Weekly Market Movements - Week Ended 24 March 2024

Overview

National hydro storage continued to decline last week and is now at 87% of the historic mean, despite North Island storage remaining well above average. South Island inflows have been below average since the last moderate inflow event at the end of February.
Residual generation was healthy last week with the lowest margin being 535 MW.

In this week's insight we look at how price correlates with daily demand profiles.

Security of Supply

Energy

National hydro storage now sits at 87% of the historic mean, down from 92% a week ago. South Island storage is at 83% of the historic mean, down from 88%, and North Island storage dropped from 147% to 145% of the historic mean. Nationally, inflows reached their lowest daily rate for over two years on the 23rd of March.

We have updated the ERCs for March. There was a small decrease in forecast risk levels due to a reduction in estimated gas consumption by the petrochemical sector.

Capacity

Capacity margins were healthy last week with the HVDC restored to full operation. The lowest residual point of 535 MW occurred on Thursday morning.

Forecast N-1-G margins are high until late April when there are six days with low margins forecast. The lowest N-1-G margin during the forecast period is 156 MW on the 6th and 7th of May. The latest NZGB report is available on the NZGB website.

Electricity Market Commentary

Weekly Demand

Total demand was 742 GWh, down slightly from 747 GWh the week prior, but remaining above the demand from this period over the past two years. Demand peaked at 5,613 MW on the morning of Wednesday 20th.

Weekly Prices

The average wholesale price at Otahuhu last week was $262/MWh, up from $211/MWh the week prior. There was one significant energy price spike on Wednesday morning with prices reaching $575/MWh at Otahuhu for the 8am trading period. This was during the highest peak of the week and a period of low wind output.

Fast instantaneous reserve prices in both islands spiked regularly over the week reaching the $100 mark on Thursday.

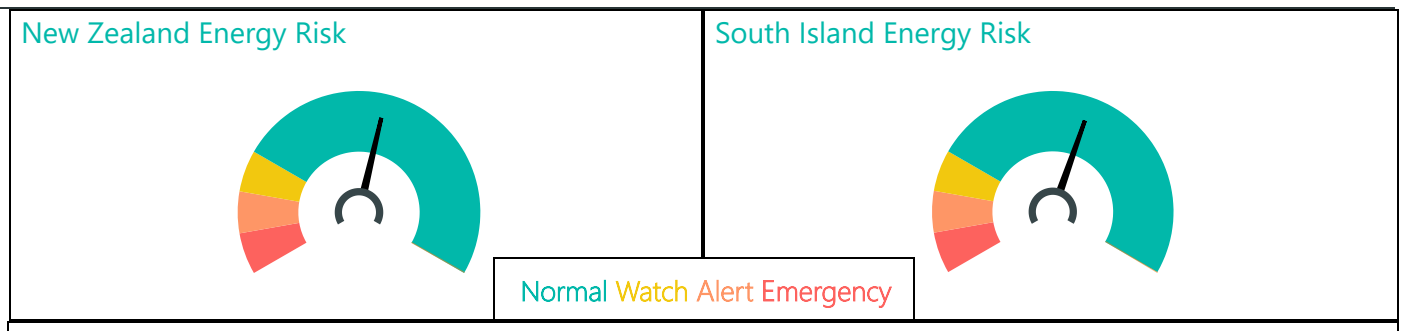
Generation Mix

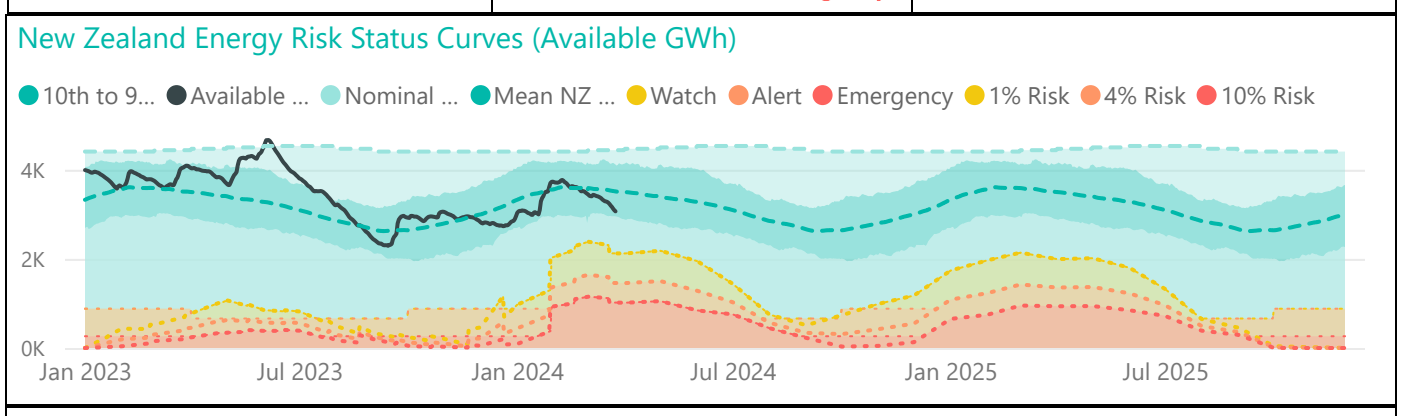
The renewable percentage of the generation mix dropped to 79%, despite hydro generation increasing 8% to 424 GWh. This was due to a fairly still week leading to wind generation dropping to 30 GWh or a 17% capacity factor. Thermal generation increased to 18% of the mix from 16% the week prior.

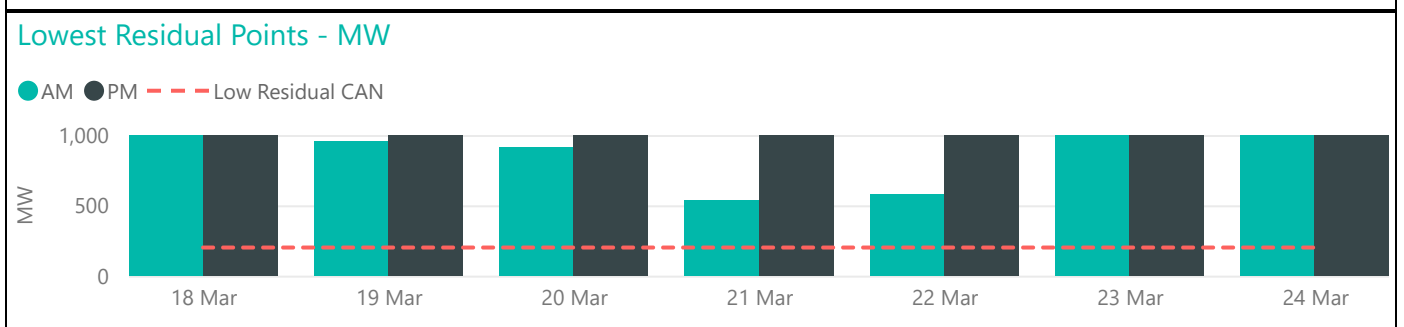
We also had a milestone in that we saw solar generation higher than wind for several periods on Friday and Sunday for the first time. Solar generation peaked at 37MW.

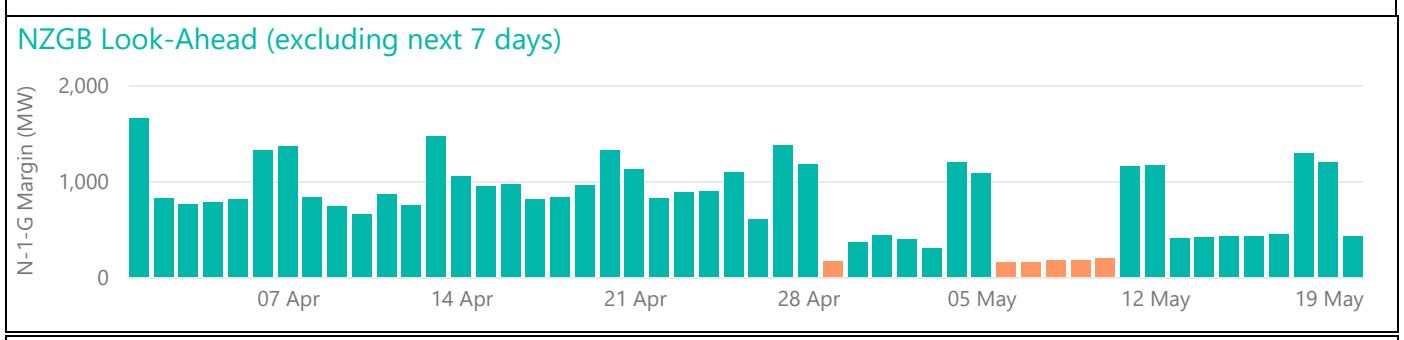
HVDC

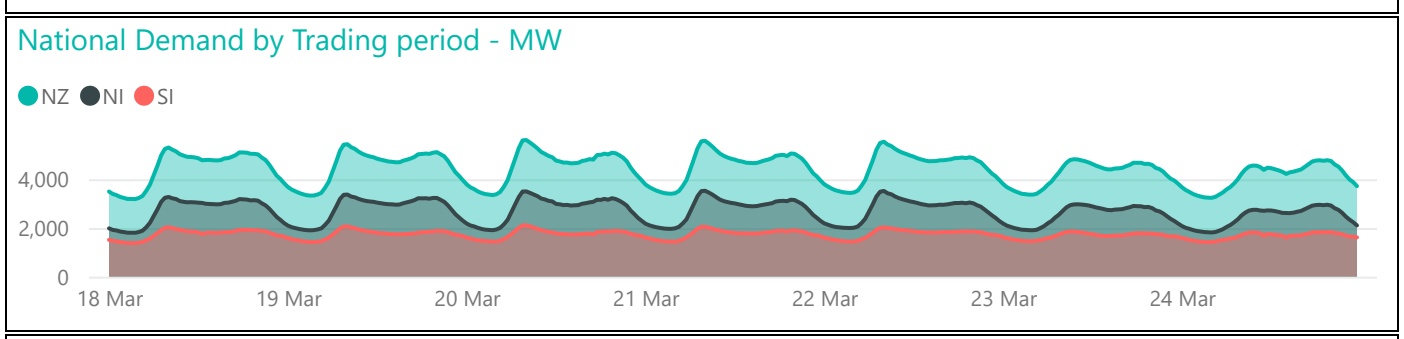
HVDC flows returned to predominately northward last week following the previous two weeks of greater southward transfer.

