

Trading Conduct Report

Market Monitoring Weekly Report

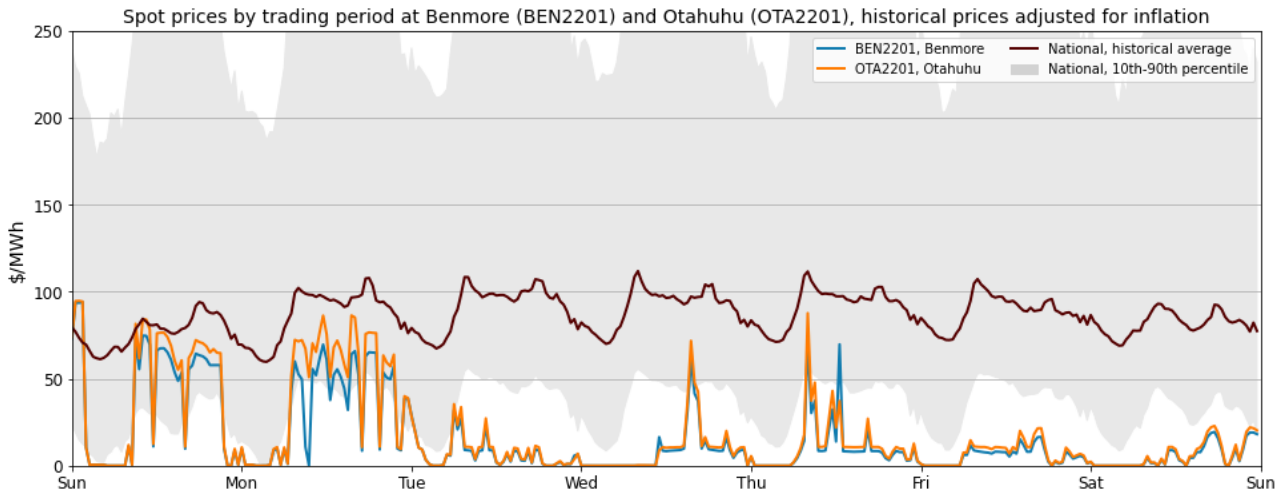
1. Overview for the week of 30 October – 5 November

- 1.1. Wholesale spot prices between 30 October and 5 November appear to be consistent with market conditions.

2. Spot Prices

- 2.1. This report monitors underlying wholesale price drivers to assess whether there are trading periods that require further analysis for the purpose of considering potential non-compliance with the trading conduct rule. In addition to general monitoring, we also single out unusually high-priced individual trading periods for further analysis by identifying when wholesale electricity spot prices at Benmore and/or Otahuhu nodes exceed their historical 90th percentiles. These historically high-priced trading periods are marked out by vertical lines in the majority of figures in this report.
- 2.2. Between 30 October and 5 November wholesale spot prices across all nodes the averaged \$16/MWh, with 95 per cent of prices falling between \$0.01/MWh and \$76/MWh.
- 2.3. Figure 1 shows spot prices at Benmore and Otahuhu alongside their historic median and historic 10th- 90th percentiles adjusted for inflation.
- 2.4. Spot prices decreased this week, with off-peak and overnight prices often hovering between \$0- \$10/MWh, and day/peak prices rising to between \$70-\$100/MWh. The highest price of the week occurred at 12:30 am on Sunday morning and reached ~ \$94/MWh at both Benmore and Otahuhu.
- 2.5. This decrease in average price was due to falling offers in anticipation of a large rainfall event, high hydro and wind generation and low demand.

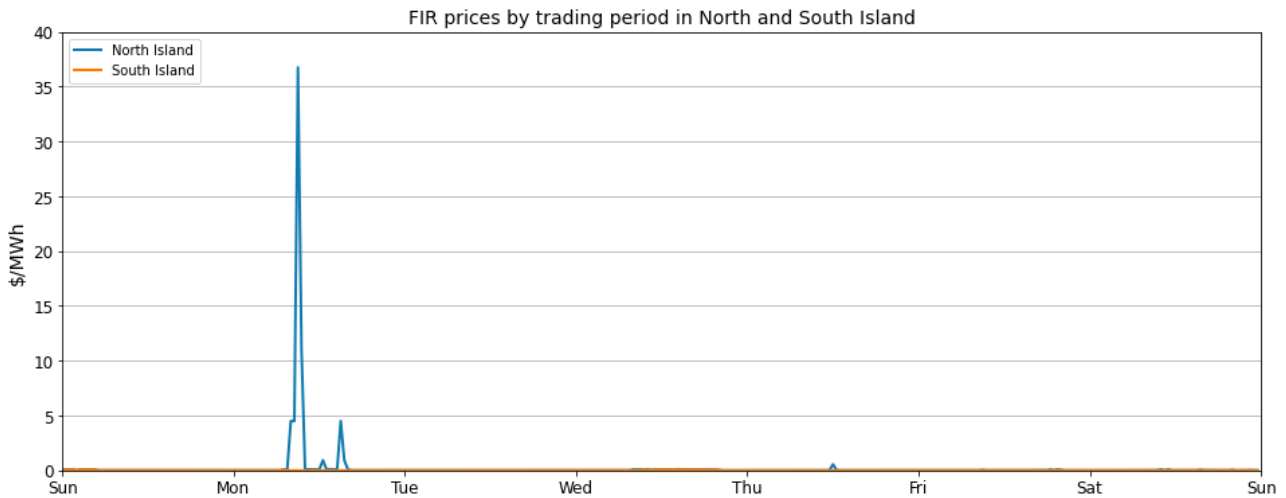
Figure 1: Wholesale Spot Prices



3. Reserve Prices

3.1. Fast instantaneous reserve (FIR) prices for the North and South Island are shown below in Figure 2. All trading periods were below \$5/MWh, except for one North Island FIR price on Monday morning, which reached ~\$37/MWh.

