Weekly Market Movements - Week Ended 18 February 2024

Overview

National hydro storage remained about average for this time of year, at 101% of the historic mean. Residual generation was healthy all week and prices were more stable than in recent weeks.

In this week's insight we look at intermittent generation offer accuracy and persistence offers.

Security of Supply

Energy

National hydro storage continued to trend towards average this week and now sits at 101% of the historic mean, down slightly from 102% the previous week. South Island storage is at 96% of the historic mean, down from 97%, and North Island storage dropped from 158% to 154% of the mean.

Capacity

Capacity margins were healthy last week with the lowest residual point being 749MW on Friday evening.

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 430 MW on 21 March. However, we issued a CAN calling for additional South Island reserve offers on 24 & 25 February during the upcoming planned bipole outage. The latest NZGB report is available on the NZGB website.

Electricity Market Commentary

Weekly Demand

Demand remains mild as is typical in summer. Last week demand increased from 740 GWh the week prior to 747 GWh. Demand peaked at 5,350 MW on the evening of Thursday 15 February.

Weekly Prices

Prices last week appeared to be more stable than the week prior. However, the average wholesale price at Otahuhu last week was $177/MWh, up from $129/MWh the week prior. The Otahuhu price peaked at $275/MWh on Friday 16 February at 15:30.

The increased average wholesale price last week was in line with thermal contribution to the generation mix rising as hydro and wind generation eased off.

Generation Mix

The renewable percentage of the generation mix dropped to 88% from 91%, which is on par with the previous 52 week average. Wind generation fell from 11% of the mix to 8.5%, and hydro decreased by a single percentage point to 60% of the generation mix. This was almost entirely replaced by thermal generation which increased to 10% of the mix from 7% the week prior.

HVDC

All daytime HVDC flows last week were northward. There was southward flow on a few nights, coinciding with periods of low demand and high North Island wind generation.
The upcoming HVDC outages are:
Pole 3 outage: 21 February - 24 February
Bipole outage: 24 February - 25 February
Pole 2 outage: 25 February - 14 March
For further details see the Customer Advice Notice.

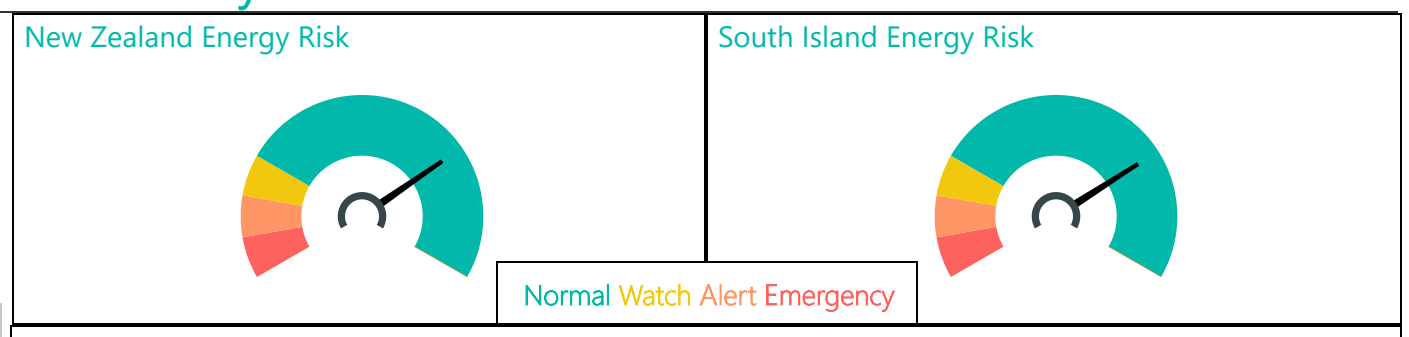
SOSA Reference Case and Sensitivities Consultation

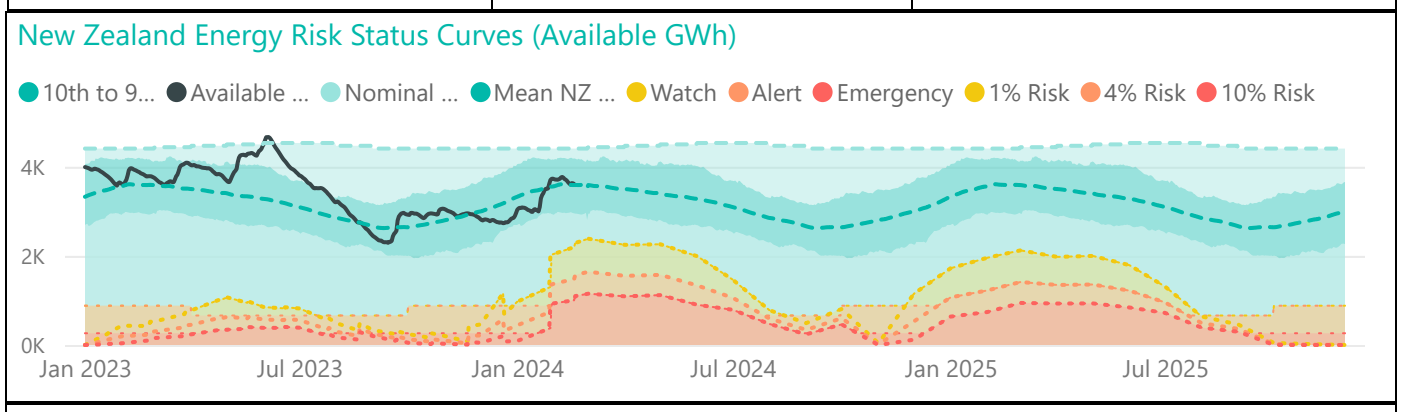
We recently published our responses to feedback received on the SOSA Reference Case and Sensitivities Consultation. This can be found here.

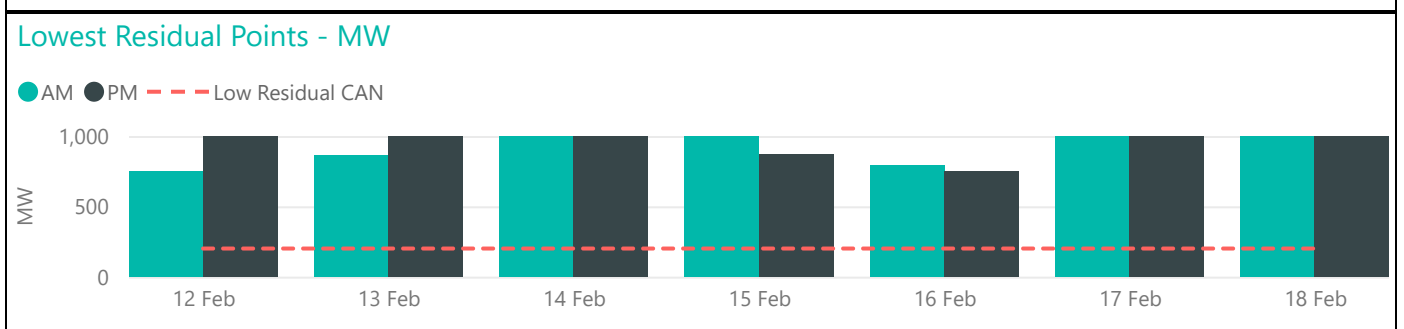
SOROP Consultation

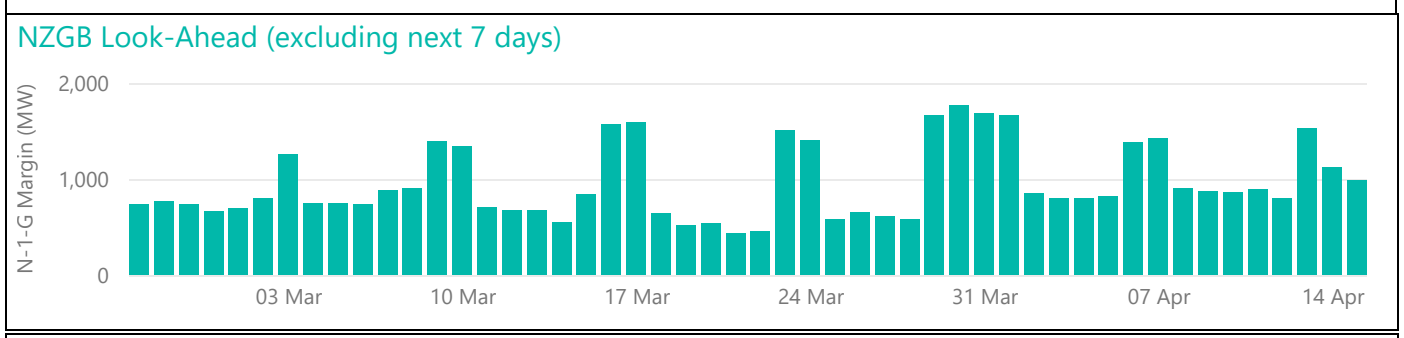
Transpower is seeking views from the electricity industry on proposed changes to the System Operator Rolling Outage Plan (SOROP). The consultation started on 7 February and runs until 6 March. There is then a two-week period for cross submissions until 20 March. Please see our website for further details.

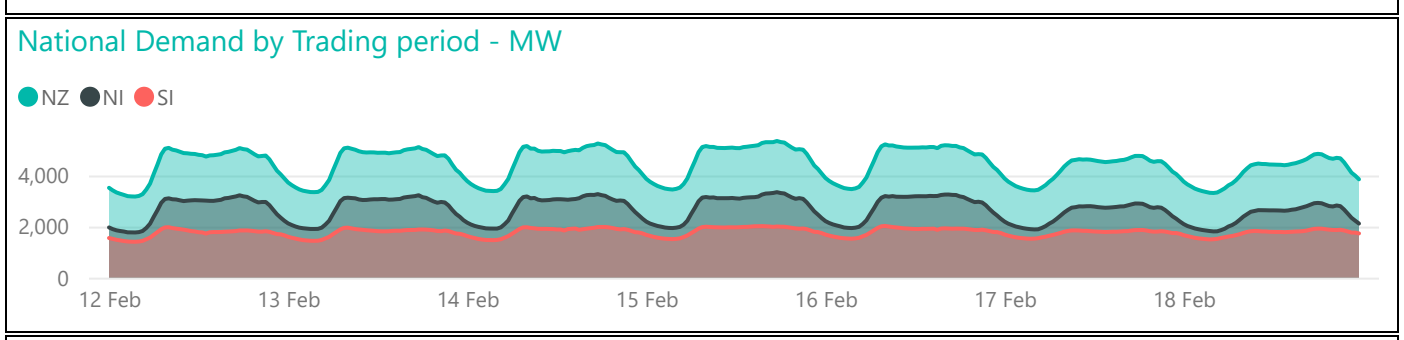
The SOROP is one of Transpower's key security of supply planning and policy documents in it's system operator role. The review is required as the current version of the SOROP has been in place since 2016 and security of supply risks are changing.

