Weekly Market Movements - Week Ended 14 April 2024

Overview

Significant inflows gave our South Island hydro storage lakes a much needed top up last week, bringing national hydro storage up to levels last seen in early March. National hydro storage is now at historic mean levels for the time of year, up from 83% the week prior. Hydro generation output has increased and thermal generation has eased off as a result.

In this week's insight we look at our updated *Electricity Risk Curves 101*.

Security of Supply

Energy

Last week national hydro storage increased to 100% of the historic mean, up from 83% the week prior. South Island storage increased to 98%, up from 80%, while North Island storage dropped from 128% to 126%.

Capacity

Capacity margins were healthy last week as a result of high thermal unit commitment. The lowest residual point of 664 MW was on Monday evening.

Forecast N-1-G margins tighten in late April and early May, and are also tight in late May. The lowest N-1-G margin during the forecast period is 21 MW on 7 May. The latest NZGB report is available on the NZGB website.

Electricity Market Commentary

Weekly Demand

Total demand increased to 748 GWh last week, slightly higher than at the corresponding time of year over the last three years. Demand peaked at 5,520 MW on the evening of Thursday 11 April.

Weekly Prices

The average wholesale energy price at Otahuhu dropped to $223/MWh from $263/MWh the week prior, likely as a result of increased hydro generation output following the inflow event displacing thermal generation. Wholesale prices peaked at $336/MWh at Otahuhu on Monday morning at 7:30AM. There was some inter-island price separation and price inversion overnight on Wednesday 10 April corresponding with a spike in SI FIR and SIR prices. For further information on price inversion see our previous insight.

Generation Mix

The renewable percentage of the generation mix increased to 84% last week; with an increase in wind generation from 5% to 7.5% and hydro generation from 53% to 57% due to increased inflows. As a result, thermal generation decreased from 19% to 13% of the mix, but this is still higher than the average contribution across the year.

HVDC

HVDC flows were northward most of the week, strengthening in the second half due to increased South Island hydro generation and reduced thermal generation in the North Island. There were a few periods of southwards HVDC transfer over night at the beginning of the week when thermal generation was high and demand low.

Under Frequency Event

An under-frequency event occurred on Thursday 11 April. See CAN for more information.

Annual Industry Exercise

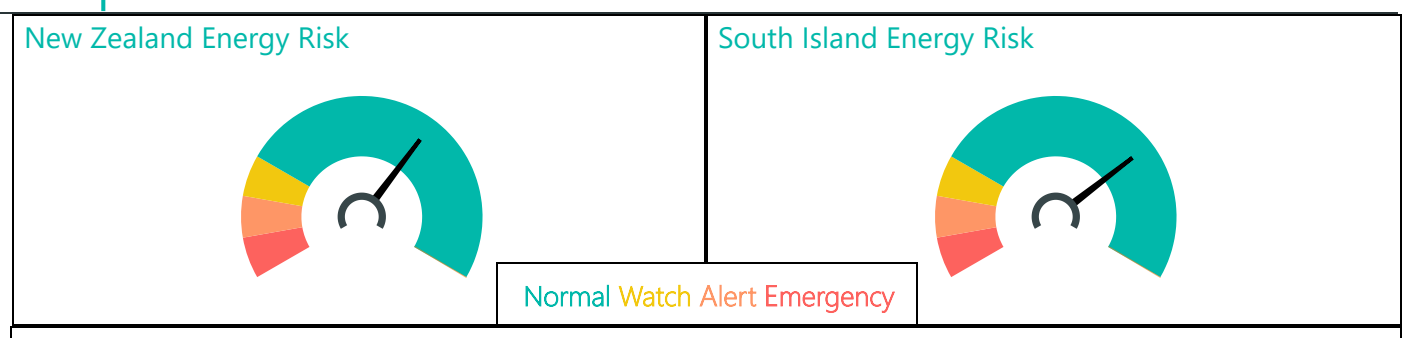
The Electricity Authority and Transpower are planning an industry exercise of a major power system event over two days on 1 and 8 May 2024.

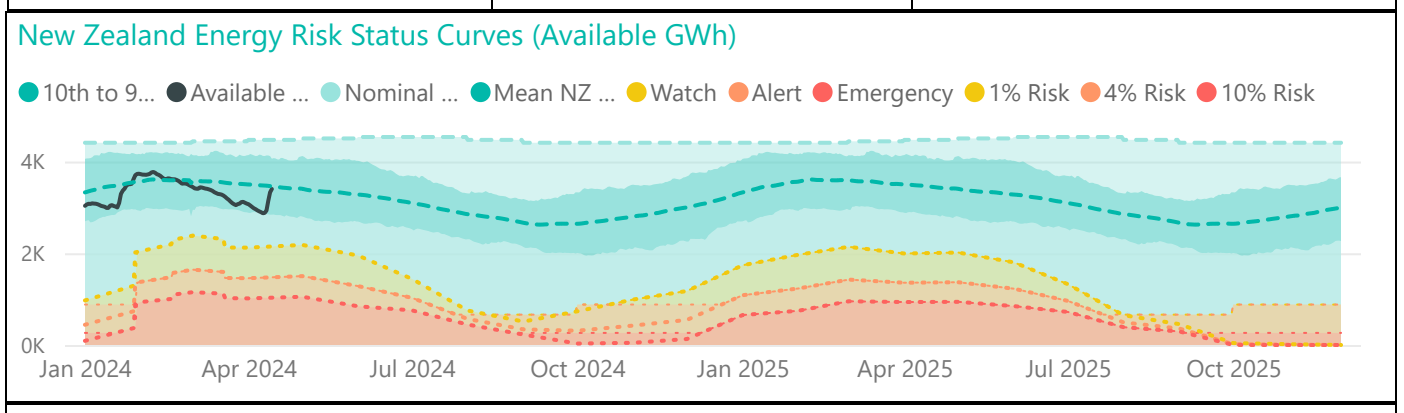
Wednesday 1 May - for control room operators

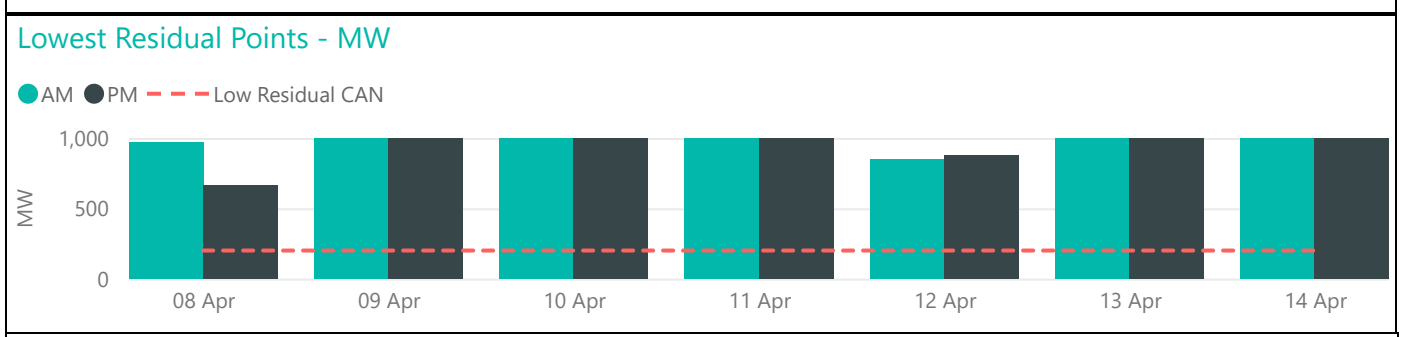
This day will be led by the system operator to test grid emergency processes and interactions between the system operator and generators, lines companies and direct connect industrial customers.

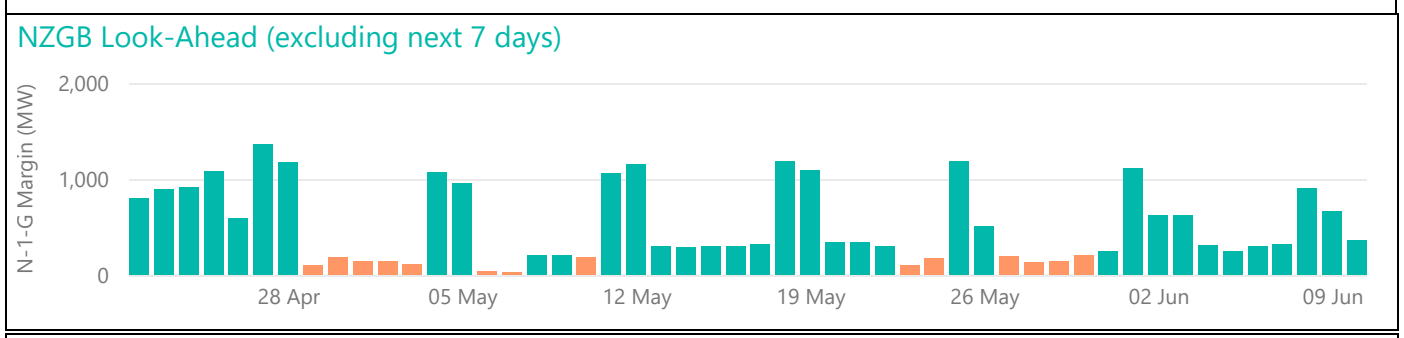
Wednesday 8 May - for digital communications/social media/customer leads

