Weekly Market Movements - Week Ended 21 January 2024

Overview

After substantial inflows into South Island storage catchments over the weekend, national hydro storage increased to 96% of the historic mean, up from 88% last week. Looking ahead, N-1-G margins are healthy throughout January and February, including consideration of the HVDC outages.

In this week's insight, we look at what has been driving the higher prices observed in the wholesale electricity market recently.

Security of Supply

Energy

Hydrology in both islands increased last week. South Island storage is 91% of the average for this time of year, up from 82%. North Island storage has increased from 139% to 143% of the historic mean.

Capacity

Residual generation margins remained healthy last week. While all residuals were above 1000MW the week prior, there were some lower residual periods last week coinciding with low wind generation. The minimum residual last week was 375 MW on the evening of Wednesday 17 January, down from a minimum of 1,046 the week prior.

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 increased to 769 GWh last week, up 3% from 744 GWh the week prior as the country continues to return to business as usual after the holidays. The demand across the last two weeks is ~5% higher than what was observed this time last year - likely due to high irrigation due to dry weather and high cooling load with warm temperatures. Demand peaked at 5477 MW on the evening of Friday 19 January, 200MW greater than last week's peak.

Weekly Prices

The average wholesale price at Haywards last week was $262/MWh, an 18% increase from $223/MWh the week prior. The last time the weekly average spot price was this high was in August 2021. Prices at all four reference nodes mostly remained above $200/MWh during the weekdays, but dropped below this on the weekend during low demand overnight periods and with increased inflows into the hydro catchments. The Otahuhu price peaked at $528/MWh on Wednesday 17 January at 4:30 pm during a period of low wind generation; a similar trend was observed on 18 January.

Generation Mix

The renewable percentage of the generation mix last week was 85% up from 83% the week prior. Wind generation dropped from 9% to 6%, thermal from 14% to 12% and geothermal from 19% to 18%. Hydro generation increased from 55% to 61% with larger inflows towards the end of the week.

HVDC

HVDC flows were predominantly northward last week. There were some periods of southwards transfer over nights with high wind generation.

SOSA Generator, Distributor and Demand Response Survey

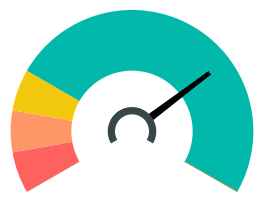
The 2024 Security of Supply Assessment (SOSA) considers existing and future investment in generation, energy storage and demand response capability from electricity generators, distributors and major electricity users. If it applies to you, please fill out the Generator, Distributor and Demand Response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

Upcoming HVDC outages

Pole 3 outage: 21 February - 25 February
Pole 2 outage: 24 February - 14 March
Bipole outage: 24 February - 25 February

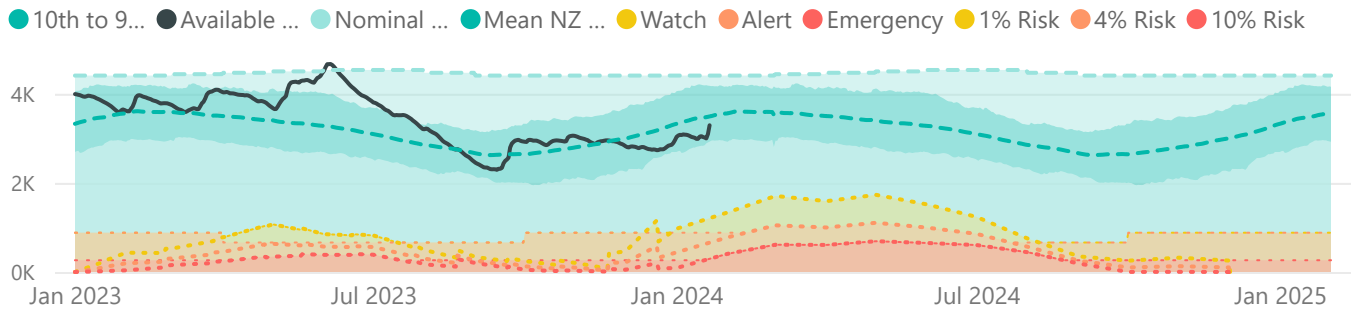
New Zealand Energy Risk

South Island Energy Risk

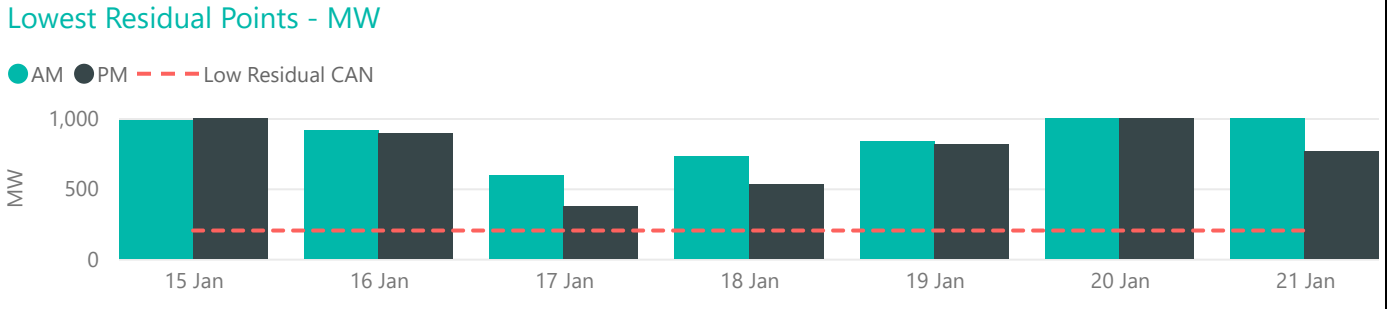


Normal Watch Alert Emergency

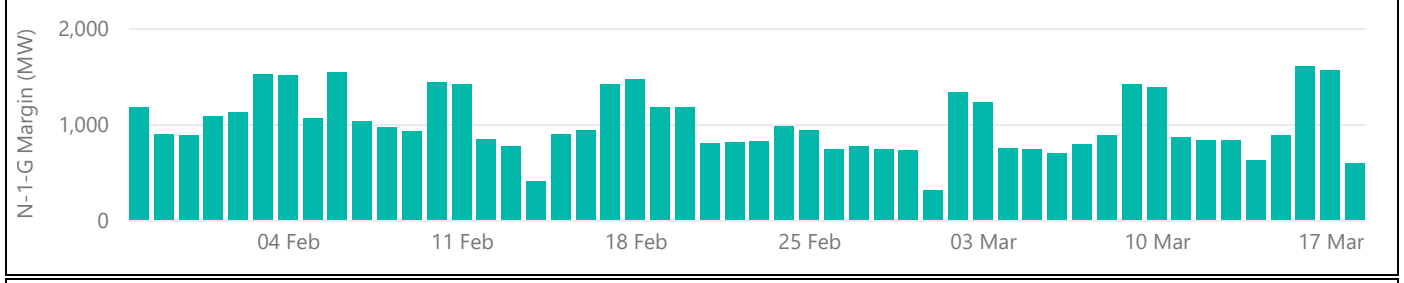
New Zealand Energy Risk Status Curves (Available GWh)



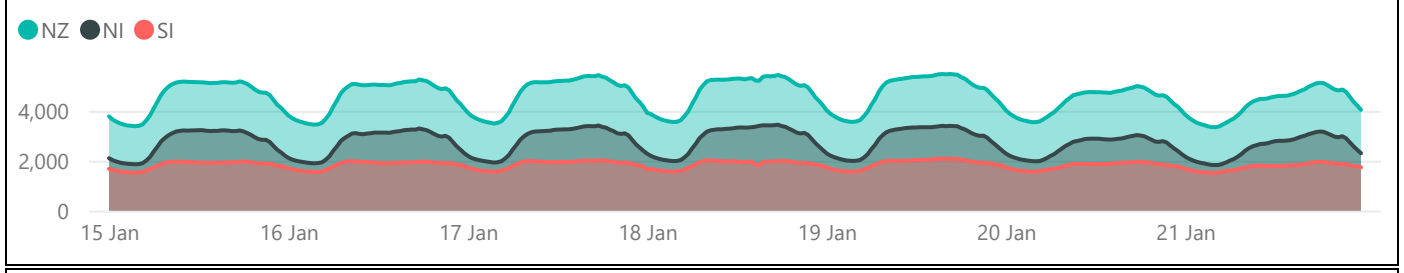
Lowest Residual Points - MW



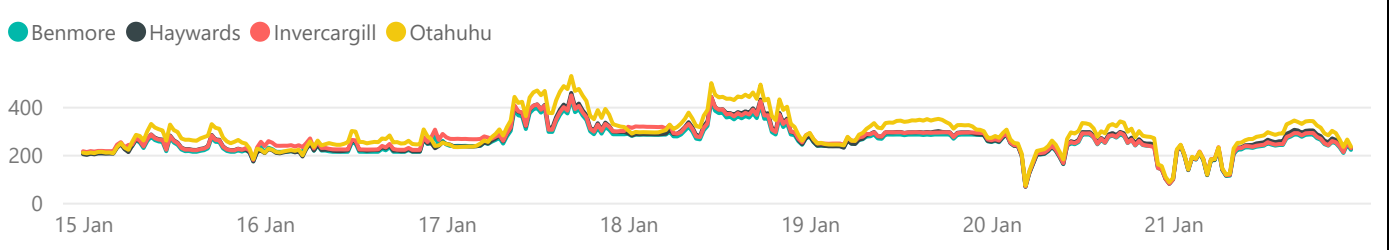
NZGB Look-Ahead (excluding next 7 days)