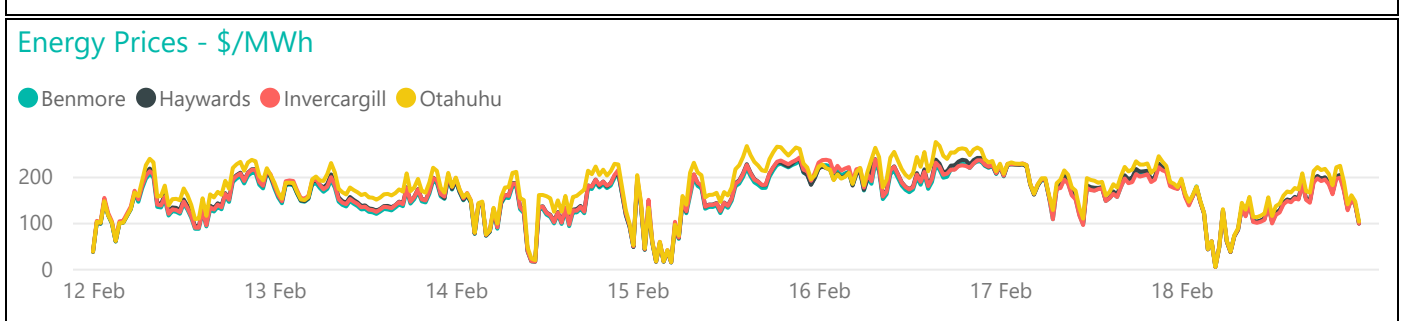


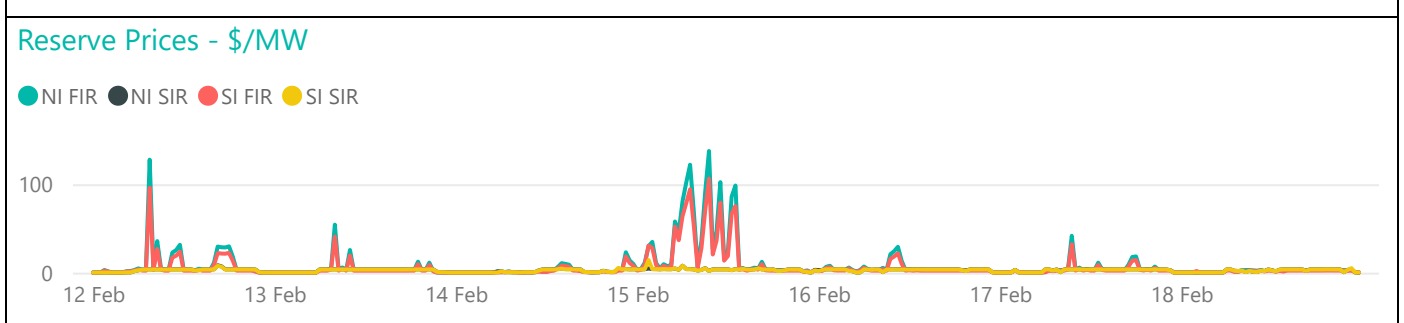


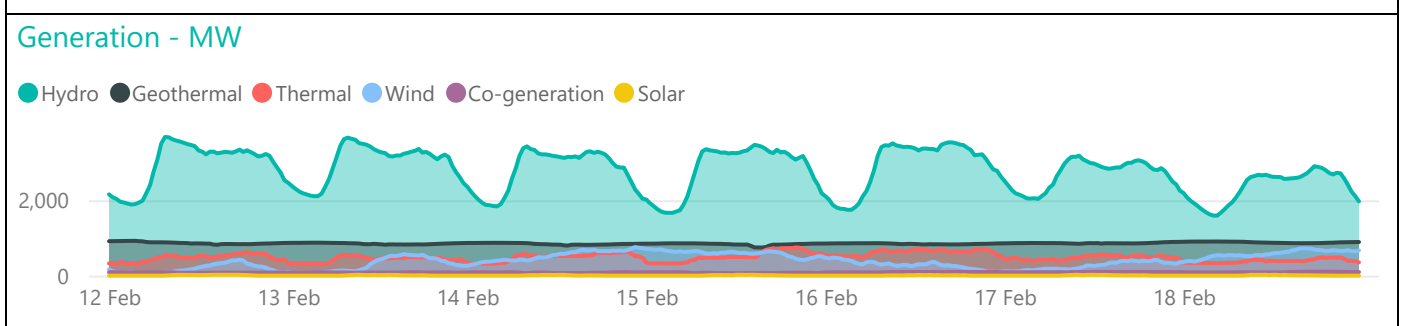


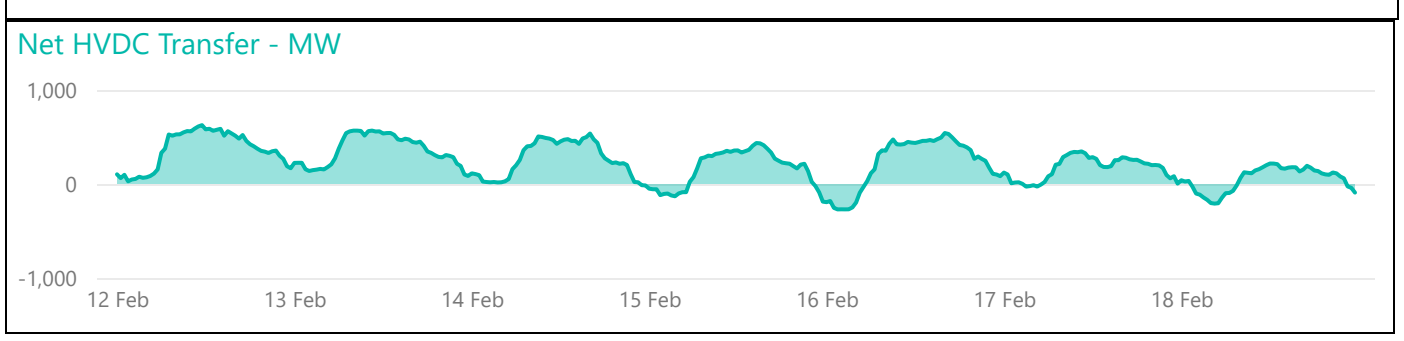










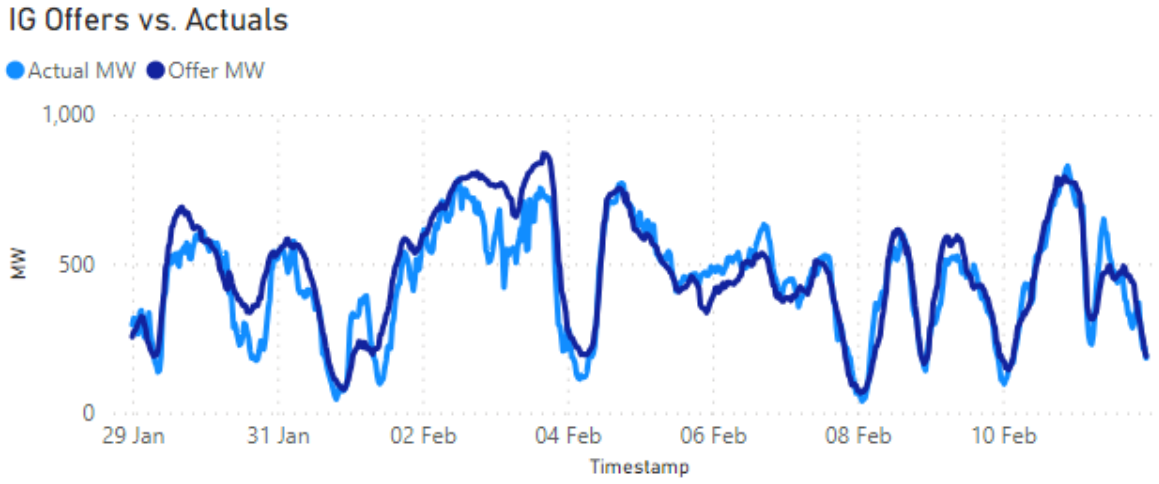


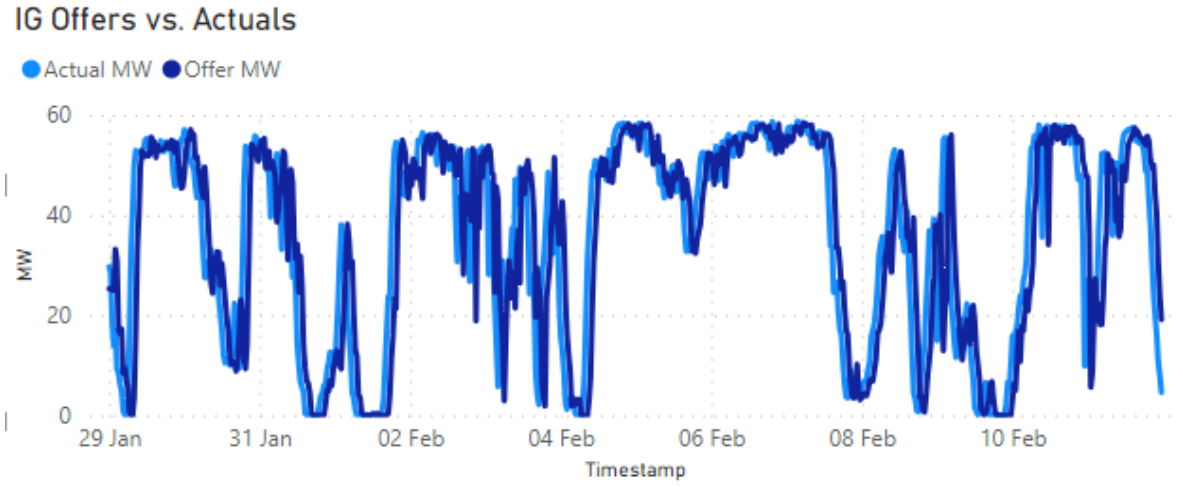
Weekly Summary Insight - Intermittent generation forecast accuracy

In this insight we look at intermittent generation (IG) offer accuracy and the impact of using persistence offers.