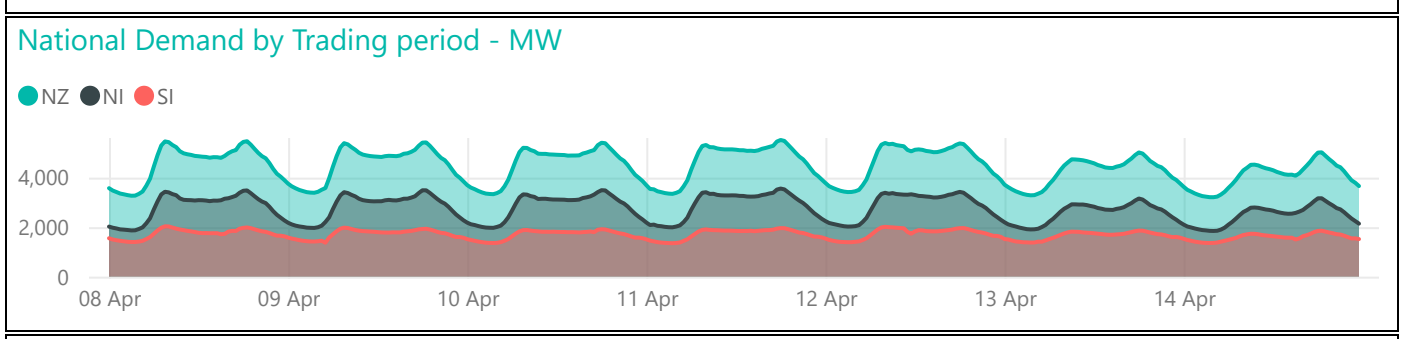
This day will be led by the Electricity Authority alongside Transpower's communication team and will test communications and interactions from Transpower out through lines companies to retailers and end consumers. More information is available on our website.

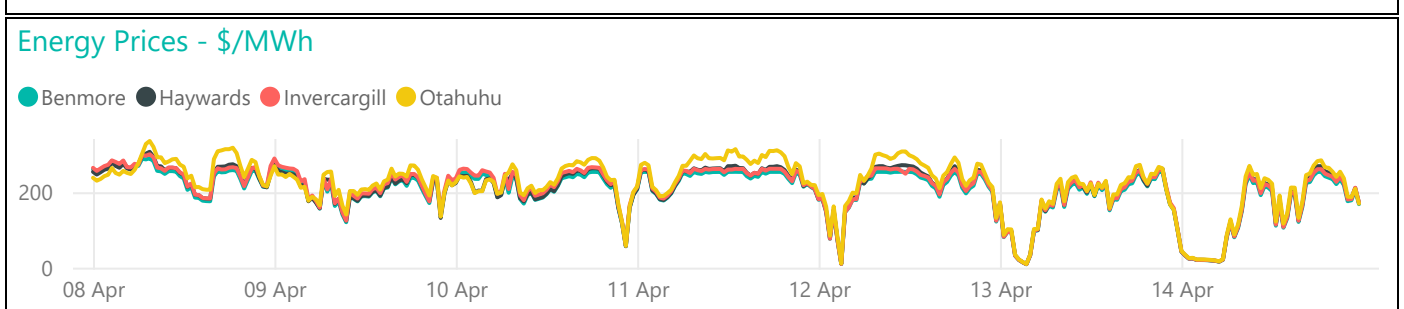


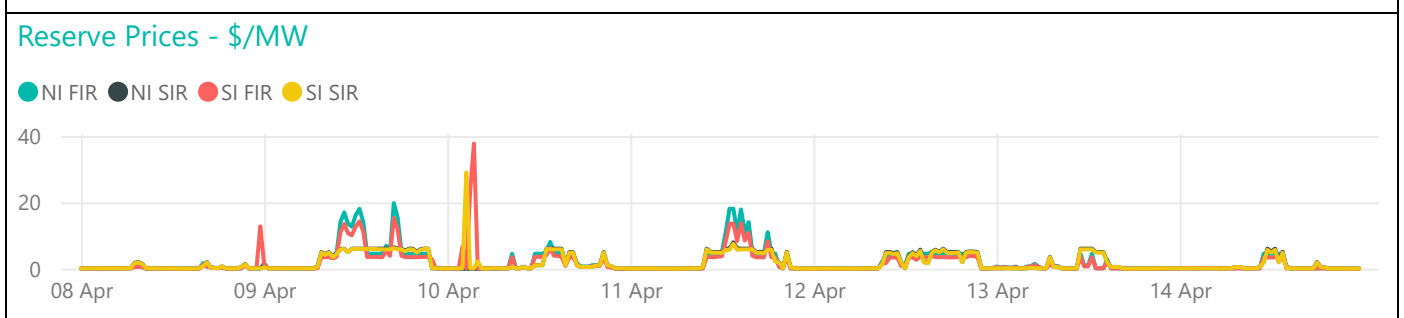


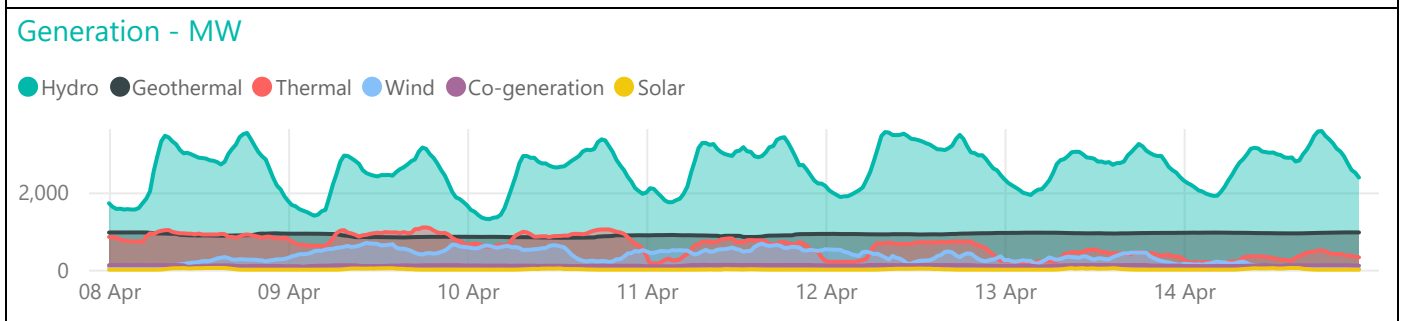


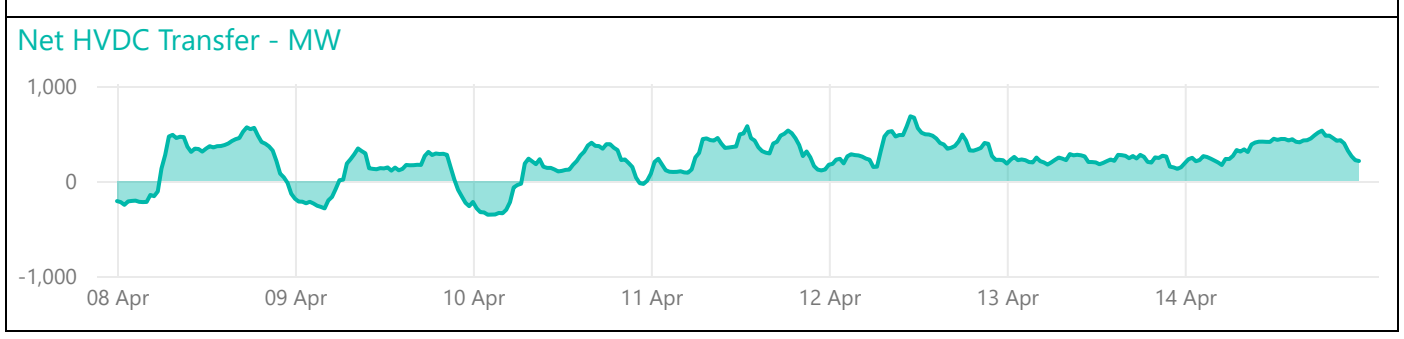












Weekly Summary Insight - Electricity Risk Curves 101

The Electricity Risk Curves (ERCs) are one of the key tools used to forecast security of energy supply in New Zealand. They have been developed for the purpose of reflecting the risk of extended energy shortages in a straightforward way, using a standardised set of assumptions. Recently we have added an 'ERCs 101' document to our website. This document provides a high level overview of the ERCs including an introduction to various concepts and modelling assumptions. It supersedes the previous series of 'Security of Supply 101' documents.

