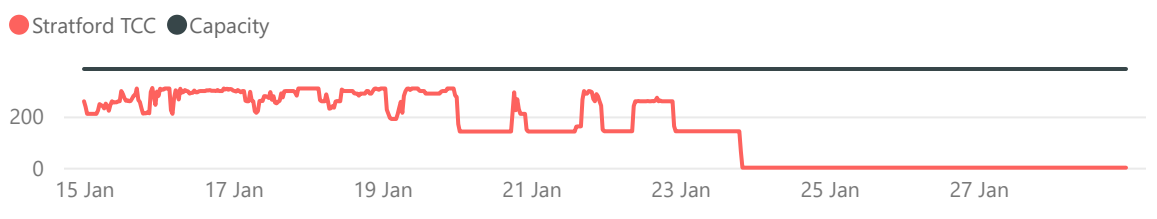


Other SI Hydro

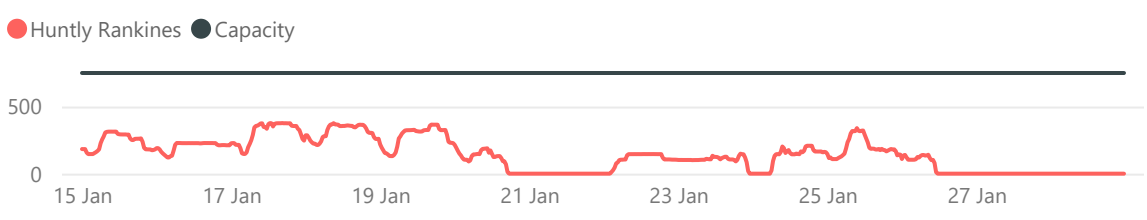
Thermal Peaking Plant



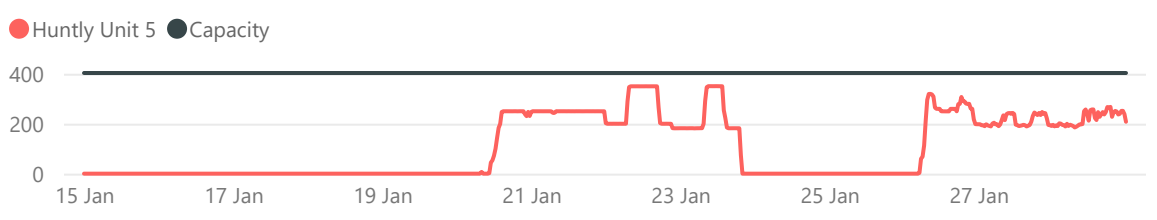
Stratford TCC



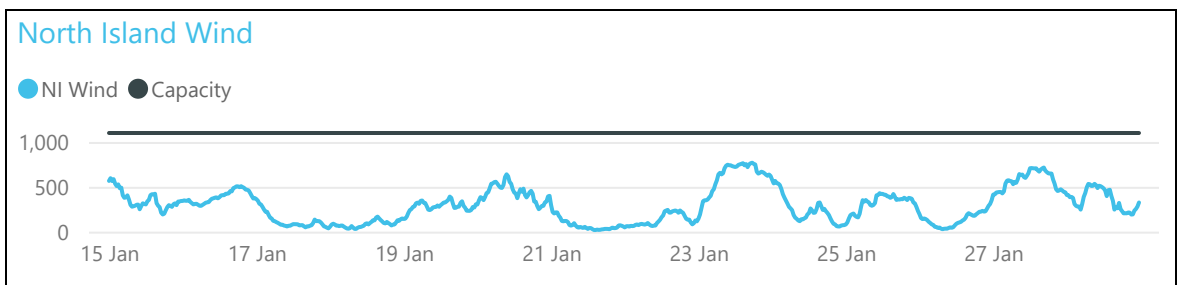
Huntly Rankines



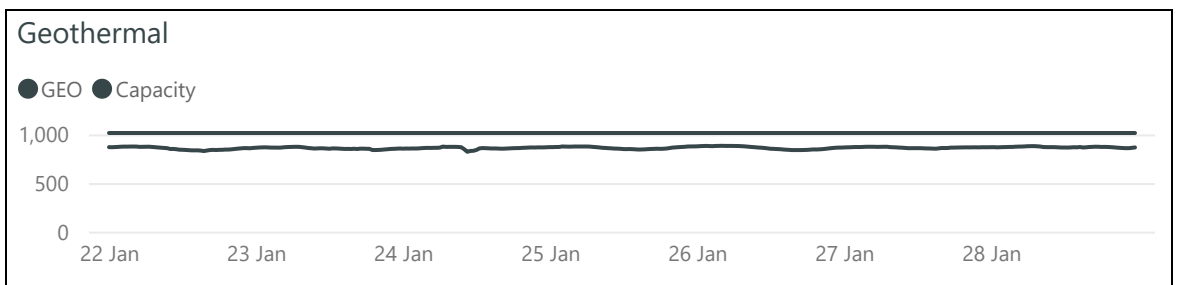
Huntly U5



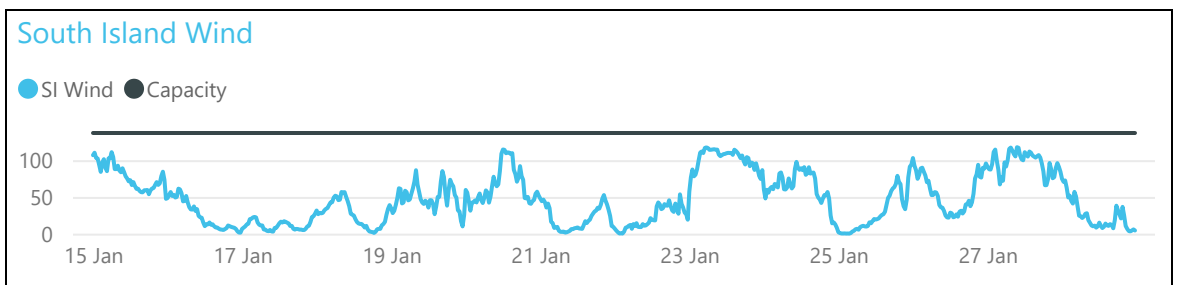