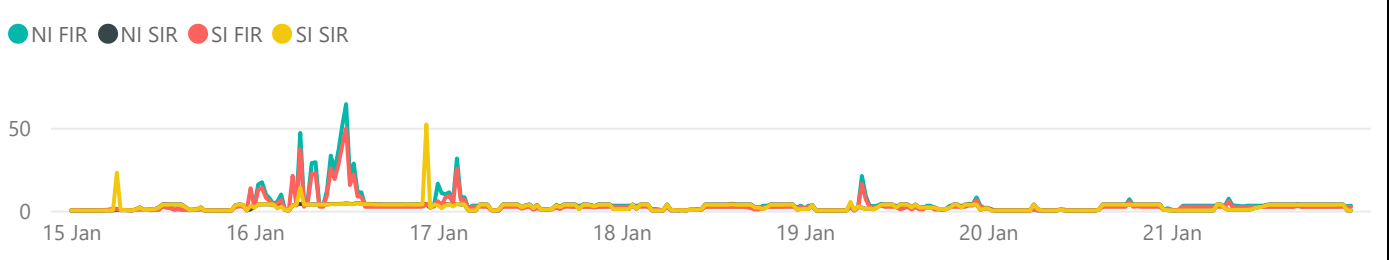
National Demand by Trading period - MW



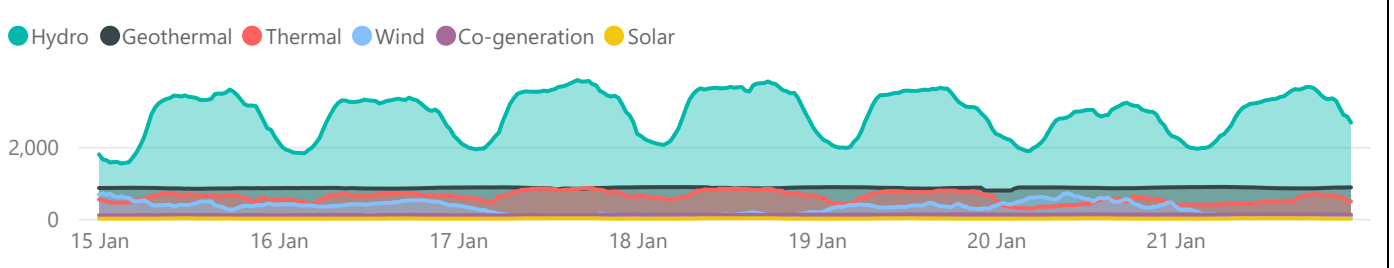
Weekly Prices - $/MWh



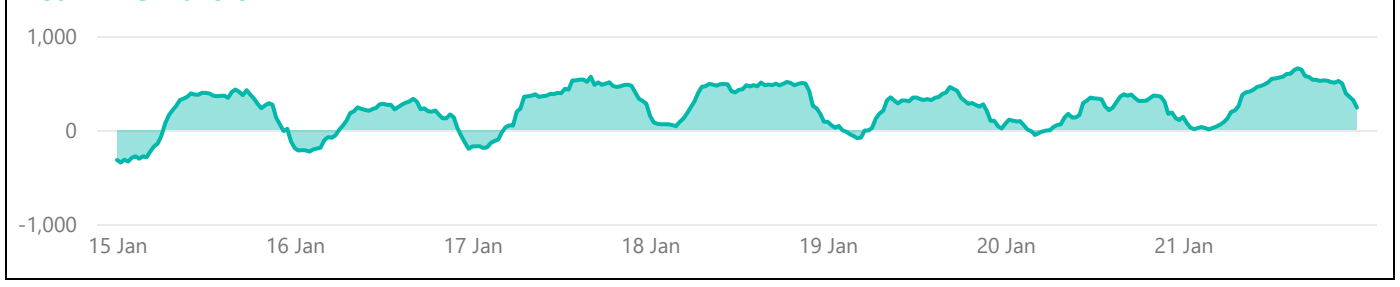
Reserve Prices - $/MWh



Generation - MW



Net HVDC Transfer - MW



Weekly Summary Insight - Factors influencing recent high prices

Over recent weeks there have been higher average prices in the wholesale electricity market than that is typically observed at this time of year. The average spot price last week was ~$260/MWh, compared to average prices of ~$160/MWh this time last year. This is due to multiple contributing factors which are discussed below.

Given our large dependence on hydro generation, hydro storage has a large influence on wholesale electricity prices. Hydro storage has been below average since late November, and South Island inflows have been below average since October. Historically, El Niño years on average have seen larger inflows into the hydro catchments over summer but the inflows observed this summer have been less that would typically be expected for this time of year. However, as is also seen historically, some El Niño years have brought extended dry sequences over summer (Figure 1). The lower than average inflows over the summer resulted in hydro storage dropping to 88% of average as at the start of last week.

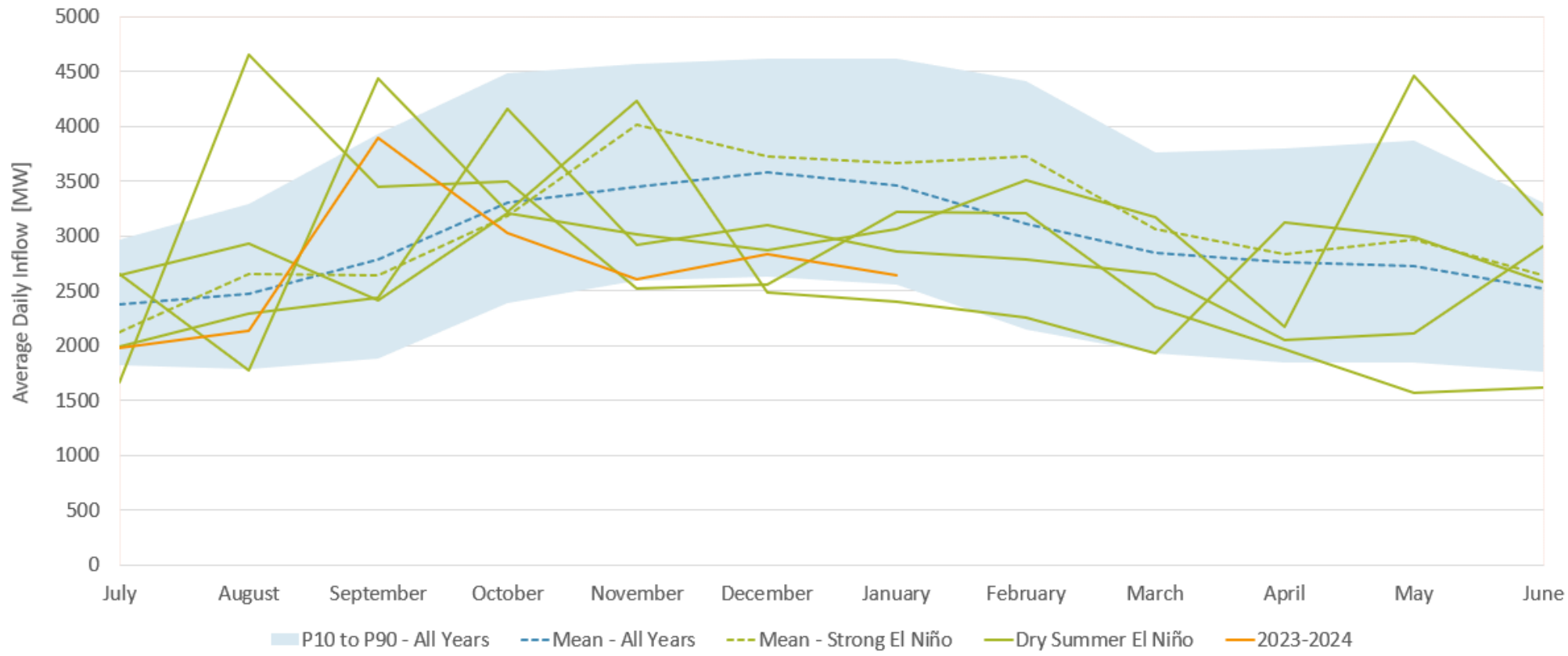


Figure 1. El Niño extended dry summer inflow sequences.

The reduced hydro inflows, declining hydro storage and uncertainty around when the extended dry sequence will be broken means that water currently stored in the hydro catchments increases in value. Hydro generators are reducing their generation in order to conserve water, and so prices rise as thermal generation is required to run to make up the difference (Figure 2).

