

Trading Conduct Report

Market Monitoring Weekly Report

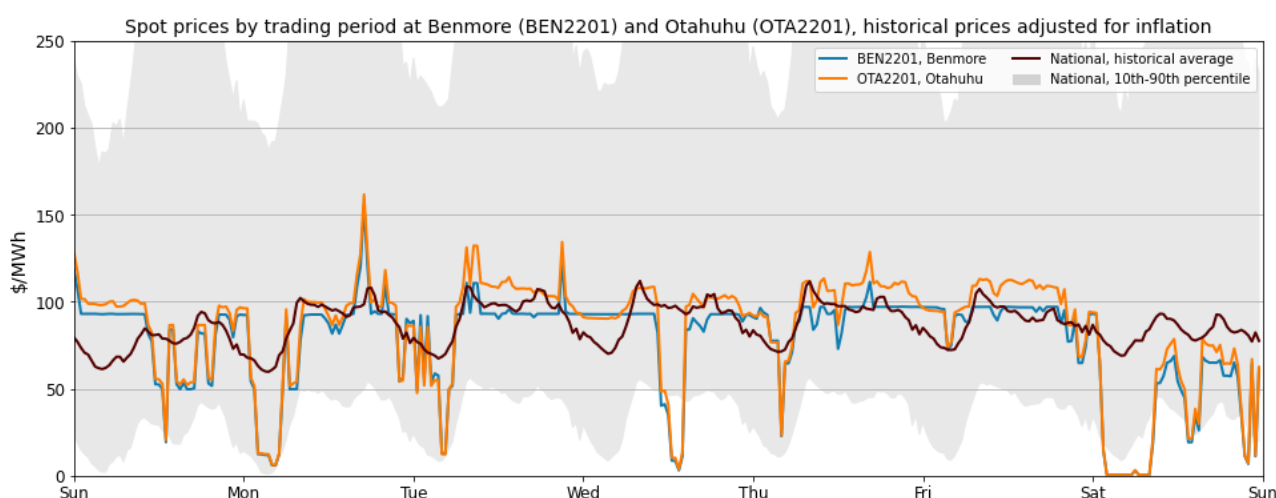
1. Overview for the week of 23-29 October

- 1.1. Wholesale spot prices between 23-29 October 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 23-29 October wholesale spot prices across all nodes averaged \$81/MWh, with 95 per cent of prices falling between \$0.5/MWh and \$119/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. Overnight spot prices this week had multiple instances of low prices under \$50/MWh. While during the day, prices tended to hover around \$100/MWh. There was one price spike above \$150/MWh on Monday evening.