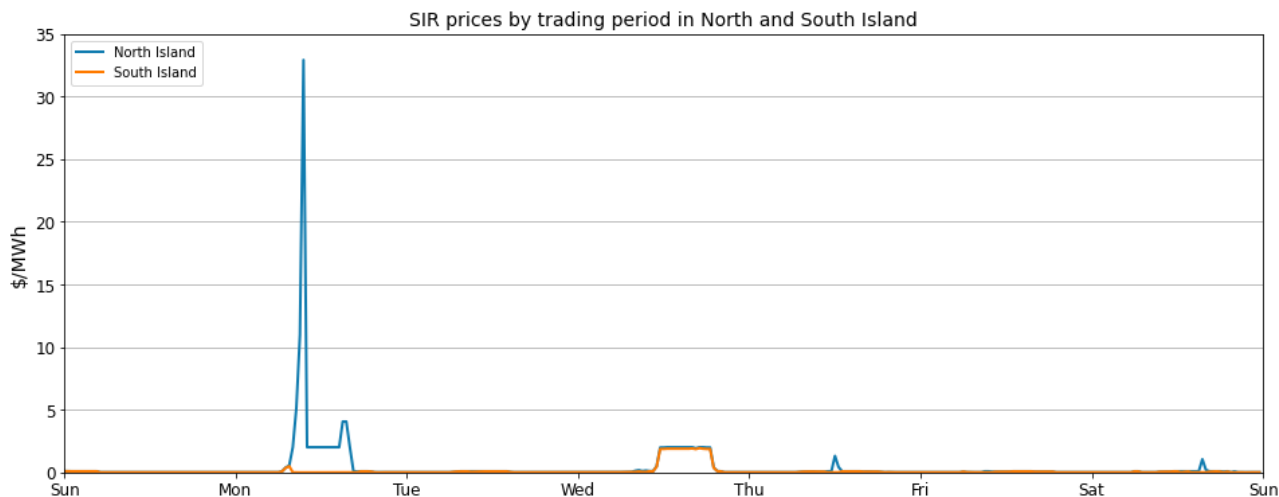
Figure 2: FIR prices by trading period and Island



3.2. Sustained instantaneous reserve (SIR) prices for the North and South Island are shown below in Figure 3. All SIR prices this week remained below \$2/MWh, except again for one North Island FIR price on Monday morning, which spiked to ~\$33/MWh.

3.3. The spikes in SIR and FIR prices occurred while the HVDC was transferring 813 MW Northward, close to its transfer limit at that time. This caused price separation between the North and South Islands for both energy and reserves.