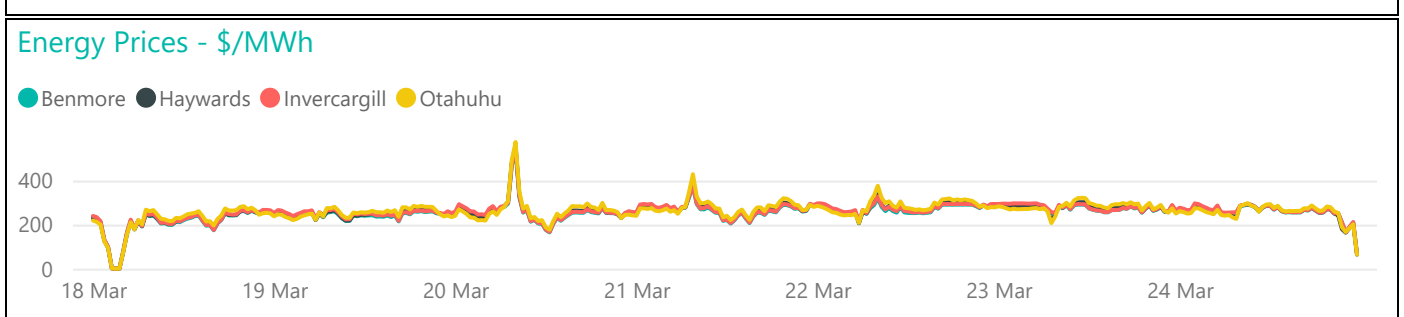


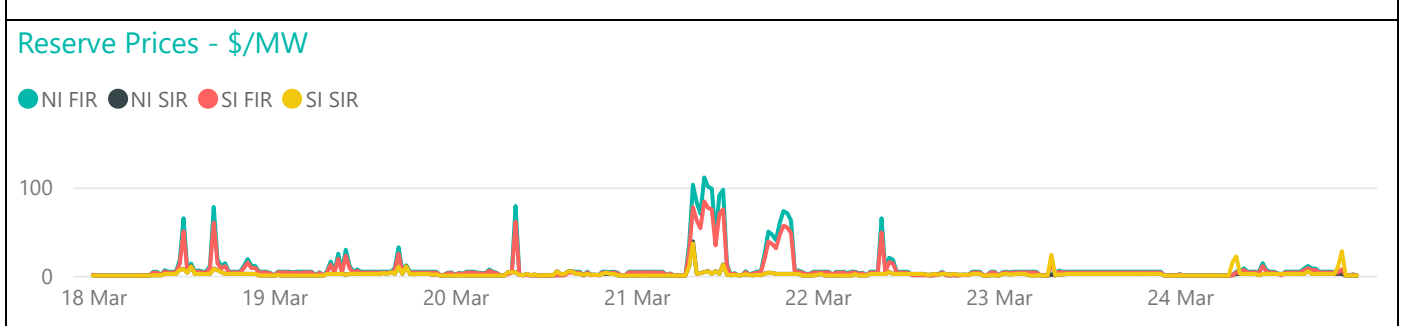


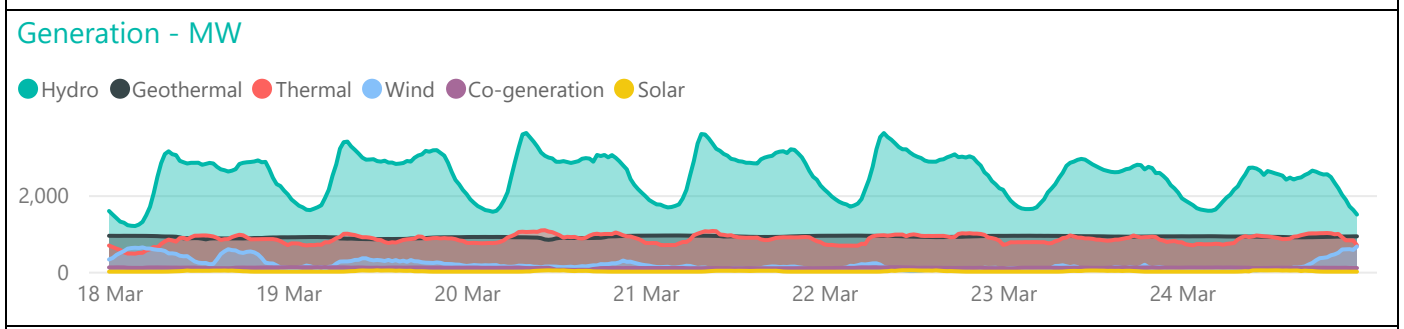


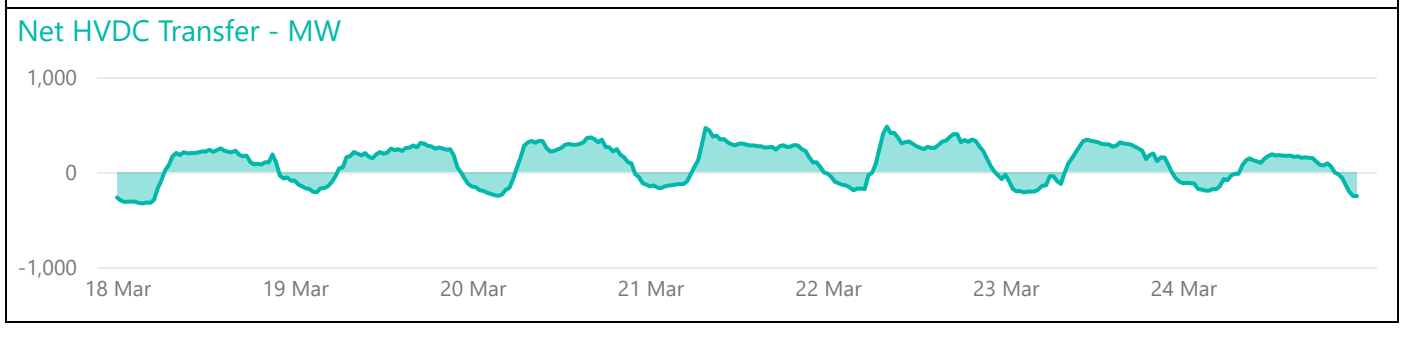






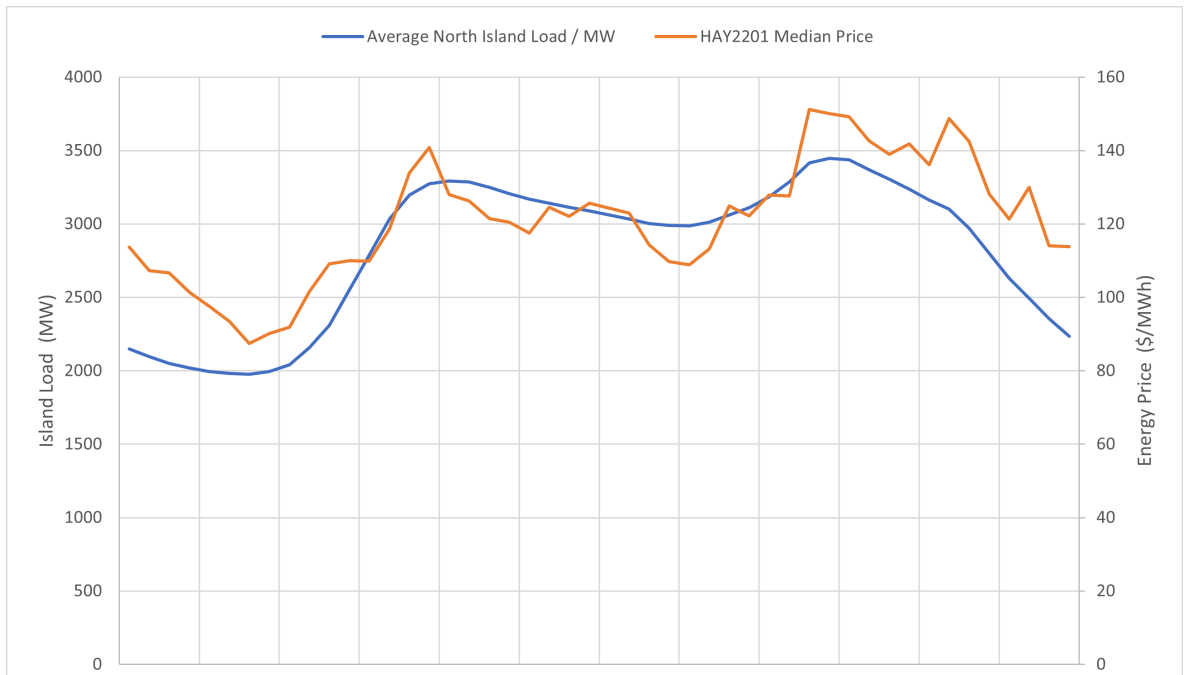


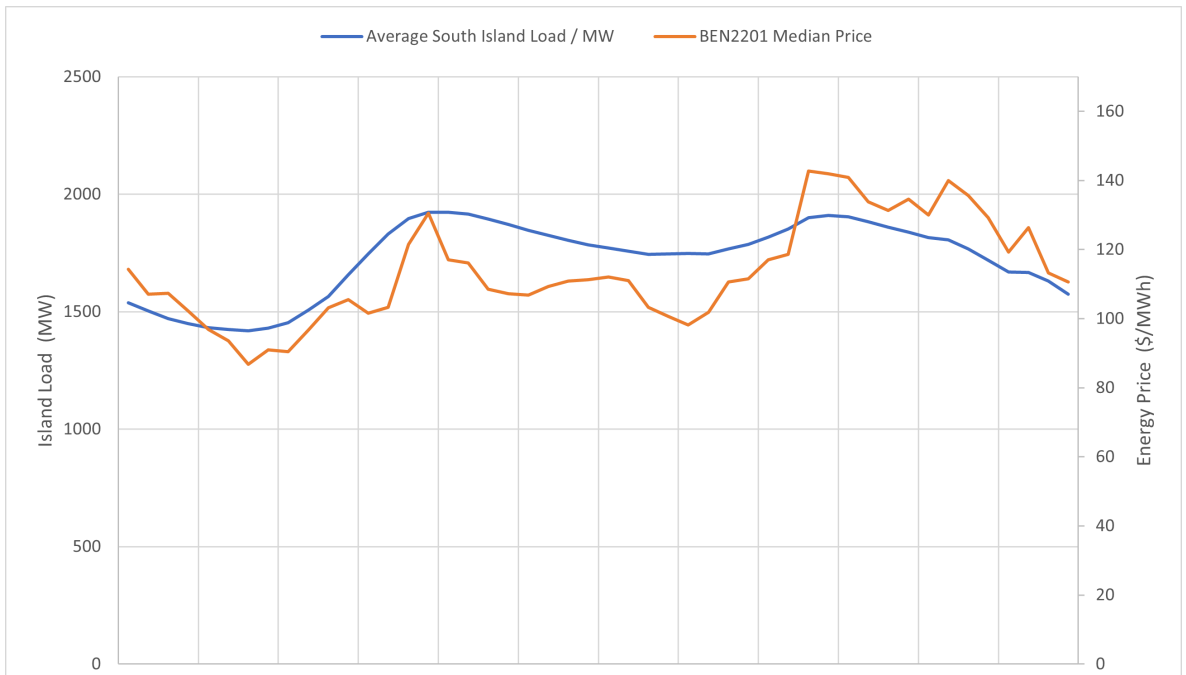




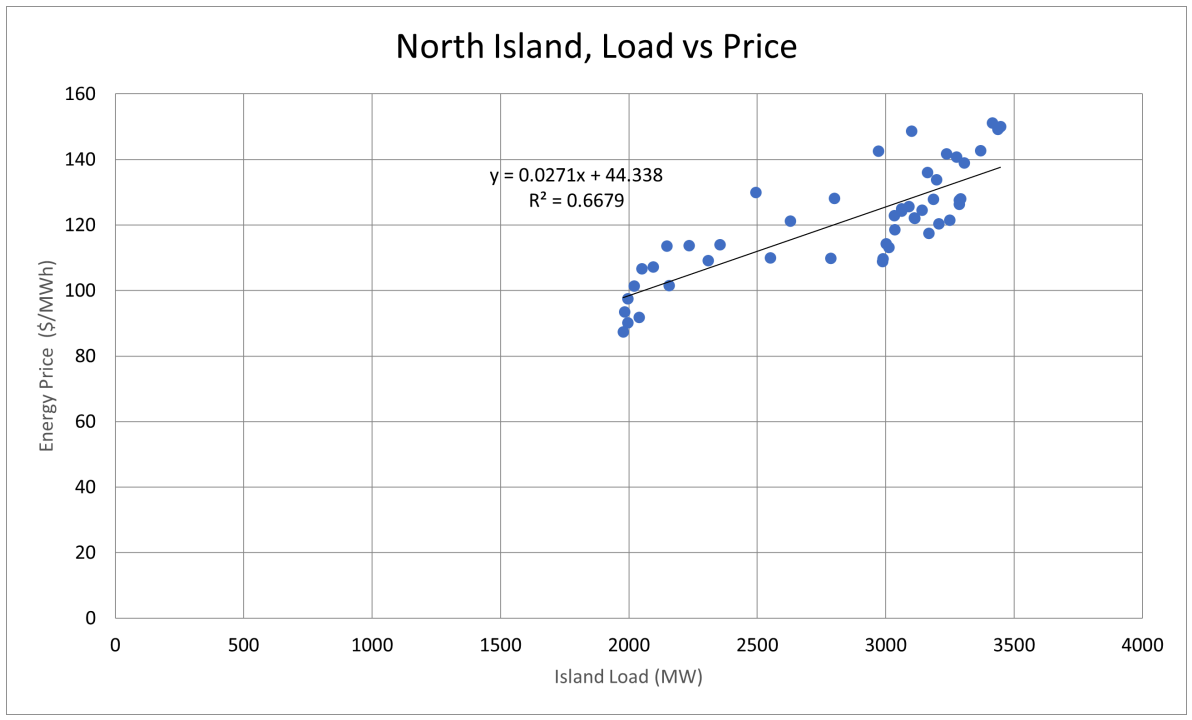
Weekly Summary Insight - How Does Price Correlate with Demand?

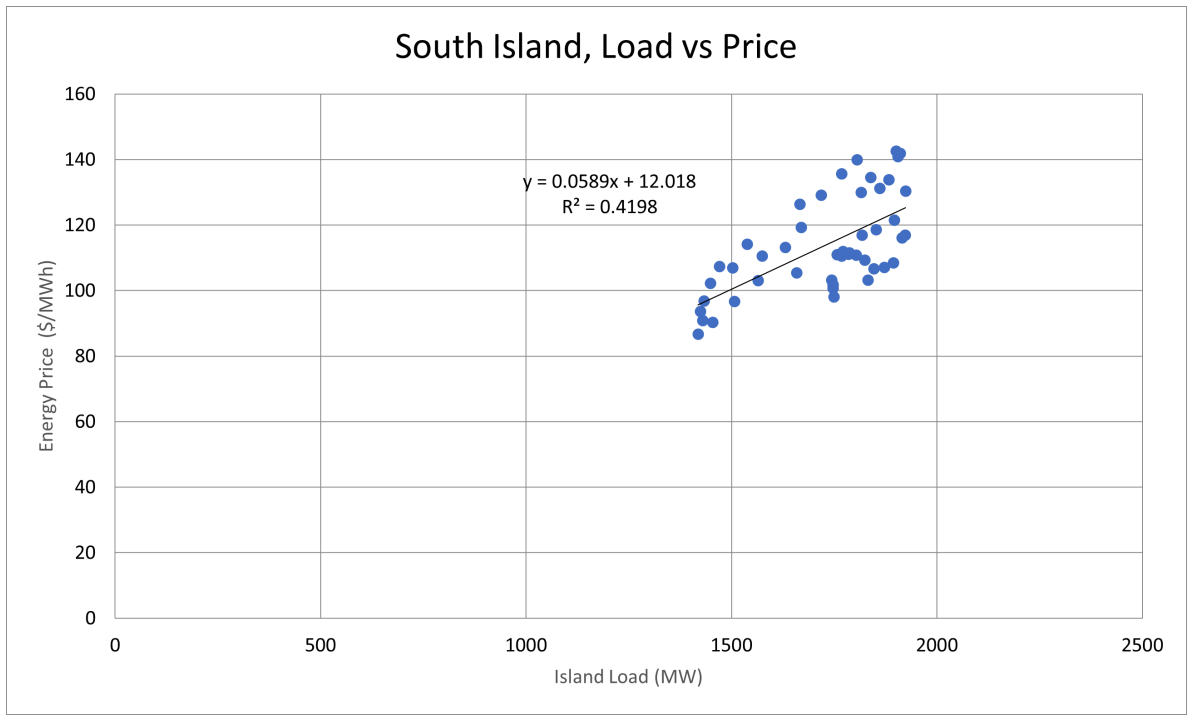
Energy prices in the wholesale market are influenced by lots of factors. In this insight we look at a correlation between price and demand.
The charts below show the daily median price for the two island reference nodes, plotted with their respective island's average load. The data covers the entire year of 2023. The median value for price is used to lessen the impact of extreme price outliers. The median price charts for the two islands are very similar as expected due to their price being closely tied together most of the time by the HVDC. From these charts it is possible to see a correlation between price and demand, with price following the diurnal pattern of the load.
Noticeable in the load trends, particularly the South Island, are the two bumps at 9pm and 11pm. These are likely due to the influence of retail tariffs on consumer behaviour i.e. heating of water cylinders or night storage heaters. These bumps have a corresponding increase in price.





Scatter charts for the above data are plotted below and linear trendlines applied. The R^2 value gives an indication for the trendline of how correlated price and demand are for this dataset, i.e. how much of the change in price can be attributed to the variance of load. So for the North Island it says that ~65% of the variation in price is explained by the variation in demand. For the South Island that figure is lower and this may be due to the island prices being tied together most of the time. However, the South Island load includes the Tiwai Aluminium Smelter so there is less load variance in the South Island.