North Island Wind



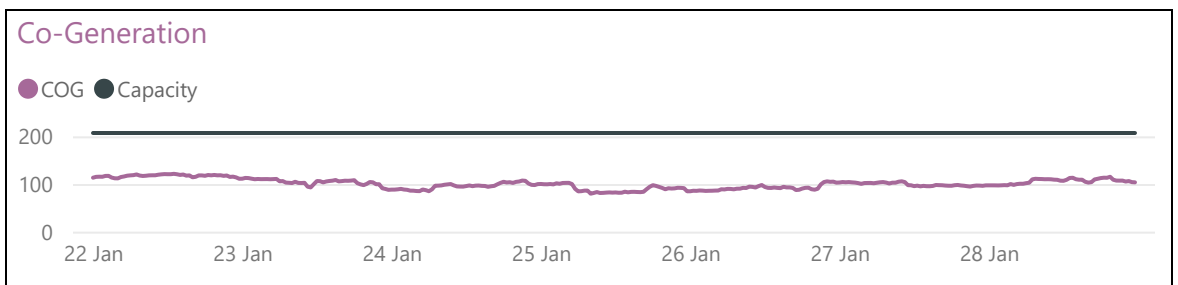
Geothermal



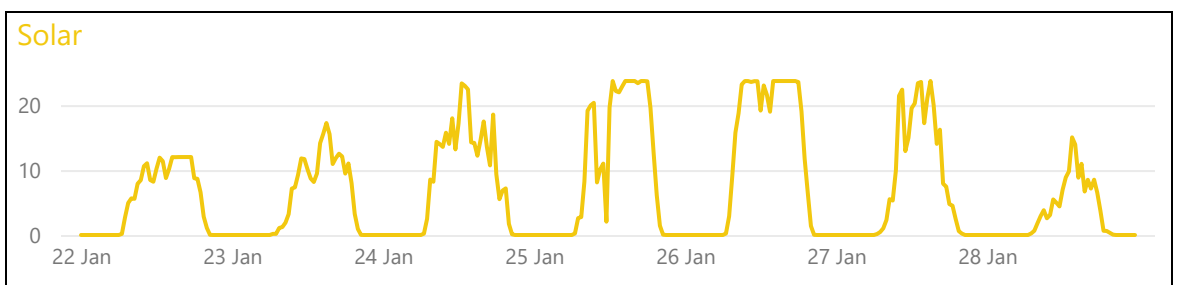
South Island Wind



Co-Generation

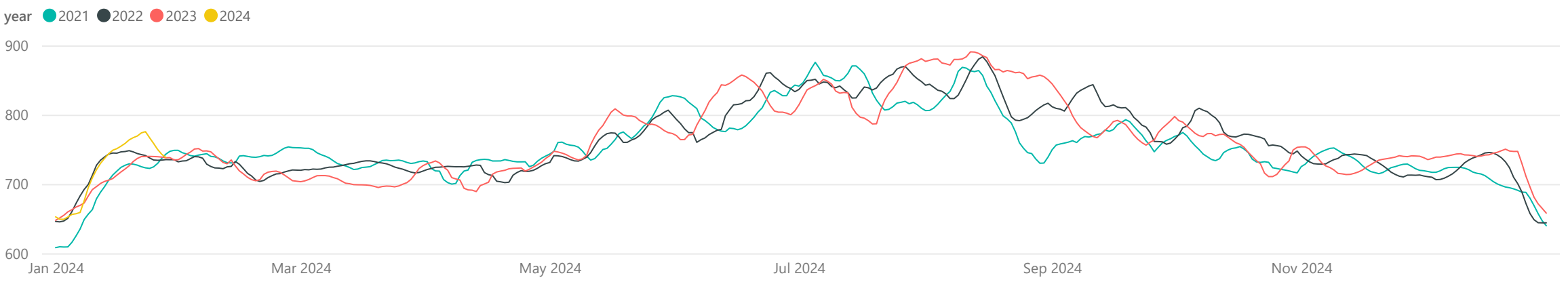


Solar

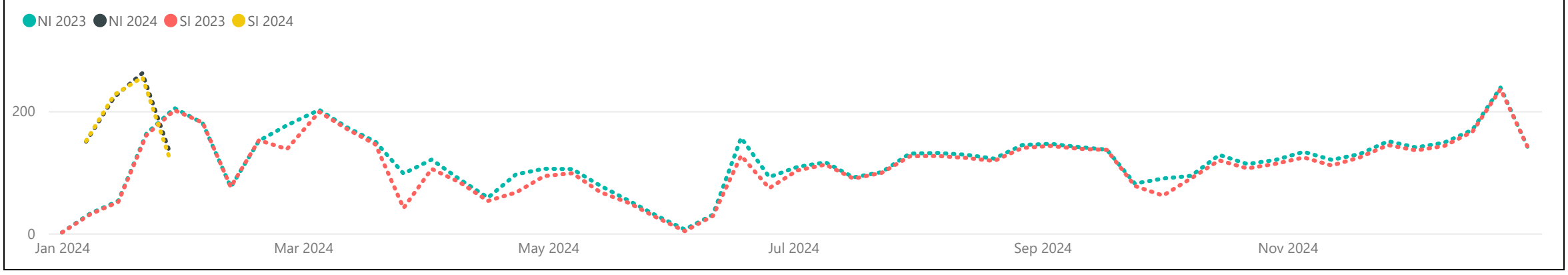


Weekly Profiles

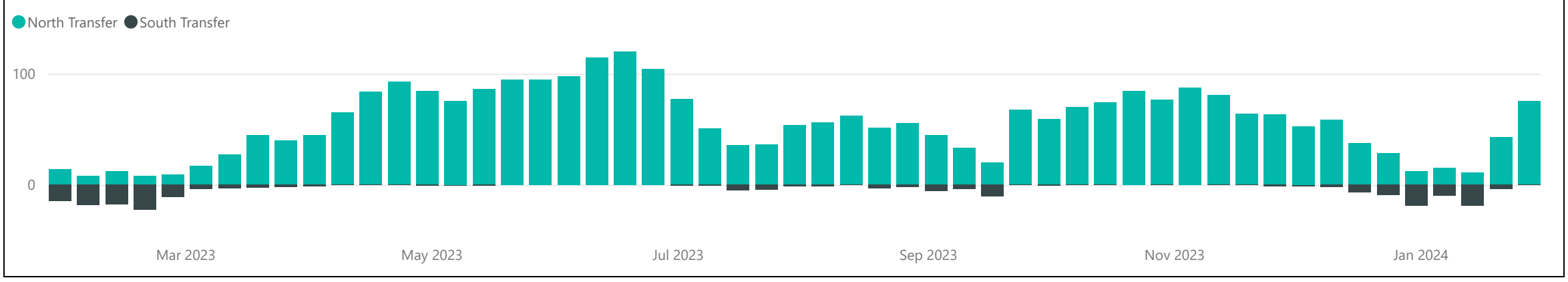
National Weekly Demand - GWh - 7 Day Rolling