Offers submitted by intermittent generators for trading periods up to two hours (four trading periods) in the future are required to be based on a persistence forecast model unless otherwise agreed with the Electricity Authority. Some generators may choose to use the persistence forecasting method for more than the required two hours ahead. Generators submit persistence offers based on whatever the intermittent generator is currently capable of generating, will persist for the next however many trading periods (minimum four).

The data shown below spans the two weeks from 29 January to 11 February. There were a couple of tight capacity margins over these two weeks (31 January and 7 February), partially worsened by an over-forecasting of wind. On the left is aggregated IG offers (12 hours ahead of real time) against actuals, and on the right is an example of a wind farm's persistence offers (one hour ahead of real time) against actuals. Persistence offers can be easily identified this way as the offers appear to be exactly the same as the actuals but shifted forward an hour. While the chart on the right appears to align more closely with actuals, persistence forecasting can sometimes lead to greater errors, particularly during periods of rapid ramping up or down. This is expected to become more prominent as the solar fleet grows.

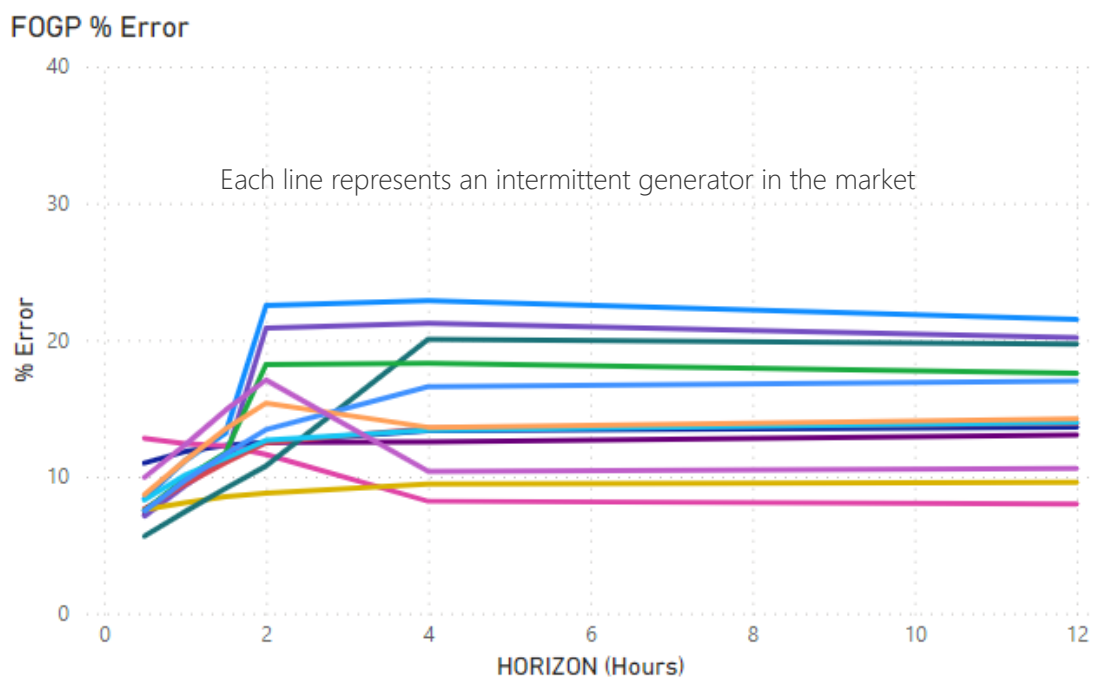


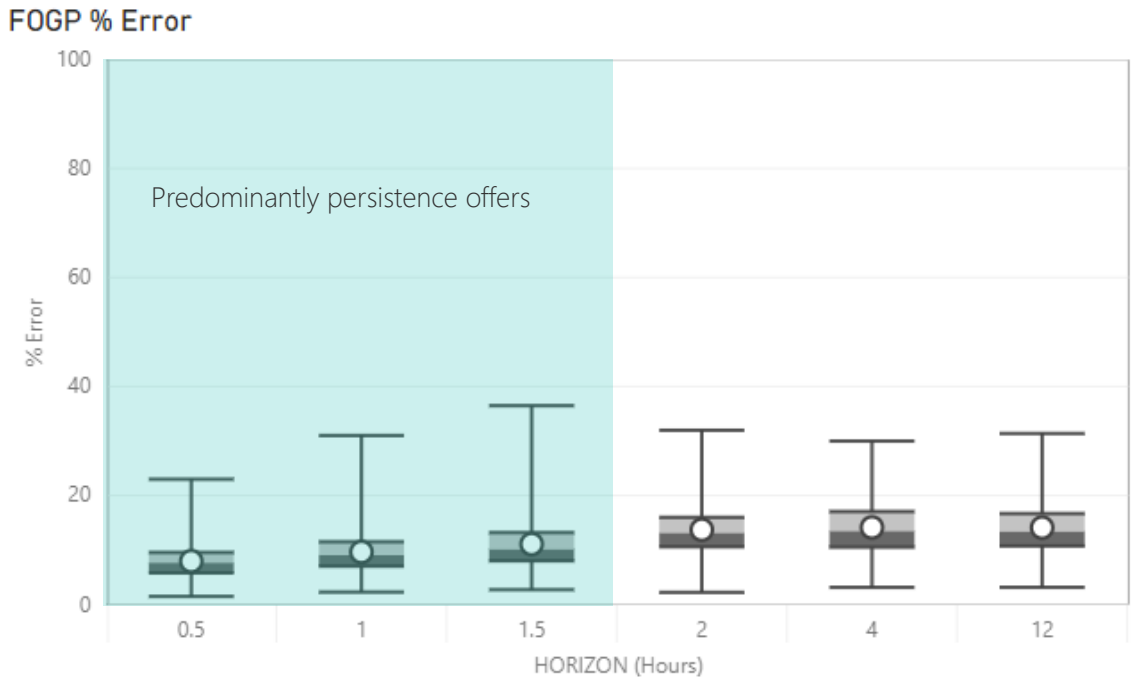


Shown below are the accuracy stats for intermittent generators in New Zealand by time horizon. In the chart on the left, it can be seen that the nearest term forecasts of generation potential (FOGP), which are predominantly persistence offers, have an average percent error of around 10%. For most intermittent generators, this is an improvement on their longer horizon FOGP, but for a few (those which already forecast their wind potential generation relatively well) the persistence offers can actually lead to a decrease in accuracy.

In the box and whisker chart on the right, it appears that for horizons which fall under persistence offering, the overall mean accuracy improves (lower mean absolute percentage error), but the span of error actually increases. This is particularly prominent at the 1.5 hour horizon, where nearly all intermittent generators submit persistence offers, i.e it is more common to see errors greater than 30% in the 1, 1.5, and 2 hour horizons than at 12 hours ahead of real time.

We will be working with industry to reduce impact of these forecast errors. The Authority also has a project reviewing the forecasting of wind generation in the market.