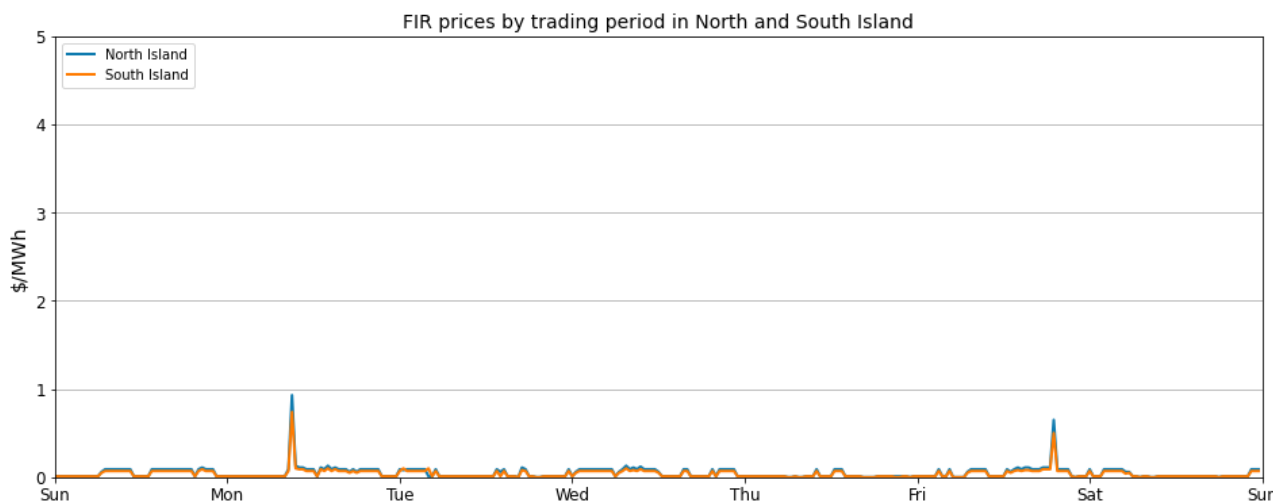
Figure 1: Wholesale Spot Prices



3. Reserve Prices

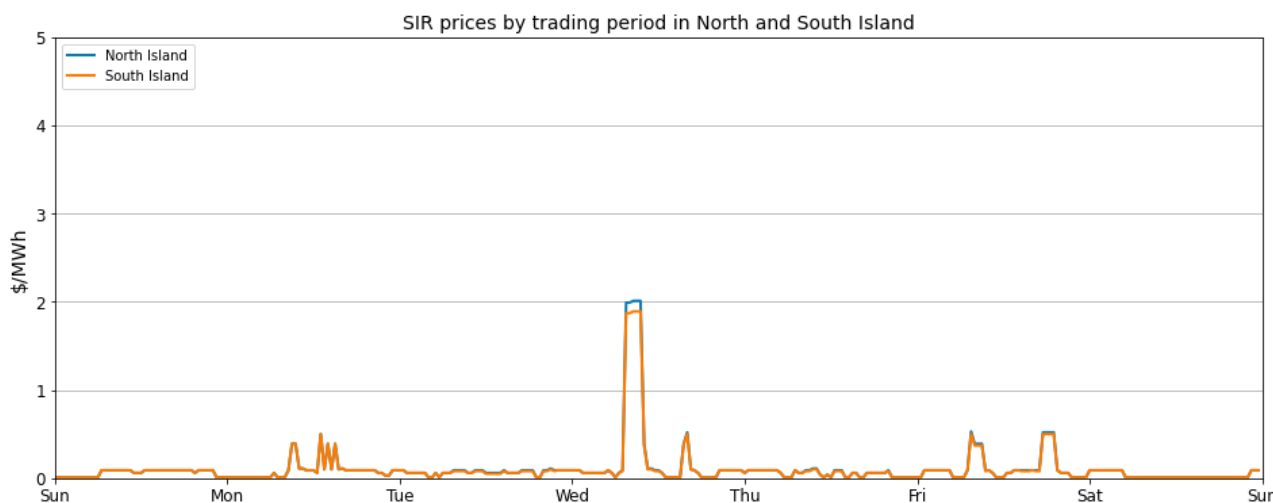
3.1. Fast instantaneous reserve (FIR) prices for the North and South Island are shown below in Figure 2. All FIR prices were low this week, with all trading periods below \$1/MWh.

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.