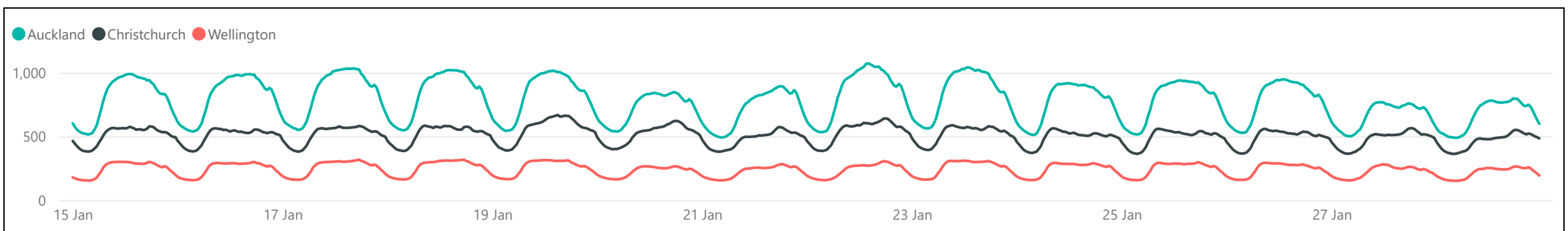
Weekly Spot Price - $/MWh



HVDC Transfer - Weekly GWh

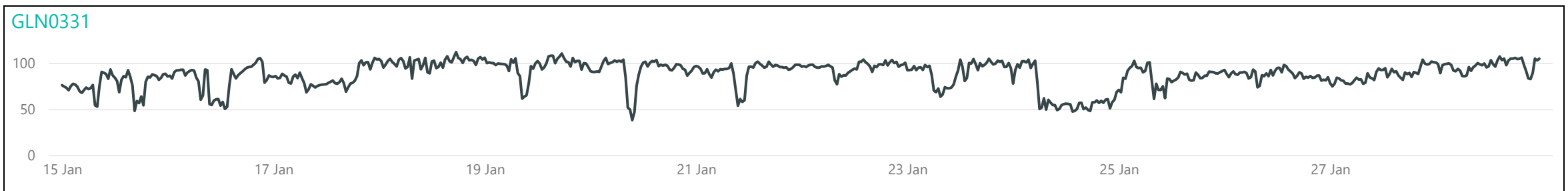


Conforming Load Profiles - Last Two Weeks *Measured in MW shown by region*

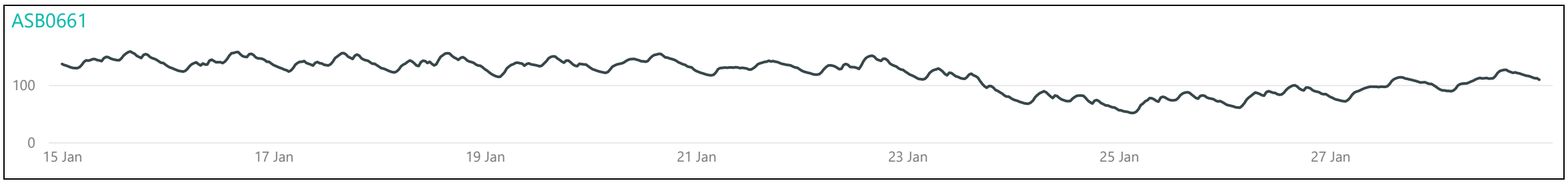


Non-Conforming Load Profiles - Last Two Weeks *Measured in MW shown by GXP*

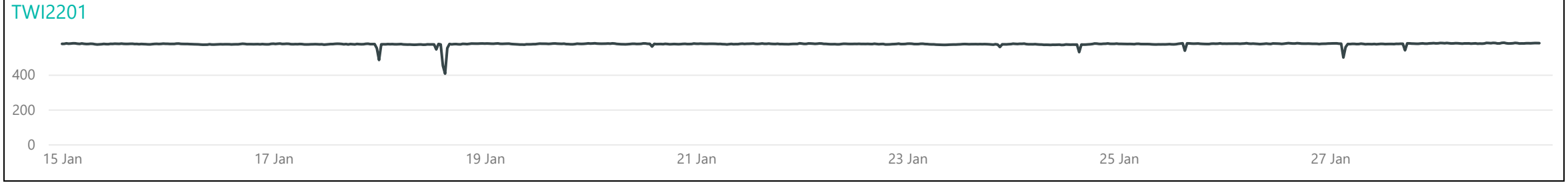
GLN0331



ASB0661



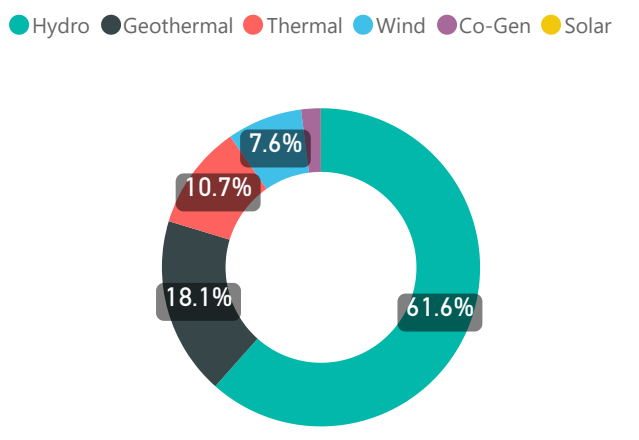
TWI2201



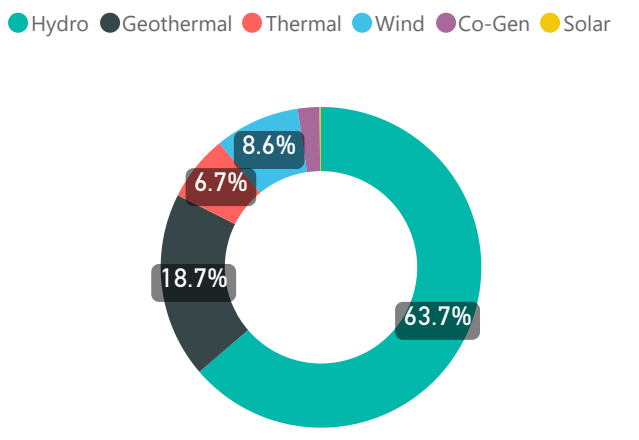