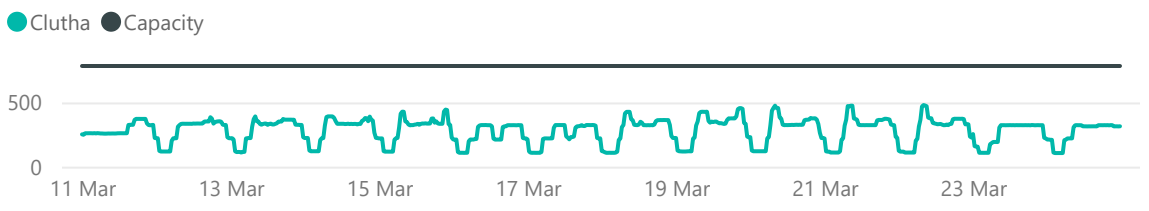




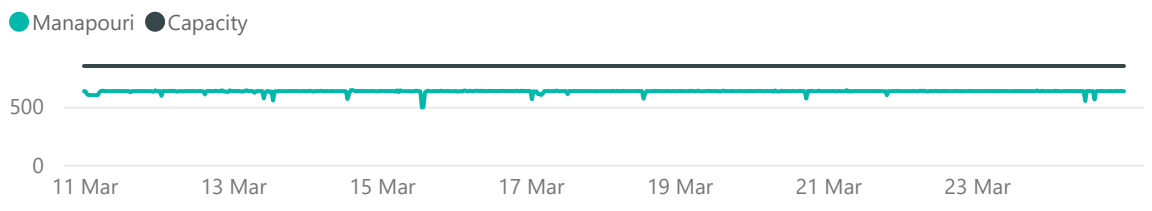
Generation Breakdown - Last Two Weeks

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

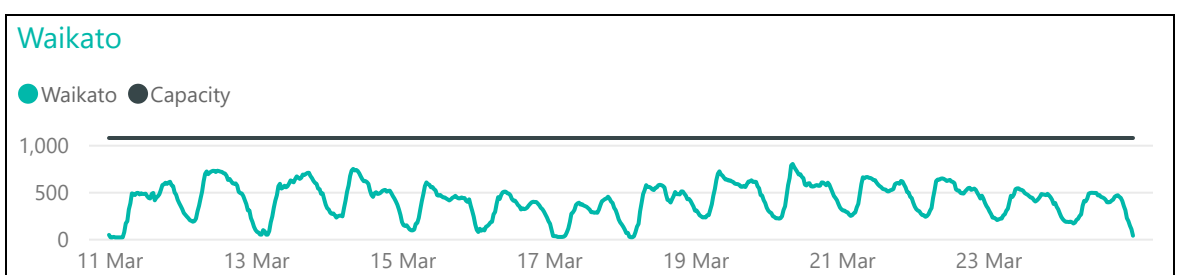
Clutha



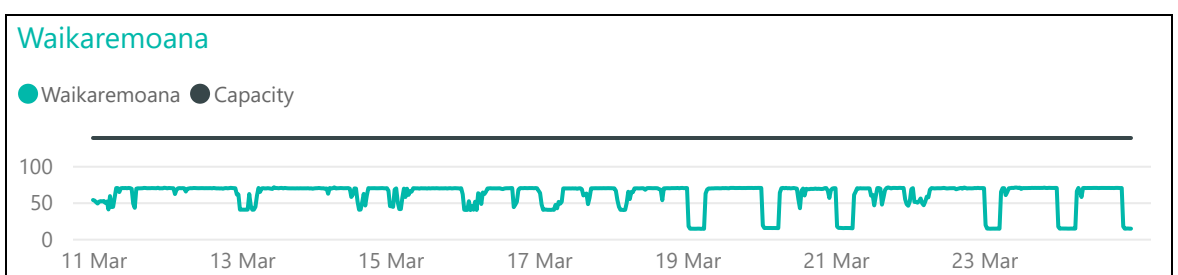
Manapouri



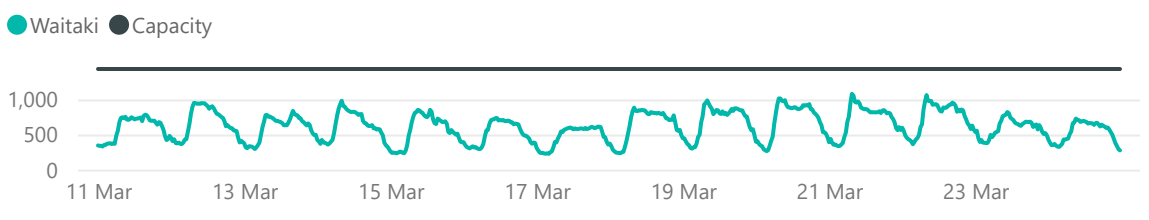
Waikato



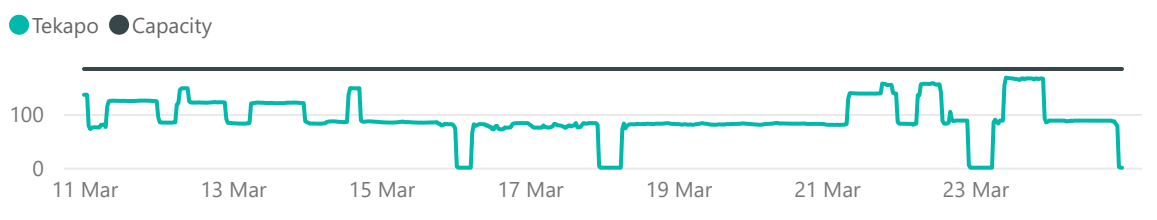
Waikaremoana



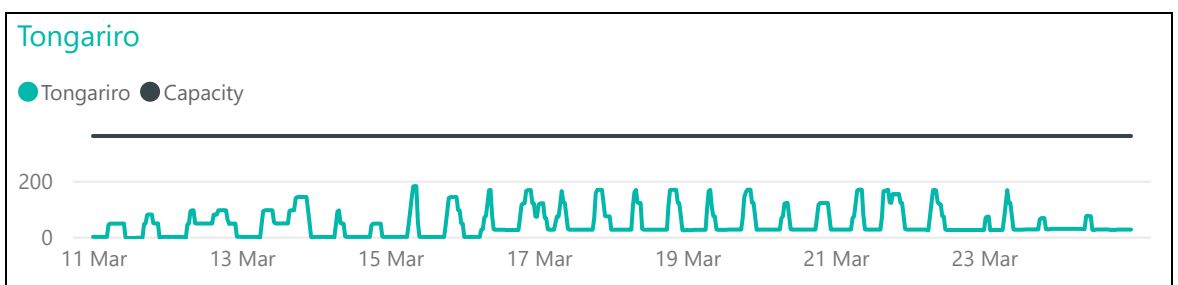
Waitaki



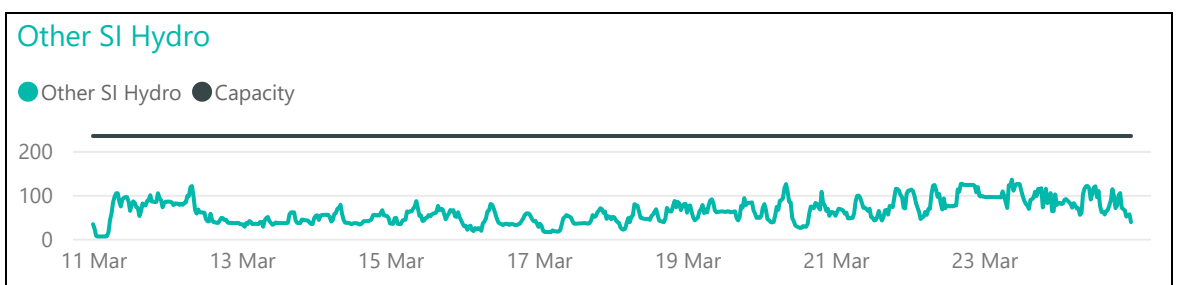
Tekapo



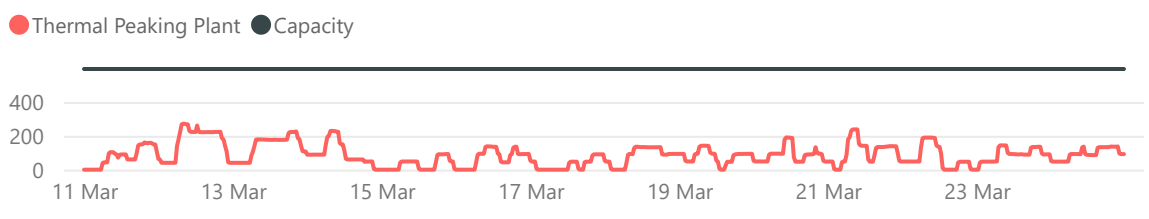
Tongariro



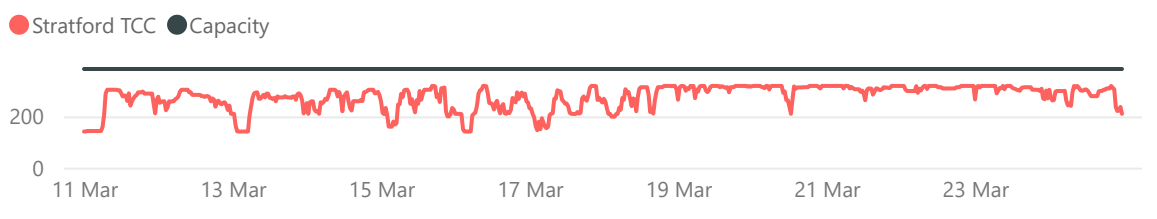
Other SI Hydro



