

Trading Conduct Report

Market Monitoring Weekly Report

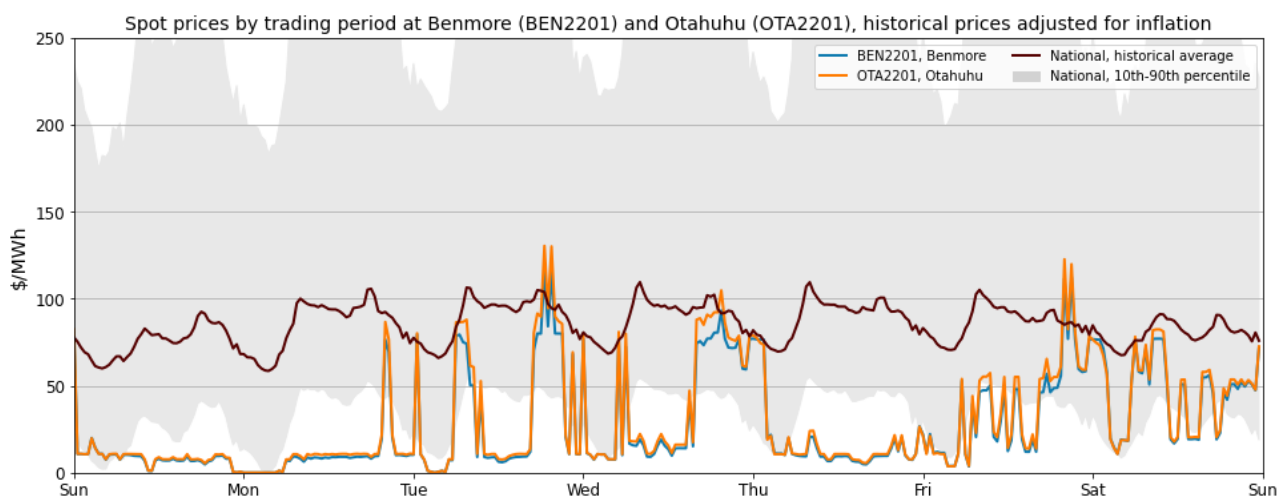
1. Overview for the week of 9-15 October

- 1.1. Wholesale spot prices between 9-15 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 9-15 October wholesale spot prices across all nodes the averaged \$34/MWh, with 95 per cent of prices falling between \$0.03/MWh and \$89/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. Prices mostly followed the pattern seen in previous weeks, with very low prices during offpeak, especially overnight, then rising to roughly \$80/MWh during the peaks. Prices rose above \$100/MWh during Tuesday and Friday evening. Most prices, however, were below the 10th percentile, indicating that prices are low for this time of year.