Figure 3: SIR prices by trading period and Island

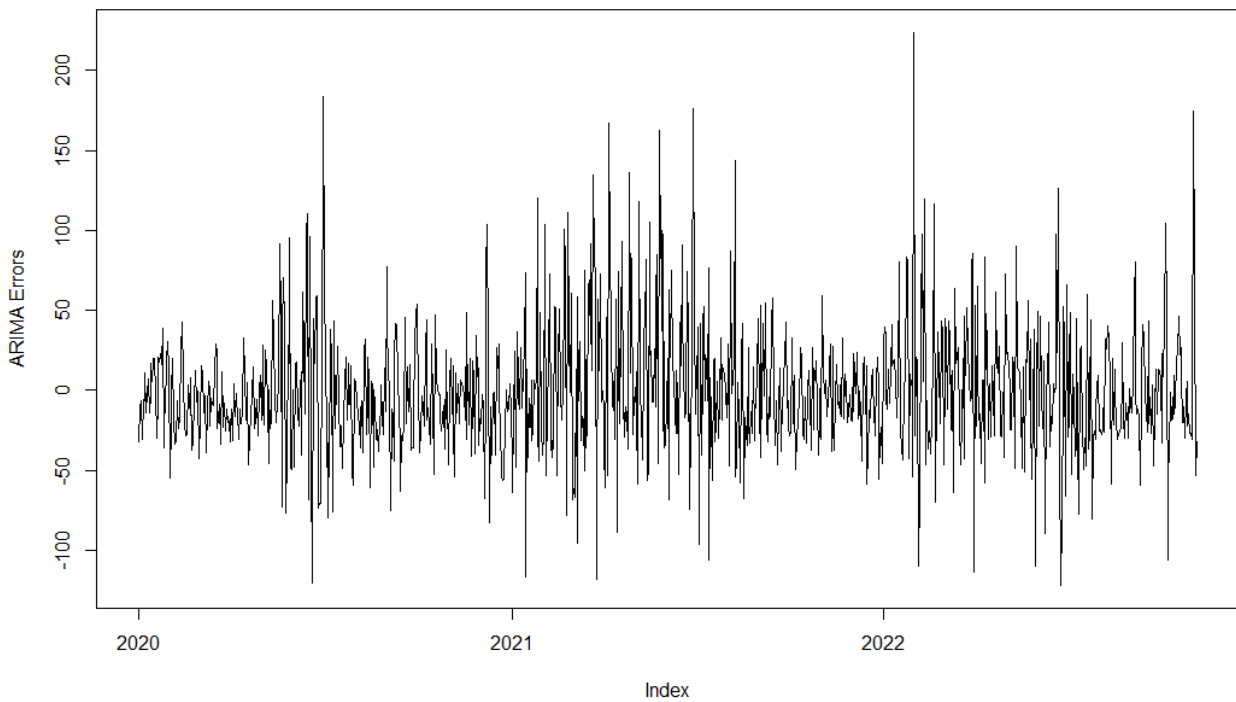


4. Regression Residuals

- 4.1. The Authority’s monitoring team uses a regression model to model spot price. The residuals show how close the predicted prices were to actual prices. Large residuals may indicate that prices do not reflect underlying supply and demand conditions. Details on the regression model and residuals can be found in Appendix A¹ on the trading conduct webpage.
- 4.2. Figure 4 shows the residuals of autoregressive moving average (ARMA) errors from the daily model. Residuals for 30 October to 5 November were large on some days. The residuals for Tuesday, Wednesday and Thursday show the model was underestimating price, while on Friday the model overestimated the price. The remaining days had small residuals suggesting that prices on those dates appear to be aligned with market conditions. Some of these under and overestimates may be due to pricing changing due to RTP and will be investigated further.

¹ <https://www.ea.govt.nz/assets/dms-assets/29/Appendix-A-Regression-Analysis.pdf>

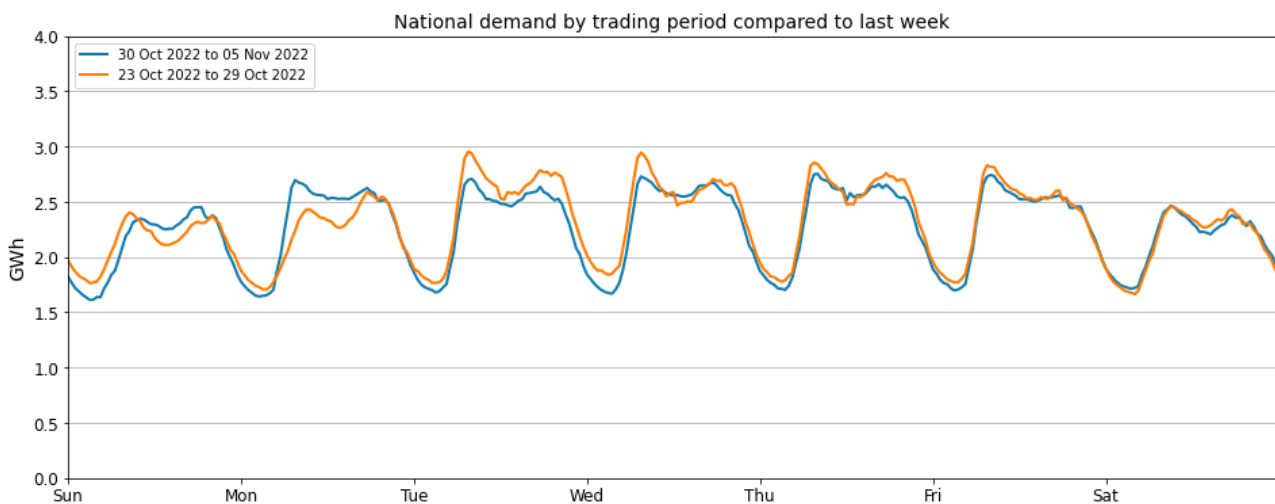
Figure 4: Residual plot of estimated daily average spot prices



5. Demand

5.1. Figure 5 shows this week's national grid demand compared to the previous week. Demand between 30 October and 5 November was similar to the previous week, due to the continued warmer temperatures. Note that the difference in Monday demand was due to Labour Day public holiday occurring the previous week.

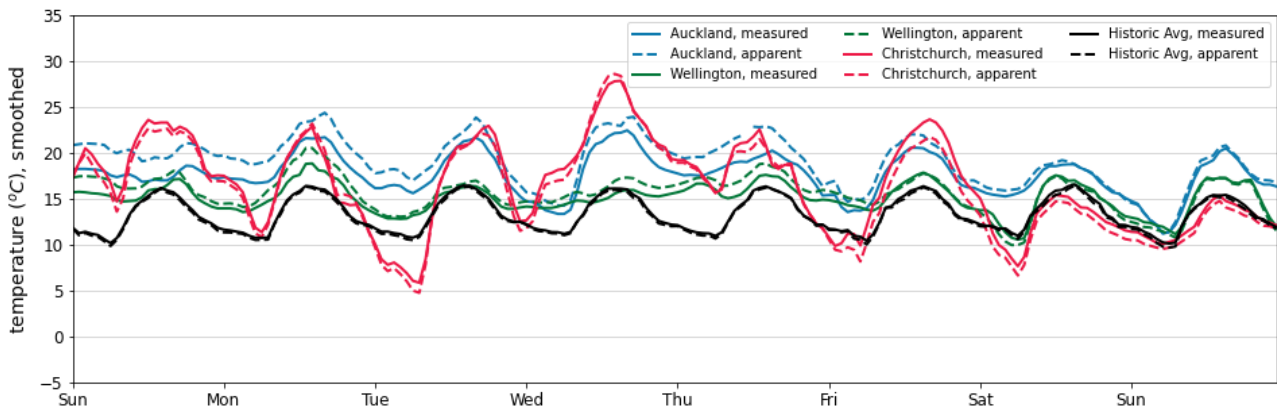
Figure 5: National demand by trading period compared to the previous week



5.2. Figure 6 shows hourly temperature at main population centres. The measured temperature is the recorded temperature, while the apparent temperature adjusts for factors like wind speed and humidity to estimate how cold it feels. Also included for reference is the mean historical temperature of similar weeks, from previous years, averaged across the three main population centres.