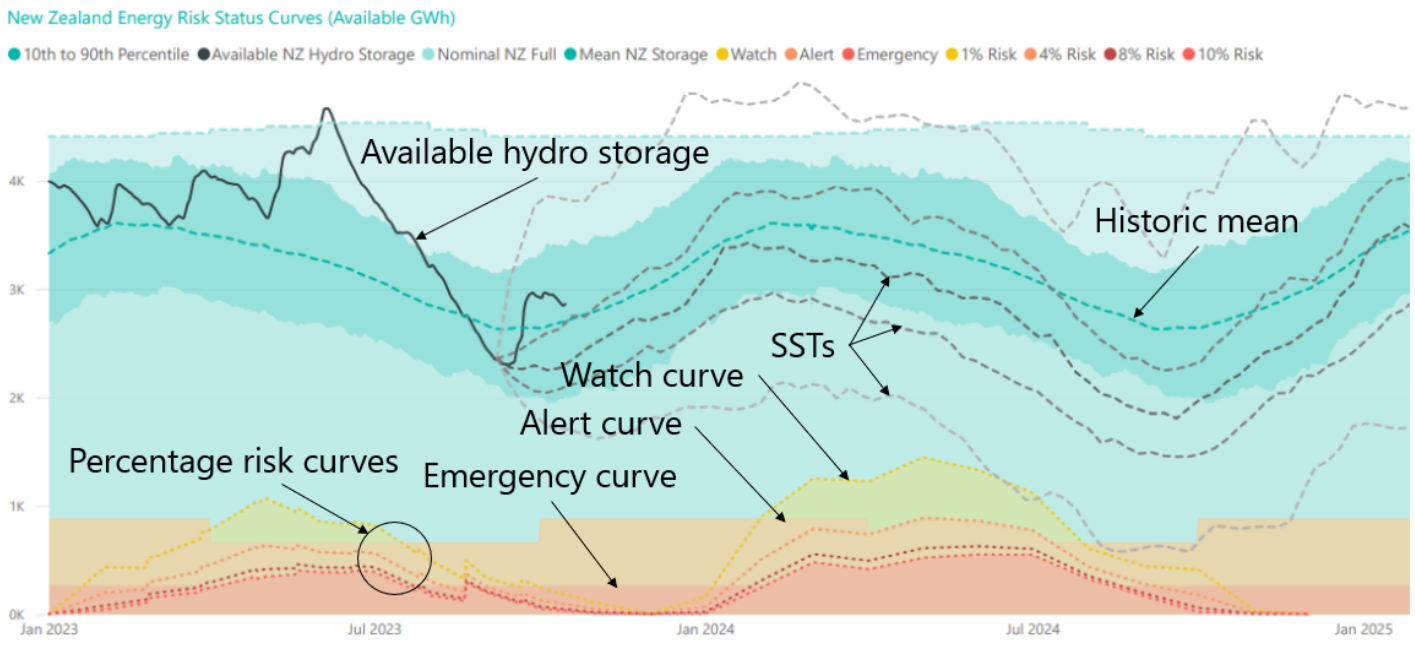
The key changes in this update include:
- updates to any assumptions/modelling changes following the SOSFIP update in June 2023;
- updates to images and information on how to interpret the curves; and
- condensed content.

The document aims to introduce participants to the key concepts of ERCs, including:
- risk status;
- simulated storage trajectories (SSTs);
- buffers and contingent storage;
- official conservation campaign (OCC) triggers;
- high level methodology used to derive the ERCs; and
- other elements of the Security of Supply framework.

It also runs through some of the critical assumptions around:
- demand forecast;
- generation types and respective generation profiles;
- generation outages; and
- transmission constraints.

Each of which is accompanied by an explanation of the impact had on the ERCs.

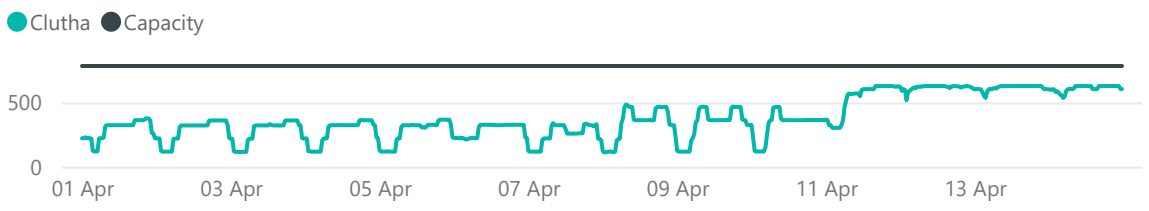
In addition to the ERC 101 document, there is also a useful video series which provides a simple visualisation of the ERCs.