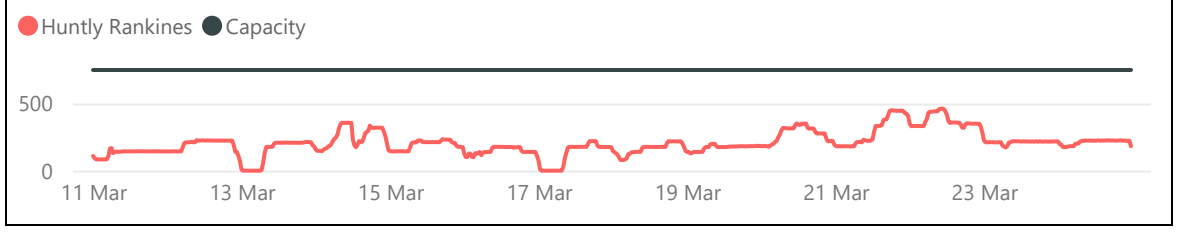
Thermal Peaking Plant



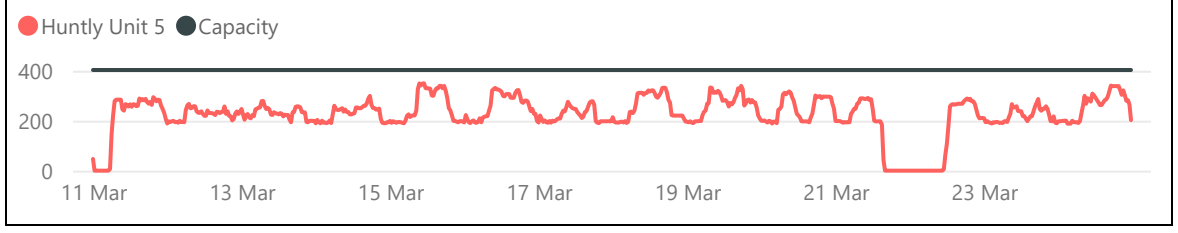
Stratford TCC



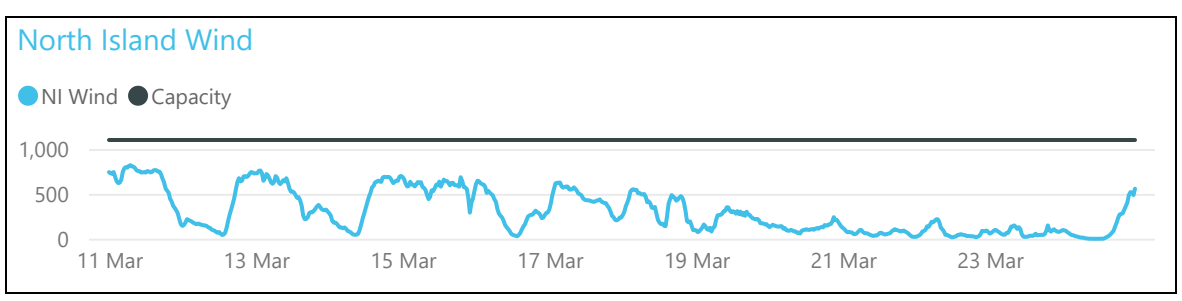
Huntly Rankines



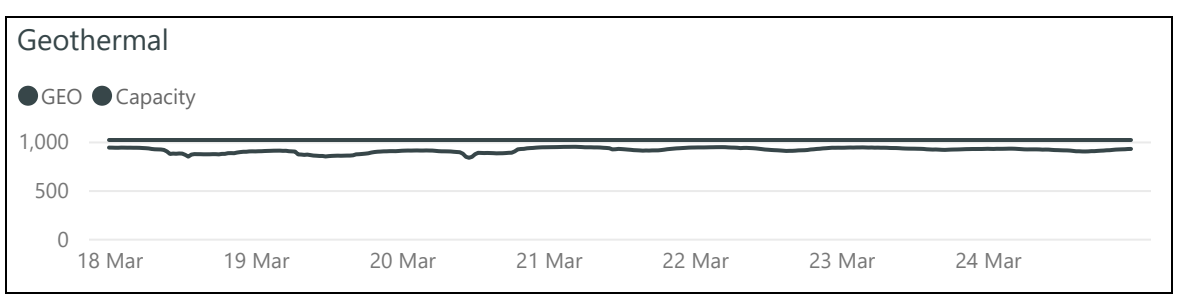
Huntly U5



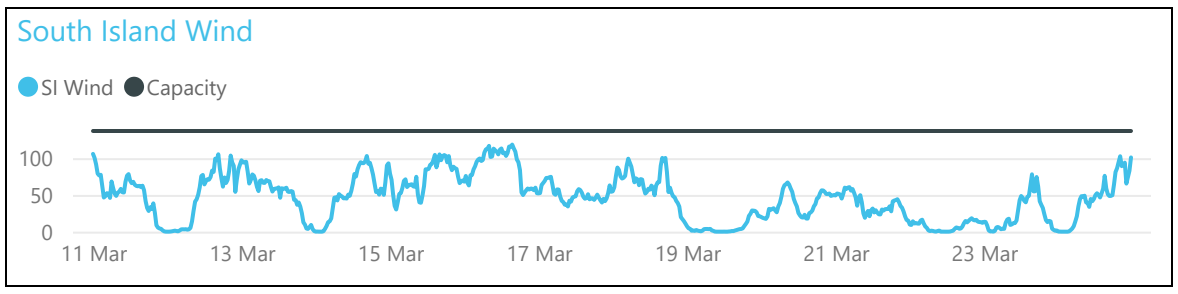
North Island Wind



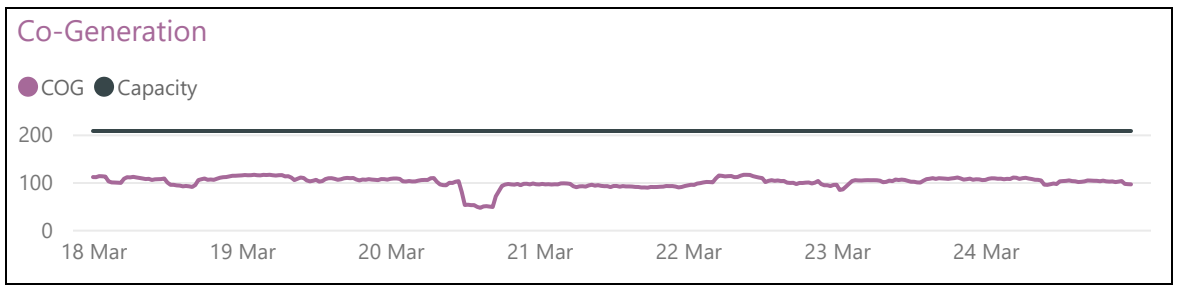
Geothermal



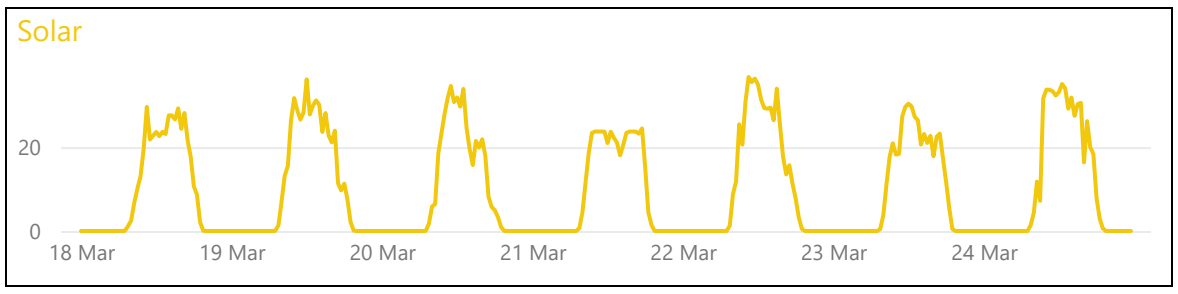
South Island Wind



Co-Generation

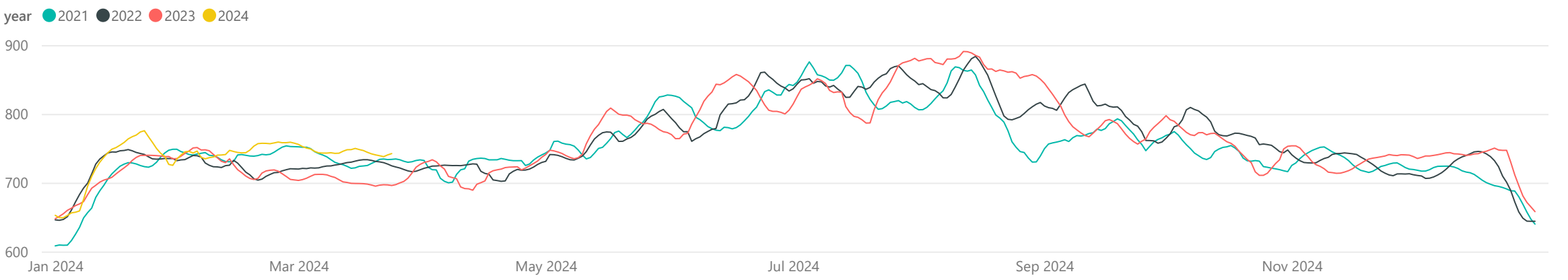


Solar

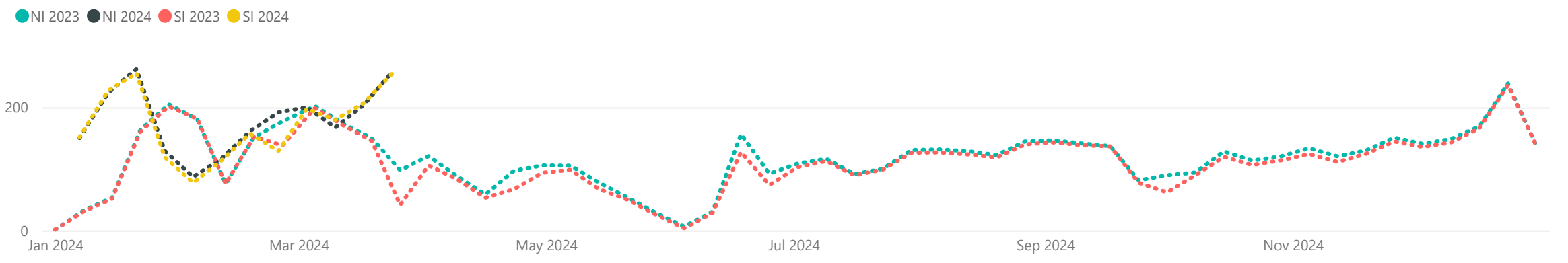


Weekly Profiles

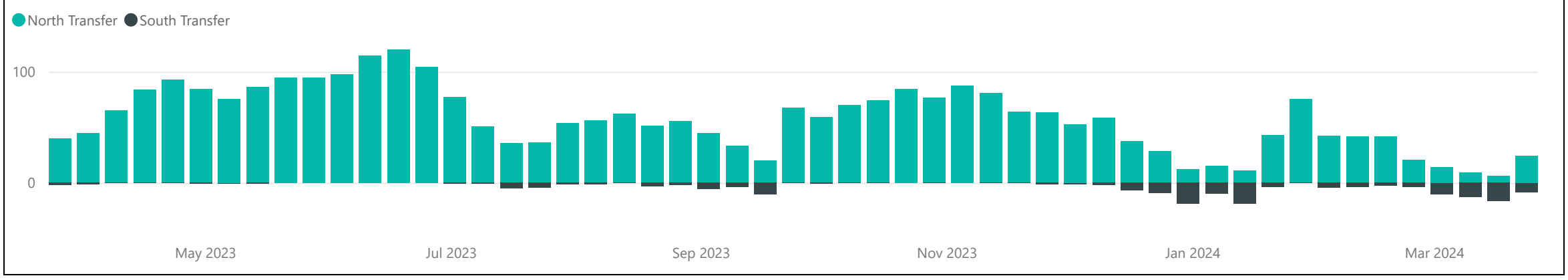
National Weekly Demand - GWh - 7 Day Rolling