5.3. Temperatures were mostly above average this week across Auckland, and Wellington and Christchurch. Auckland and Wellington were mostly between ~10 and ~23 degrees throughout the week. Christchurch experienced more volatility, with temperatures between ~5 and ~28 degrees.

Figure 6: Temperatures across main centres

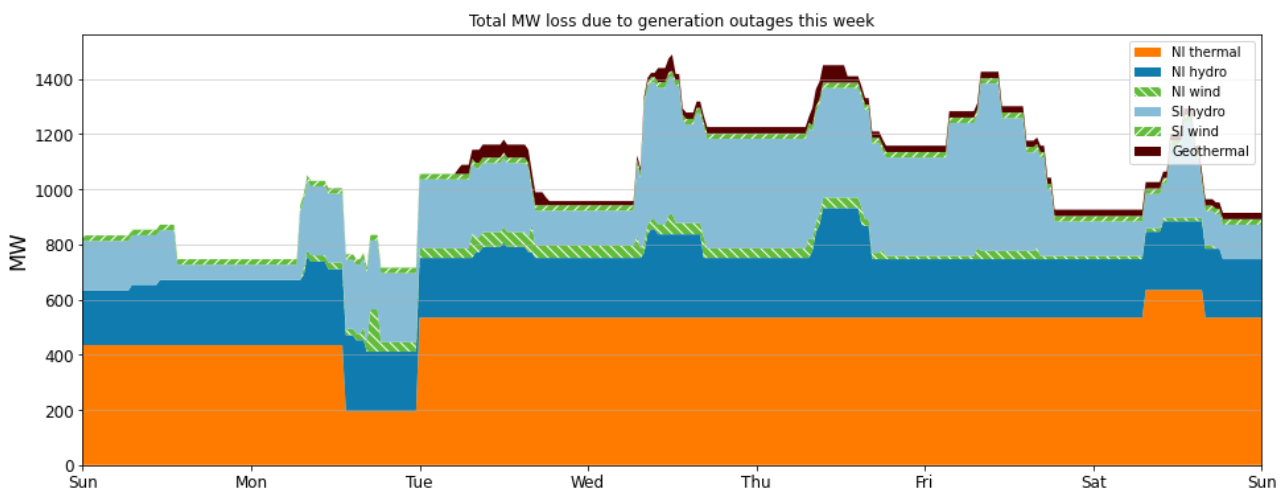


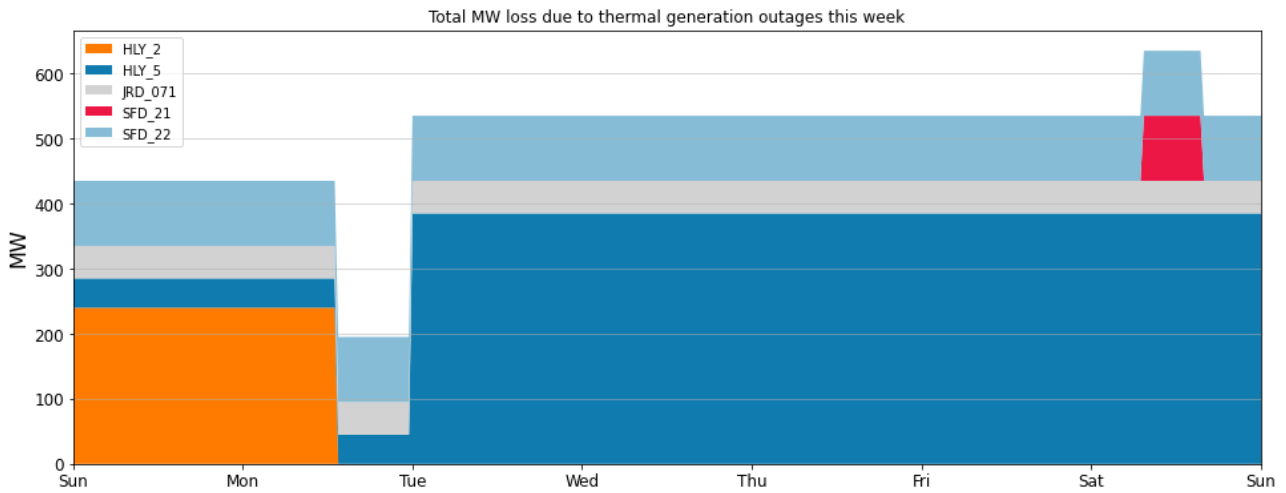
6. Outages

6.1. Figure 7 shows generation capacity on outage. Total capacity on outage ranged between 700 – 1,000 MW throughout the week between Sunday and Tuesday. From Wednesday to Friday, outages increased to between 1,200-1,400 MW, as more North and South Island hydro went on outage. Outages stepped back down to ~900MW on Saturday.