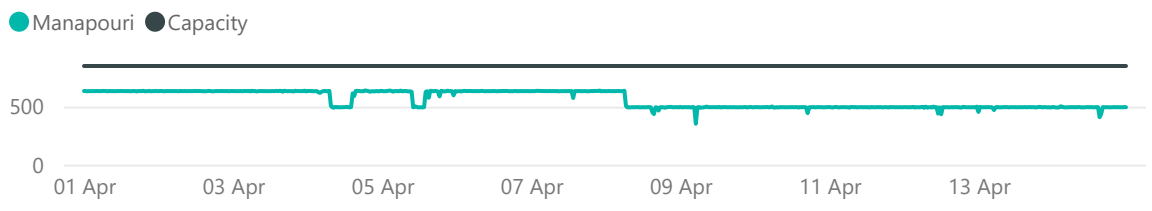
Generation Breakdown - Last Two Weeks

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

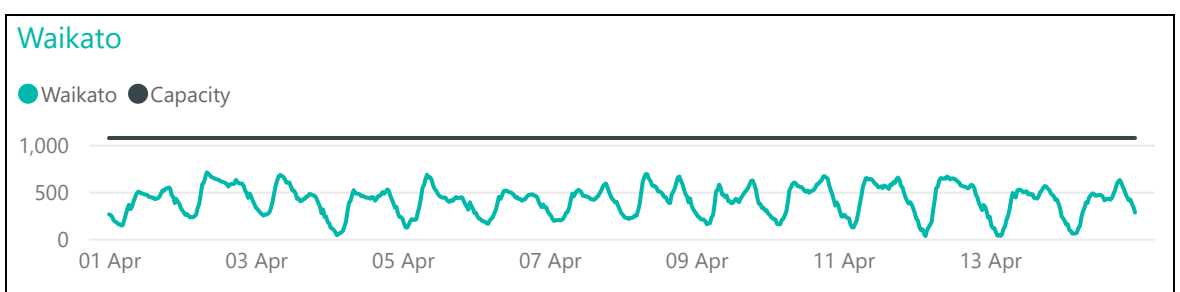
Clutha



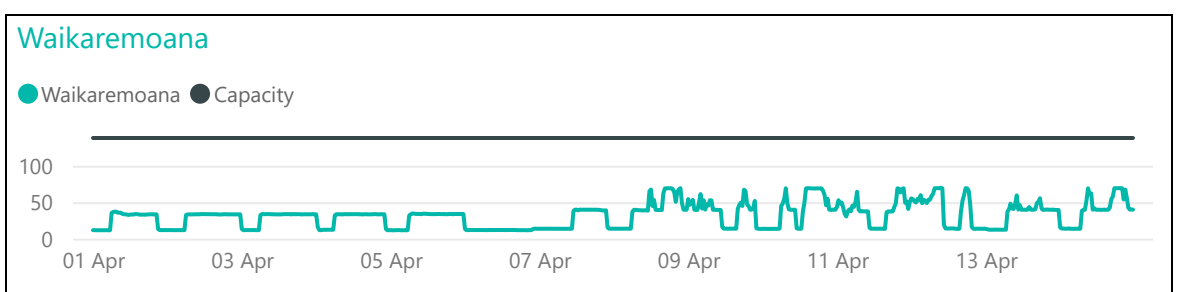
Manapouri



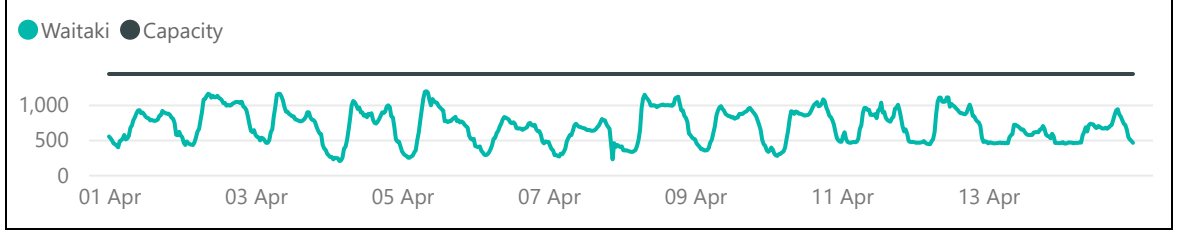
Waikato



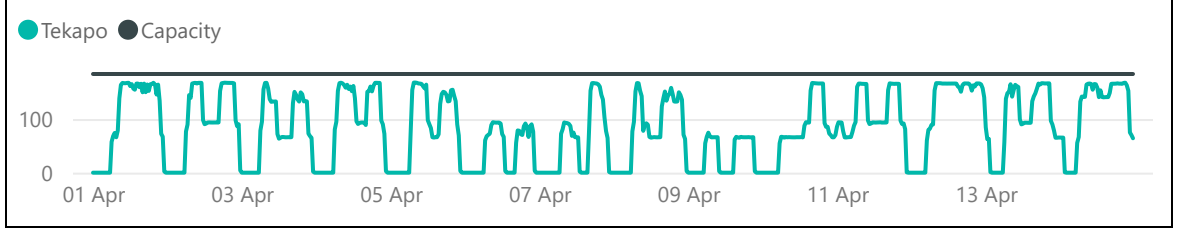
Waikaremoana



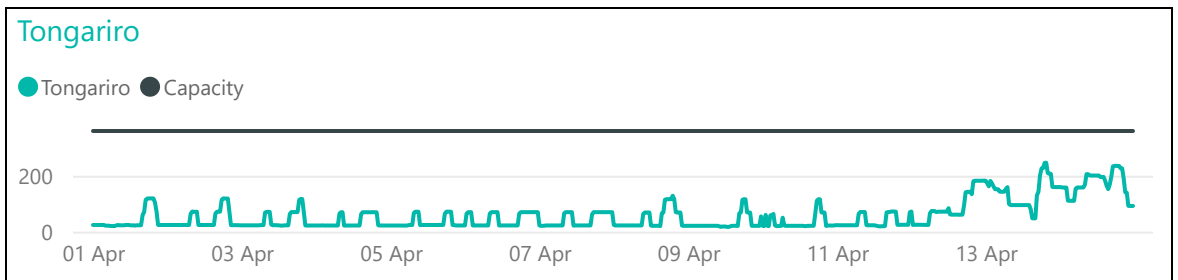
Waitaki



Tekapo

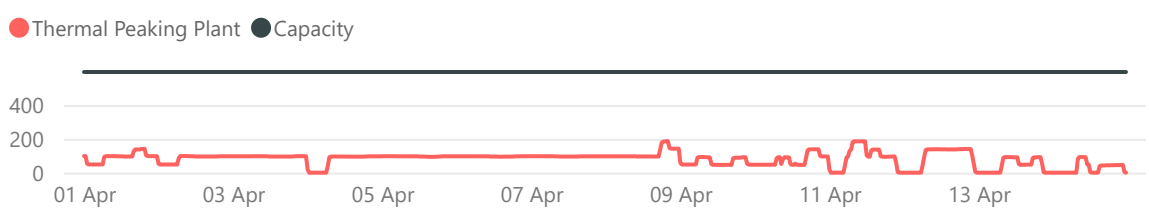


Tongariro

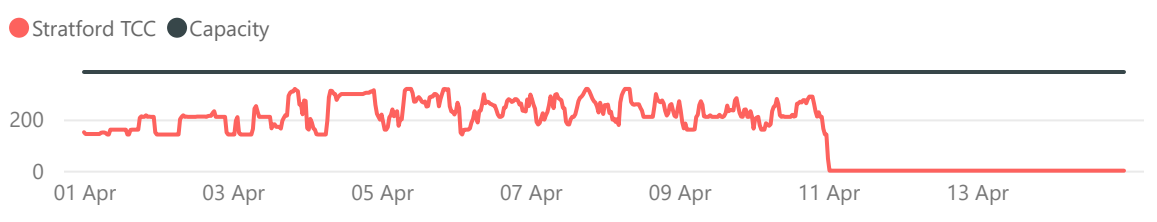


Other SI Hydro

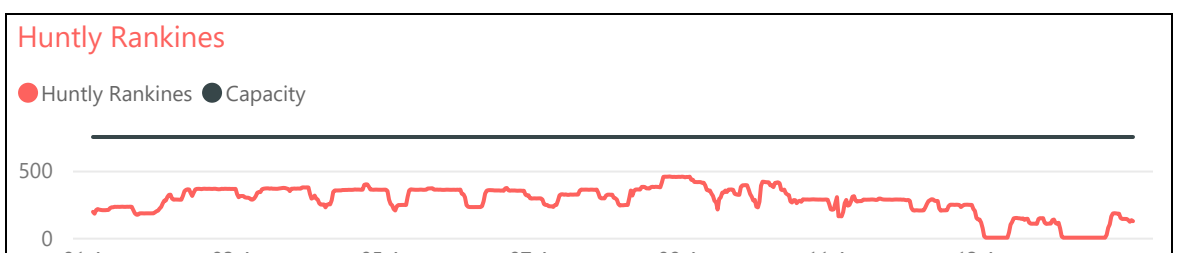
Thermal Peaking Plant



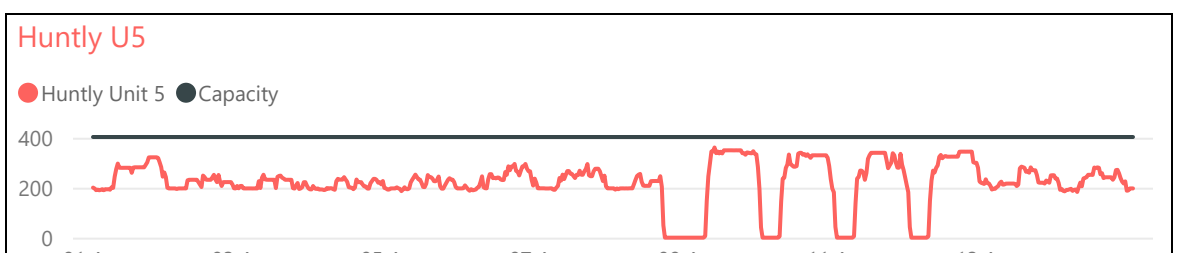
Stratford TCC



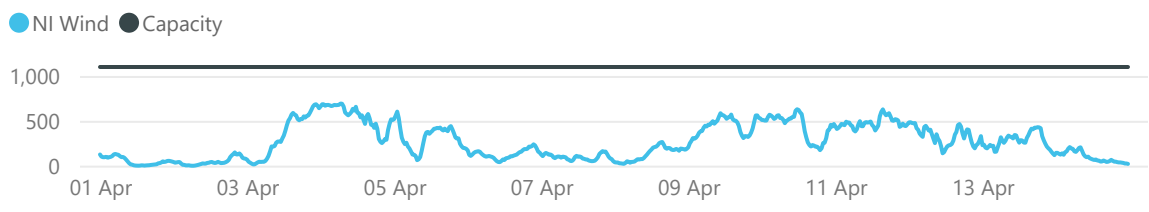
Huntly Rankines



Huntly U5

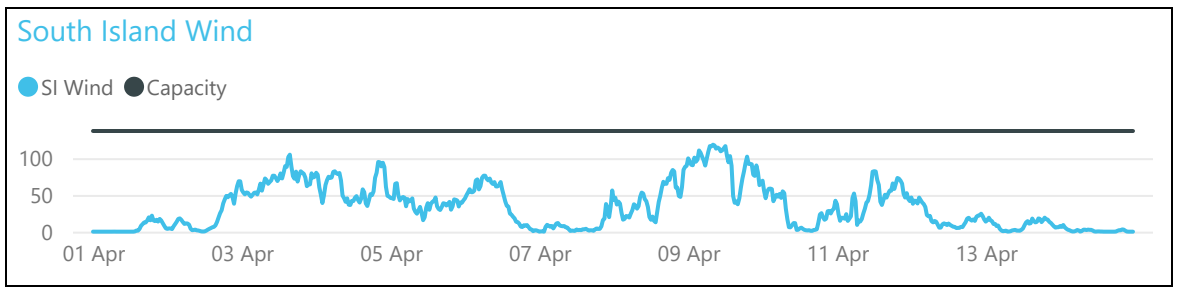