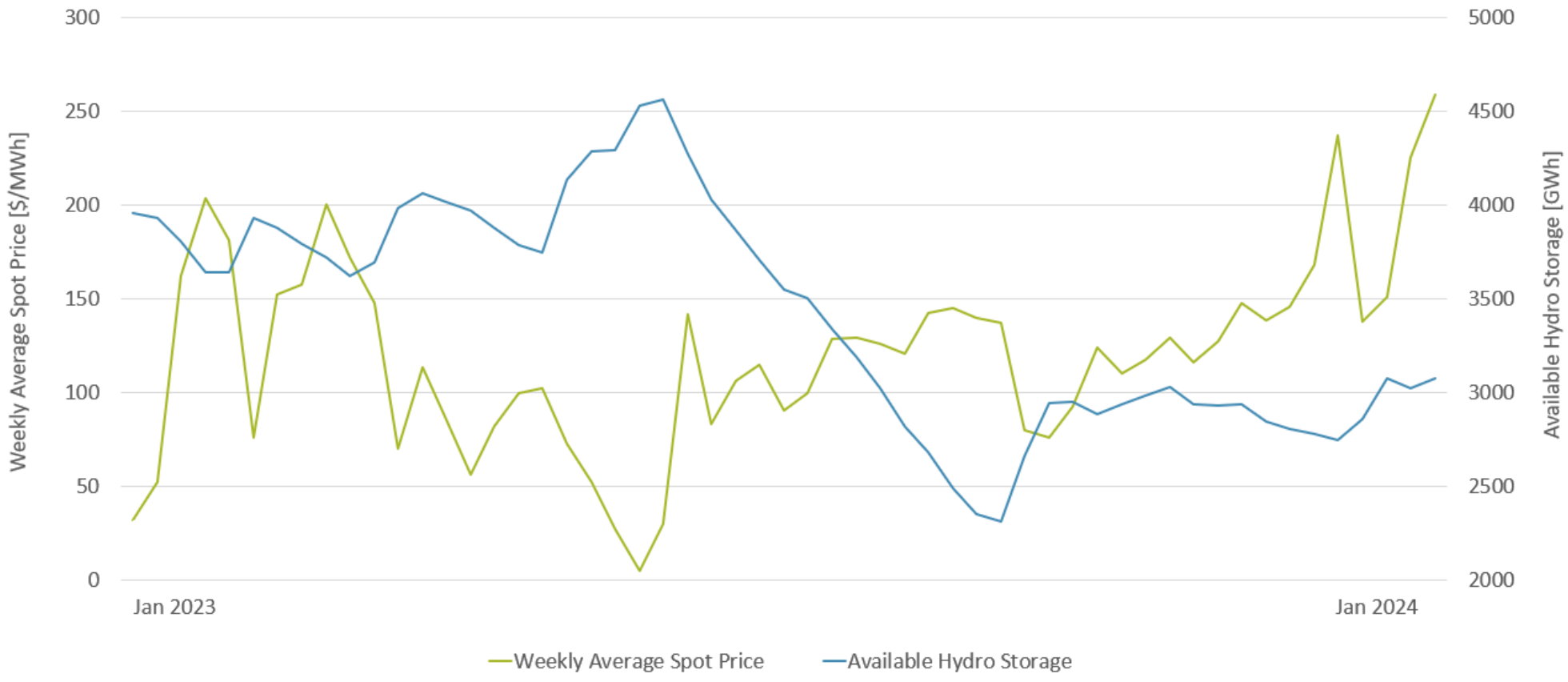


Figure 2. Relationship between available hydro storage and average price across 2023 and 2024 to date.

In addition to low hydro, last week wind generation was also low - contributing 6% to the generation mix compared to the 7.6% average seen over the past year. This drives the prices up even further than low hydro alone. When prices peaked last week at $528/MWh at Otahuhu at 4:30pm 17 January, wind generation was low at 66MW which is only ~5% of installed wind capacity. For more information on how wind effects price refer to this insight.

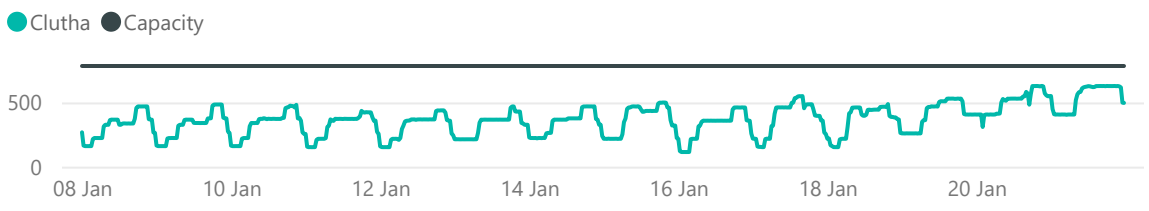
In addition to the supply side conditions putting upward pressure on spot prices, demand has also been increasing as the country comes back from holidays. Demand has not been unusually high so has not been driving the price up alone, but the last two weeks have seen demand ~5% higher than what was seen this time last year. This is likely in part due to higher irrigation load, cooling load from air conditioning, and general demand growth.

The higher prices occur as a result of the market responding to these factors on the supply and demand-side.