TRANSPOWER

Generation Mix

Last 52 Weeks Generation Mix - Weekly GWh



Last 7 Days Generation Mix - Weekly GWh



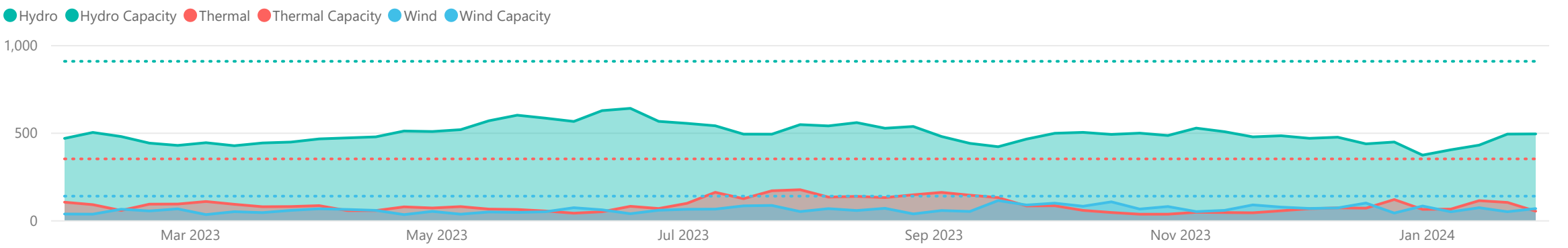
Average Metrics Last 7 Days

Renewable Percentage	CO2e Tonnes/Week	CO2e g/kWh
91%	41,896	53.3

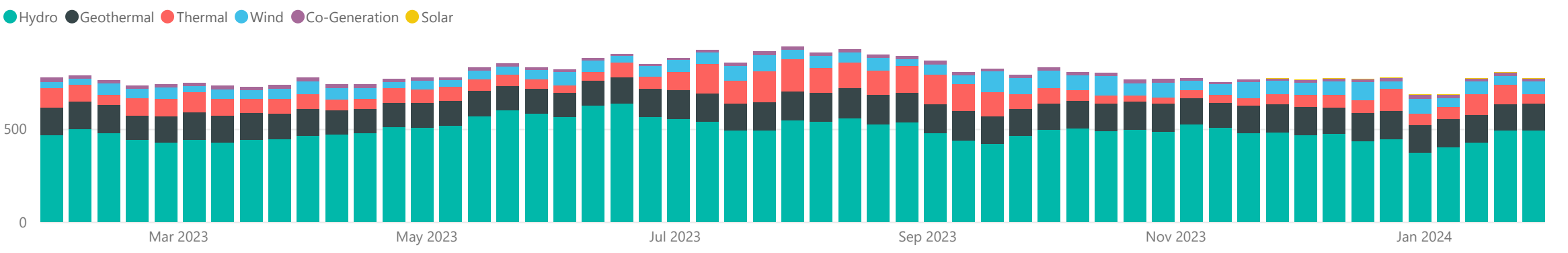
Average Metrics Last 52 Weeks

Renewable Percentage	CO2e Tonnes/Week	CO2e g/kWh
87%	60,690	74.6

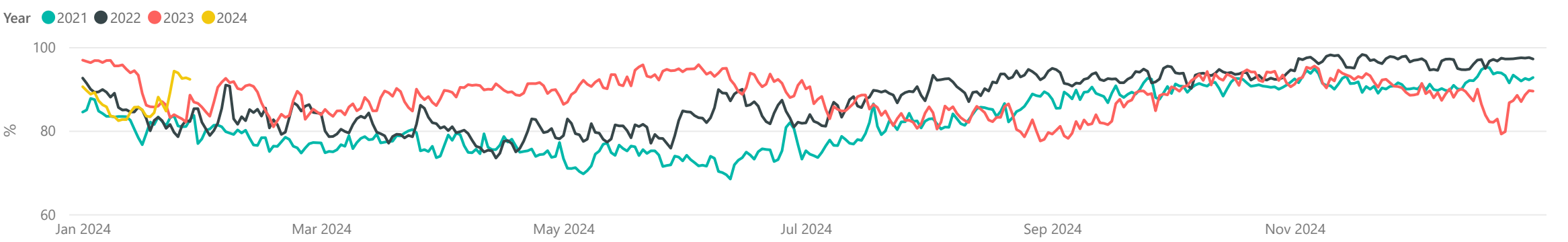
Weekly Generation Mix vs Capacity - GWh