North Island Wind

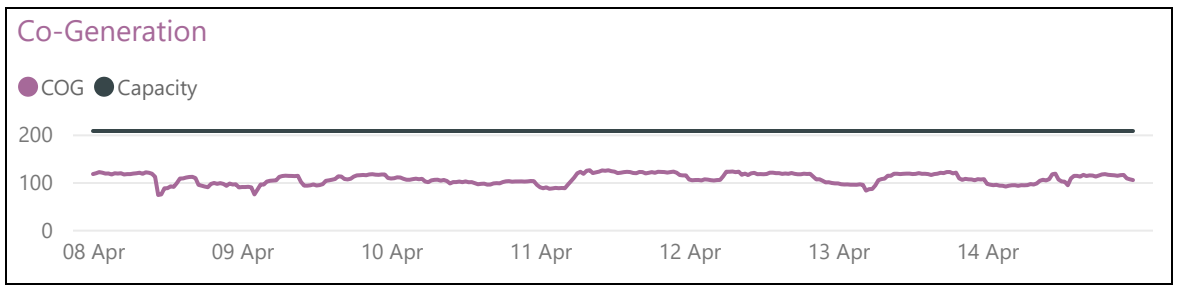


Geothermal

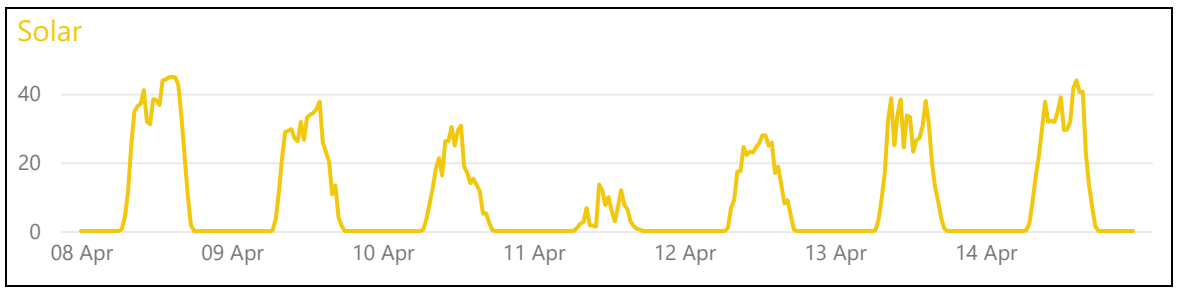
South Island Wind



Co-Generation

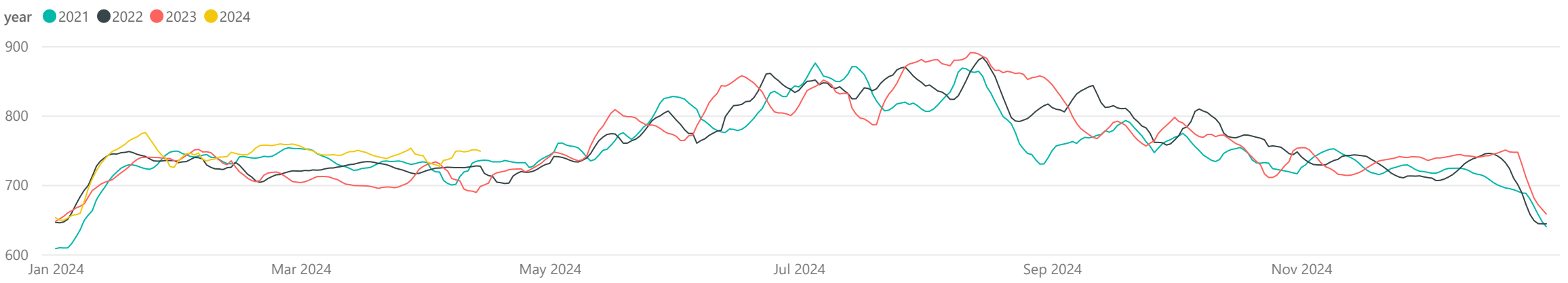


Solar

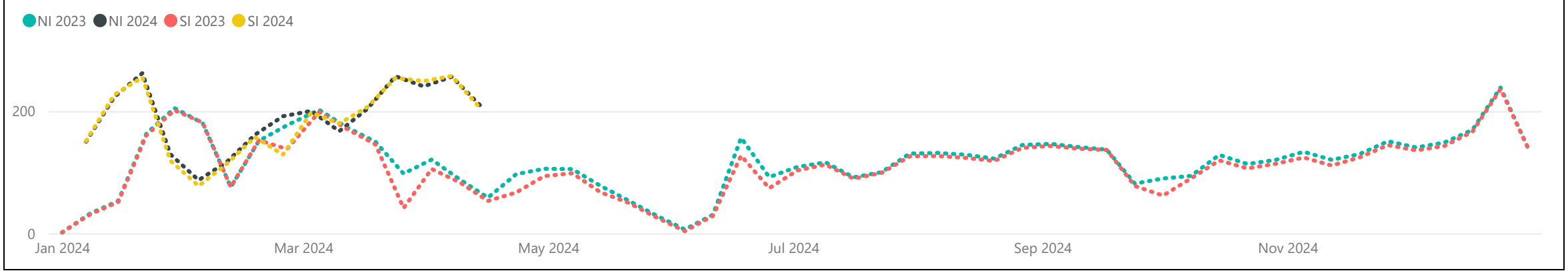


Weekly Profiles

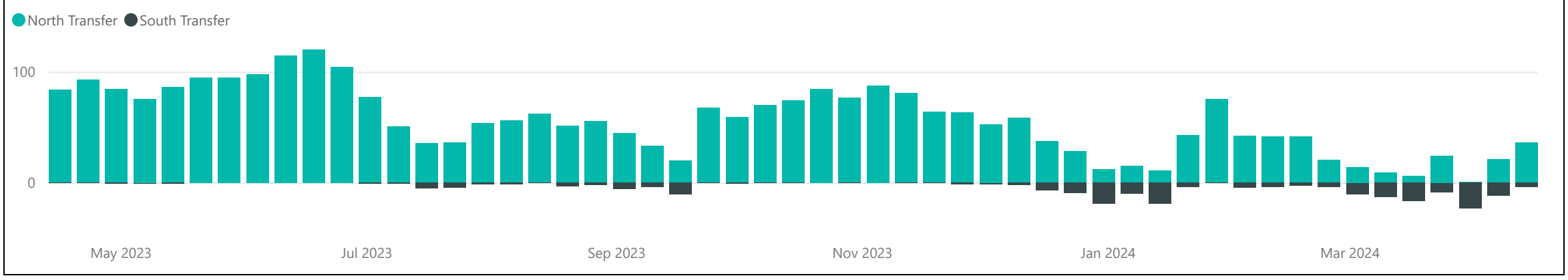
National Weekly Demand - GWh - 7 Day Rolling



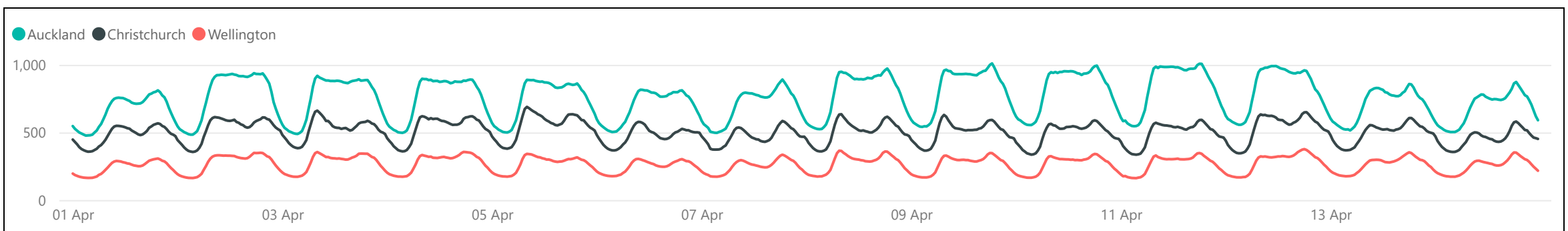
Weekly Spot Price - $/MWh



HVDC Transfer - Weekly GWh

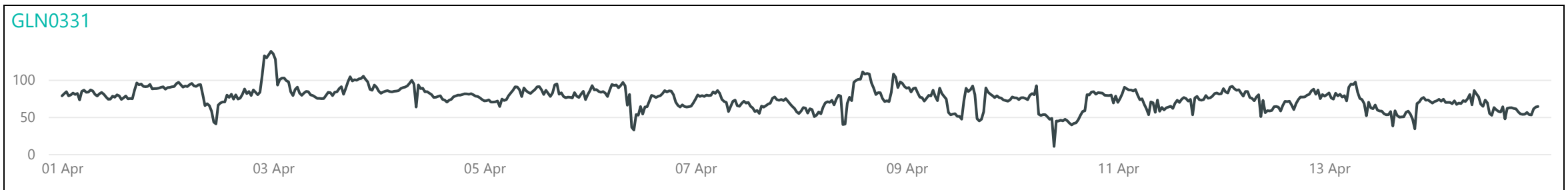


Conforming Load Profiles - Last Two Weeks *Measured in MW shown by region*



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

GLN0331



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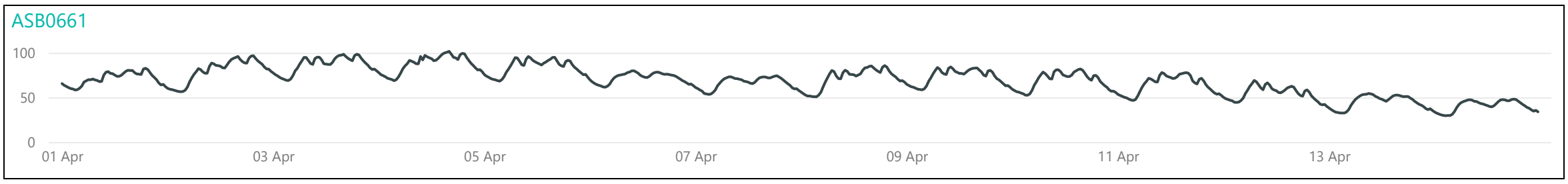