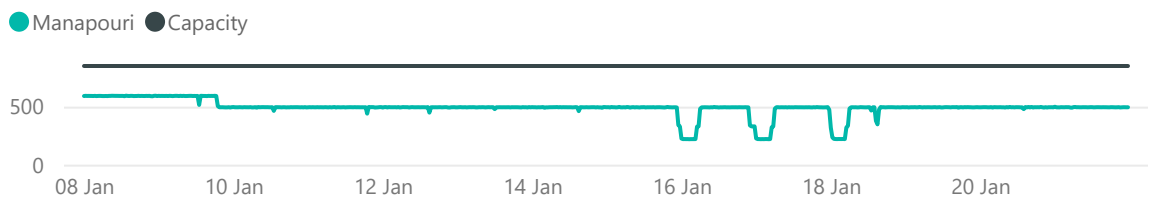
Generation Breakdown - Last Two Weeks

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

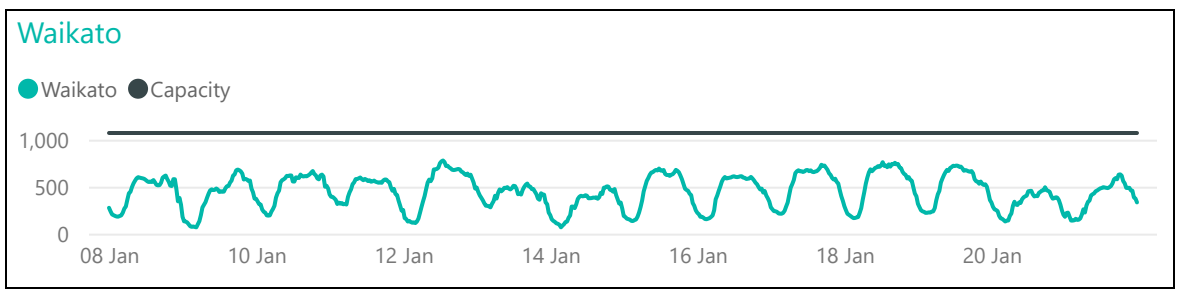
Clutha



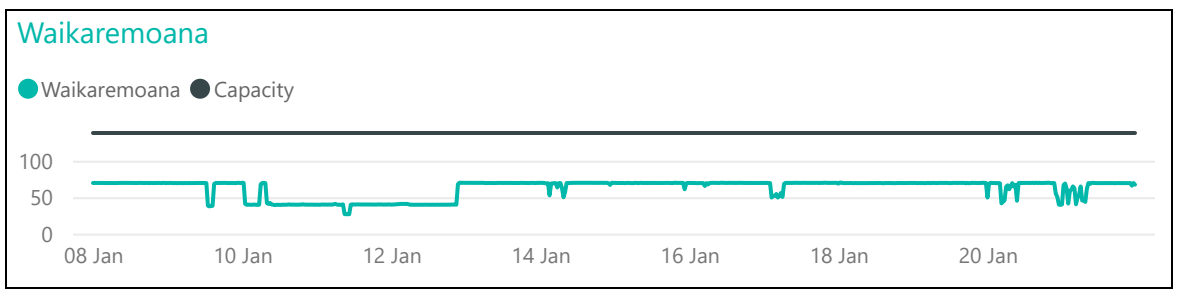
Manapouri



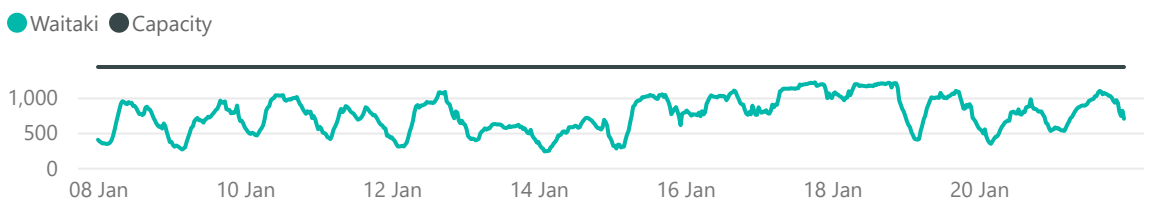
Waikato



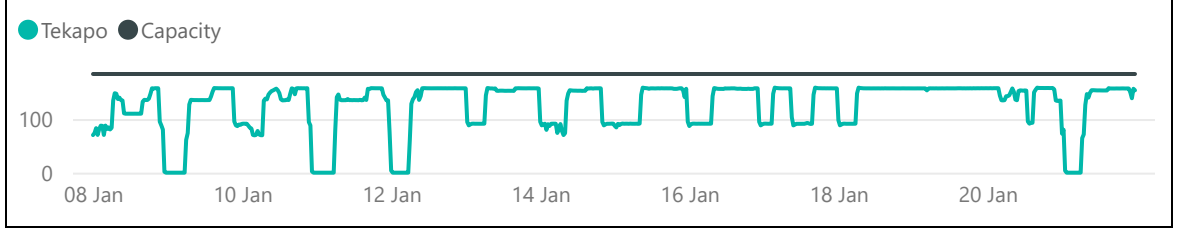
Waikaremoana



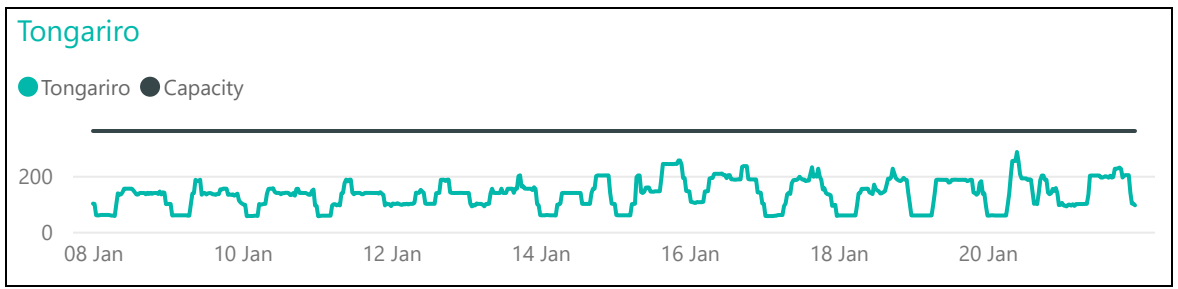
Waitaki



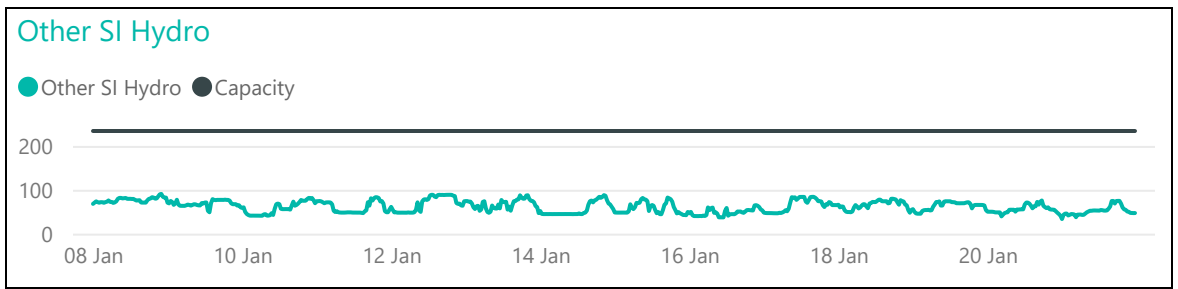
Tekapo



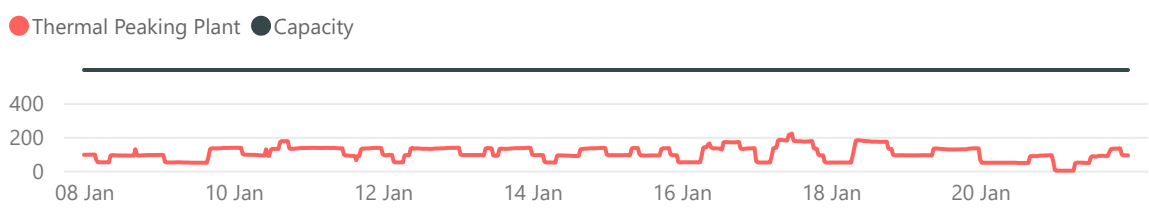
Tongariro



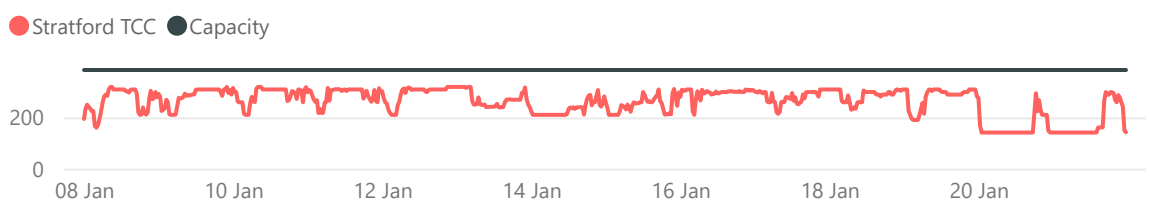
Other SI Hydro



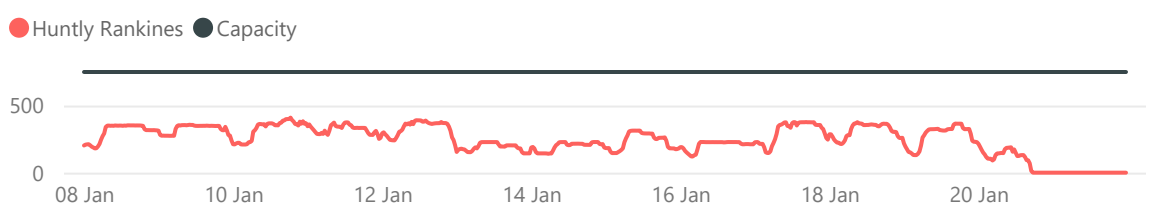
Thermal Peaking Plant



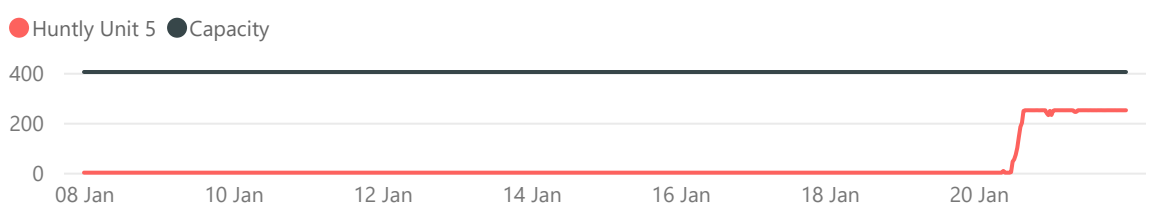
Stratford TCC



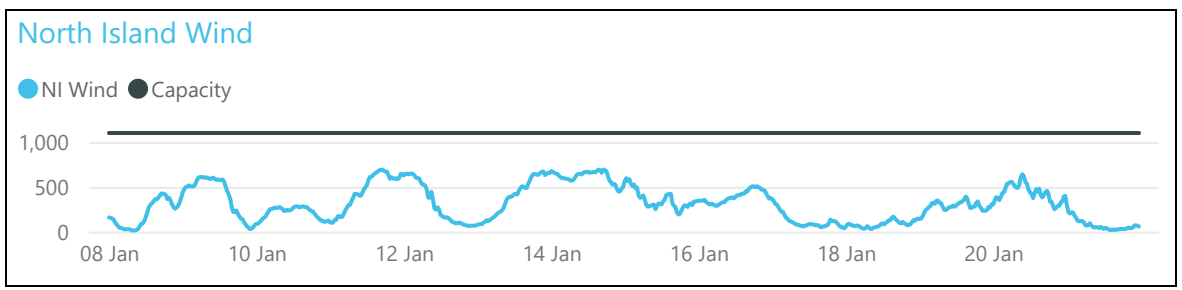
Huntly Rankines



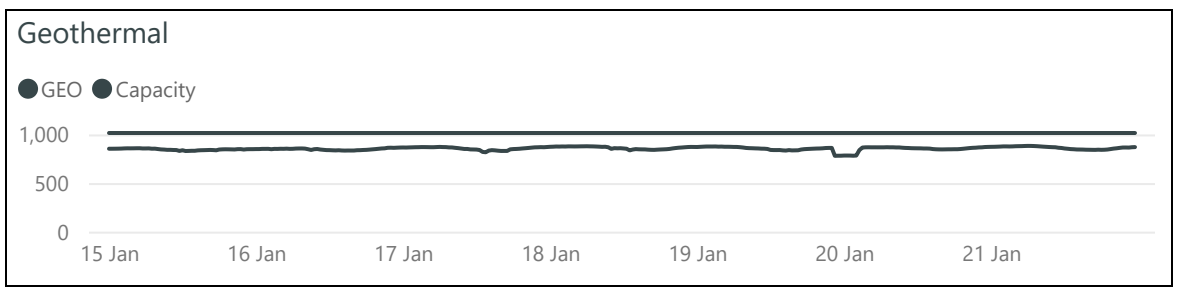