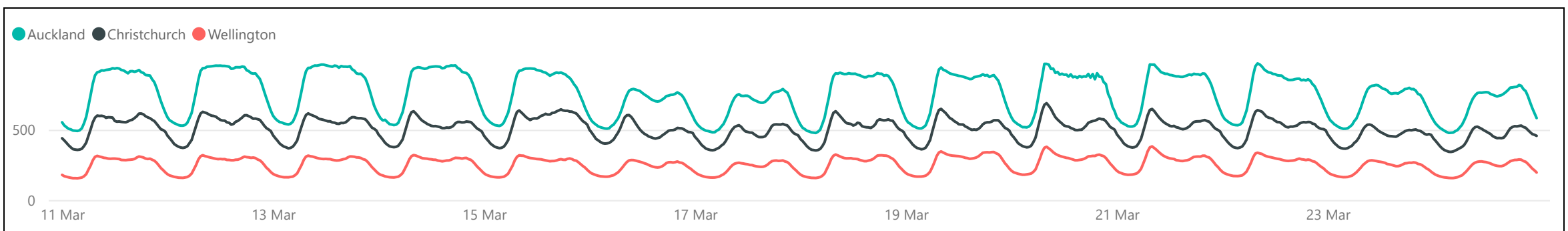
Weekly Spot Price - $/MWh



HVDC Transfer - Weekly GWh



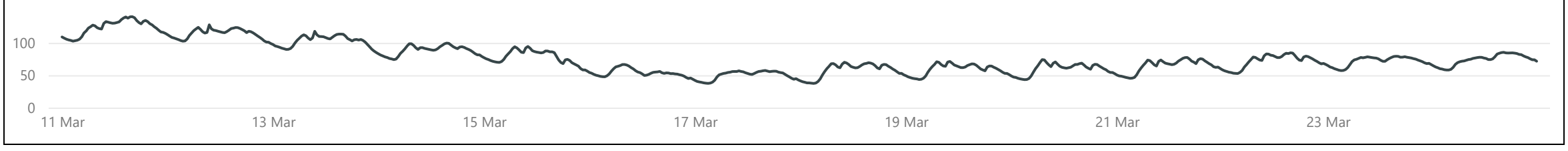
Conforming Load Profiles - Last Two Weeks *Measured in MW shown by region*



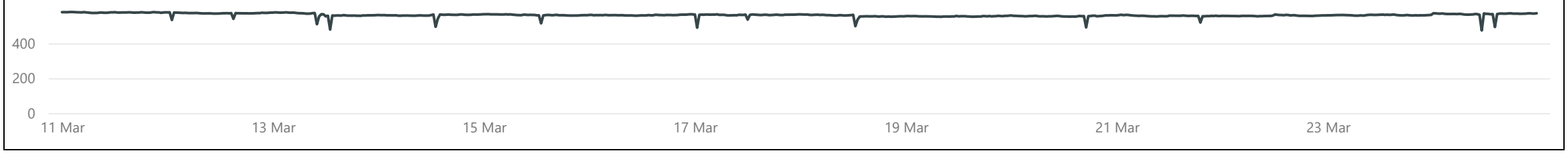
Non-Conforming Load Profiles - Last Two Weeks *Measured in MW shown by GXP*