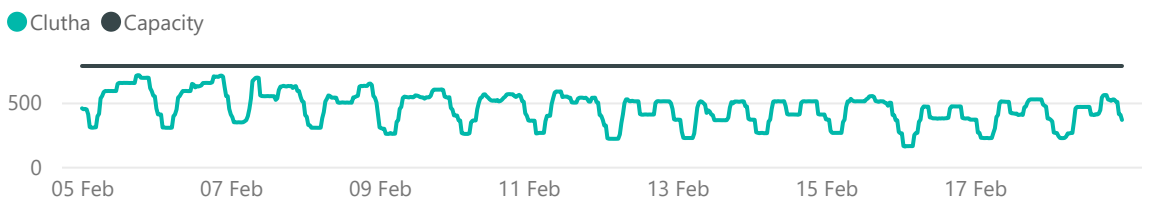




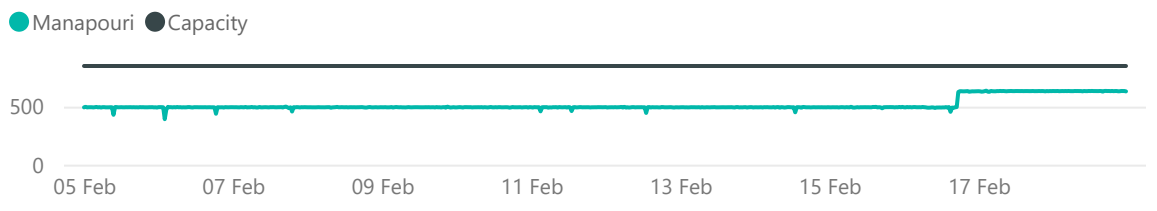
Generation Breakdown - Last Two Weeks

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

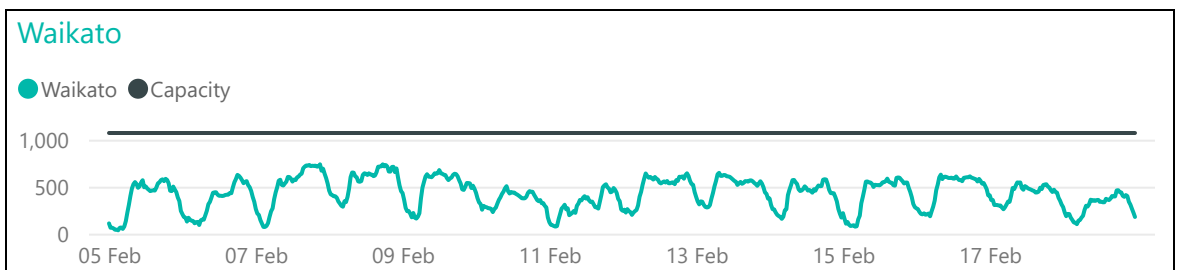
Clutha



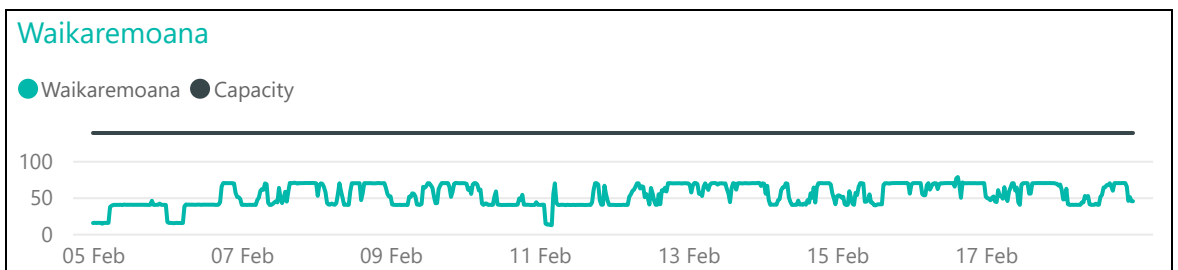
Manapouri



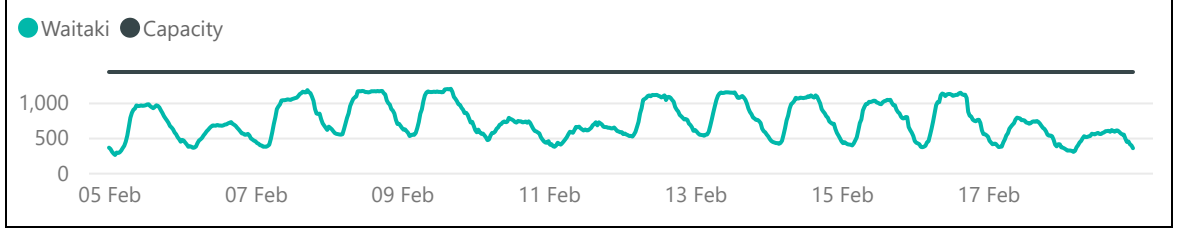
Waikato



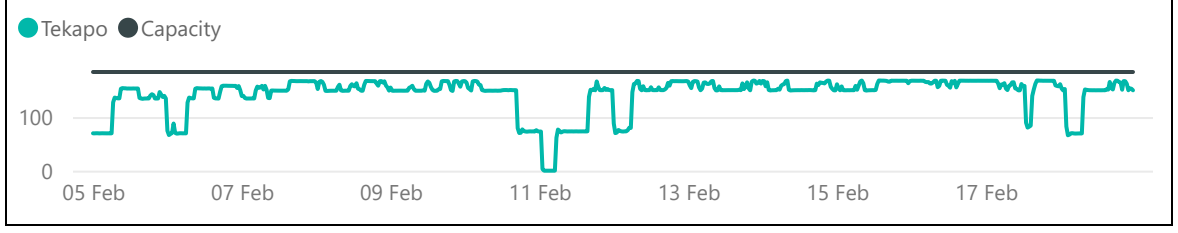
Waikaremoana



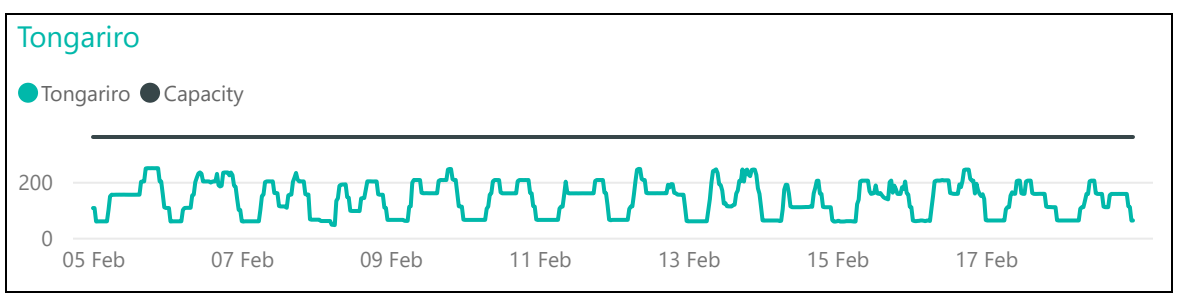
Waitaki



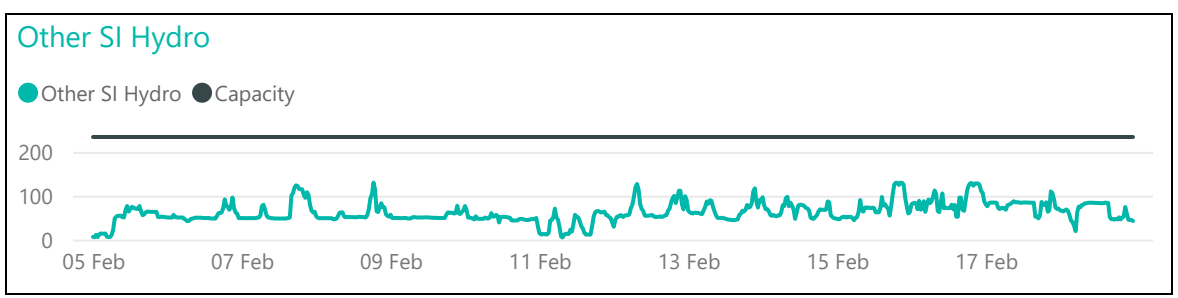
Tekapo



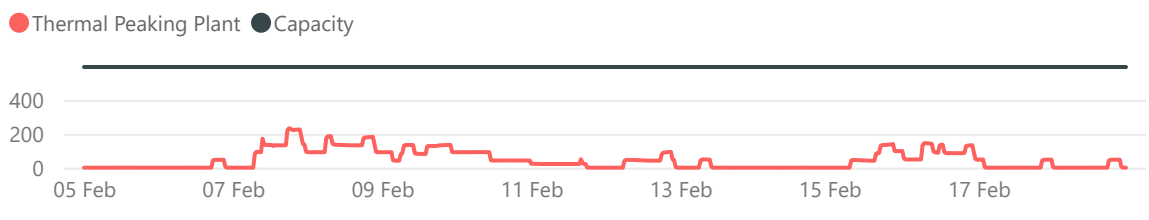
Tongariro



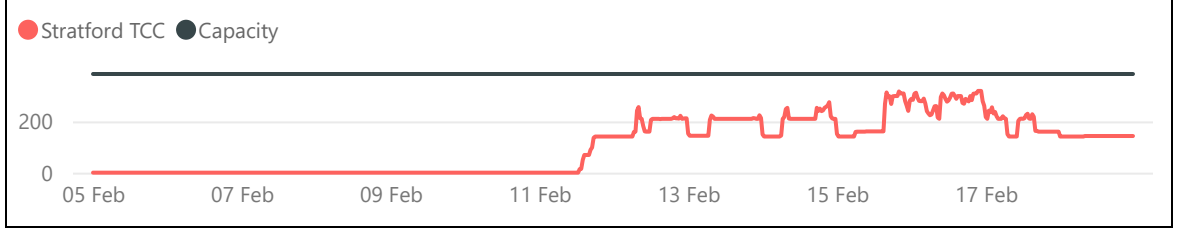
Other SI Hydro



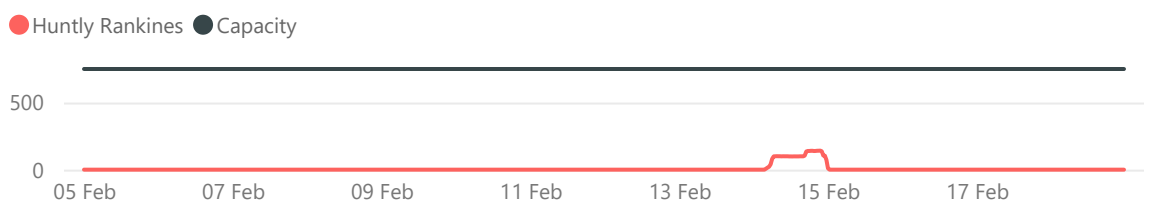
Thermal Peaking Plant



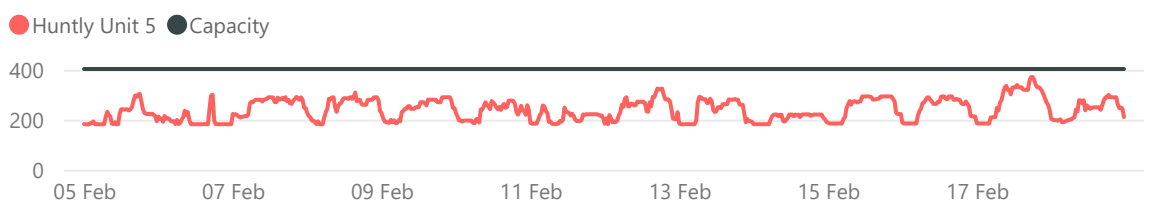
Stratford TCC



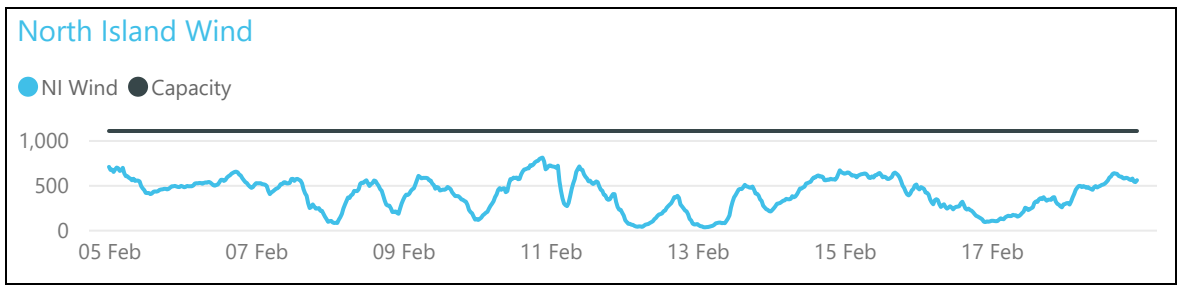
Huntly Rankines