6.2. With regards to thermal outages, the second Stratford peaker remains on outage. Junction Road was on outage all week. Huntly 2 ended its outage on Monday, while Huntly 5 went on full outage from Tuesday. The first Stratford peaker went on outage briefly on Saturday.

Figure 7: Total MW loss due to generation outages

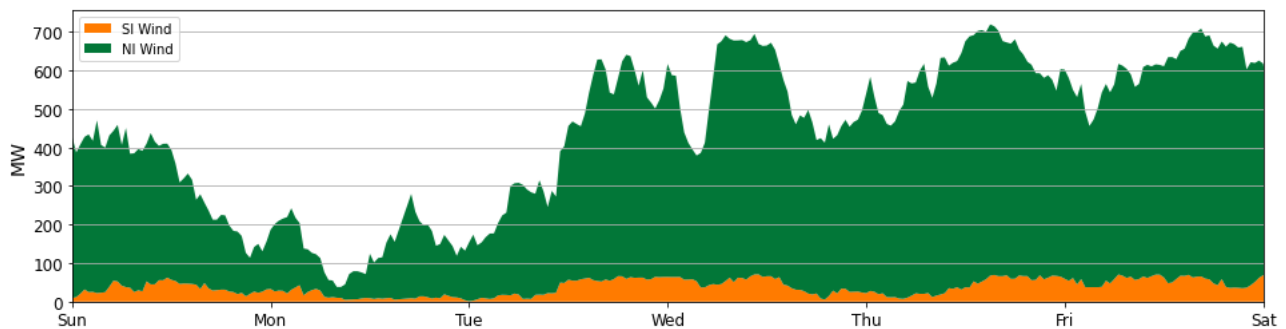




7. Generation

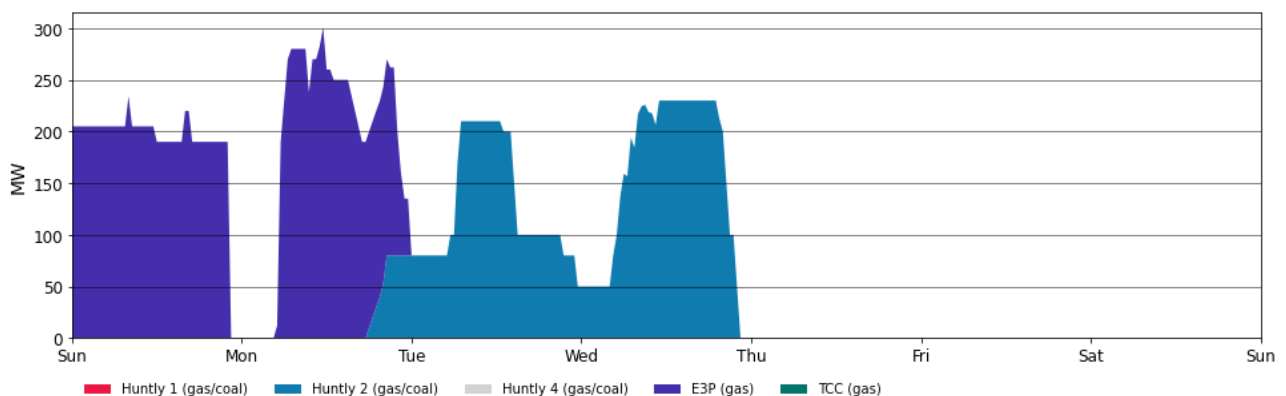
7.1. This week wind generation varied between ~50 and 700 MW, as seen in Figure 8. Wind hovered around 400 MW on Sunday, before decreasing down to roughly ~50 MW on Monday morning. Wind generation ramped up throughout Tuesday and stayed between 400-700 MW for the remainder of the week.

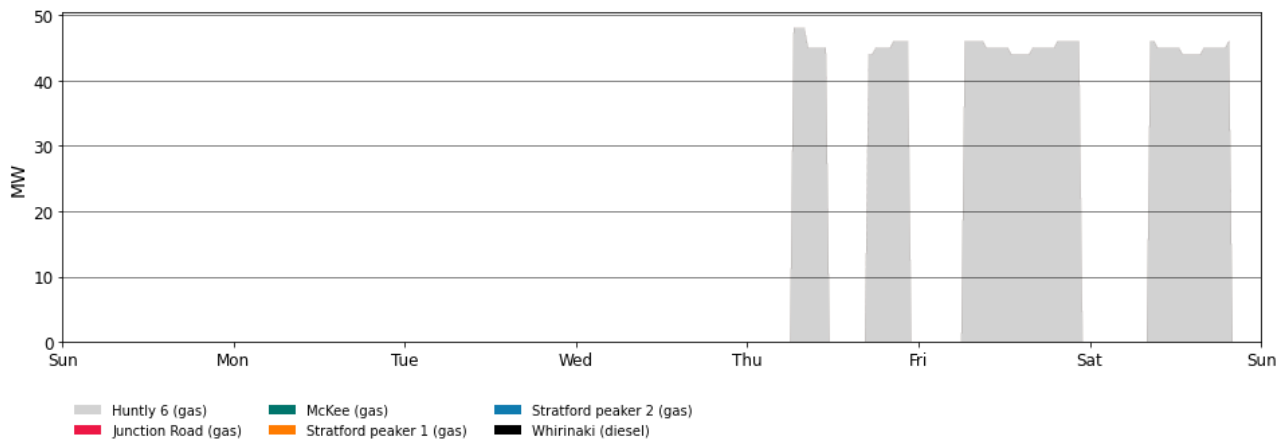
Figure 8: Wind Generation



7.2. Figure 9 shows generation of thermal baseload and thermal peaker plants between and 30- October and 5 November. Only E3P ran during the day as baseload on Sunday and Monday, before going on outage. Huntly 2 ran on Tuesday and Wednesday, but was then switched off, likely due to high winds and low demand.