GLN0331

ASB0661



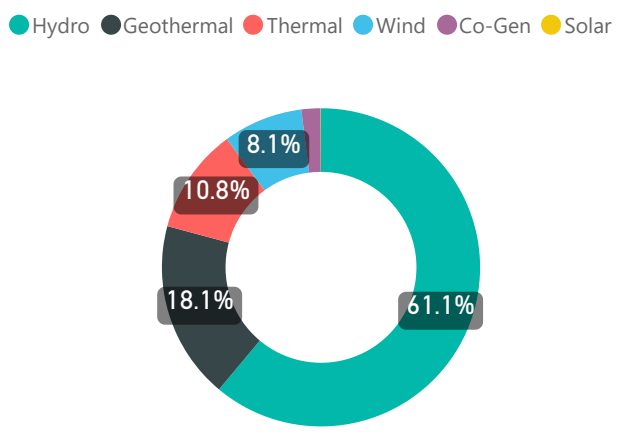
TWI2201



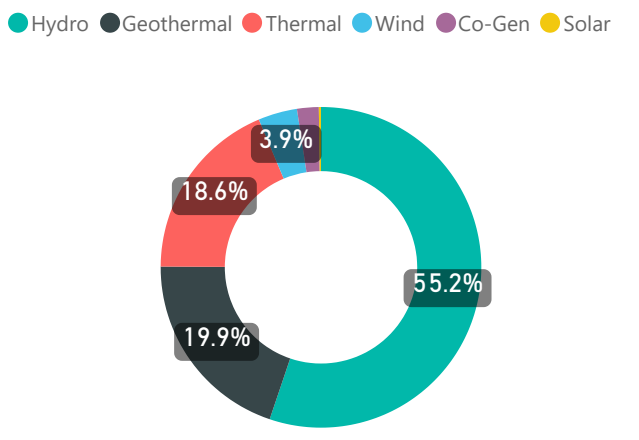
TRANSPOWER

Generation Mix

Last 52 Weeks Generation Mix - Weekly GWh



Last 7 Days Generation Mix - Weekly GWh



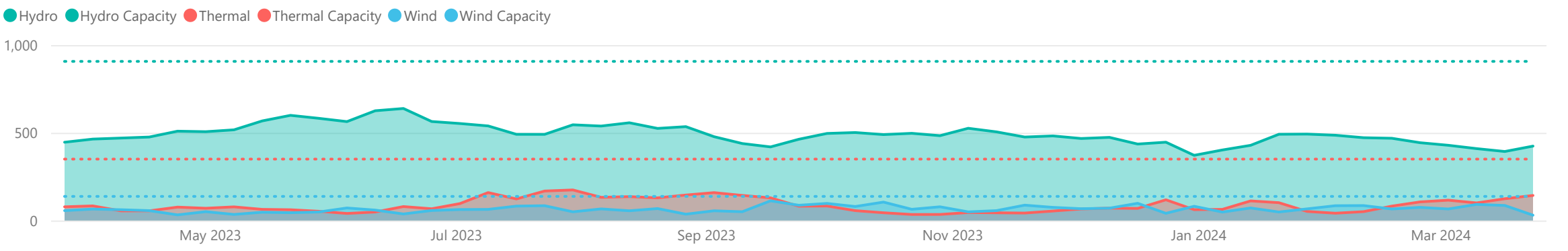
Average Metrics Last 7 Days

Renewable Percentage	CO2e Tonnes/Week	CO2e g/kWh
79%	97,477	127.4

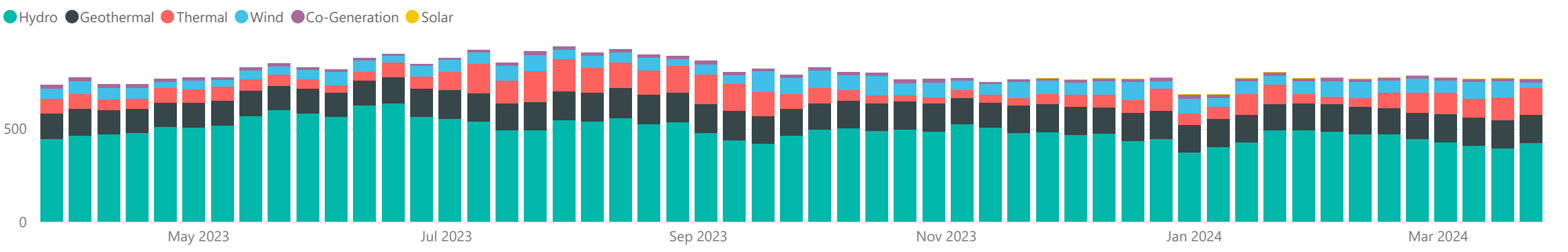
Average Metrics Last 52 Weeks

Renewable Percentage	CO2e Tonnes/Week	CO2e g/kWh
87%	60,803	74.3