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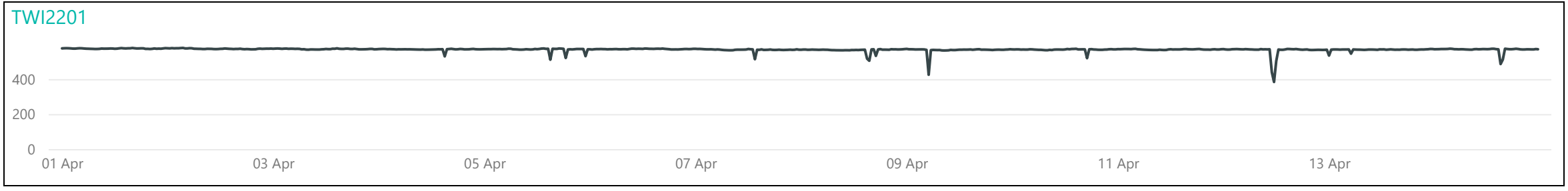
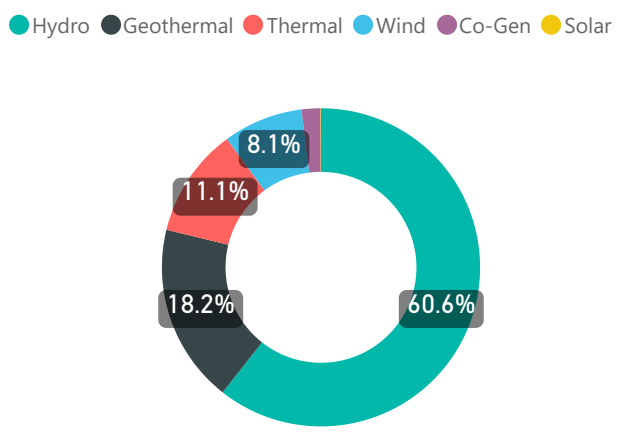