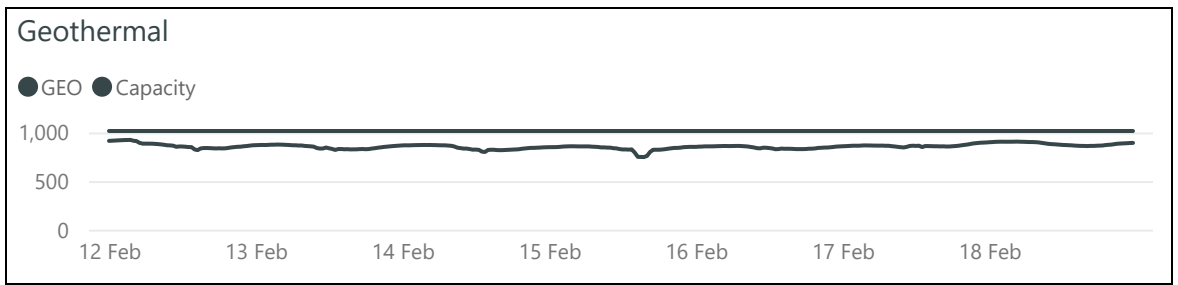
Huntly U5



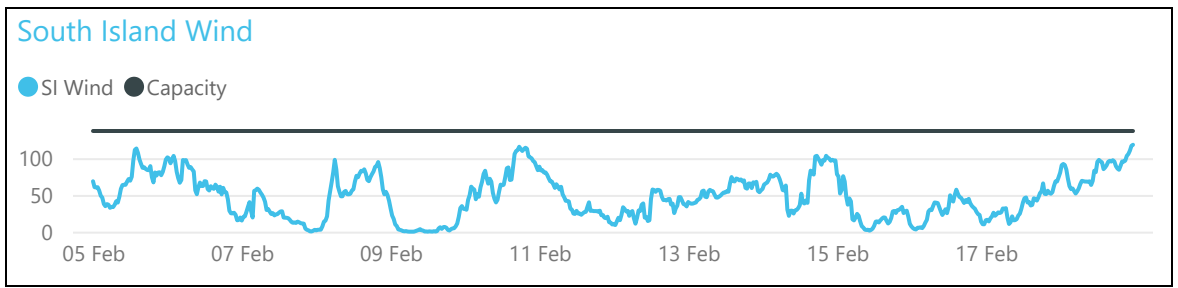
North Island Wind



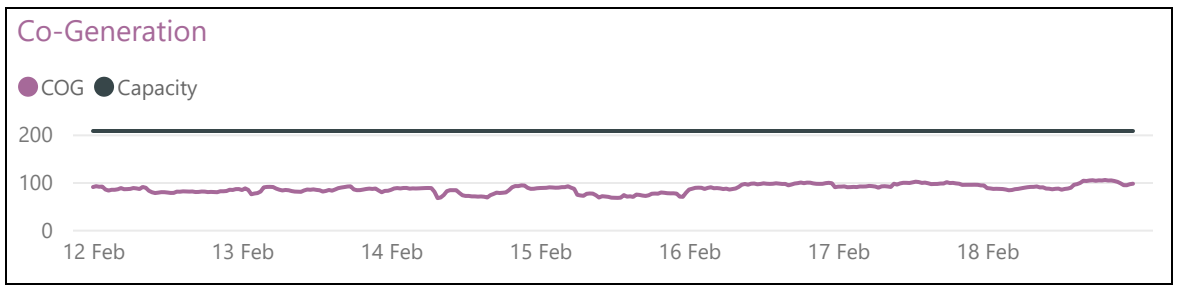
Geothermal



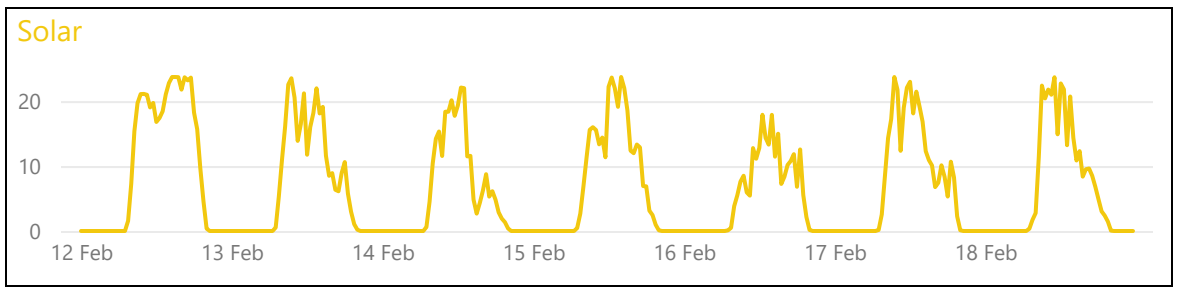
South Island Wind



Co-Generation

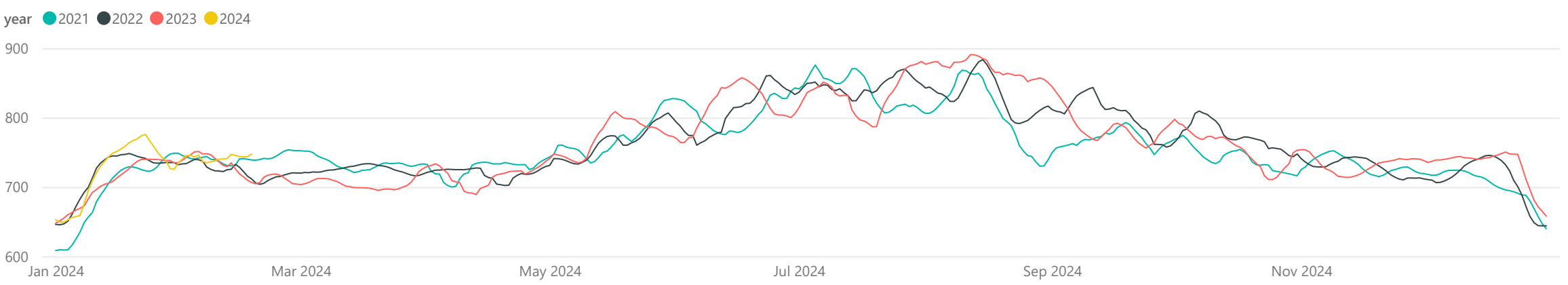


Solar

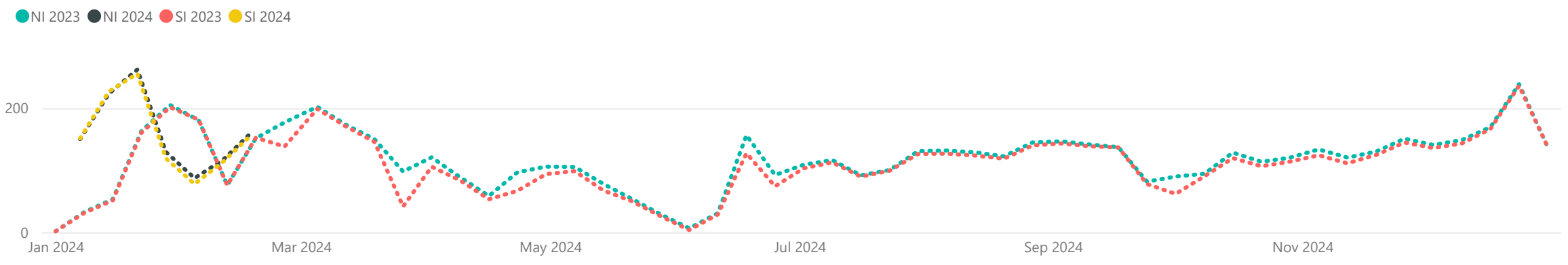


Weekly Profiles

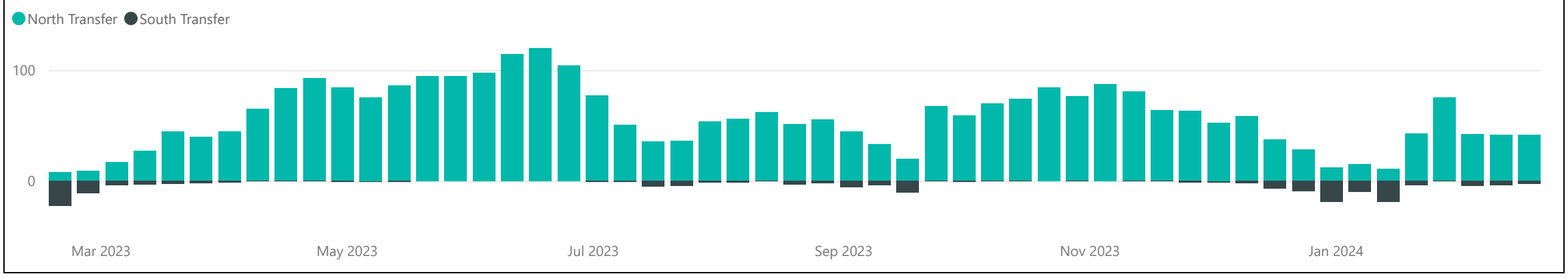
National Weekly Demand - GWh - 7 Day Rolling



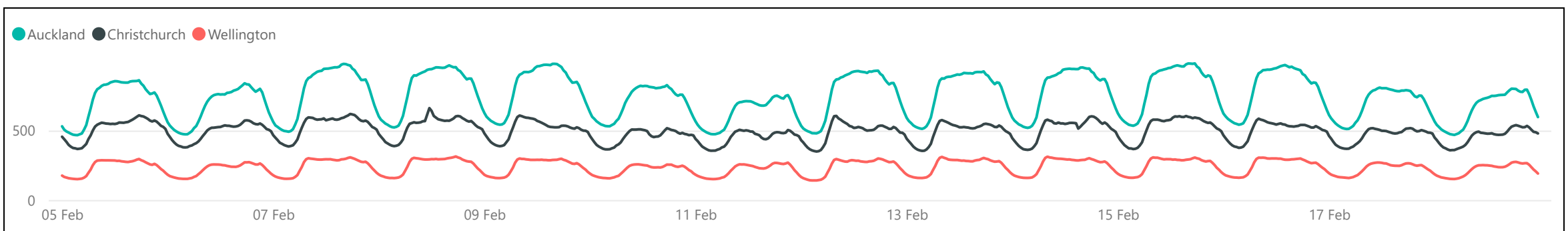
Weekly Spot Price - $/MWh



HVDC Transfer - Weekly GWh

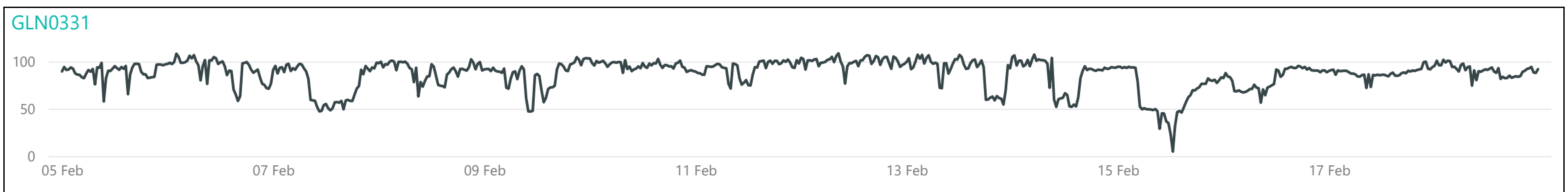


Conforming Load Profiles - Last Two Weeks *Measured in MW shown by region*



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

GLN0331



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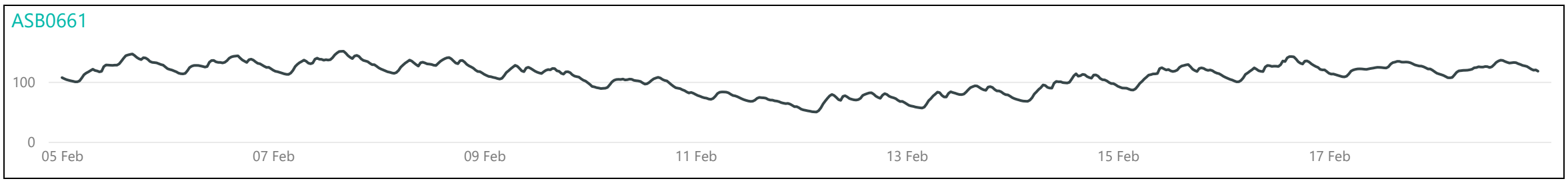