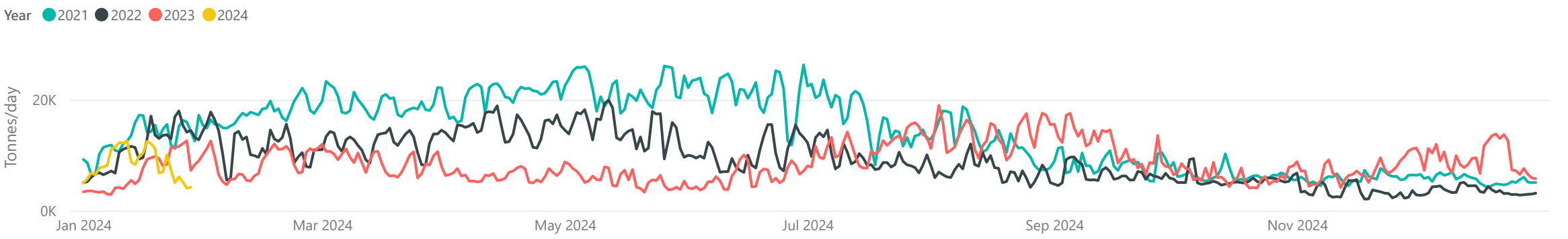
Weekly Generation Mix - GWh



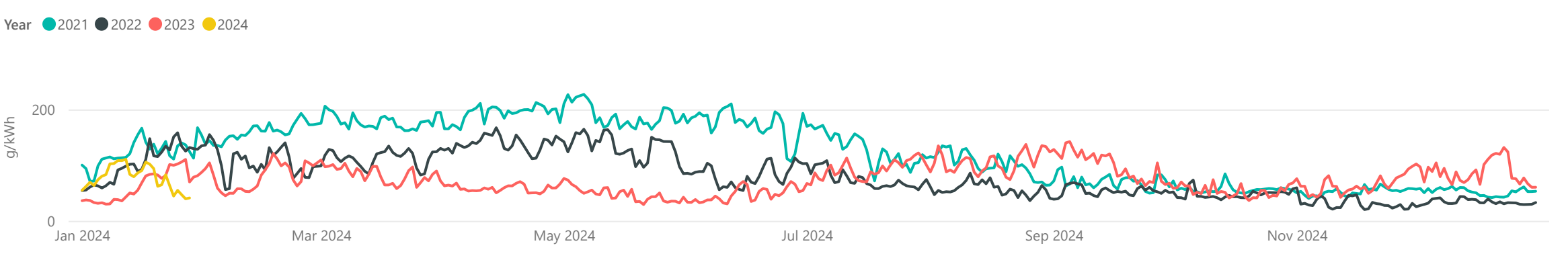
NZ Renewable Percentage



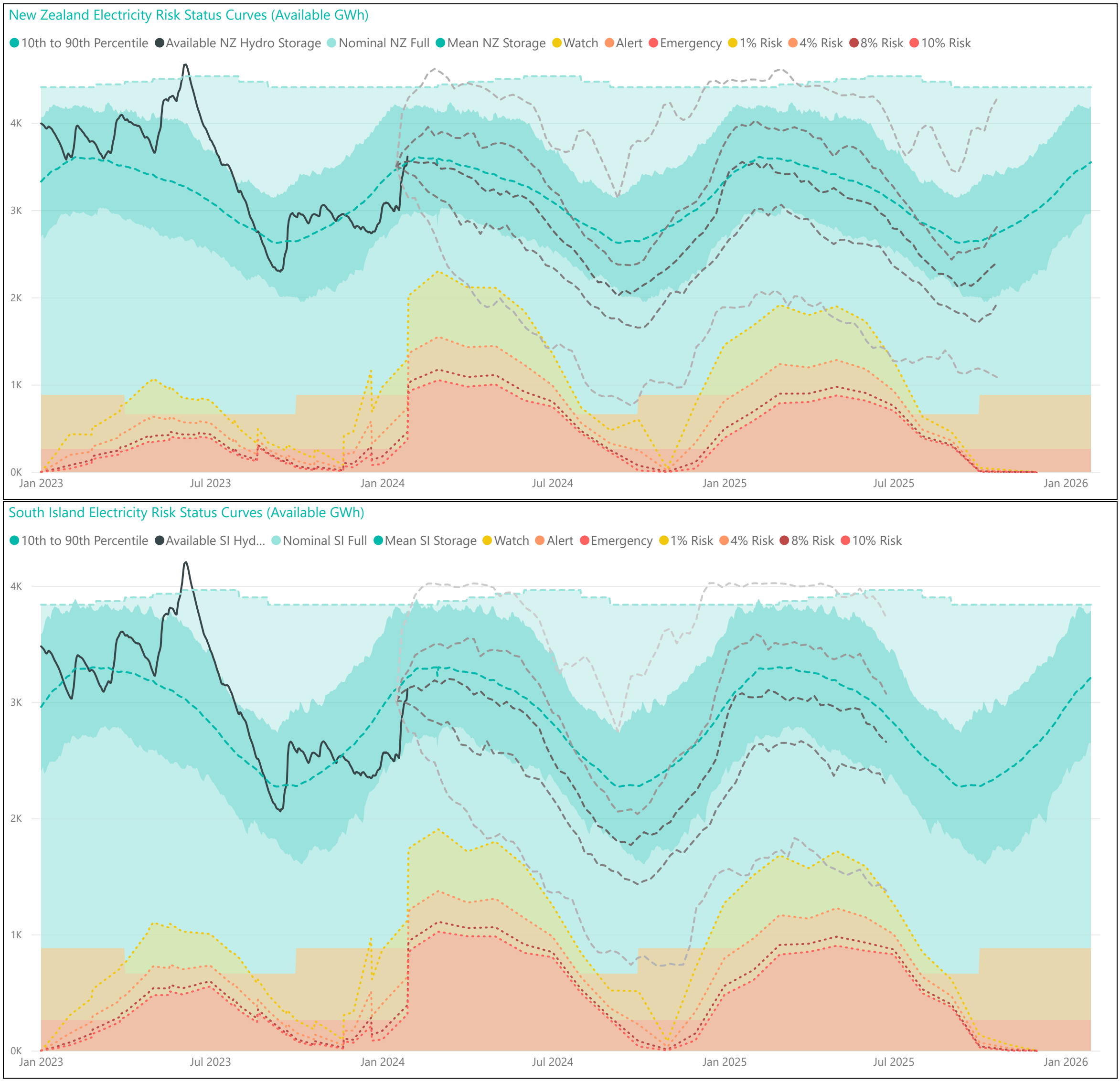
CO2 Tonnes/Day



CO2 g/kWh



Electricity Risk Curves



Electricity Risk Curve Explanation:

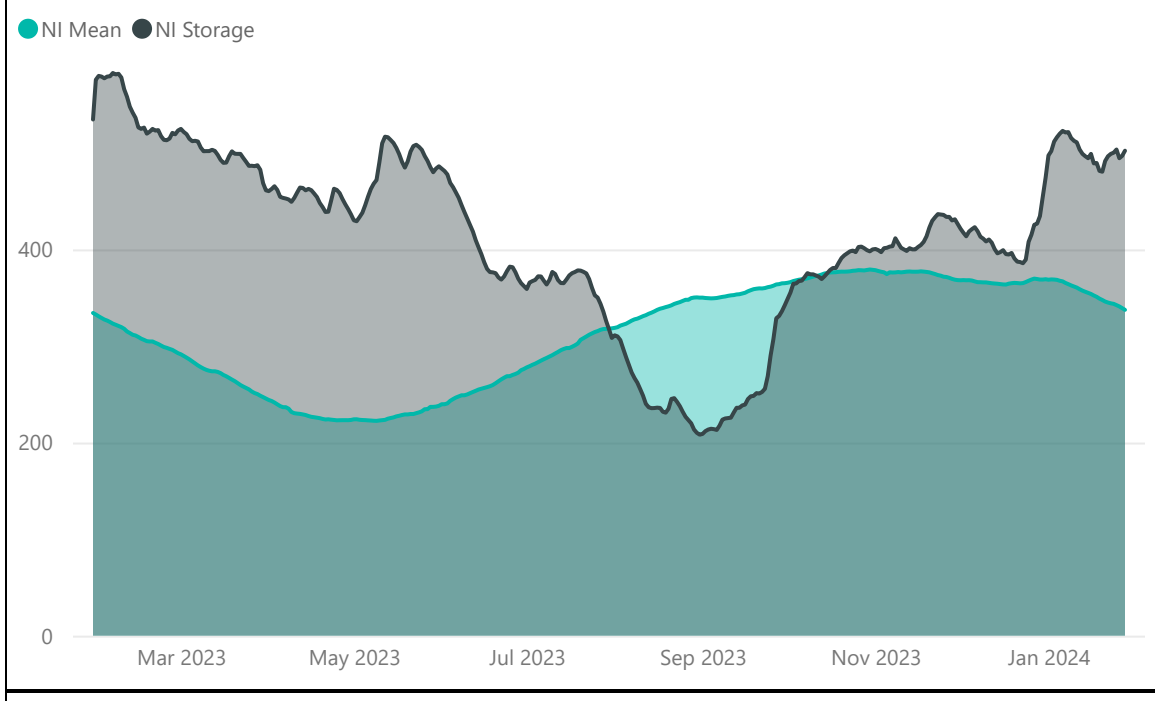
Watch Curve - The maximum of the one percent risk curve and the floor and buffer
Alert Curve - The maximum of the four percent risk curve and the floor and buffer