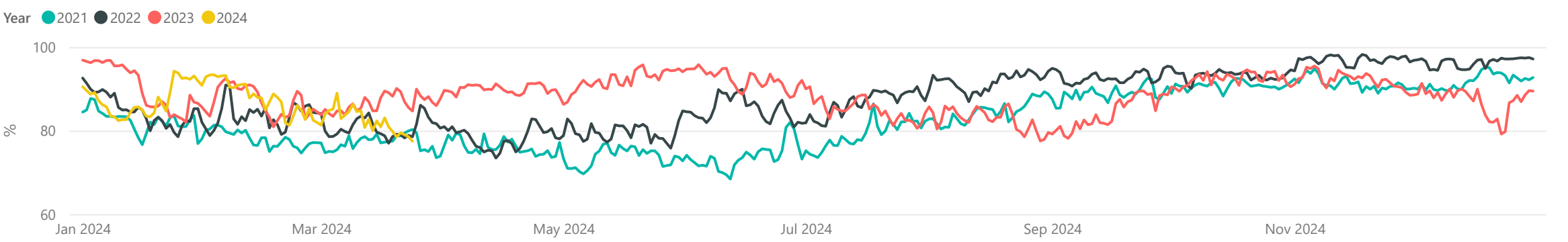
Weekly Generation Mix vs Capacity - GWh



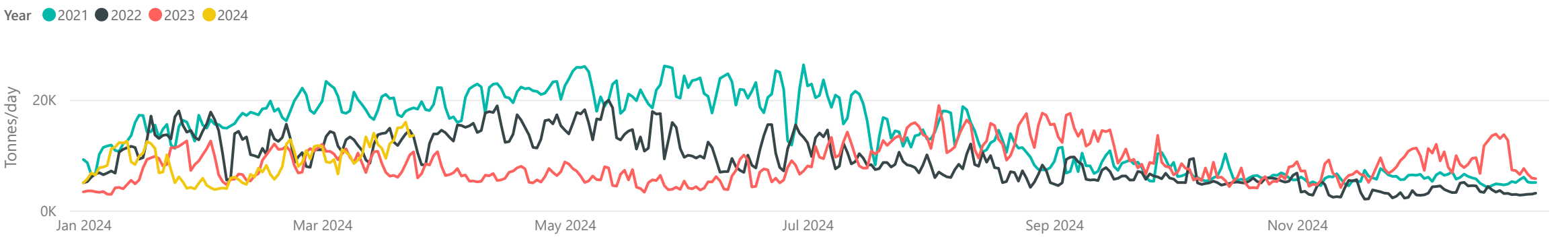
Weekly Generation Mix - GWh



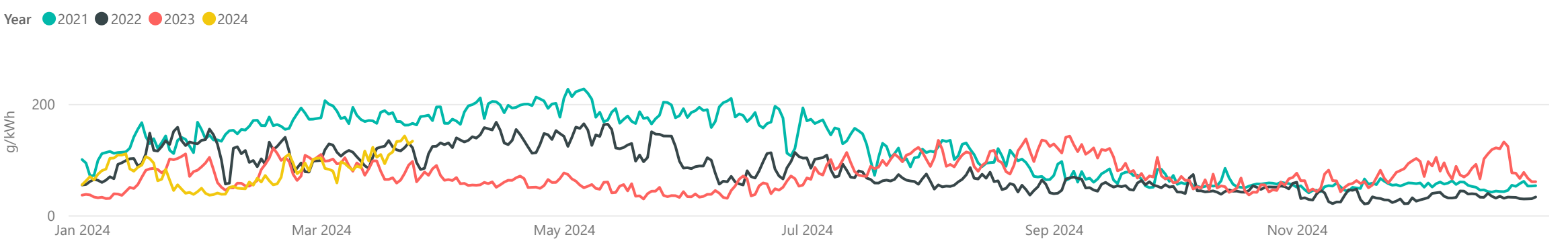
NZ Renewable Percentage



CO2 Tonnes/Day

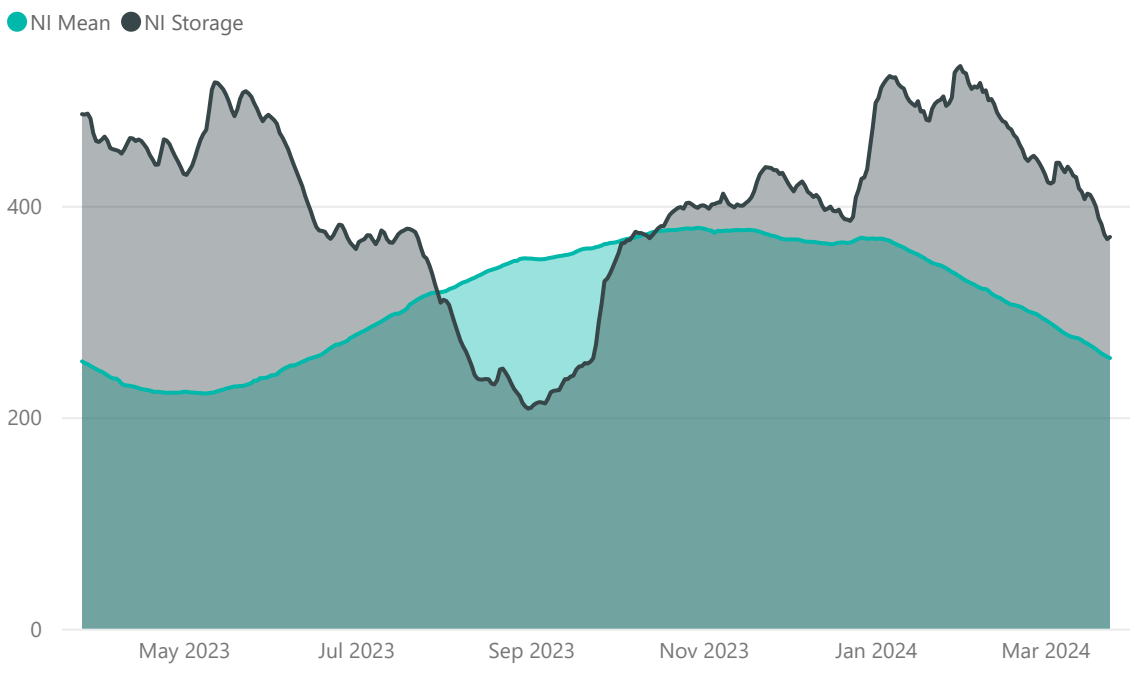


CO2 g/kWh

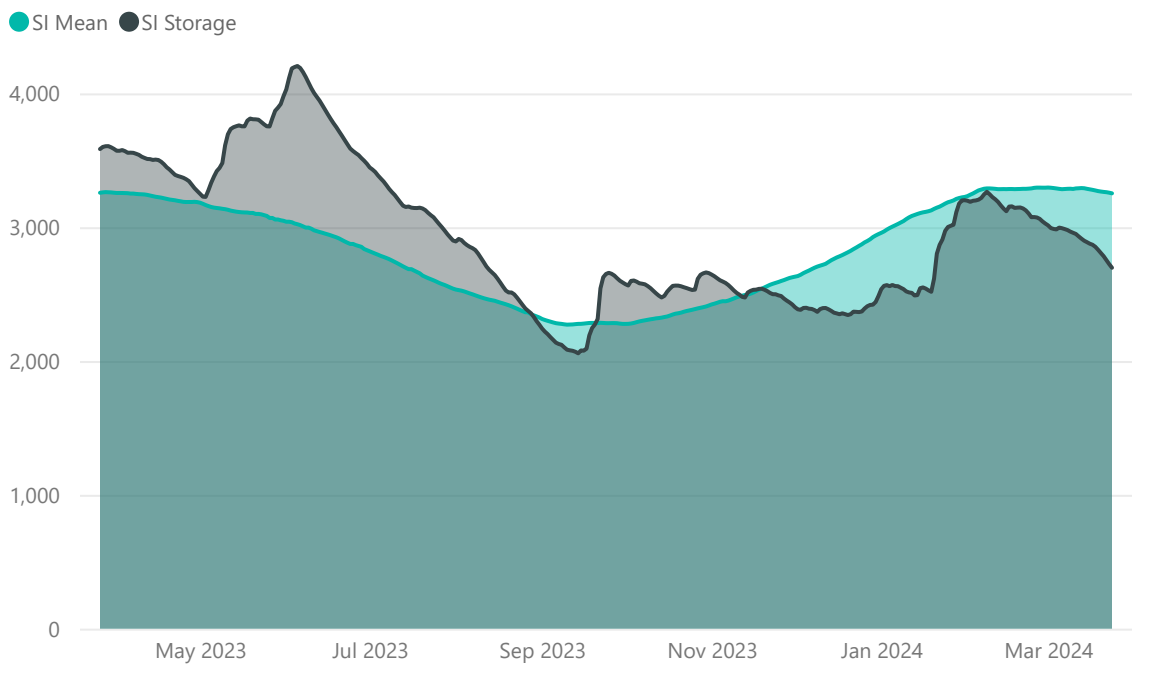


Hydro Storage

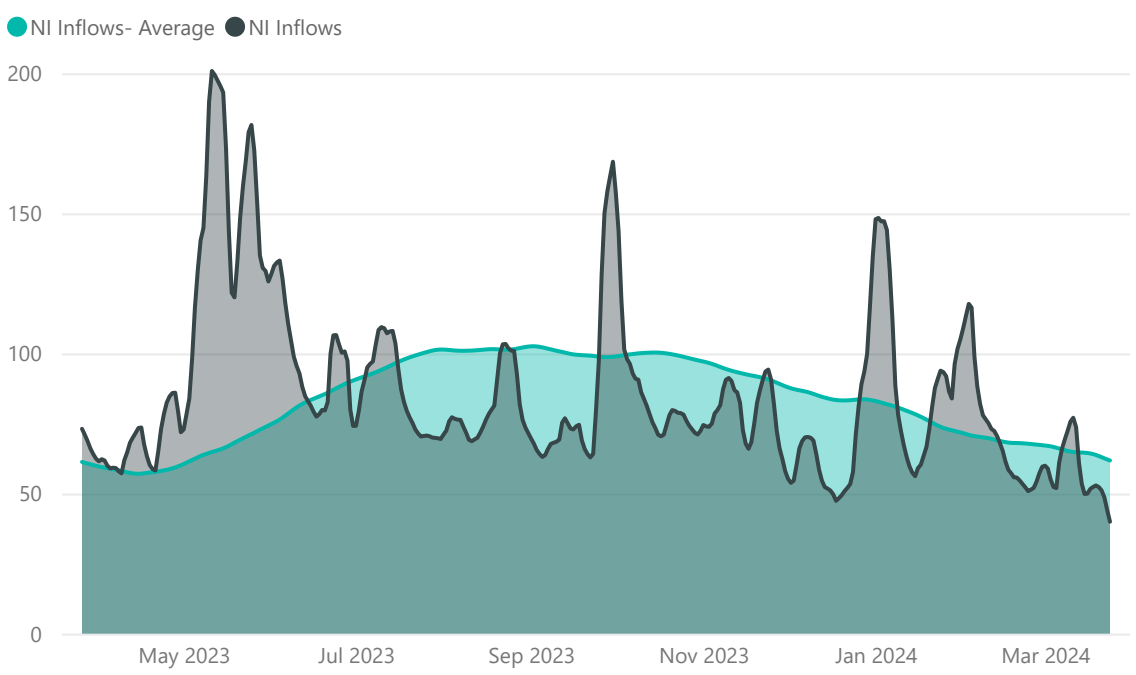
North Island Hydro Storage (Available GWh)



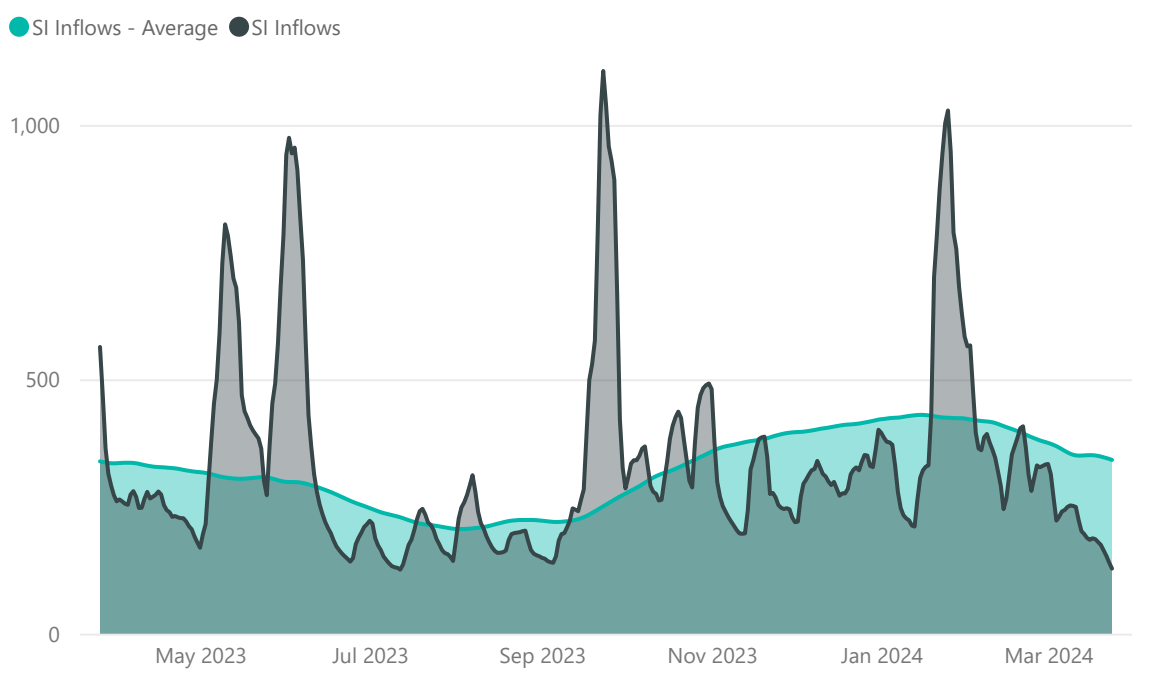
South Island Hydro Storage (Available GWh)