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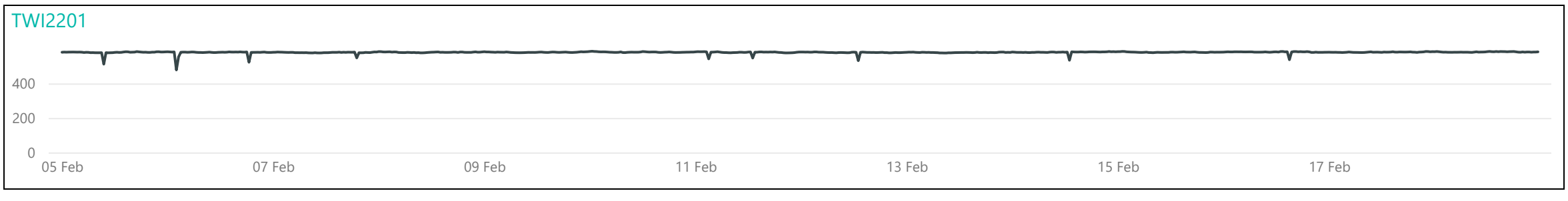
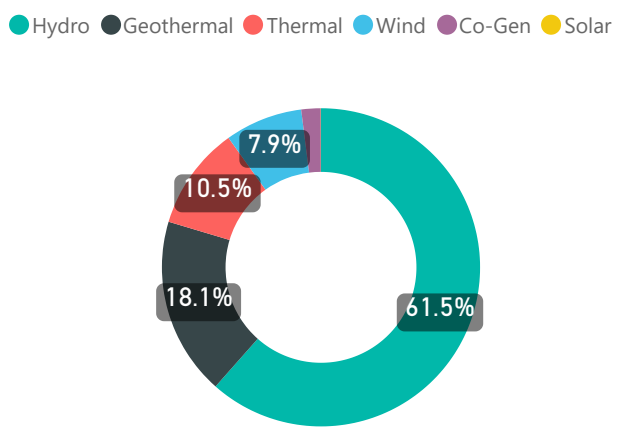