Huntly U5



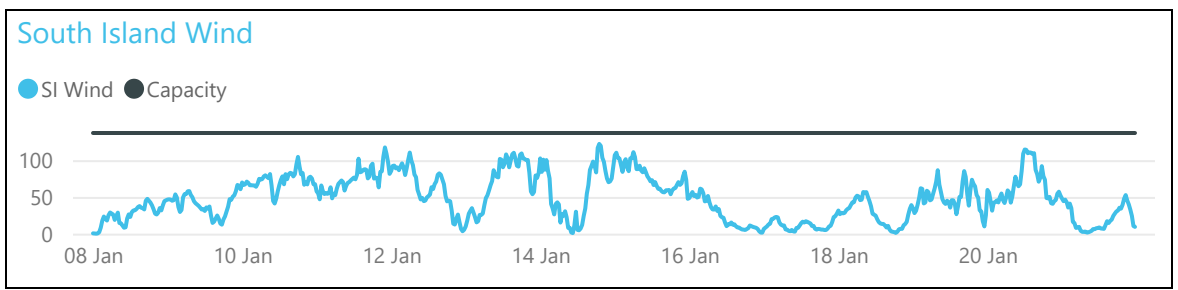
North Island Wind



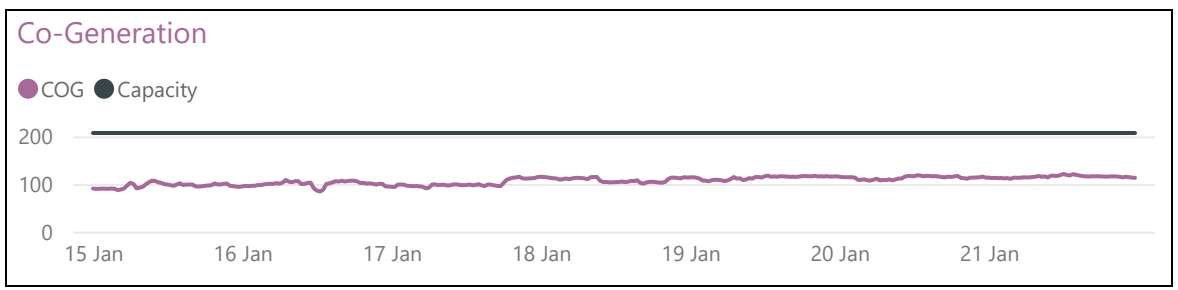
Geothermal



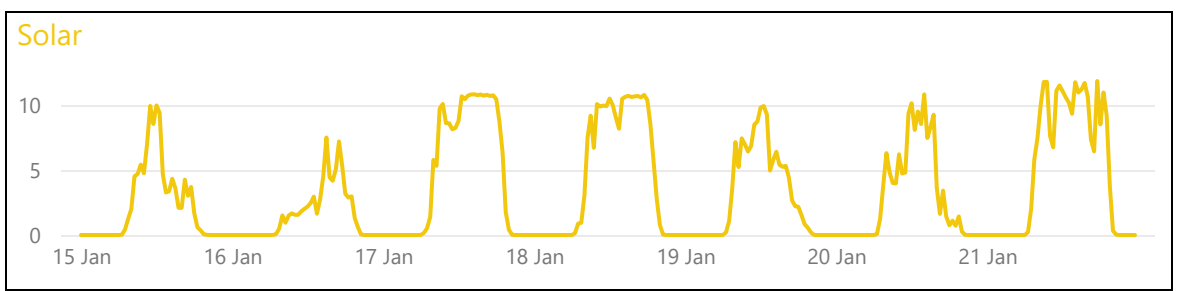
South Island Wind



Co-Generation

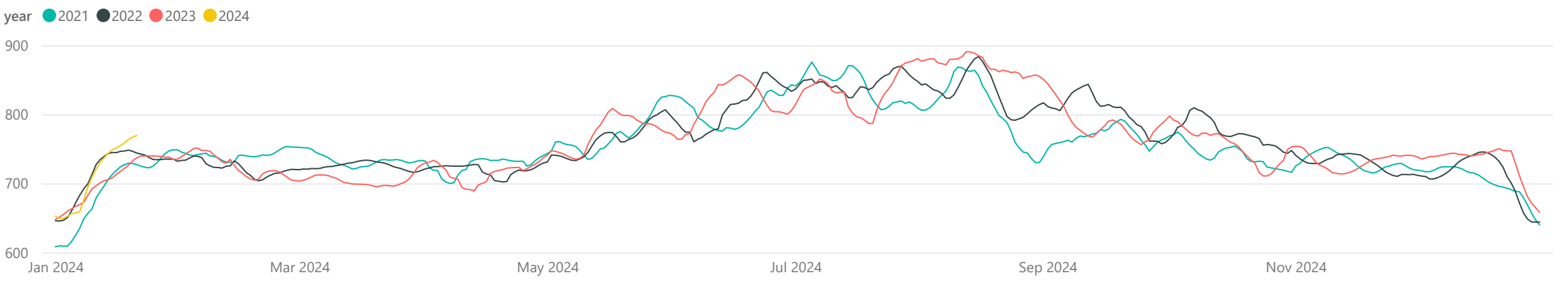


Solar

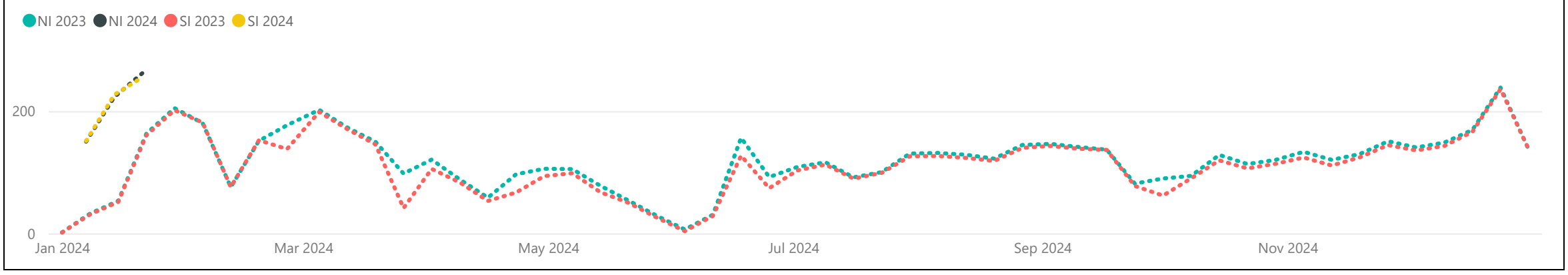


Weekly Profiles

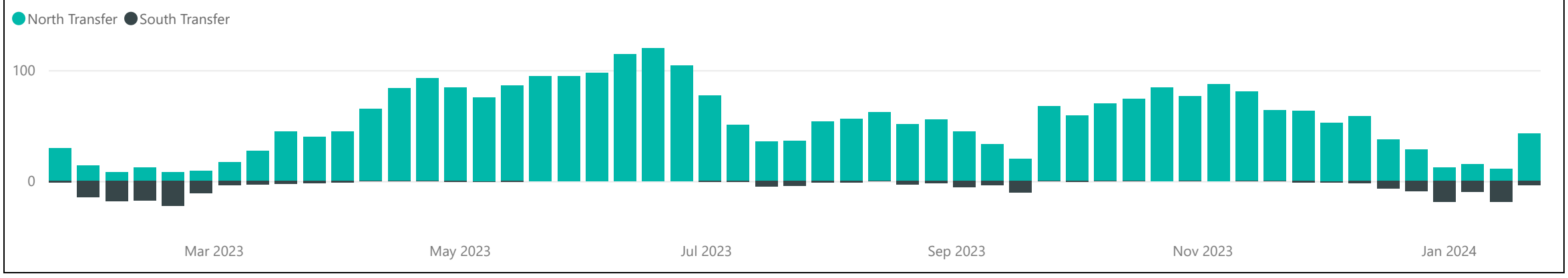
National Weekly Demand - GWh - 7 Day Rolling



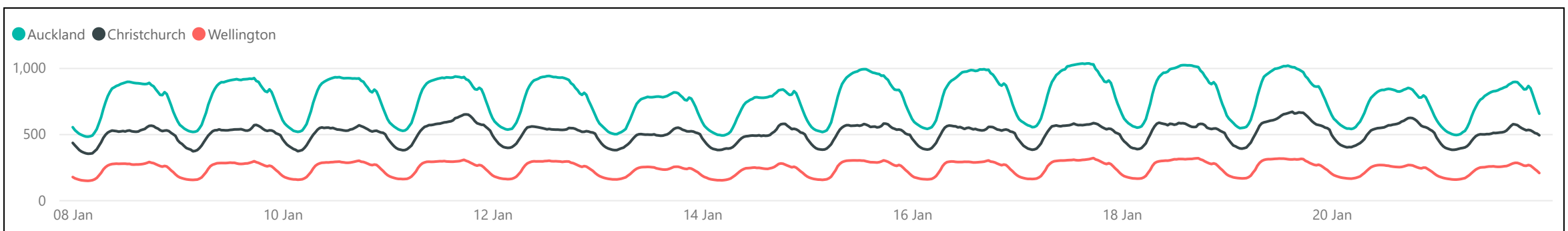
Weekly Spot Price - $/MWh



HVDC Transfer - Weekly GWh

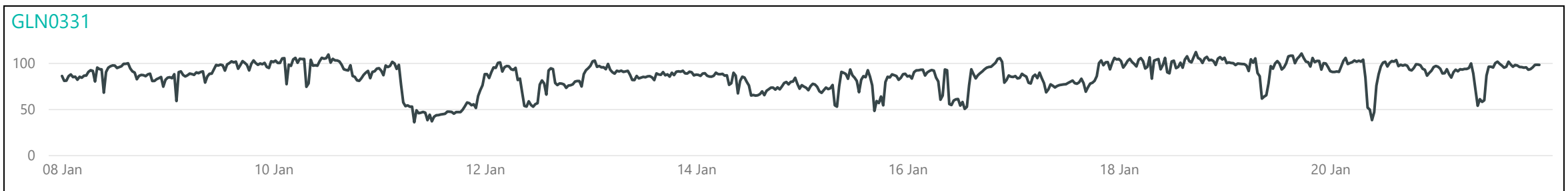


Conforming Load Profiles - Last Two Weeks *Measured in MW shown by region*



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

GLN0331



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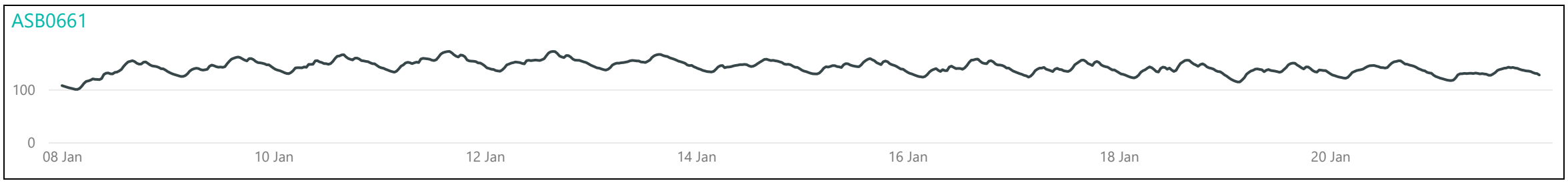