Figure 3: SIR prices by trading period and Island



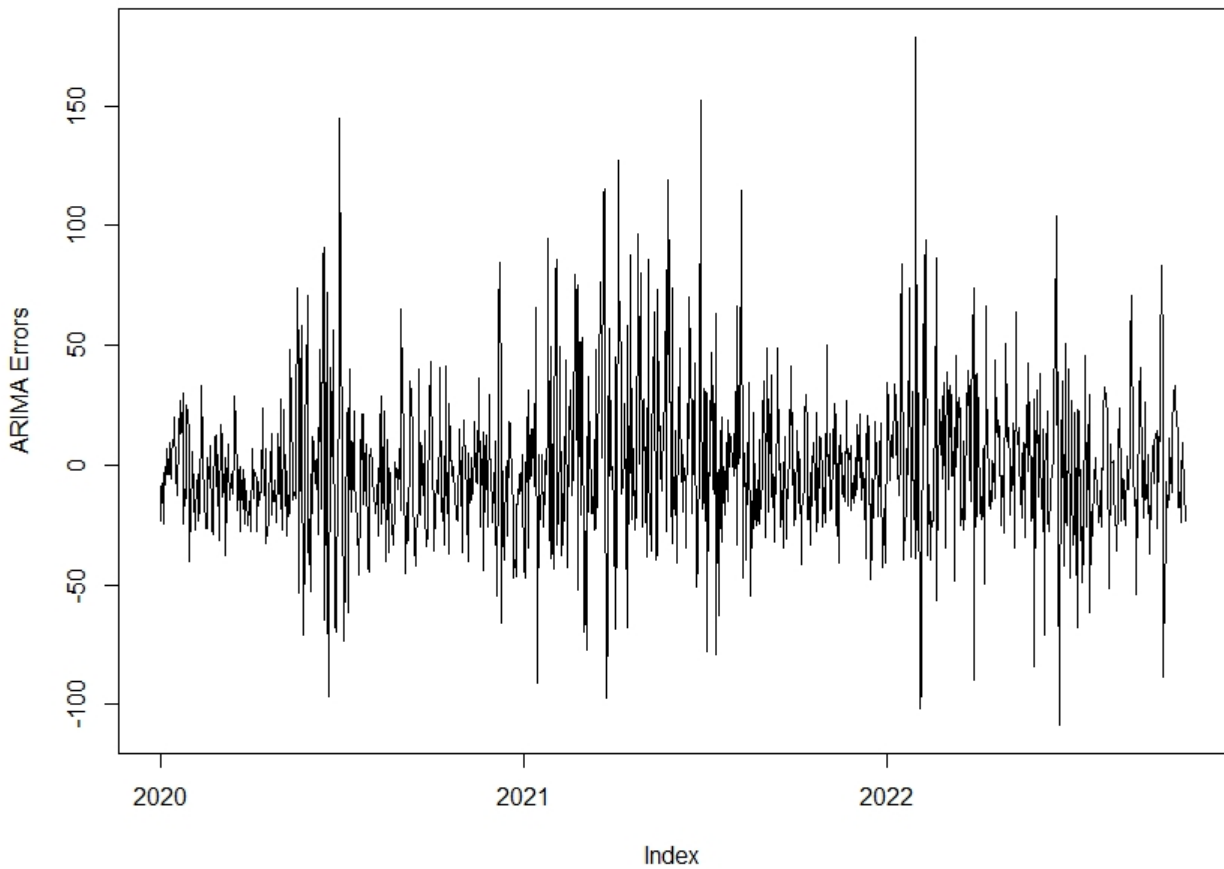
4. Regression Residuals

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 23 to 29 October were generally small, suggesting that prices on those dates appear to be aligned with market conditions.

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

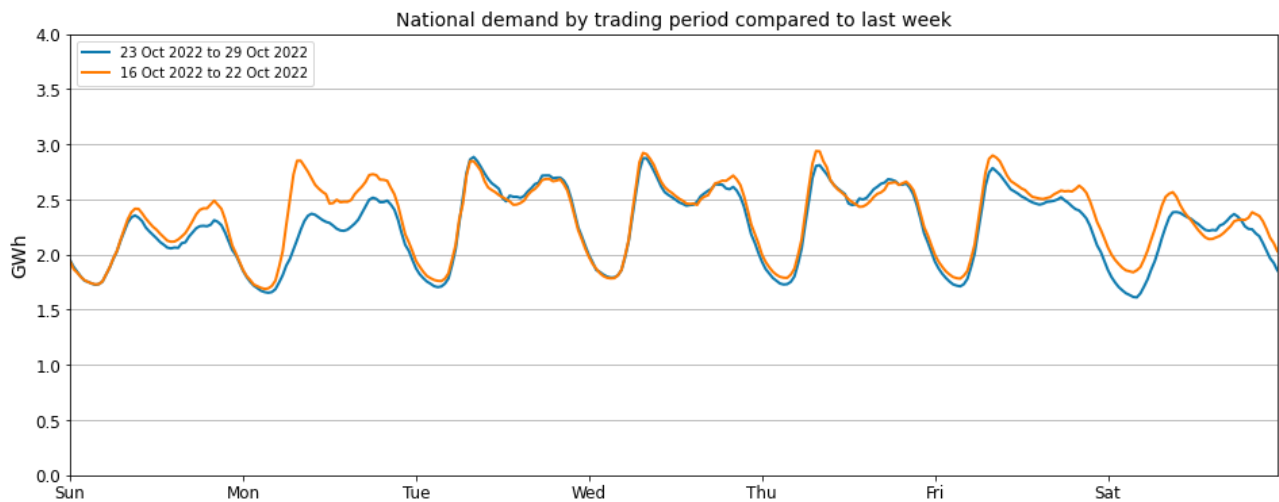
Figure 4: Residual plot of estimated daily average spot prices



5. Demand

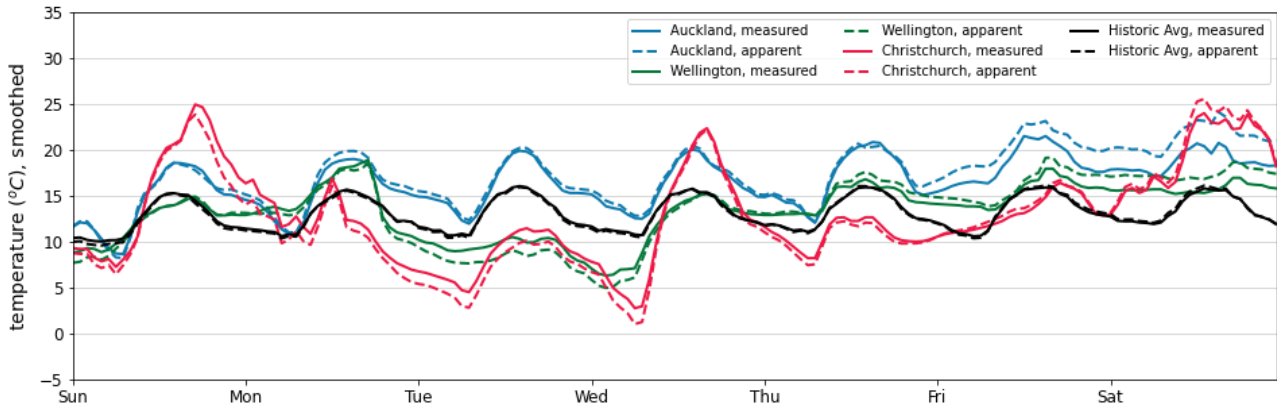
5.1. Figure 5 shows this week's national grid demand compared to the previous week. Demand between 23 and 29 October was similar to the previous week, except Monday, which was a public holiday. These similarities are likely due to continued warmer temperatures.