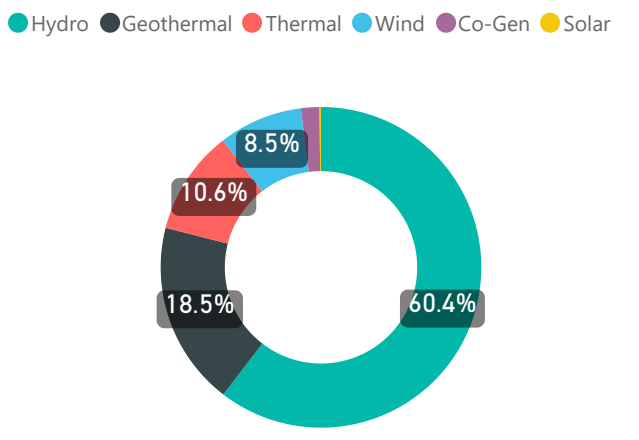
TRANSPOWER

Generation Mix

Last 52 Weeks Generation Mix - Weekly GWh



Last 7 Days Generation Mix - Weekly GWh



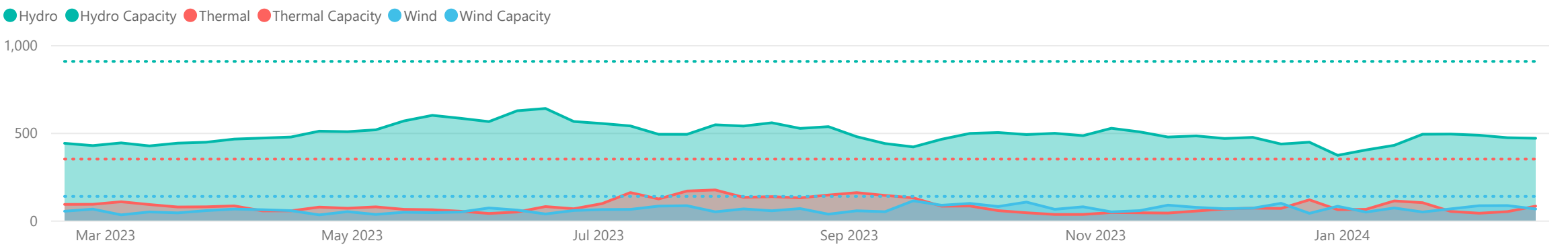
Average Metrics Last 7 Days

Renewable Percentage	CO2e Tonnes/Week	CO2e g/kWh
88%	47,470	61.2

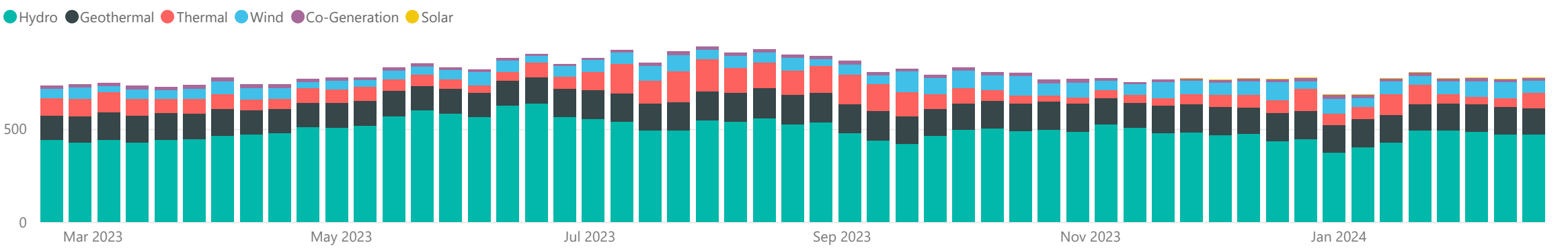
Average Metrics Last 52 Weeks

Renewable Percentage	CO2e Tonnes/Week	CO2e g/kWh
88%	59,656	73.3

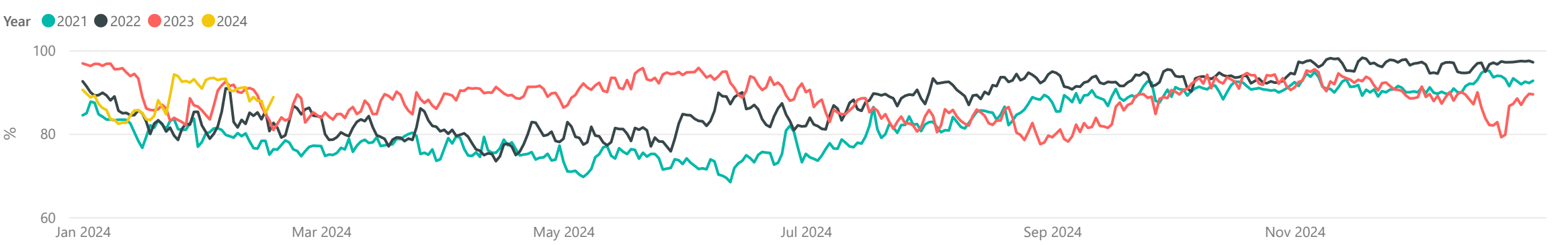
Weekly Generation Mix vs Capacity - GWh



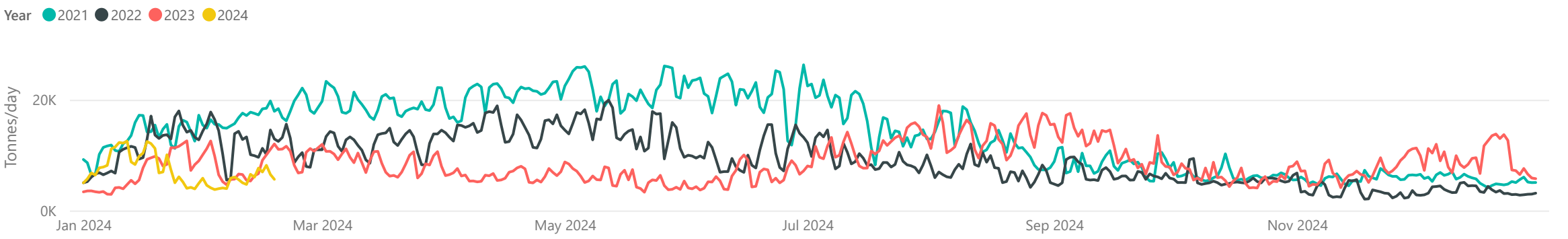
Weekly Generation Mix - GWh



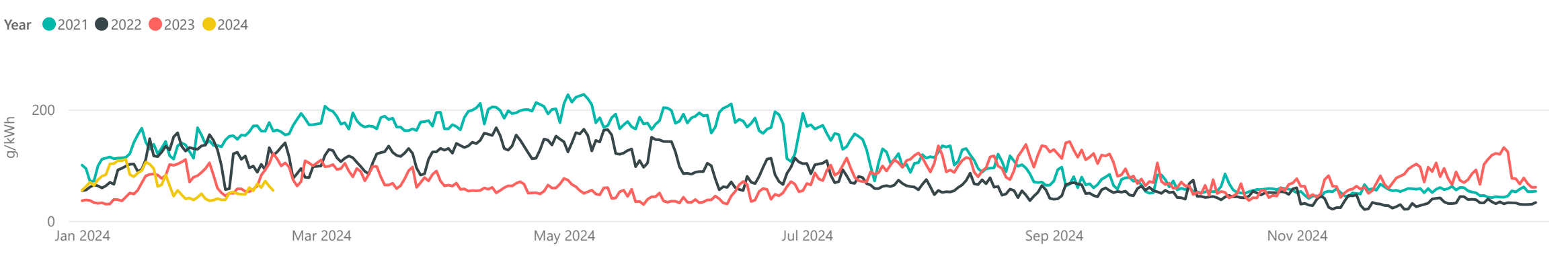
NZ Renewable Percentage



CO2 Tonnes/Day

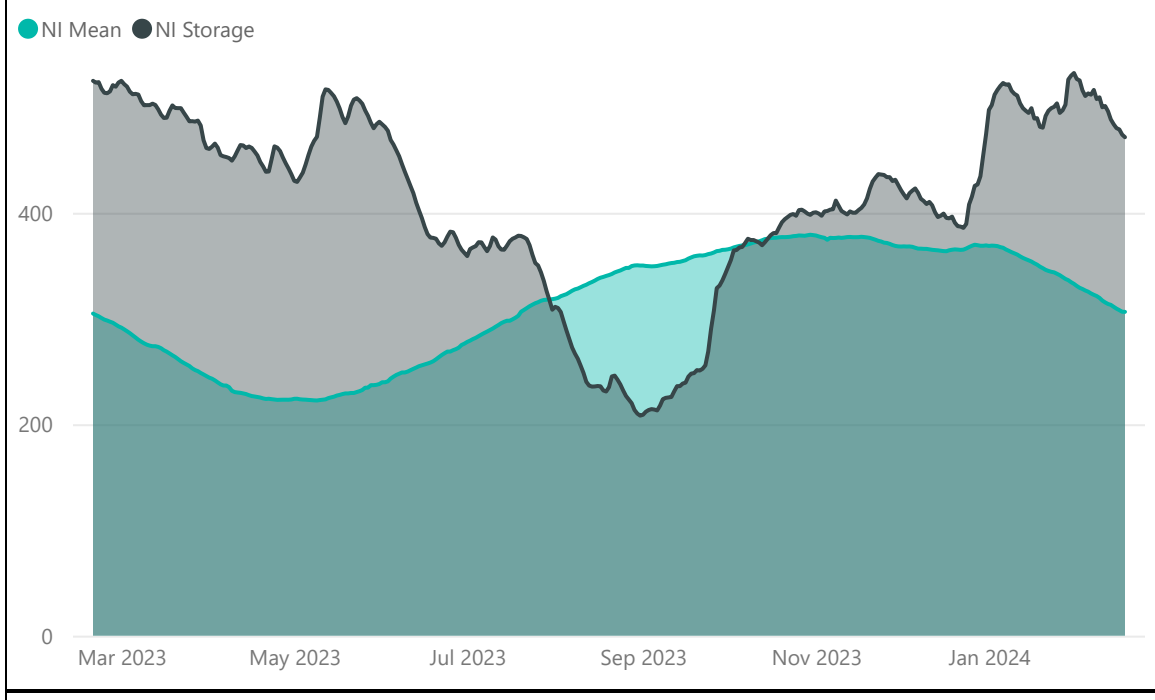


CO2 g/kWh

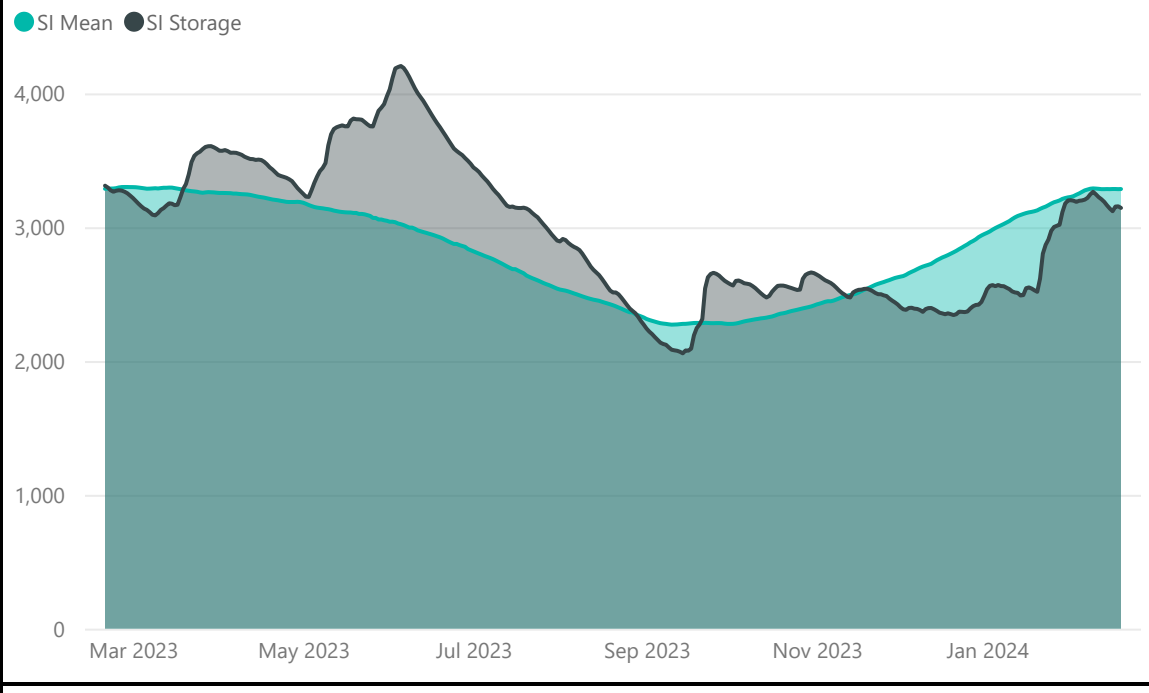


Hydro Storage

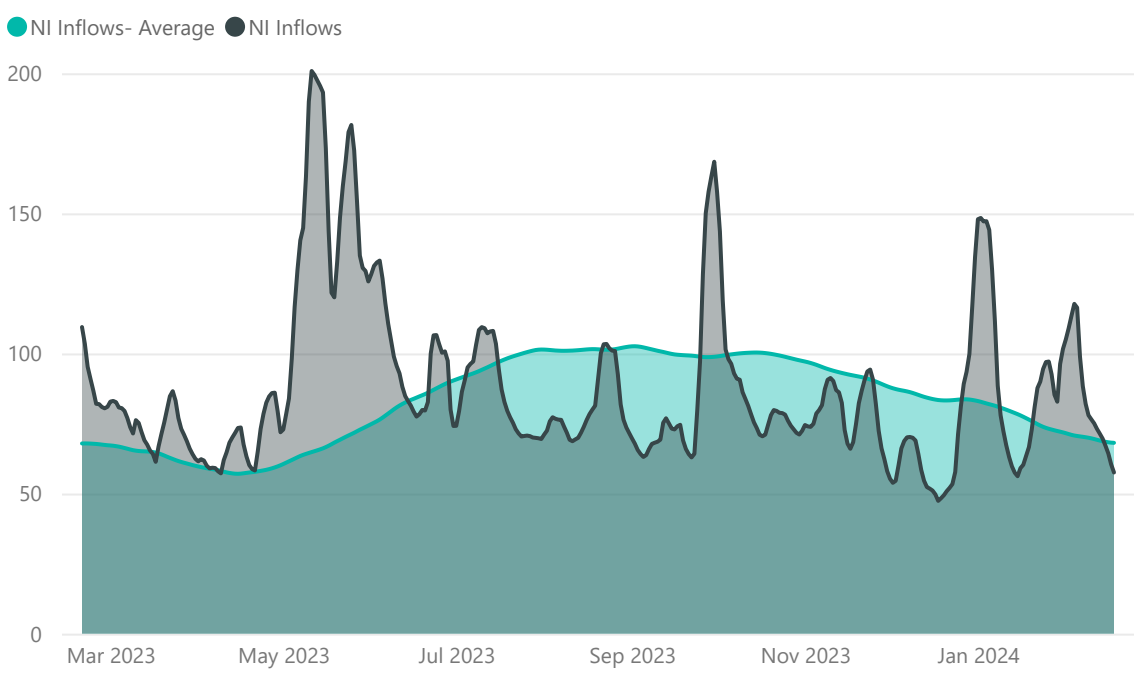
North Island Hydro Storage (Available GWh)



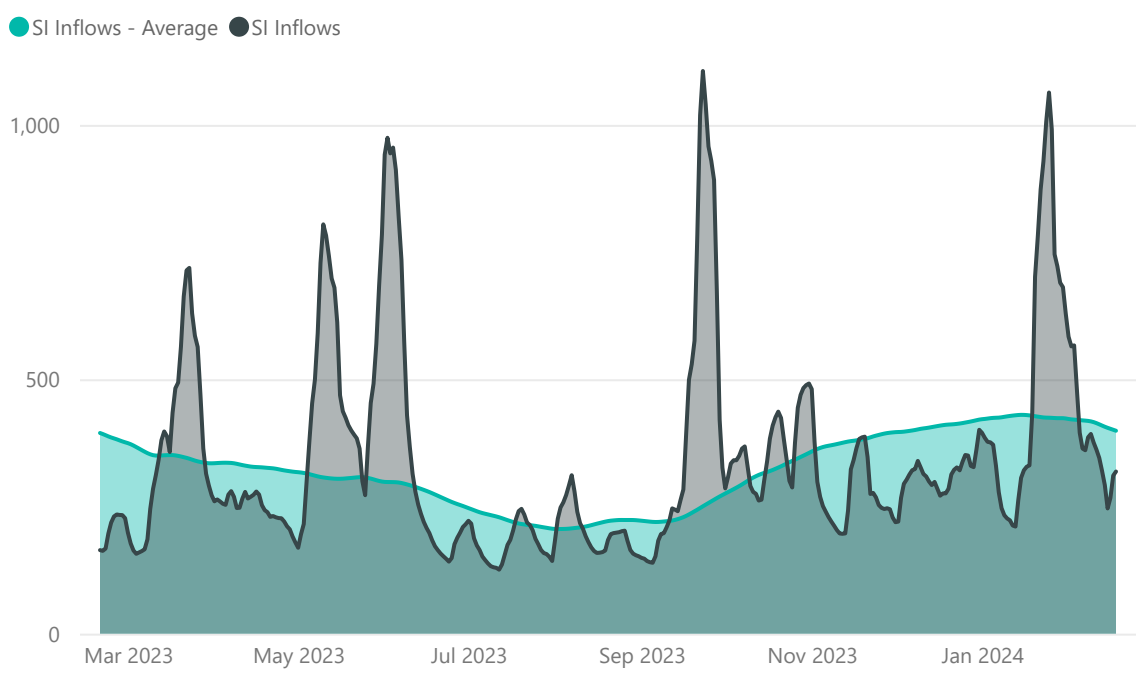
South Island Hydro Storage (Available GWh)