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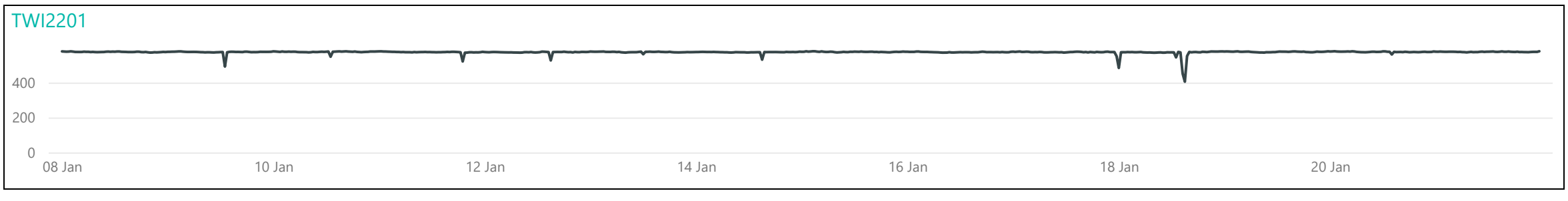
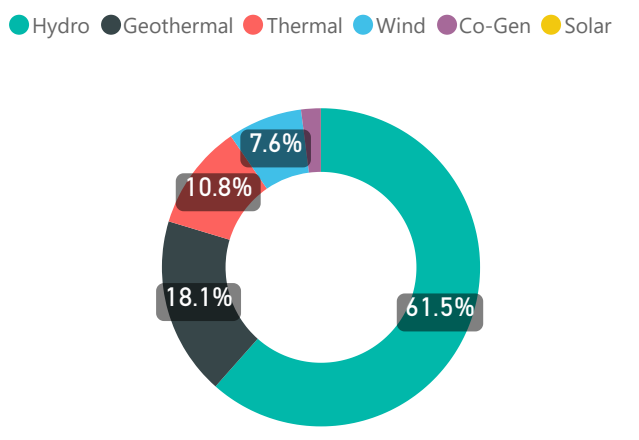