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 in Auckland, and Wellington were mostly between 10 and 20 degrees throughout the week. Christchurch experienced more volatility, with temperatures between 3 and 25 degrees.

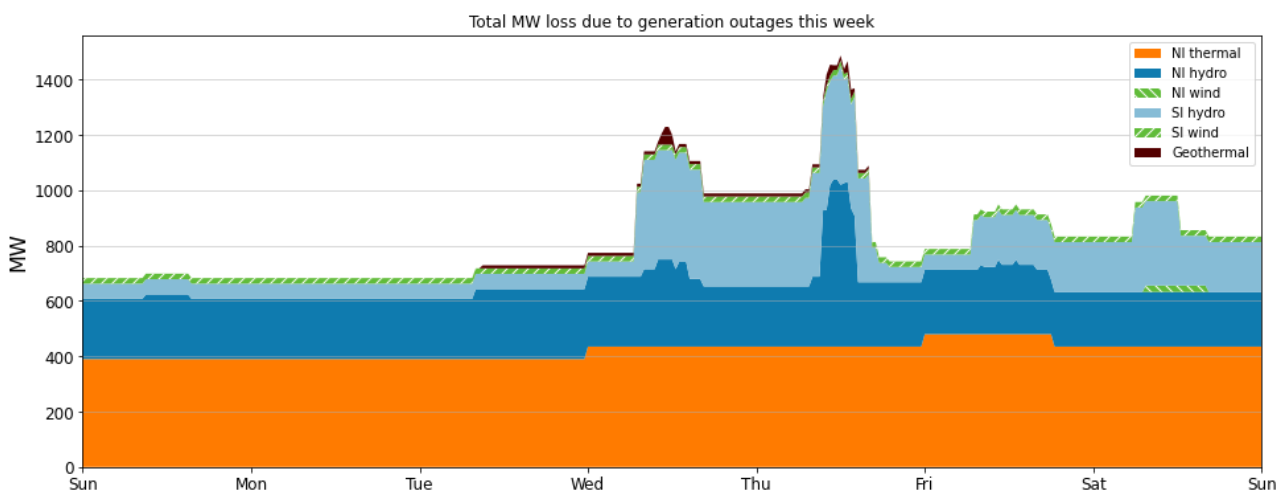
Figure 6: Temperatures across main centres

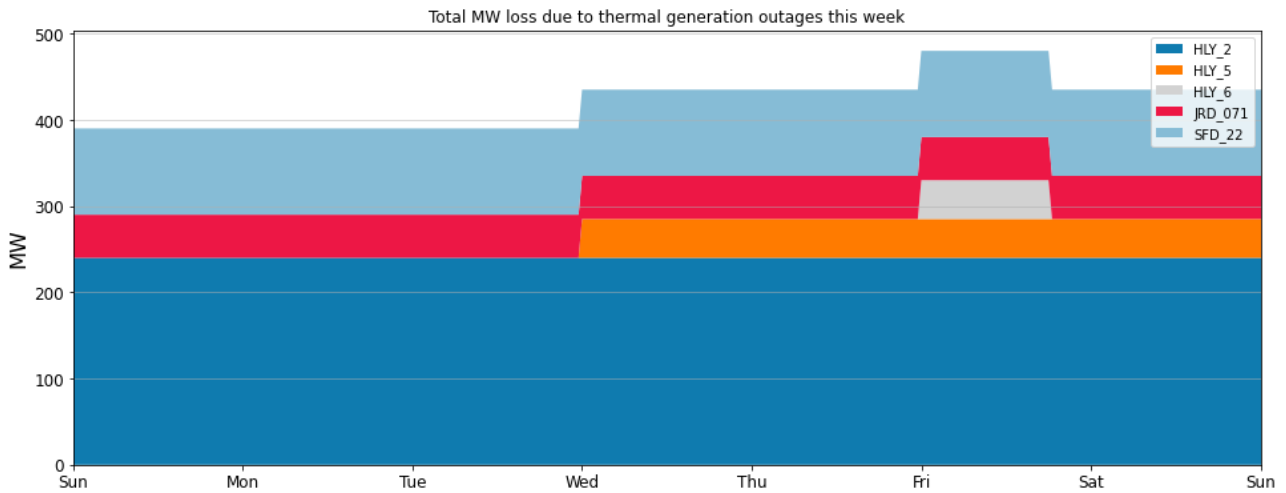


6. Outages

- 6.1. Figure 7 shows generation capacity on outage. Total capacity on outage ranged between 700 – 900 MW between Sunday and Tuesday. During Wednesday and Thursday outages increased to over 1,200 and 1,400 MW respectively, due to increased North and South Island hydro outages. Then between Friday and Saturday, outages decreased to between 800-1000 MW.
- 6.2. With regards to thermal outages, the second Stratford peaker remains on outage. Huntly 2 and Junction Road were on outage all week. Huntly 5 went on outage from Wednesday and Huntly 6 was on outage over Friday.