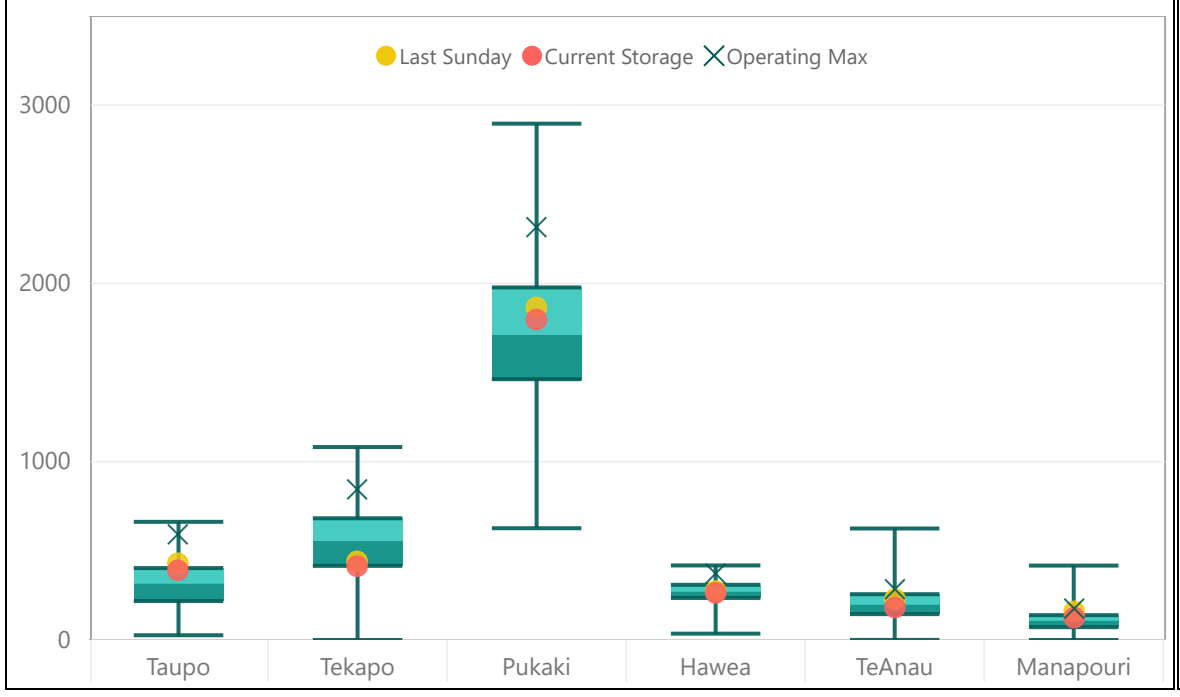
North Island Mean 7 Day Inflows (Available GWh)



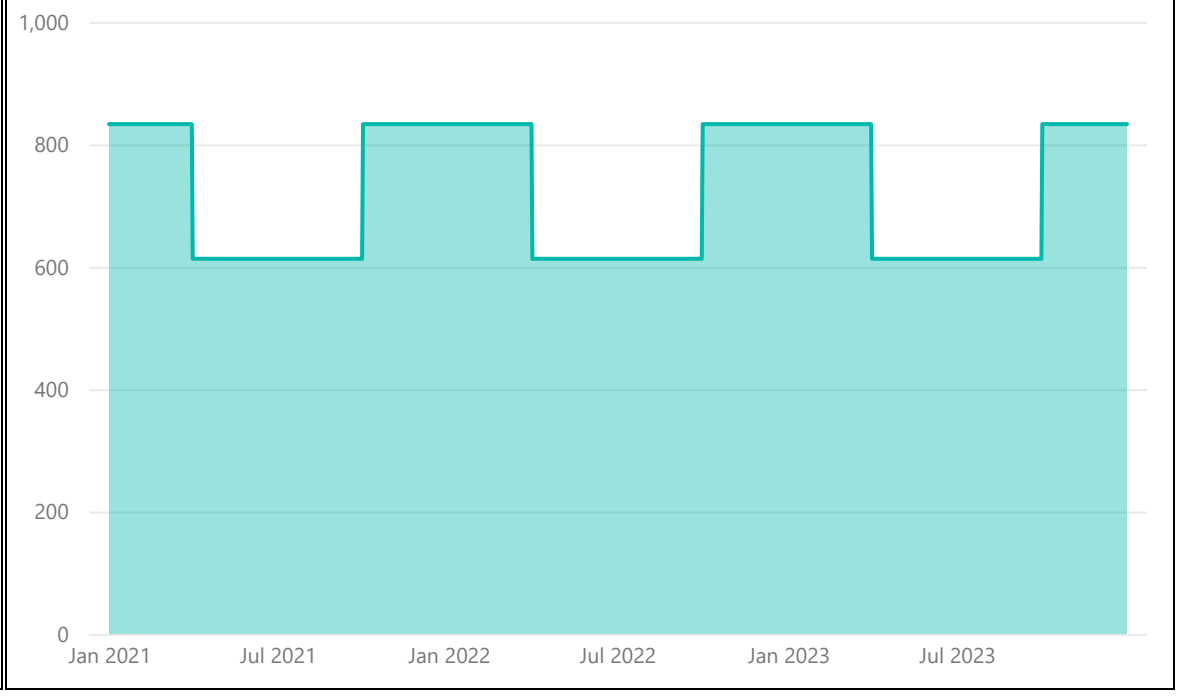
South Island Mean 7 Day Inflows (Available GWh)



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

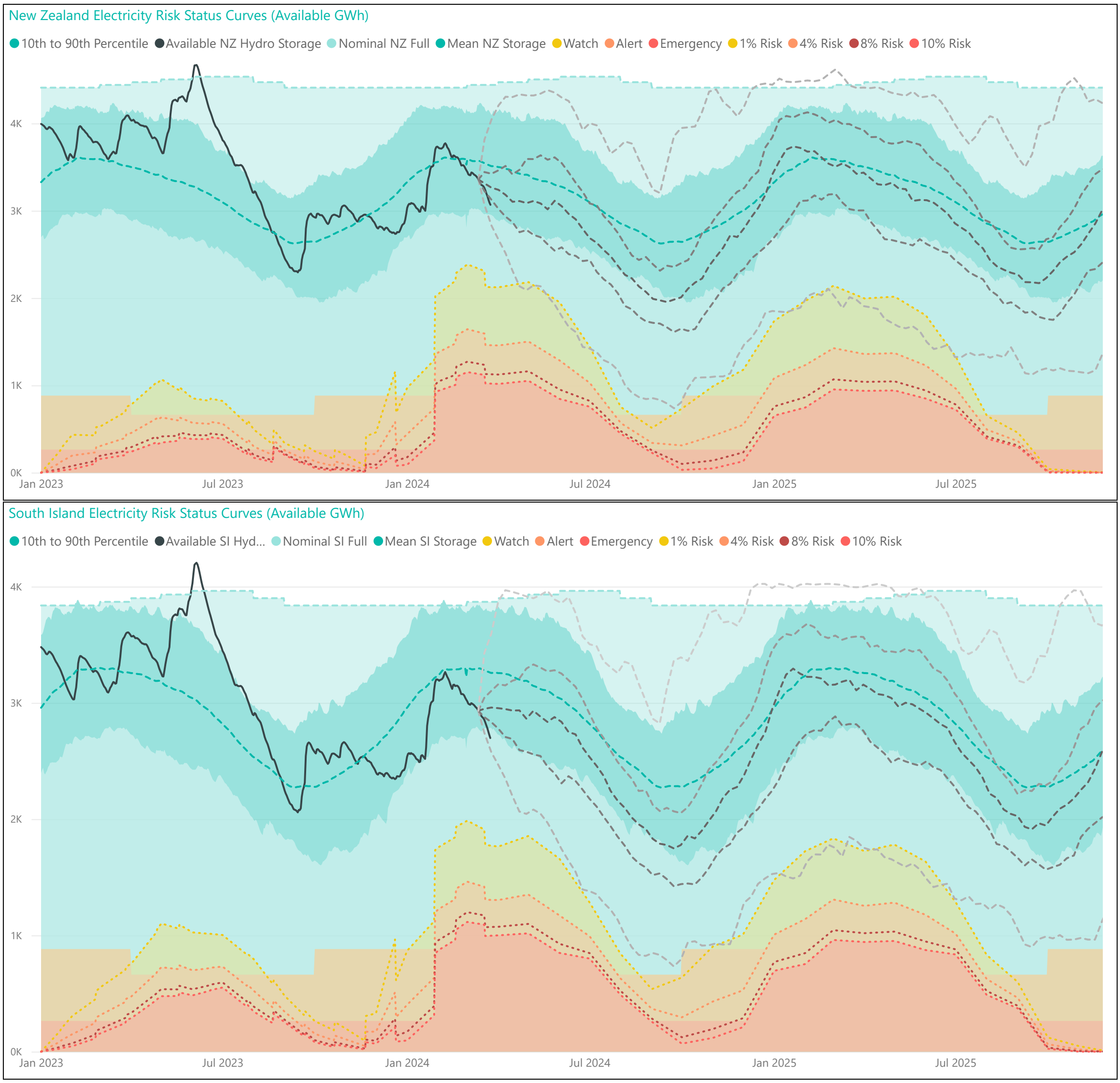
For any inquiries related to security of supply contact market.operations@transpower.co.nz

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

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).