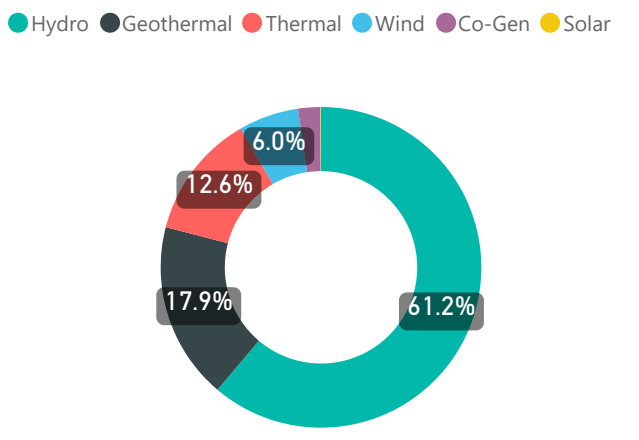
TRANSPOWER

Generation Mix

Last 52 Weeks Generation Mix - Weekly GWh



Last 7 Days Generation Mix - Weekly GWh



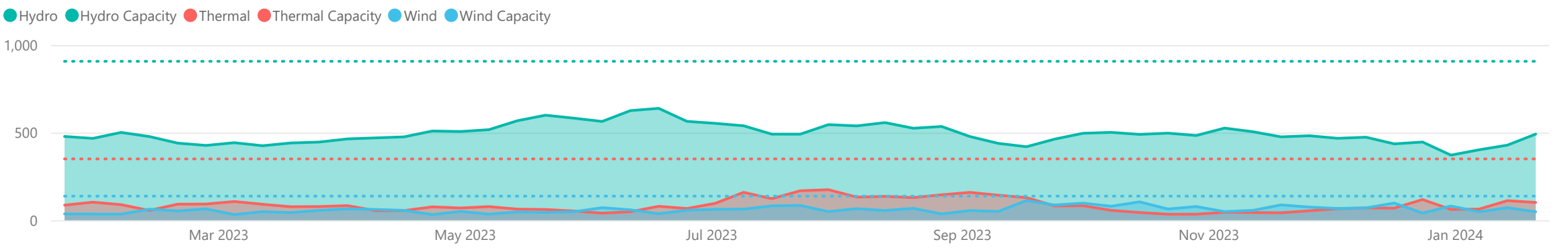
Average Metrics Last 7 Days

Renewable Percentage	CO2e Tonnes/Week	CO2e g/kWh
85%	69,686	86.3

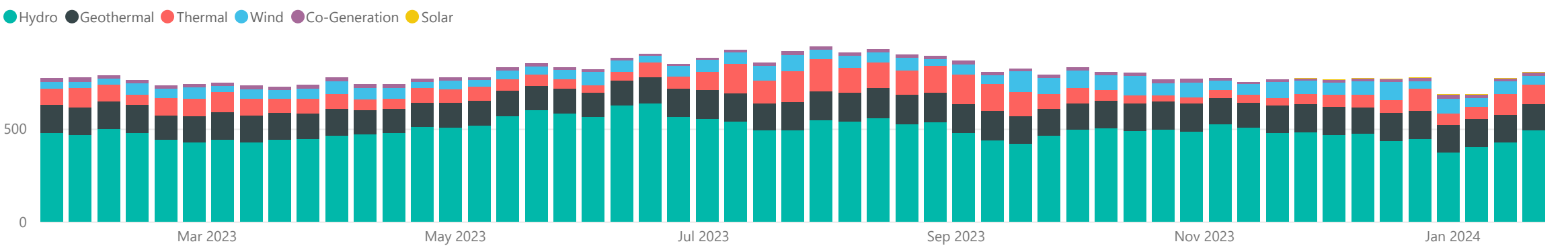
Average Metrics Last 52 Weeks

Renewable Percentage	CO2e Tonnes/Week	CO2e g/kWh
87%	61,317	75.4

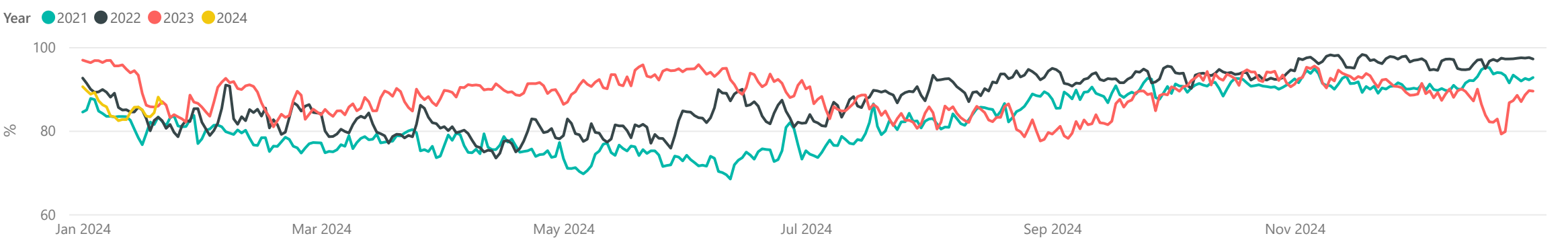
Weekly Generation Mix vs Capacity - GWh



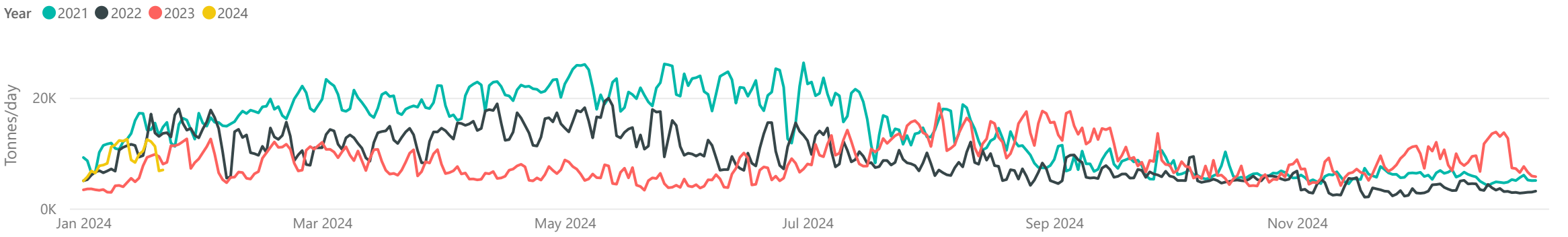
Weekly Generation Mix - GWh



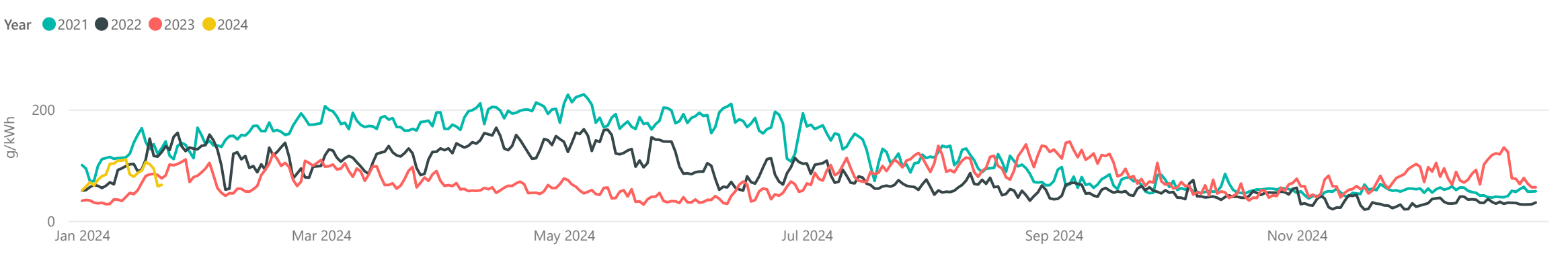
NZ Renewable Percentage



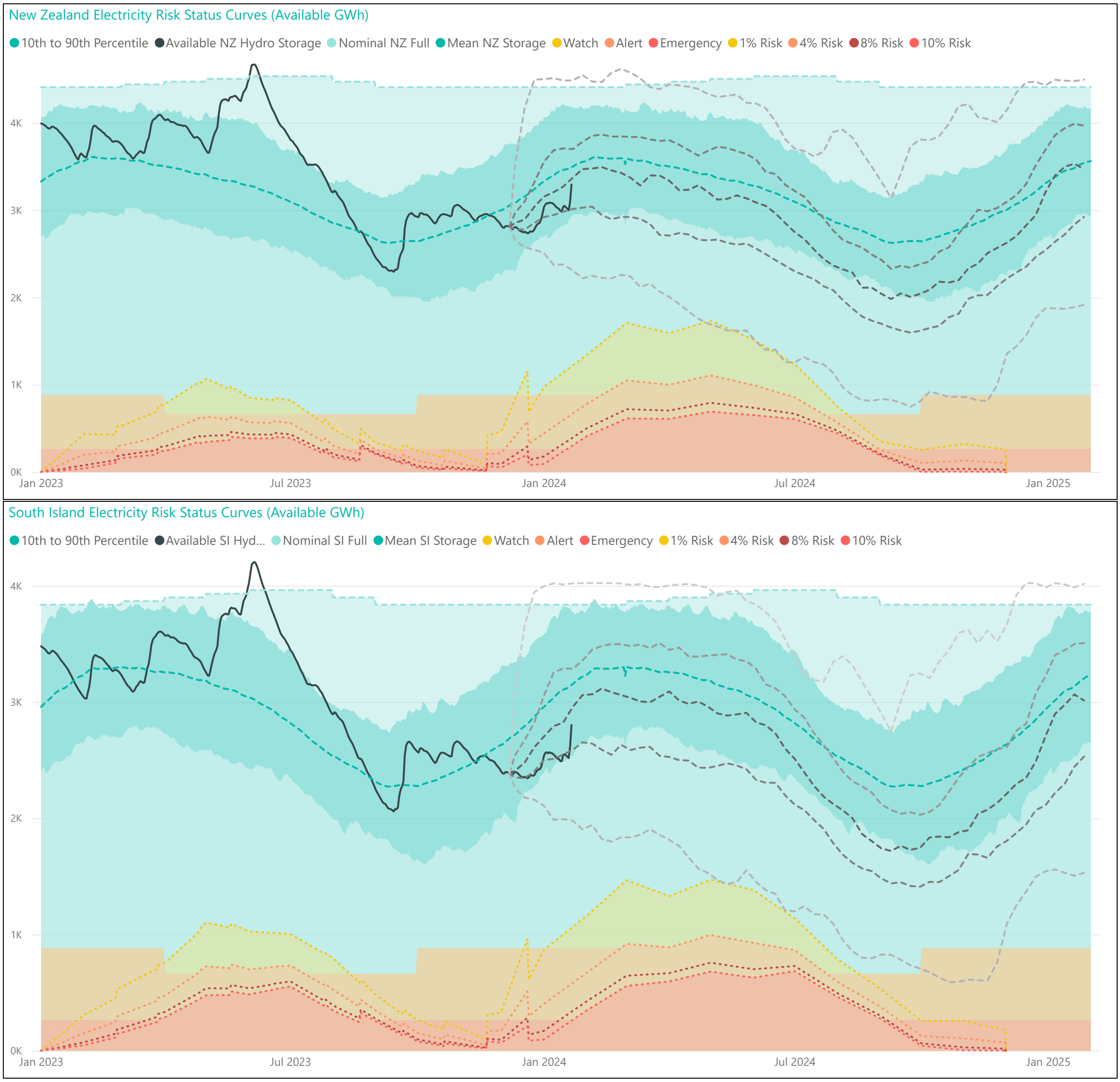
CO2 Tonnes/Day



CO2 g/kWh



Electricity Risk Curves



Electricity Risk Curve Explanation:

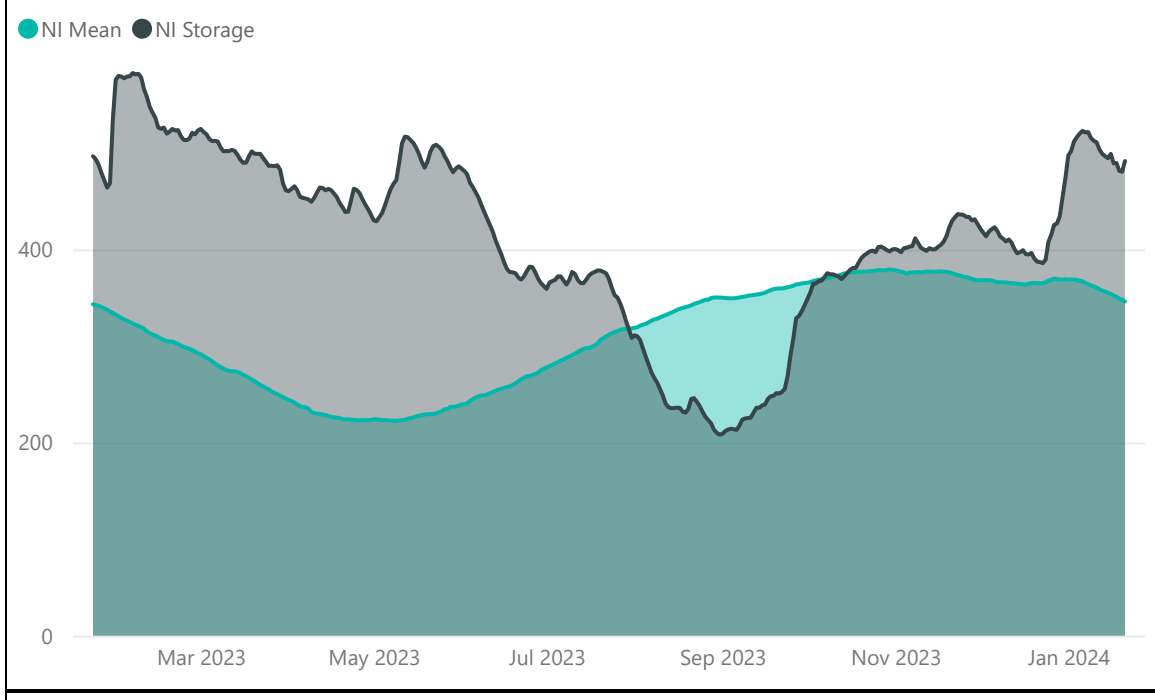
Watch Curve - The maximum of the one percent risk curve and the floor and buffer
Alert Curve - The maximum of the four percent risk curve and the floor and buffer
Emergency Curve - The maximum of the 10 percent risk curve and the floor and buffer
Official Conservation Campaign Start - The Emergency Curve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

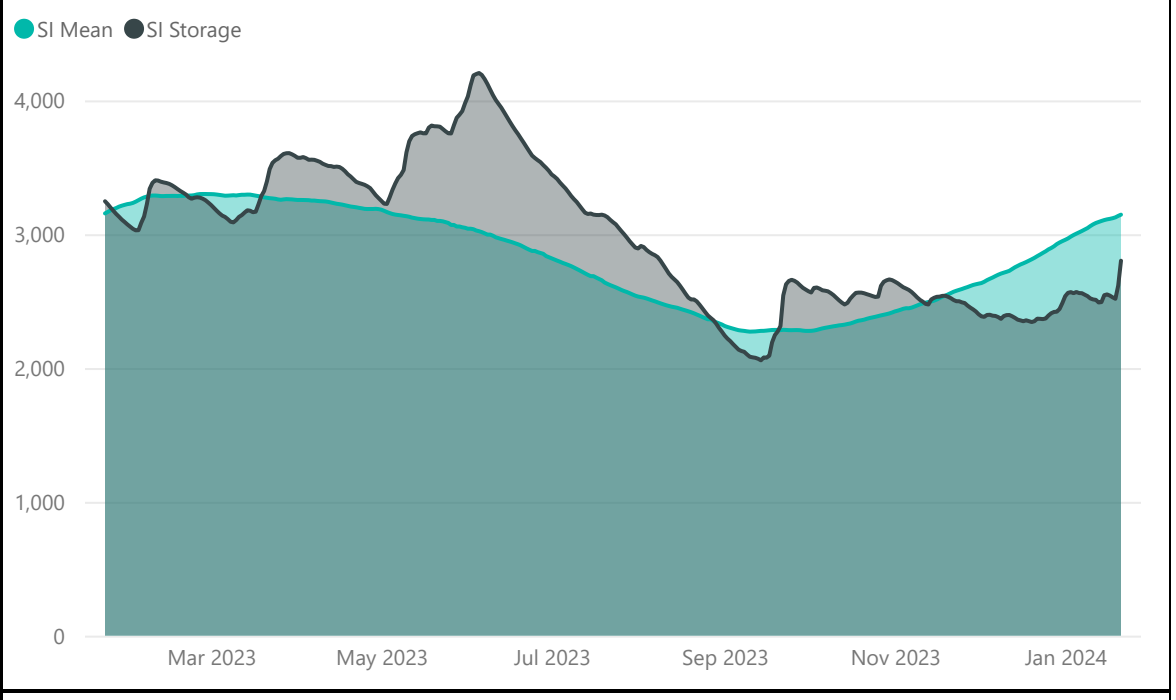
The dashed grey lines represent the minimum, lower quartile, median, upper quartile and the maximum range of the simulated storage trajectories (SSTs). These will be updated with each Electricity Risk Curve update (monthly).