Figure 7: Total MW loss due to generation outages

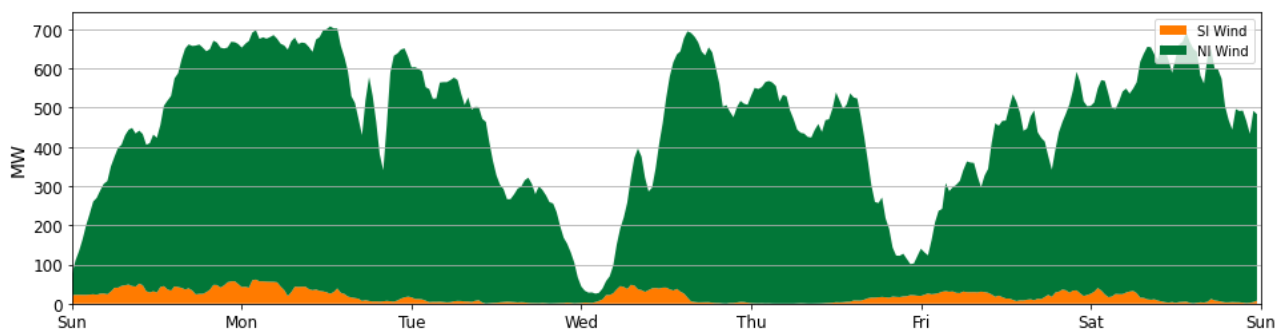




7. Generation

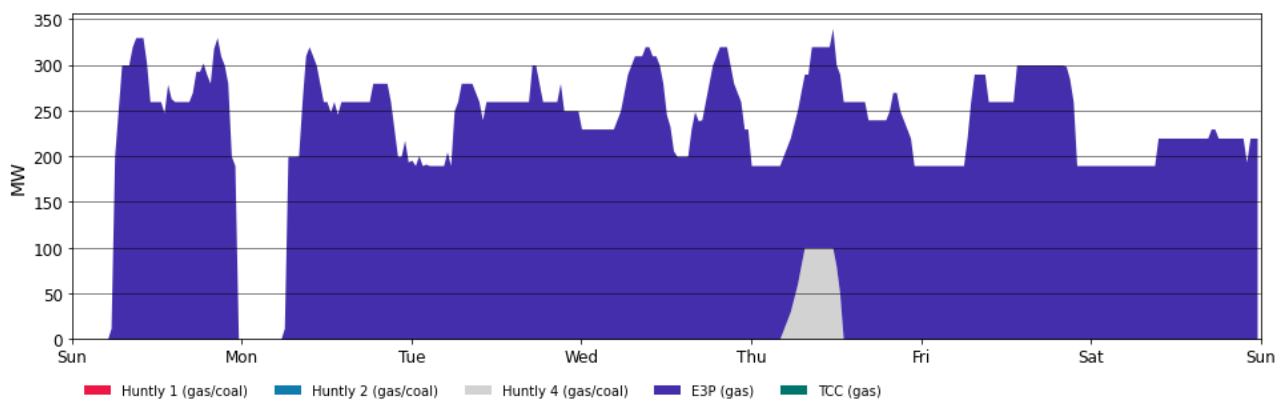
- 7.1. This week wind generation varied between 40 and 700 MW, as seen in Figure 8. Wind increased from around 100MW on Sunday morning to 650MW by the evening. Wind generation dropped off on Monday evening - this aligned with the ~\$160/MWh spot price.
- 7.2. Wind generation then began to decline throughout Tuesday and reached its weekly low early on Wednesday morning. Wind quickly ramped up to 700 MW by Wednesday evening, and the oscillated between 100-700 MW for the remainder of the week.