Emergency Curve - The maximum of the 10 percent risk curve and the floor and buffer
Official Conservation Campaign Start - The Emergency Curve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

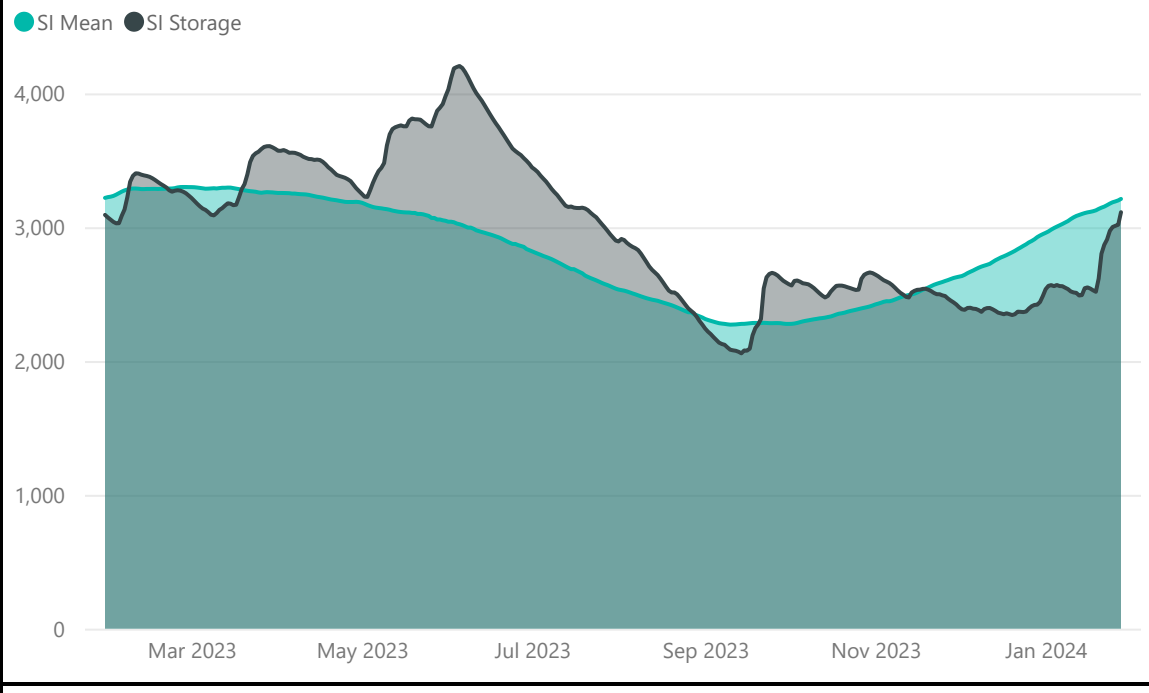
The dashed grey lines represent the minimum, lower quartile, median, upper quartile and the maximum range of the simulated storage trajectories (SSTs). These will be updated with each Electricity Risk Curve update (monthly).