Hydro Storage

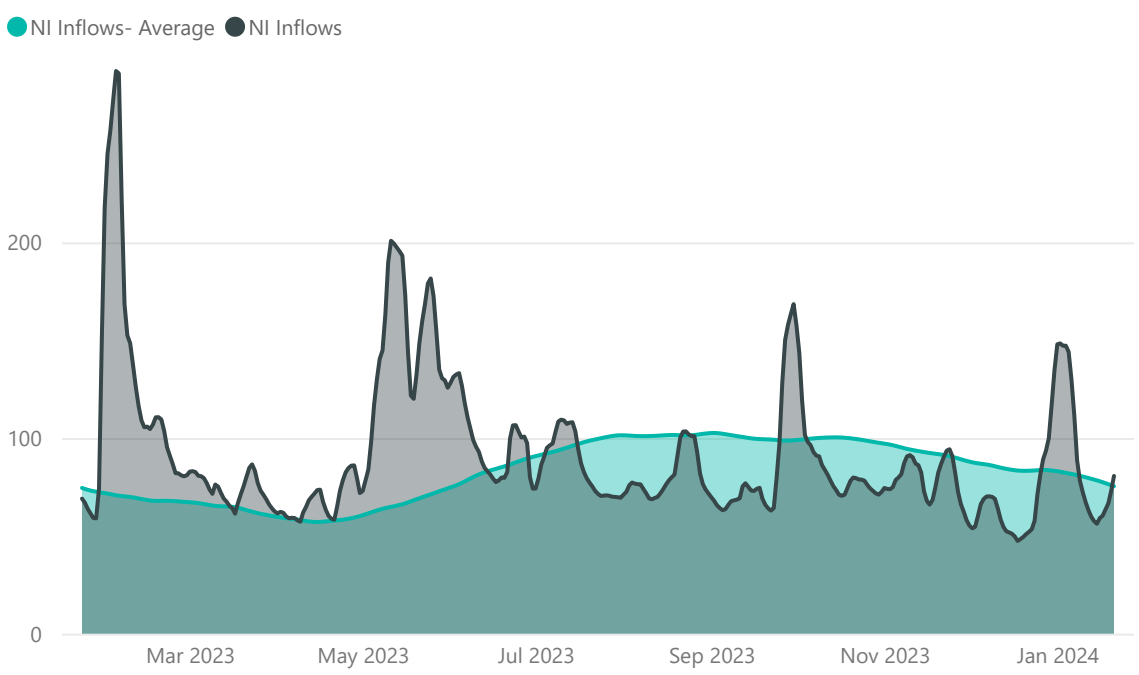
North Island Hydro Storage (Available GWh)



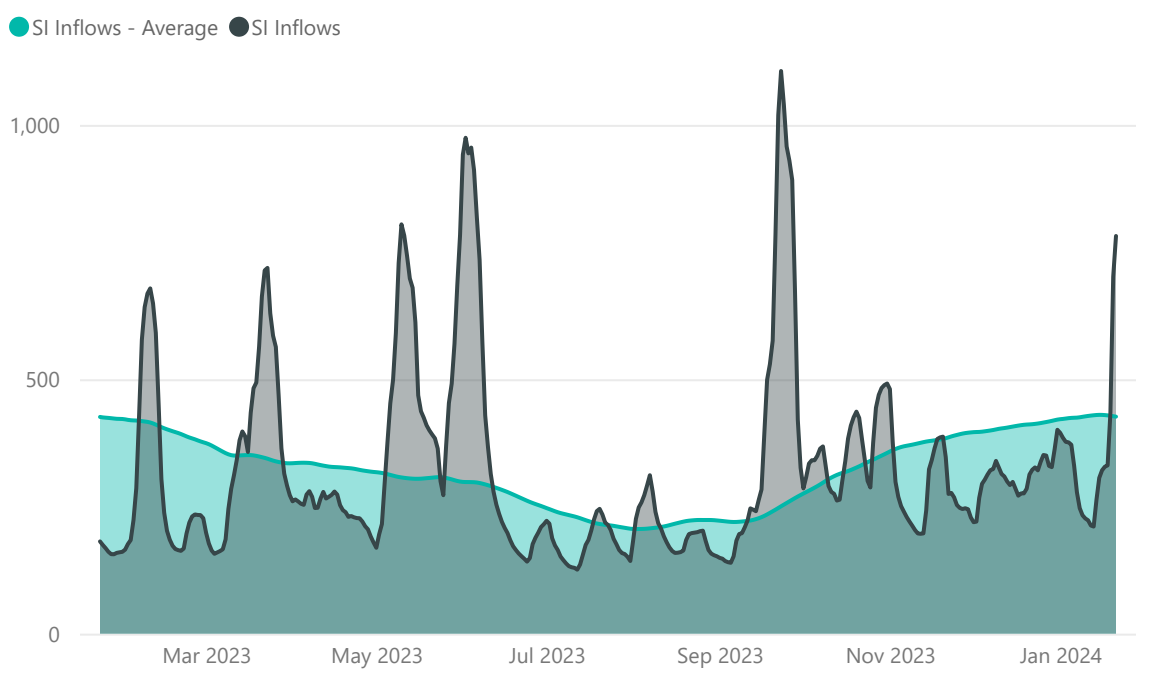
South Island Hydro Storage (Available GWh)



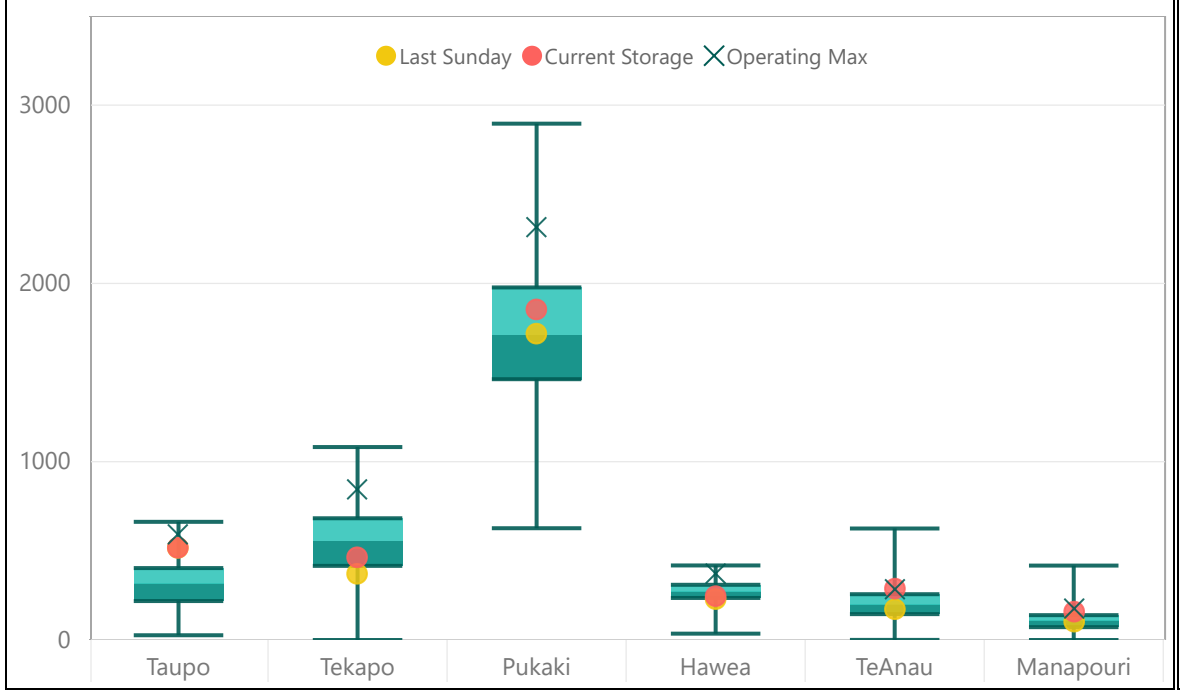
North Island Mean 7 Day Inflows (Available GWh)



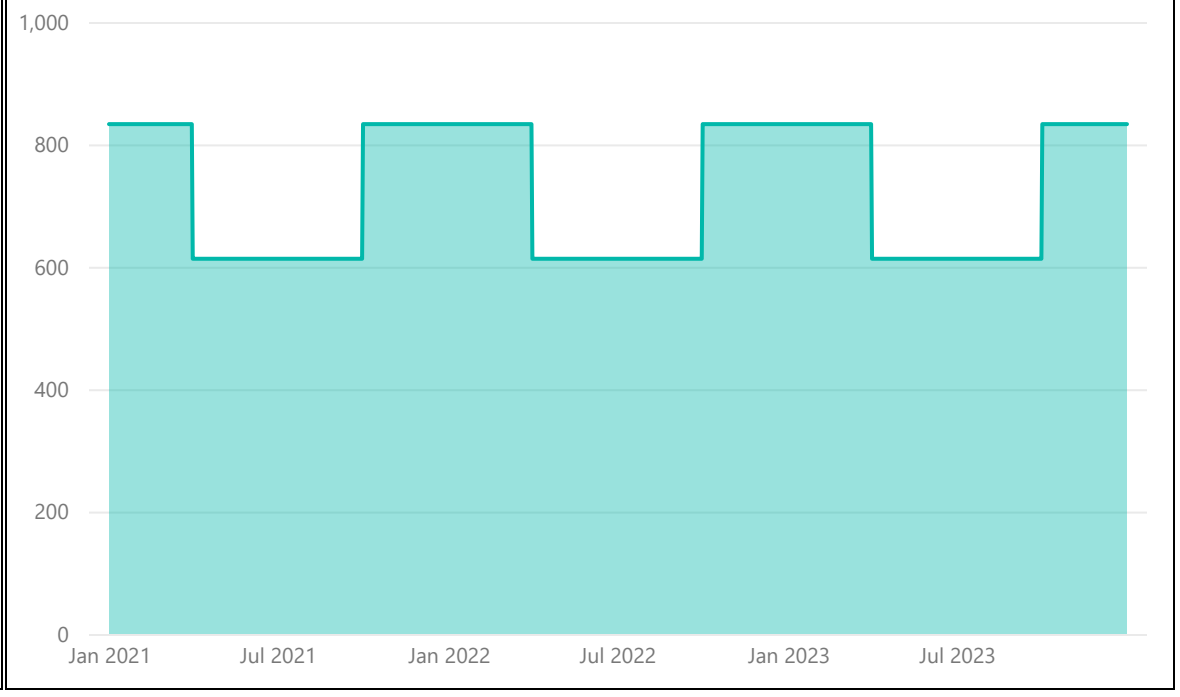
South Island Mean 7 Day Inflows (Available GWh)



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