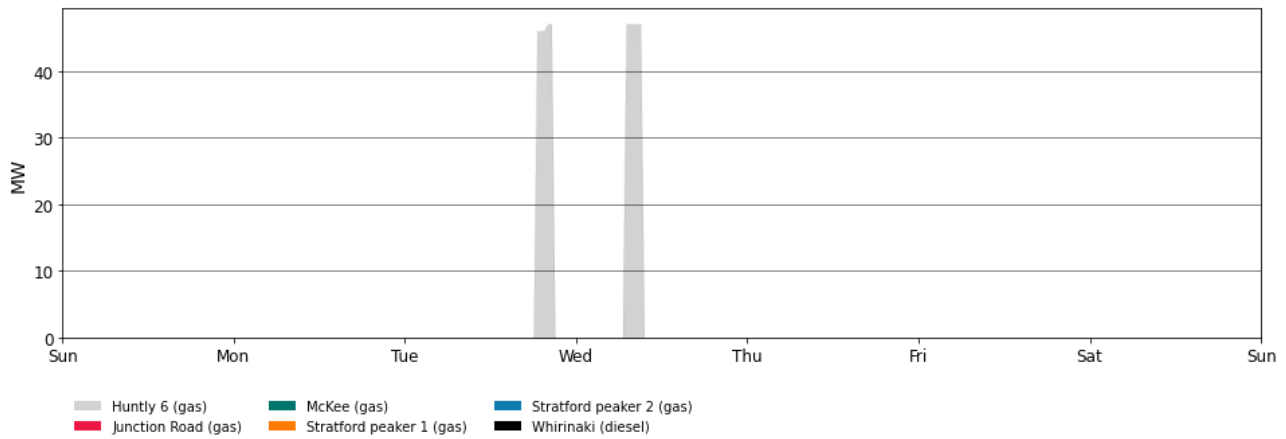
Figure 8: Wind Generation



- 7.3. Figure 9 shows generation of thermal baseload and thermal peaker plants between and 23-29 October. E3P, which had been two-shifting, started running continuously from Monday onwards. Huntly 4 ran during Thursday morning.