Hydro Storage

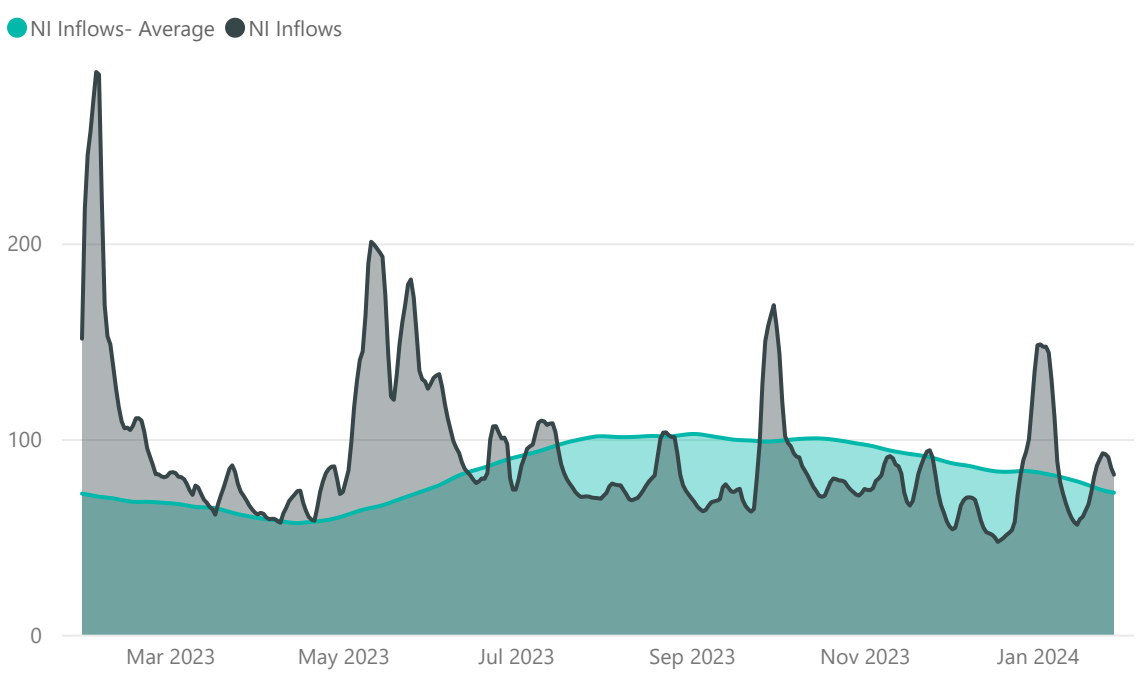
North Island Hydro Storage (Available GWh)



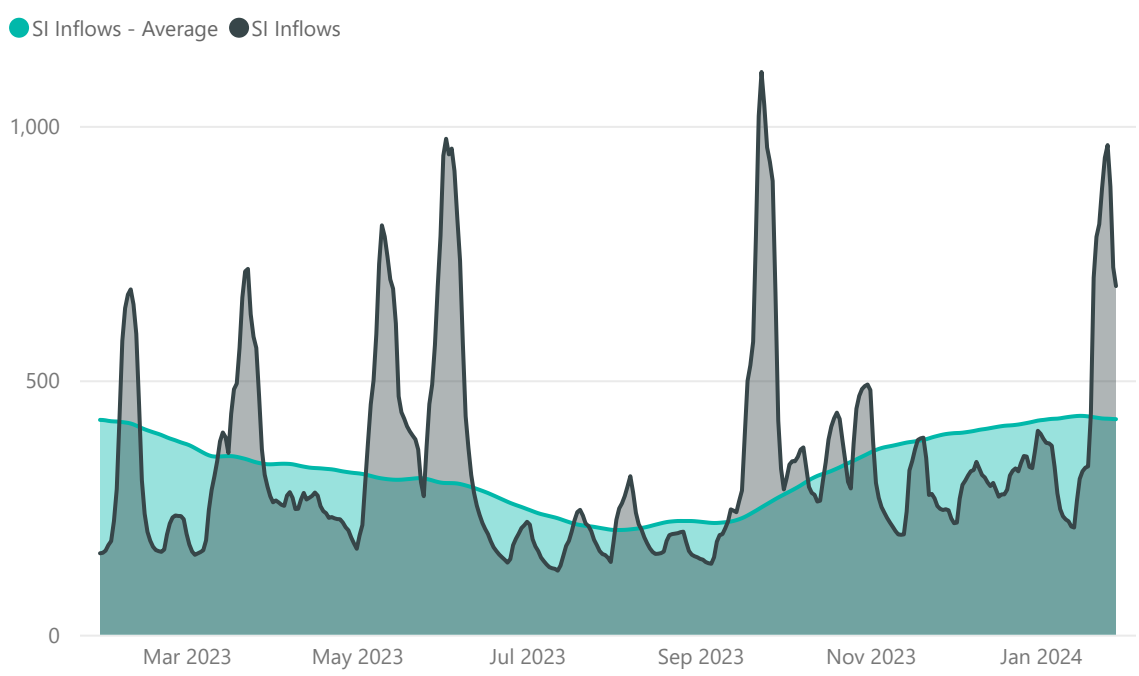
South Island Hydro Storage (Available GWh)