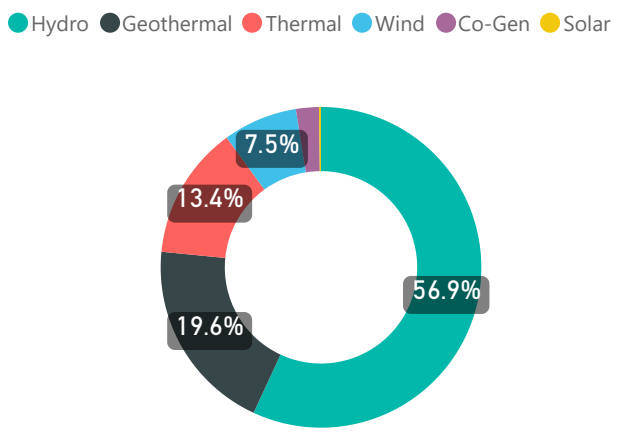
TRANSPOWER

Generation Mix

Last 52 Weeks Generation Mix - Weekly GWh



Last 7 Days Generation Mix - Weekly GWh



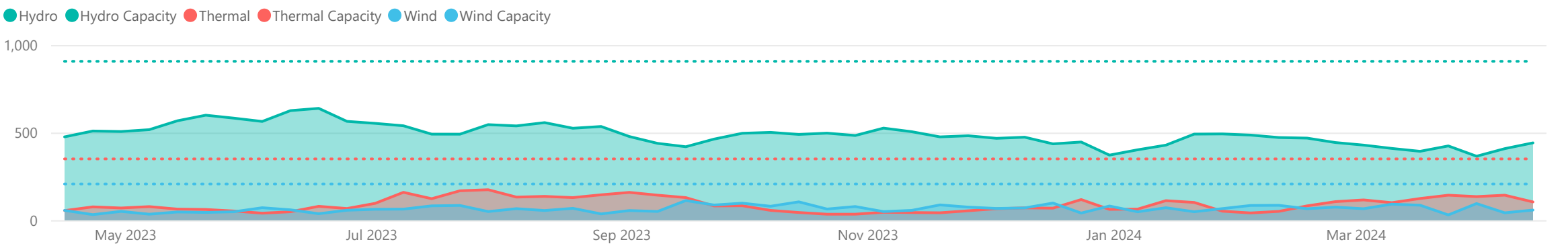
Average Metrics Last 7 Days

Renewable Percentage	CO2e Tonnes/Week	CO2e g/kWh
84%	81,134	103.5

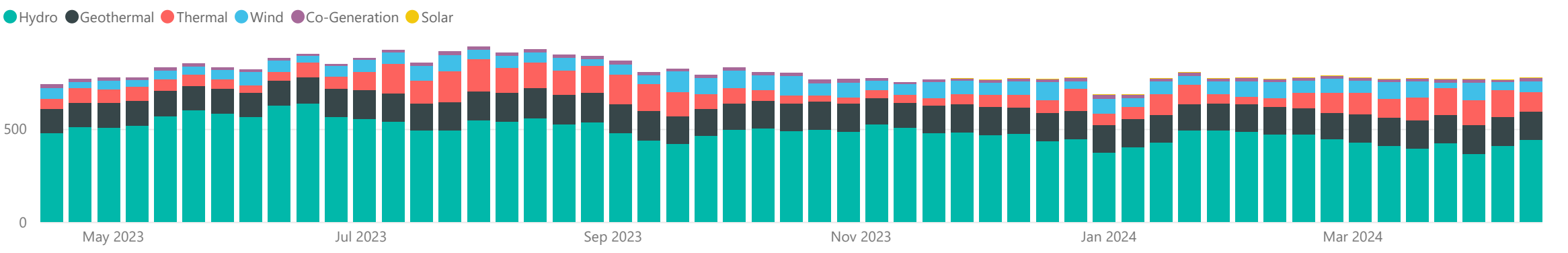
Average Metrics Last 52 Weeks

Renewable Percentage	CO2e Tonnes/Week	CO2e g/kWh
87%	63,428	77.6

Weekly Generation Mix vs Capacity - GWh

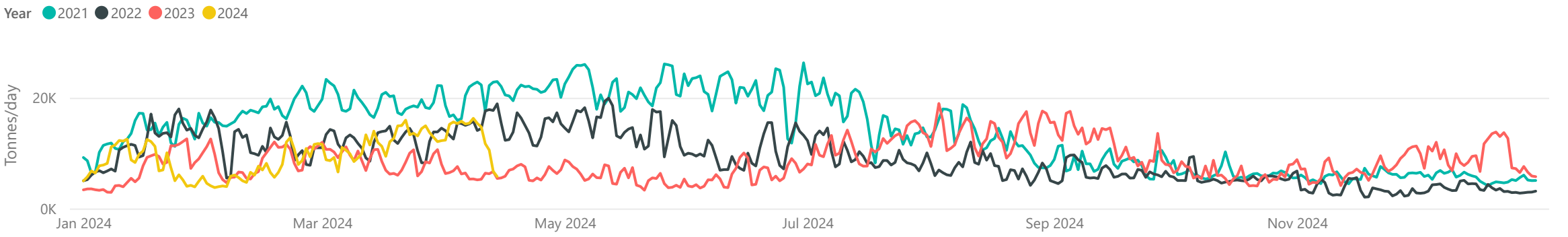


Weekly Generation Mix - GWh

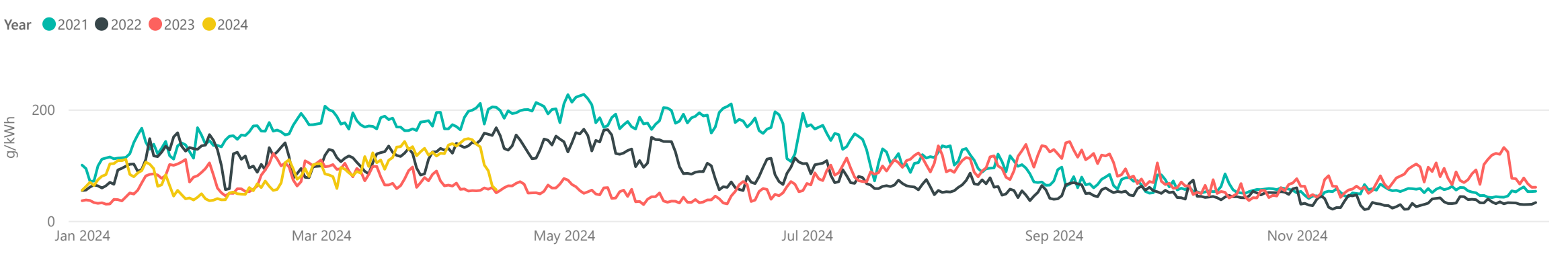


NZ Renewable Percentage

CO2 Tonnes/Day

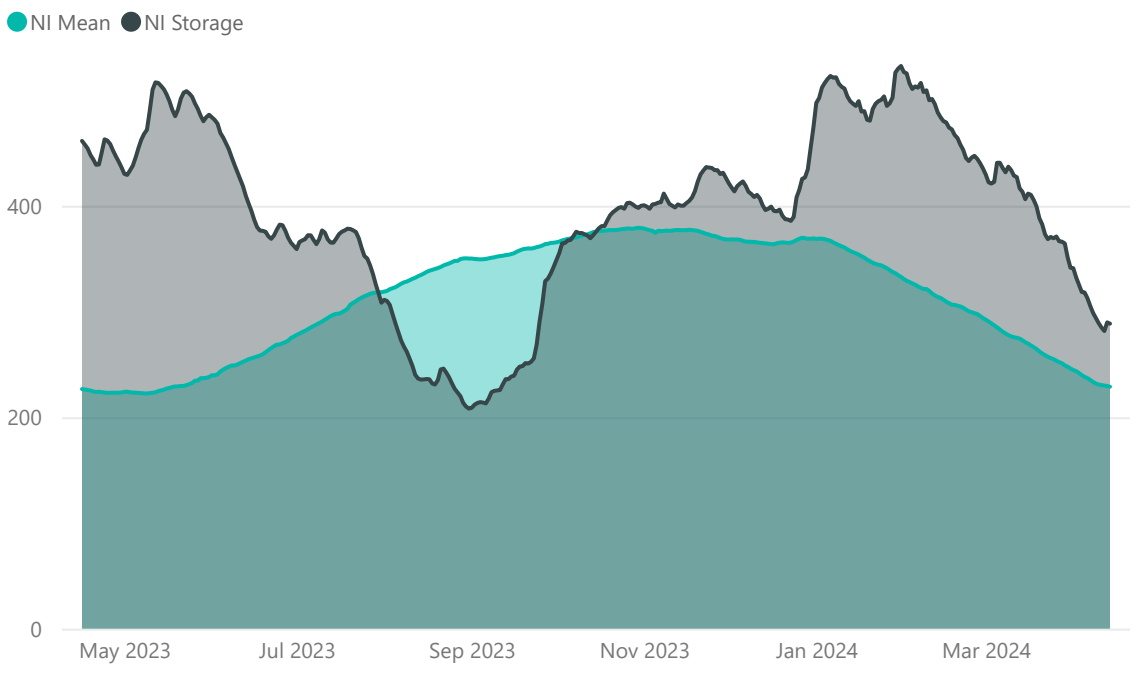


CO2 g/kWh

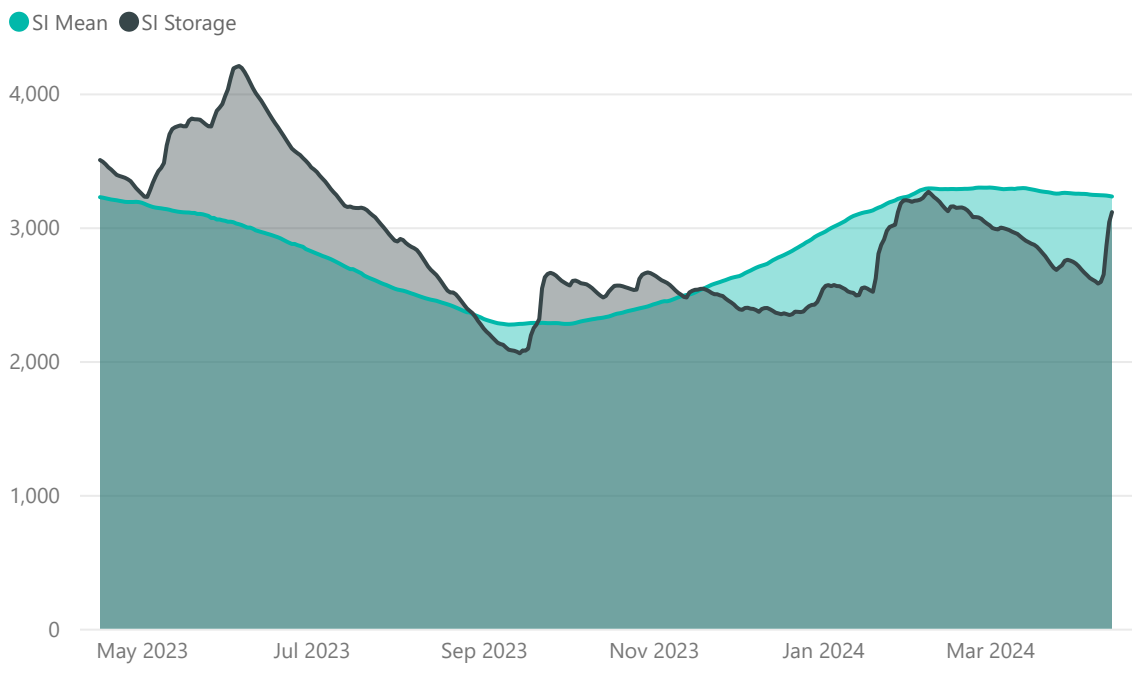


Hydro Storage

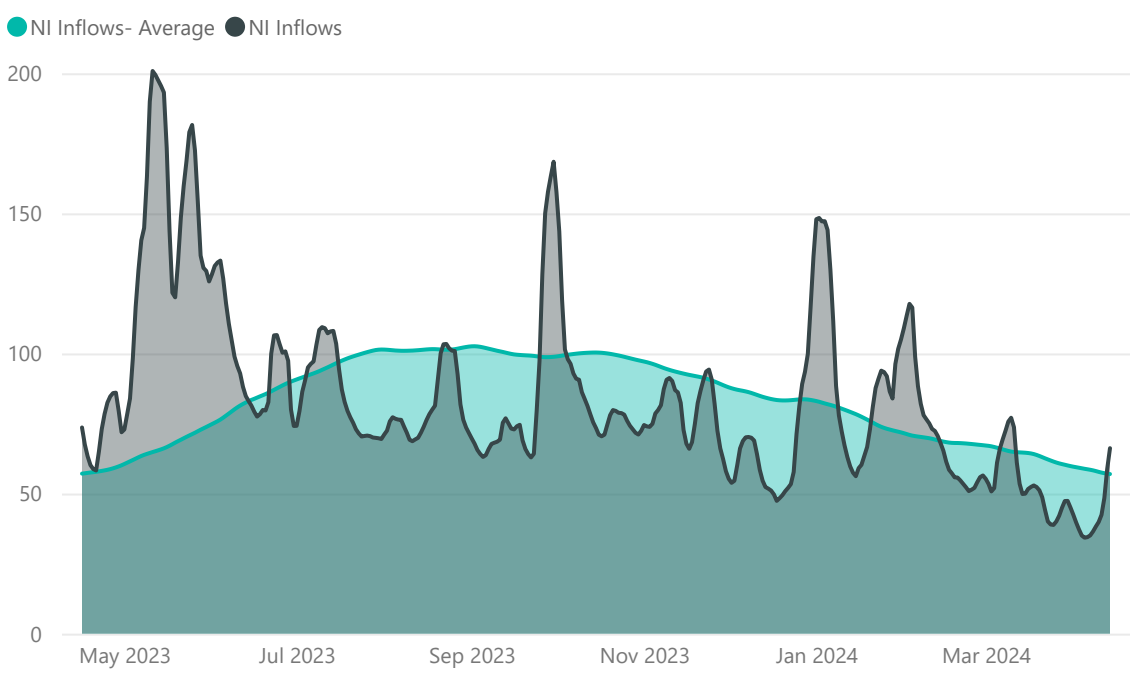
North Island Hydro Storage (Available GWh)



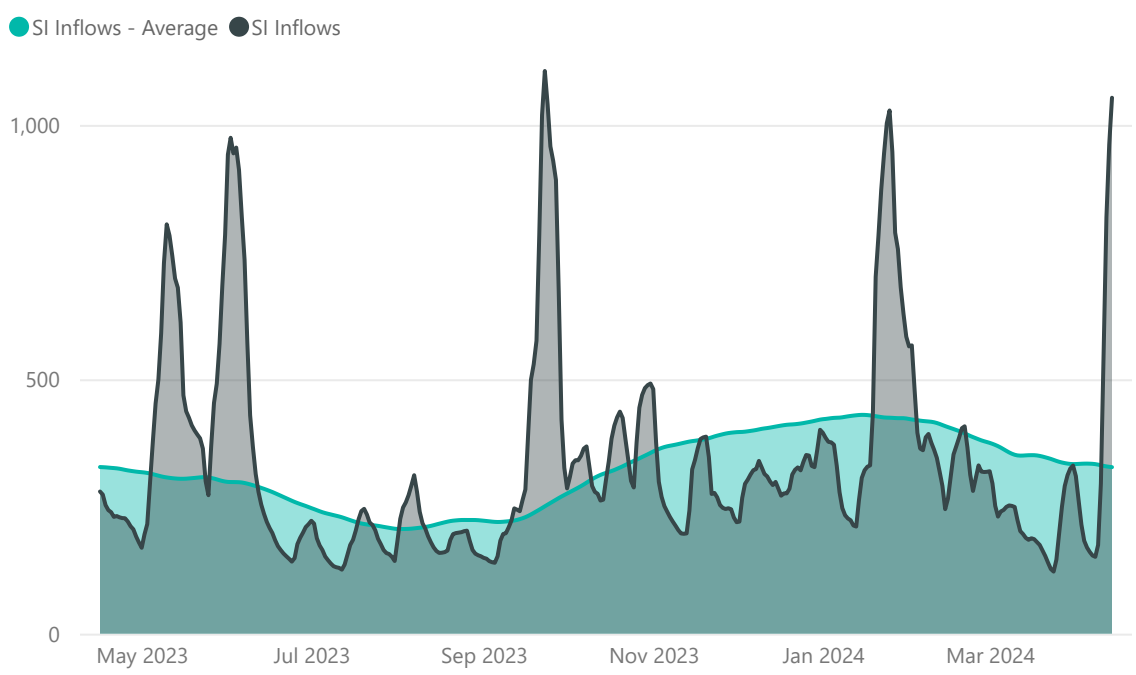
South Island Hydro Storage (Available GWh)