Figure 9: Thermal Generation



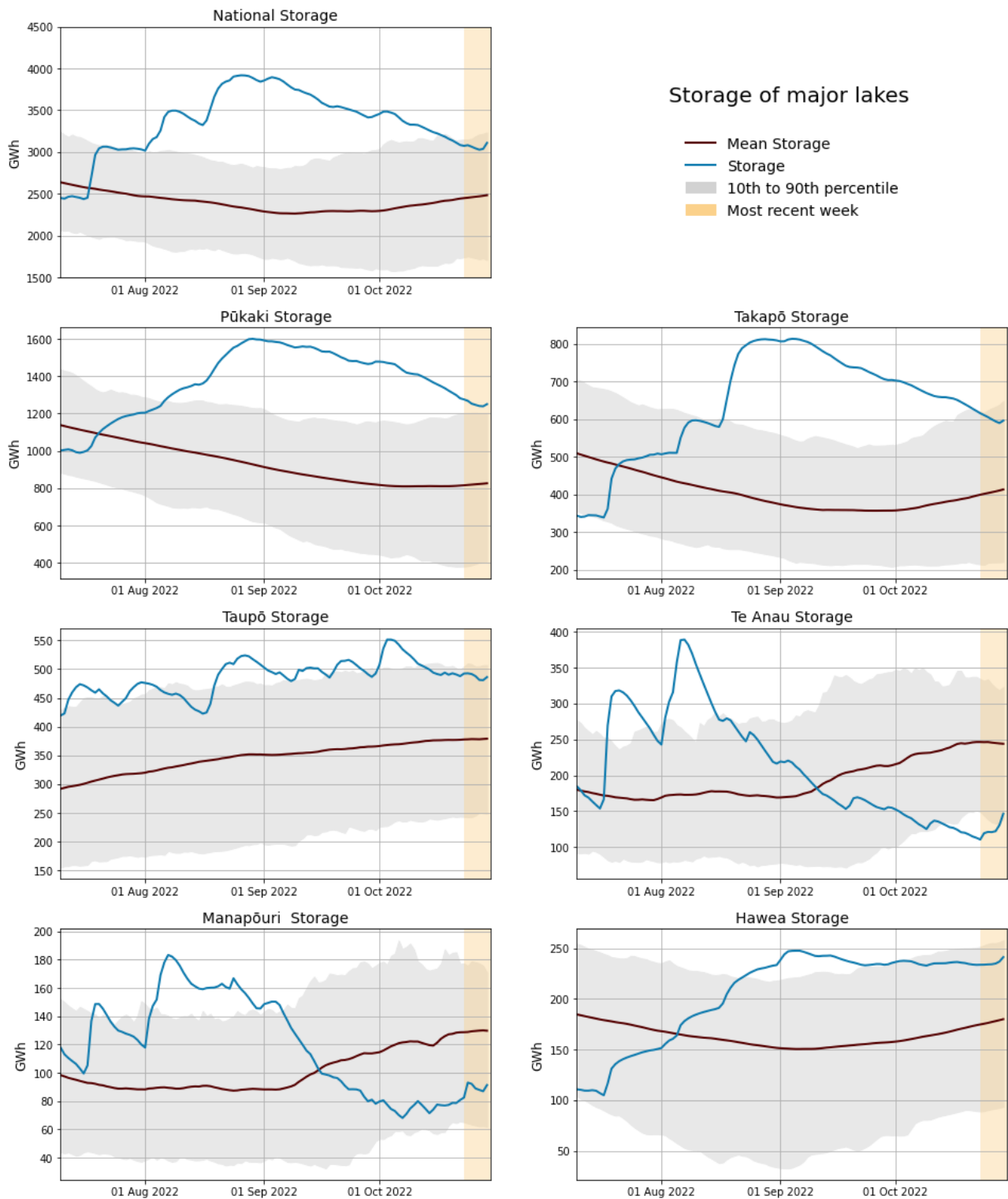


- 7.4. Huntly 6 was the only peaker dispatched this week. Both dispatches were during peak times on Tuesday and Wednesday and aligned with lower wind generation.
- 7.5. As a percentage of total generation, between 24 and 30 October, hydro generation totalled 65.6 per cent, geothermal 18.5 per cent, thermal 5.1 per cent and wind 9.7 per cent.

8. Storage/Fuel Supply ards overnight.

- 8.1. Figure 10 shows total controlled national hydro storage as well as the storage of major catchment lakes including their historical mean and 10th to 90th percentiles.
- 8.2. Hydro storage levels continue to remain above usual for this time of year at around 77 per cent of nominally full. All lakes ticked up slightly last week, however, only Pūkaki remains above its 90th percentile .
- 8.3. Lakes Hawea, Takapō and Taupō remain below their 90th percentile this week. Storage at Lake Te Anau has climbed above its 10th percentile, while Manapōuri remains above its 10th percentile.
- 8.4. The overall decline has caused national storage to also sink below its 90th percentile.
- 8.5. The flow at the HVDC has been primarily northwards during the day, but southwards overnight.

Figure 10: Hydro Storage

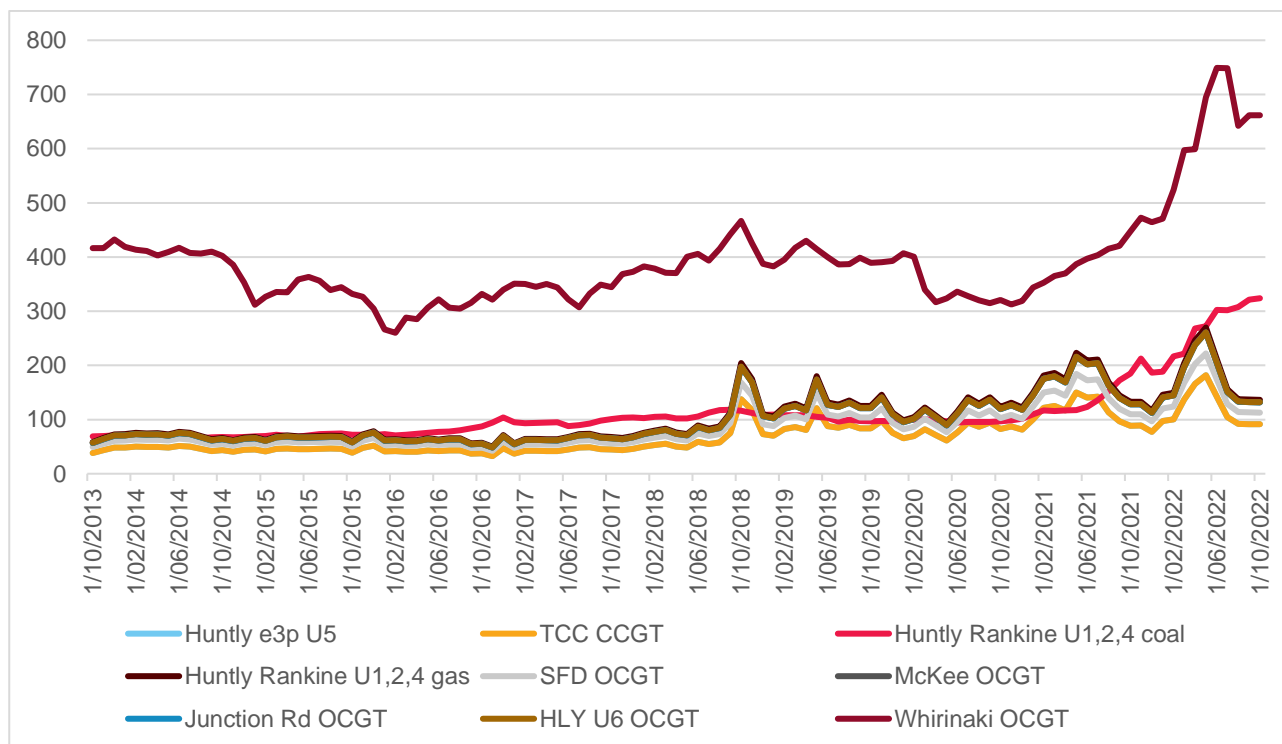


9. Price versus estimated costs

- 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 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 October 2022. The SRMC of gas fuelled plants continues to remain steady, the SRMC of diesel has decreased since June, while the SRMC of coal continues to increase.
- 9.4. In early October Indonesian coal was around \$570/tonne putting the latest SRMC of coal fuelled Huntly generation at ~\$320/MWh. The SRMC of Whirinaki has decreased to ~\$660/MWh.
- 9.5. SRMCs of gas run thermal plants decreased to between \$91/MWh and \$136/MWh with the increase in gas fuel availability in the market.
- 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