Figure 9: Thermal Generation





7.3. Huntly 6 ran this week from Thursday onwards. On Thursday it ran during peak, however, over Friday and Saturday it ran for longer stints, likely to cover baseload throughout the day.

7.4. As a percentage of total generation, between 31 October and 6 November, hydro generation totalled 70 percent, geothermal 18 percent, thermal 2 percent and wind 8 percent.

8. Storage/Fuel Supply

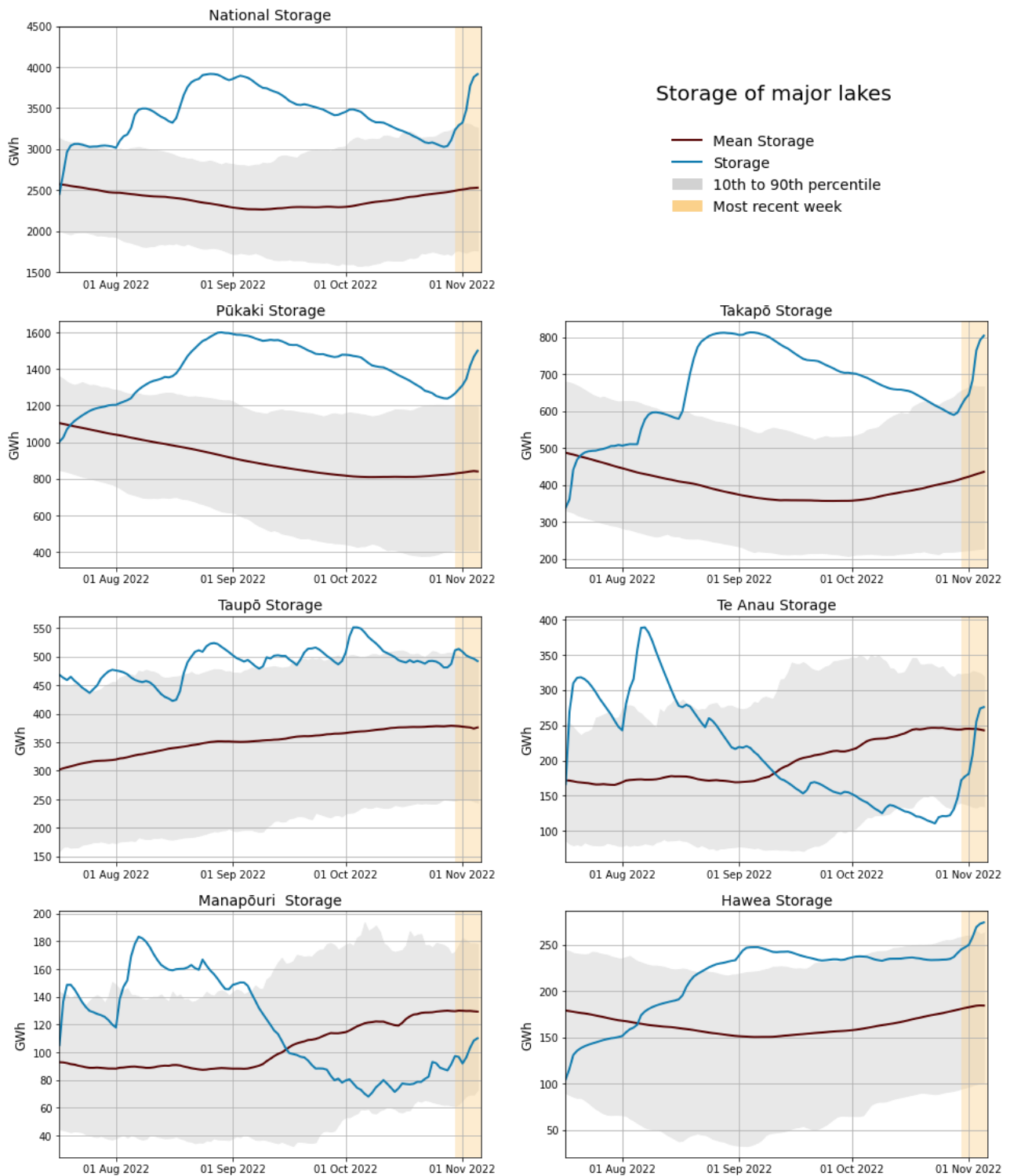
8.1. Total controlled national hydro storage as well as the storage of major catchment lakes including their historical mean and 10th to 90th percentiles is shown in Figure 10.

8.2. National hydro storage levels increased due to heavy rainfall this week, and is now around 91 per cent of nominally full.