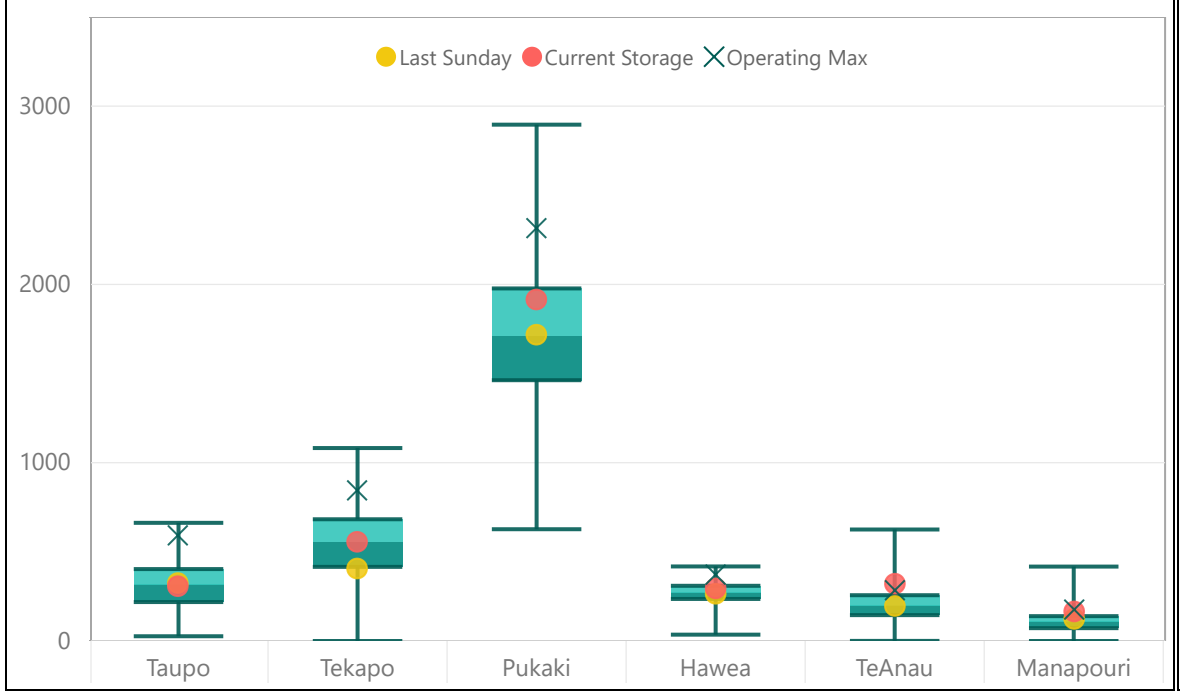
North Island Mean 7 Day Inflows (Available GWh)



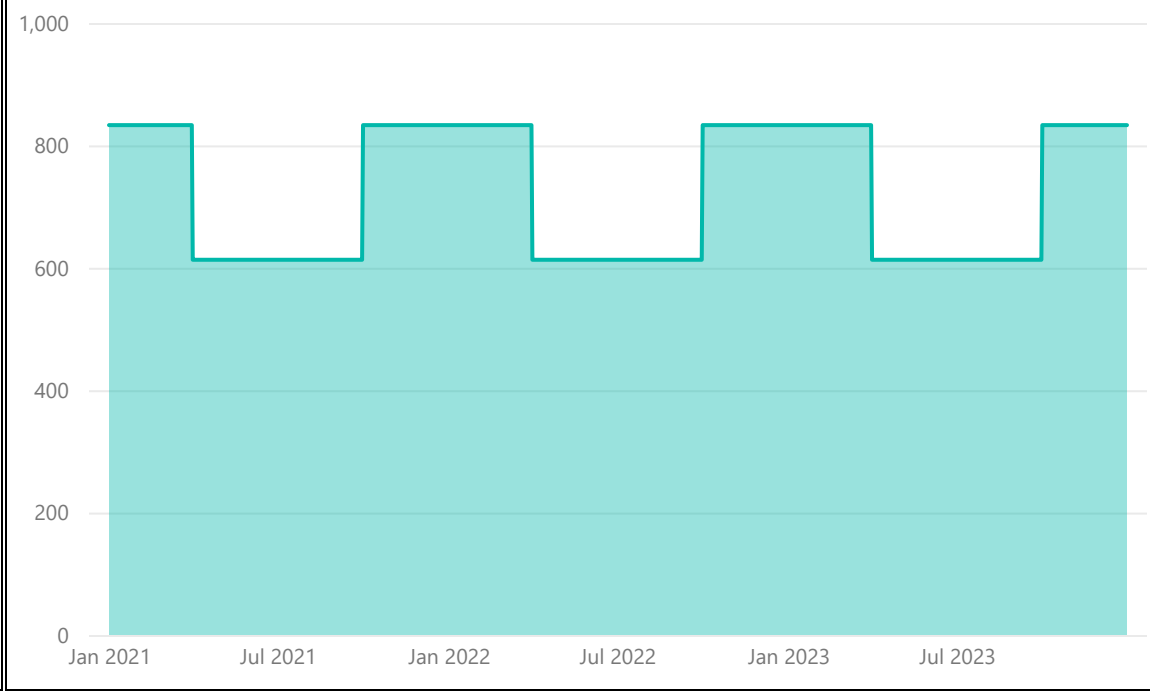
South Island Mean 7 Day Inflows (Available GWh)



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

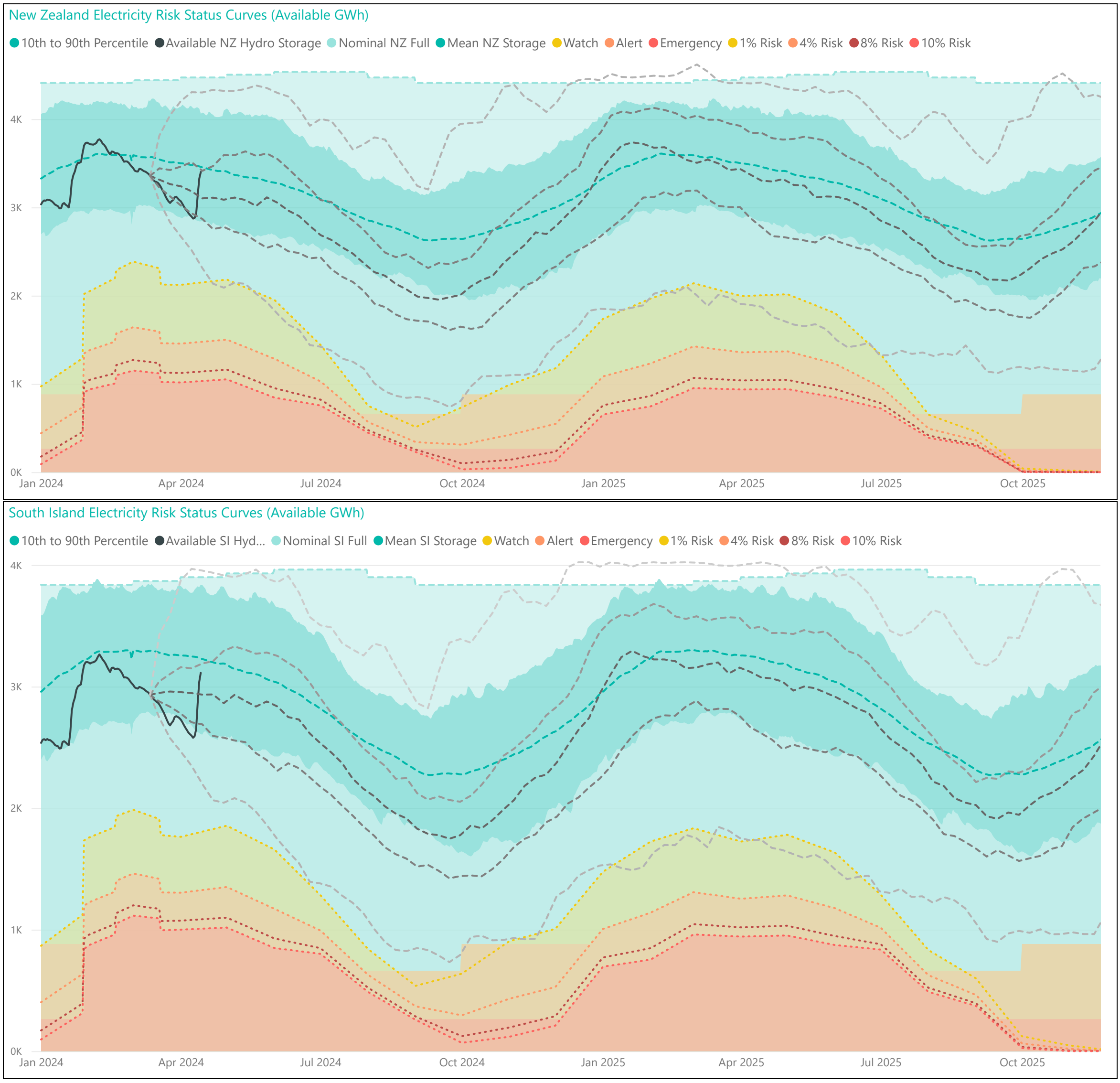
For any inquiries related to security of supply contact market.operations@transpower.co.nz

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).