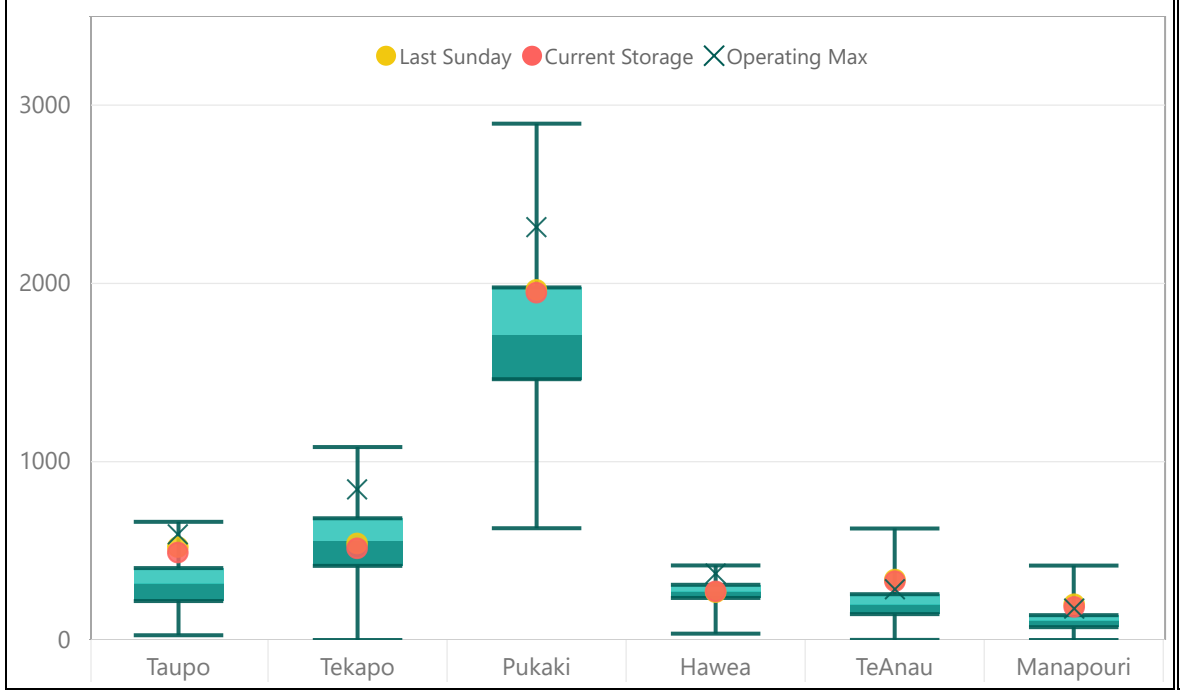
North Island Mean 7 Day Inflows (Available GWh)



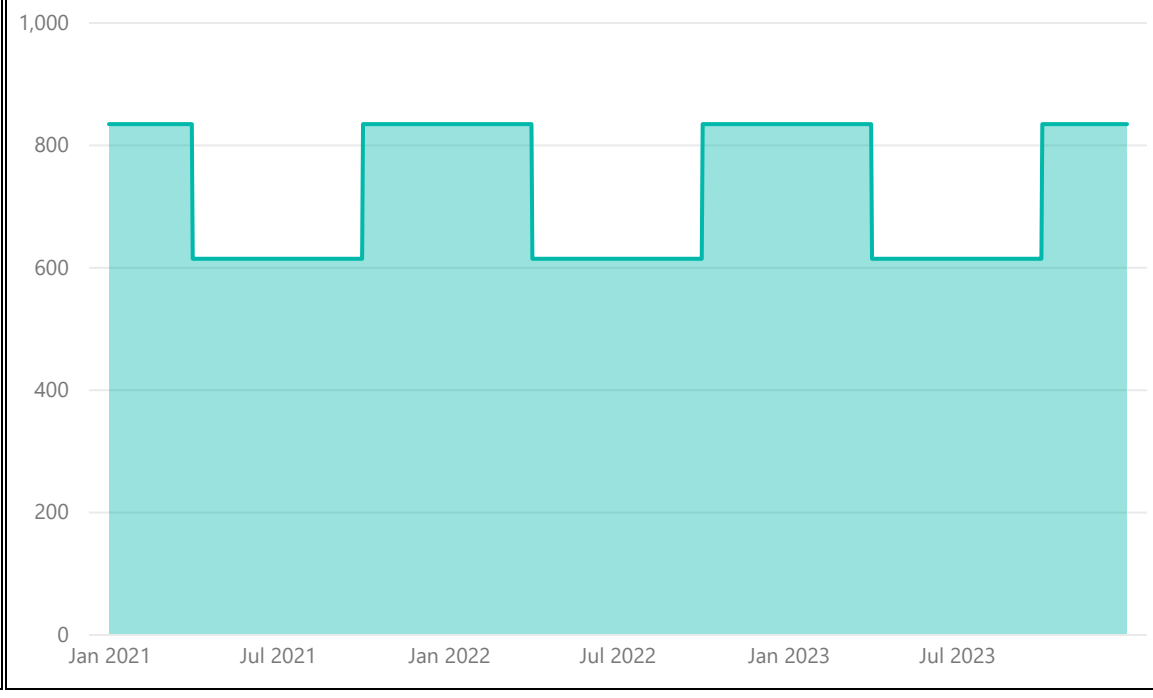
South Island Mean 7 Day Inflows (Available GWh)



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

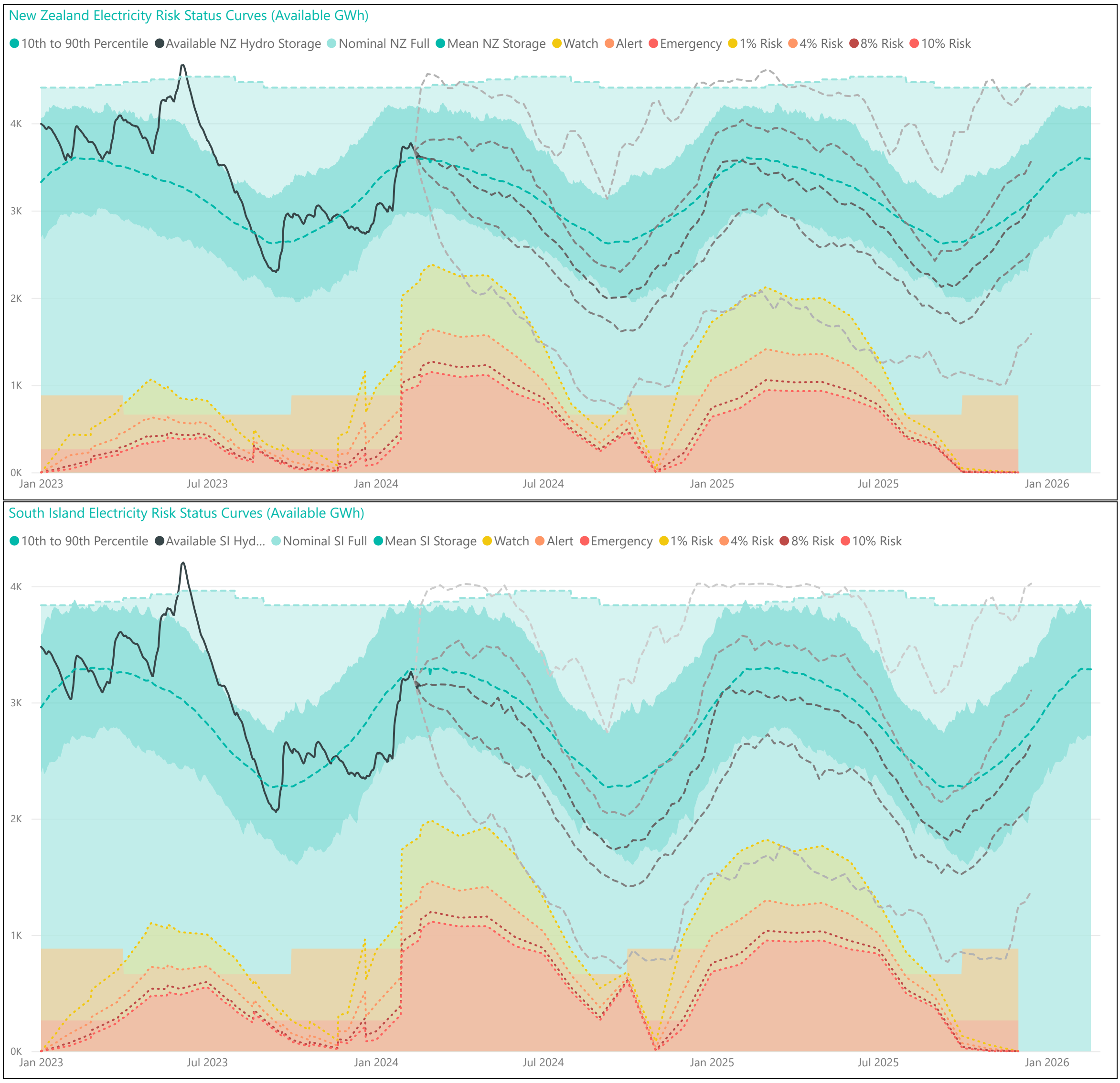
For any inquiries related to security of supply contact market.operations@transpower.co.nz

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).