8.3. Lakes Hawea, Takapō and Pūkaki all climbed back well above their 90th percentile this week. Lake Te Anau rose above its historic mean, while Manapōuri climbed close to its historic mean. Storage at Lake Taupō fell slightly this week.

8.4. The flow of the HVDC was northward all week.

Figure 10: Hydro Storage

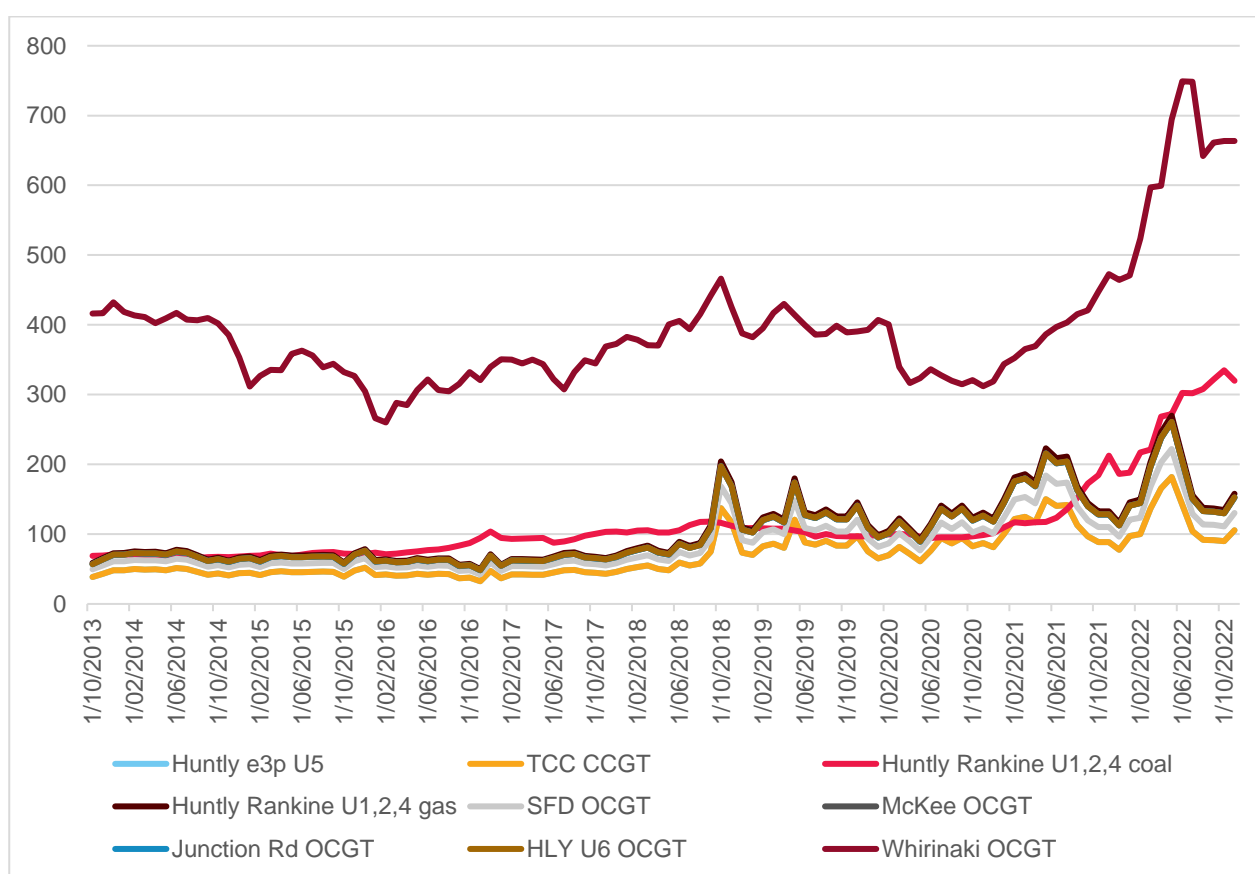


9. Price versus estimated costs

- 9.1. In a competitive market, prices should be close to (but not necessarily at) the short run marginal cost (SRMC) of the marginal generator (where SRMC includes opportunity cost).
- 9.2. The SRMC (excluding opportunity cost of storage) for thermal fuels is estimated using gas and coal prices, and the average heat rates for each thermal unit. Note that the SRMC calculations include the carbon price, an estimate of operational and maintenance costs, and transport for coal.

- 9.3. Figure 11 shows an estimate of thermal SRMCs as a monthly average up to 1 November 2022. The SRMC of gas fuelled plants has increased, the SRMC of diesel remains below its June peak, while the SRMC of coal has fallen.
- 9.4. In early November Indonesian coal was around ~\$560/tonne putting the latest SRMC of coal fuelled Huntly generation at ~\$320/MWh. The SRMC of Whirinaki has stayed constant at ~\$660/MWh. Both are likely reactions to a slight easing of international demand.
- 9.5. The SRMC of gas run thermal plants increased slightly to between \$105/MWh and \$160/MWh, likely due to the decrease in gas fuel availability in the market with Kupe on outage in November.
- 9.6. More information on how the SRMC of thermal plants is calculated can be found in Appendix C² on the trading conduct webpage.