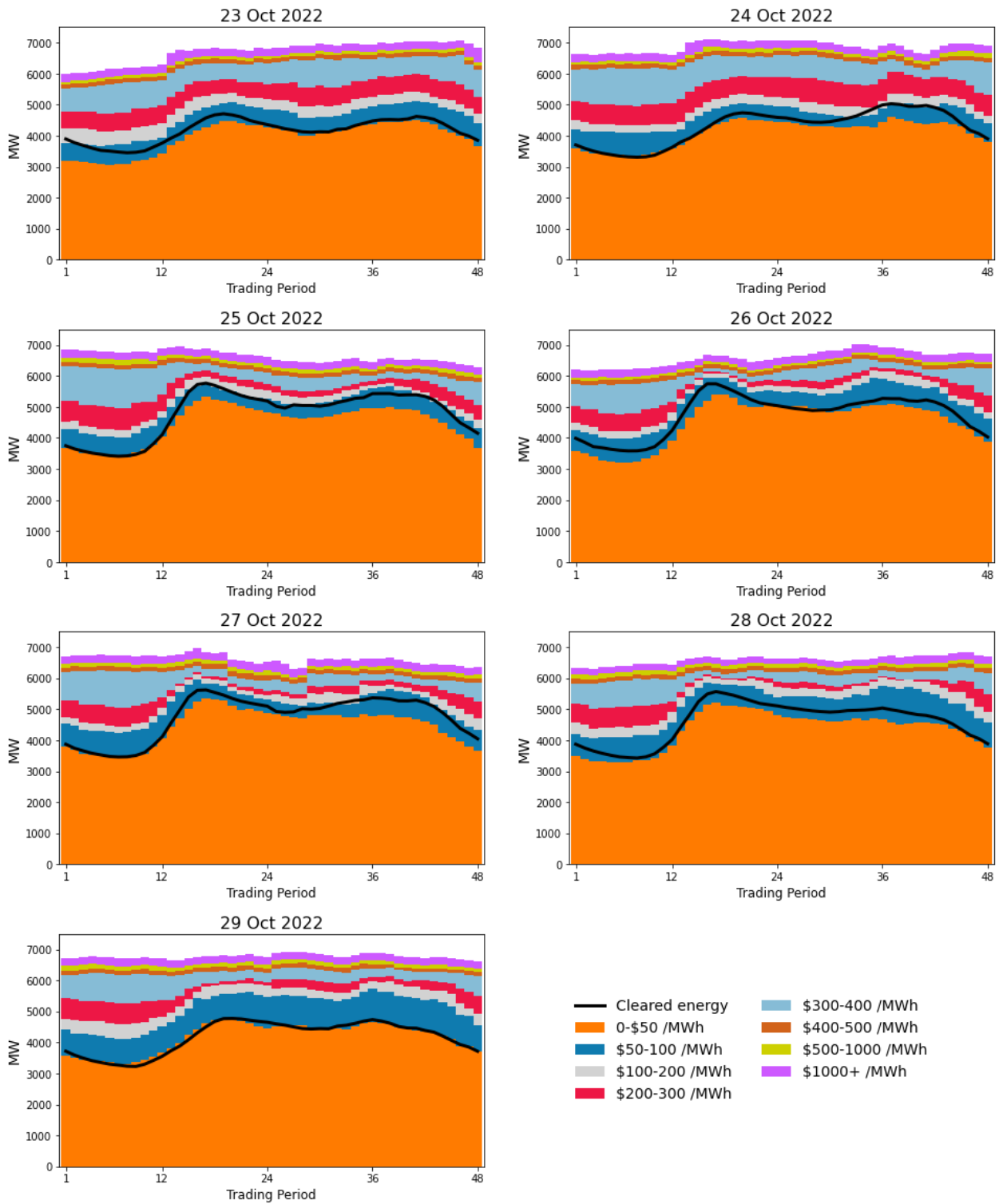
10. Offer Behaviour

- 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 \$50-100/MWh or \$100-200/MWh bands. In previous weeks, the unusual abundance of hydro caused the offer stack to have less mid-priced generation offers and lower priced generation offers. In more recent weeks, however, with all lakes having declined, more hydro generation has been shifted into higher priced tranches. This reflected in the higher average price.

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.

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.