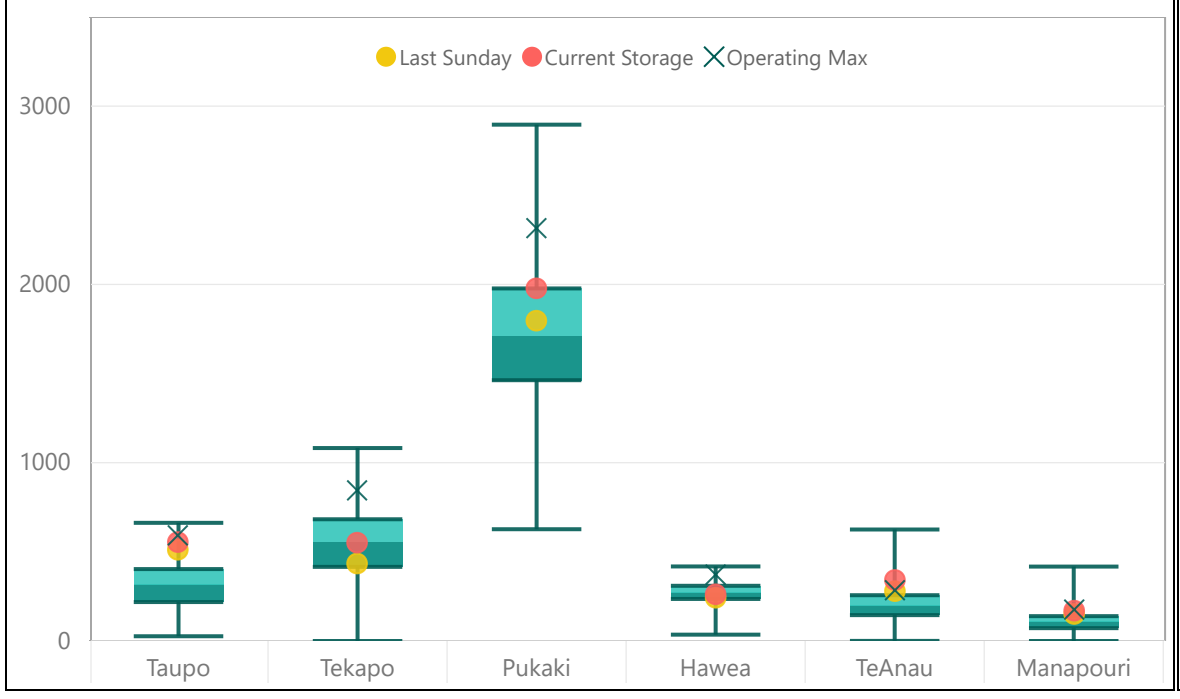
North Island Mean 7 Day Inflows (Available GWh)



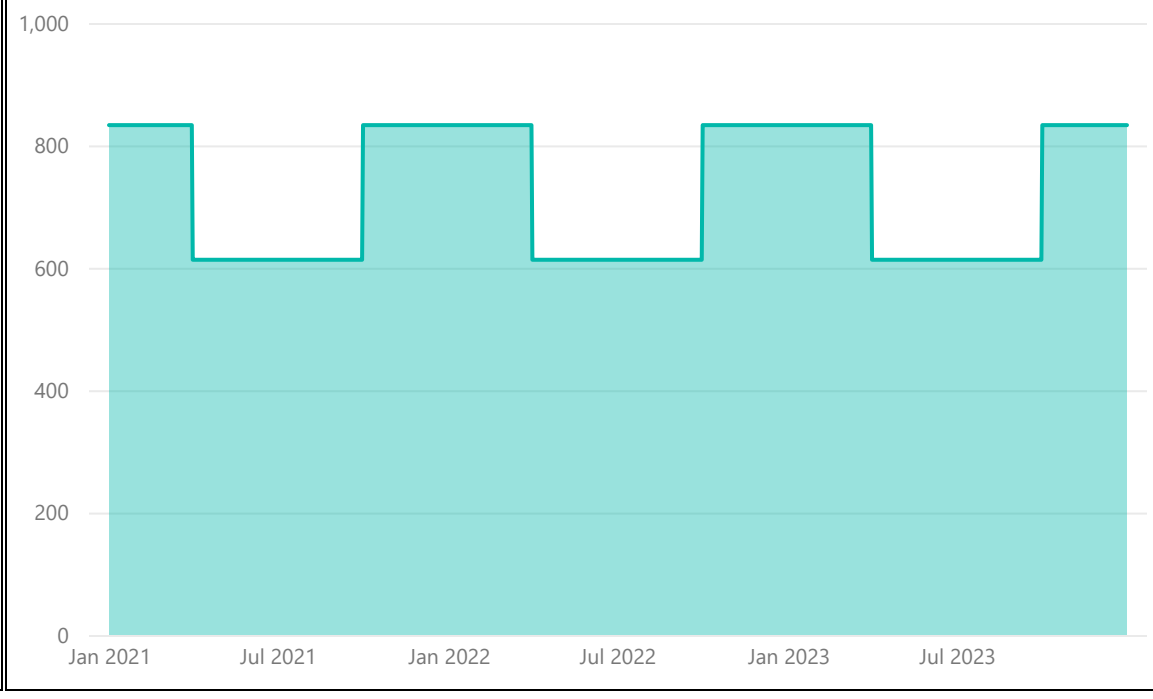
South Island Mean 7 Day Inflows (Available GWh)



National Lake Storage (Available GWh) Against Historic Levels



Contingent Storage (Reserved GWh)



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