Figure 11: Estimated monthly SRMC for thermal fuels



10. Offer Behaviour

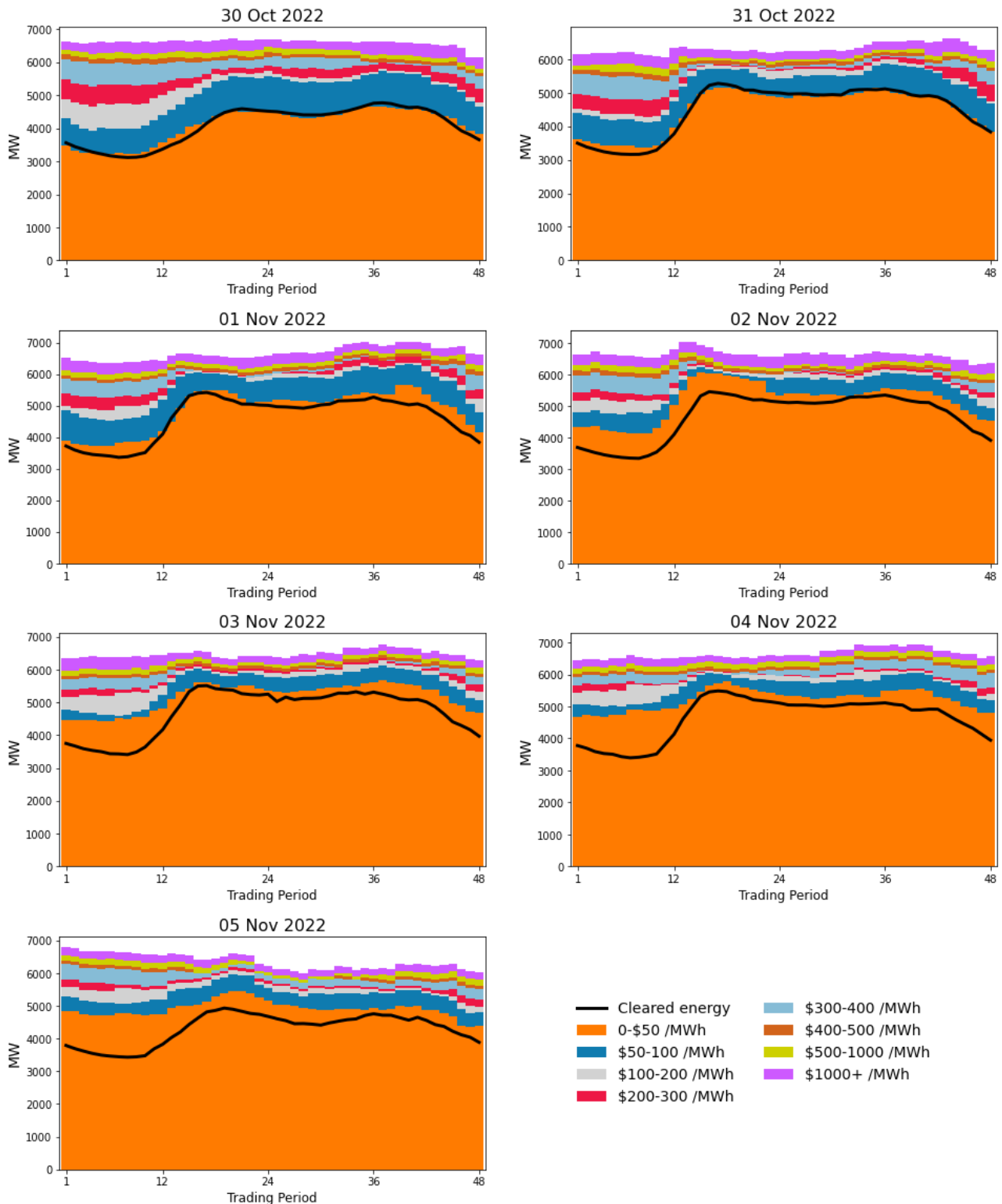
- 10.1. Figure 12 shows this week's daily offer stacks, adjusted to take into account wind generation, transmission constraints, reserves and frequency keeping³. The black line shows cleared energy, indicating the range of the average final price.
- 10.2. The majority of cleared energy this week fell in either the \$0-50/MWh or \$50-100/MWh bands. In previous weeks, when the lakes were declining, more hydro generation was shifted into higher priced tranches. This week, however, with a large

² <https://www.ea.govt.nz/assets/dms-assets/30/Appendix-C-Calculating-thermal-SRMCs.pdf>

³ The offer stacks show all offers bid into the market (where wind offers are truncated at their actual generation and excluding generation capacity cleared for reserves) in price bands and plots the cleared quantity against these.

increase in storage, a large amount of hydro generation was shifted to low priced tranches. This reflected in the lower average price, and low off-peak prices.

Figure 12: National daily offer stack



11. Ongoing Work in Trading Conduct

11.1. This week prices appeared to be consistent with supply and demand conditions.

11.2. Further analysis is being done on the trading periods in Table 1 as indicated.

Table 1: Trading periods identified for further analysis

Date	TP	Status	Notes
19/02/22-24/02/22	Several	Compliance enquiries in progress	After reviewing information received from Genesis regarding offers from Tekapo B while Lake Tekapo was spilling, this case has been passed to compliance to assess if the offers were compliant with trading conduct rules.
07/10/22	15-16	Further analysis	The Authority is making enquires with Genesis regarding offers changes to final tranche prices at Huntly 1,4 and 5 for trading period 15-16.