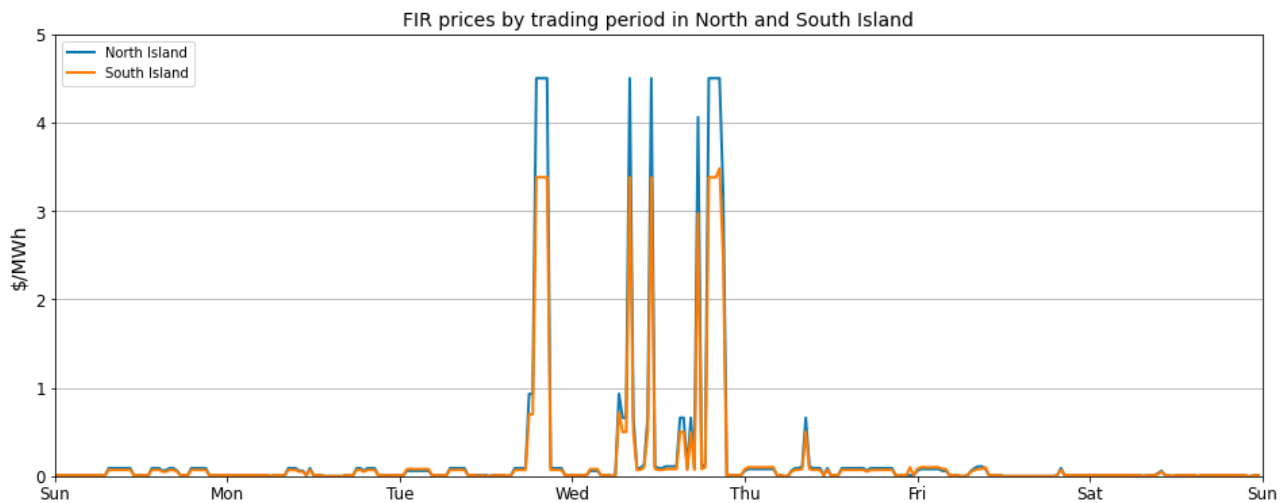
Figure 1: Wholesale Spot Prices



3. Reserve Prices

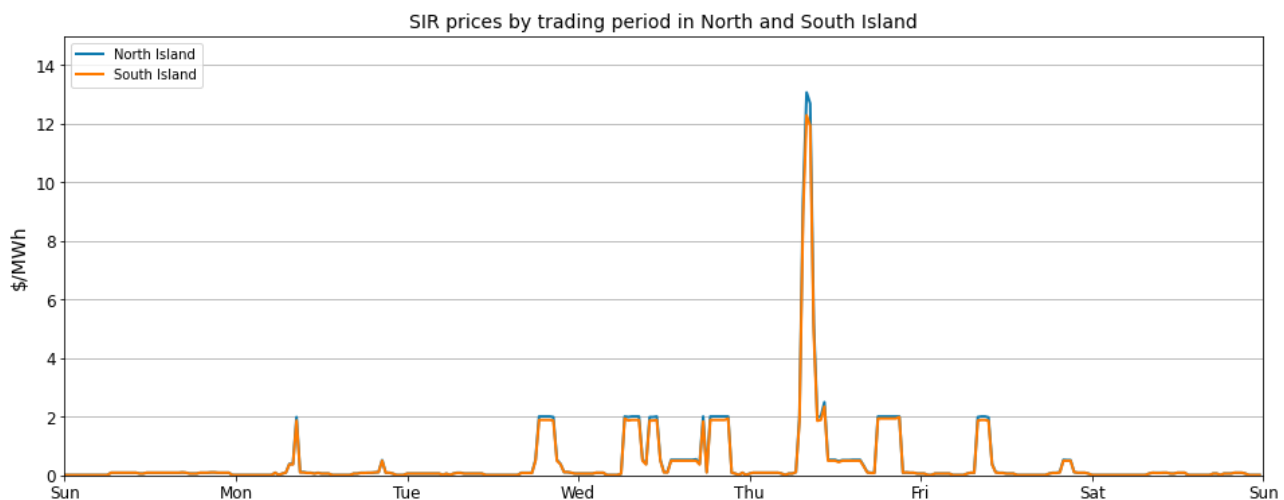
3.1. Fast instantaneous reserve (FIR) prices for the North and South Island are shown below in Figure 2. All FIR prices fell within historical bounds this week, with all trading periods below \$5/MWh.

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 \$20/MWh.

Figure 3: SIR prices by trading period and Island



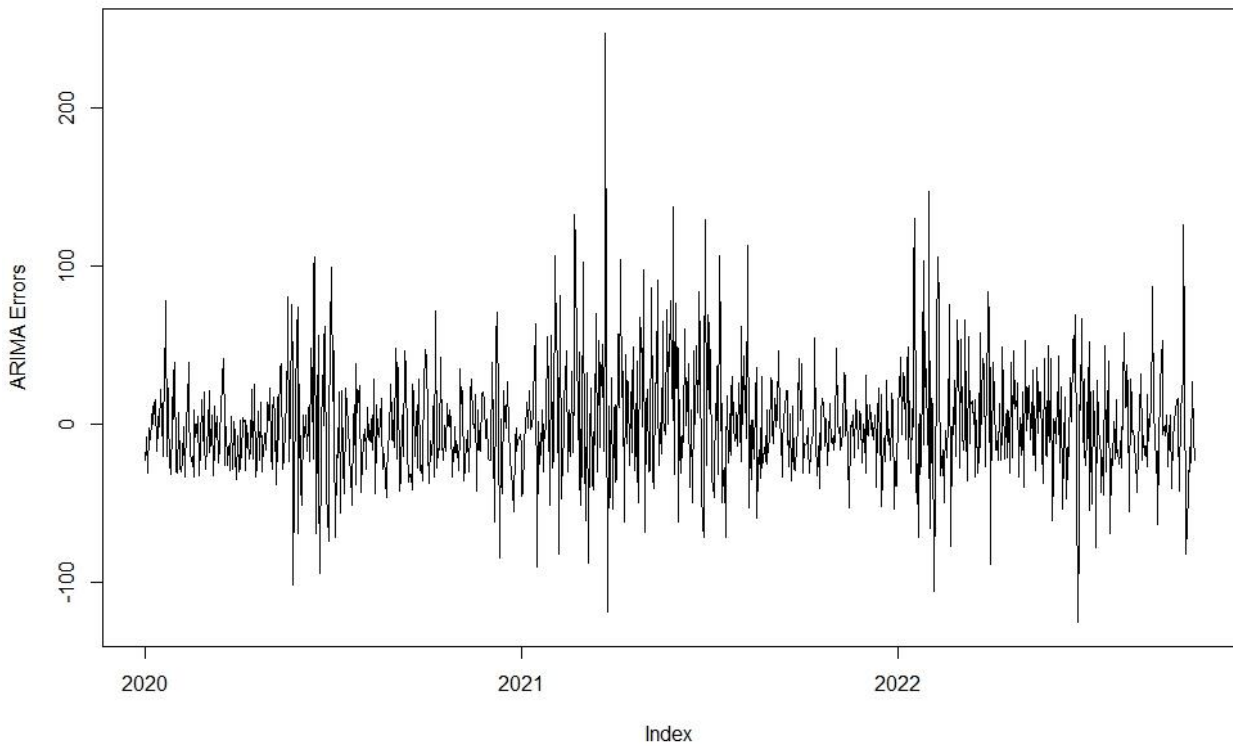
4. Regression Residuals

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. **Error! Not a valid bookmark self-reference.** shows the residuals of autoregressive moving average (ARMA) errors from the daily model. Residuals for 9 to 15 October were relatively 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>

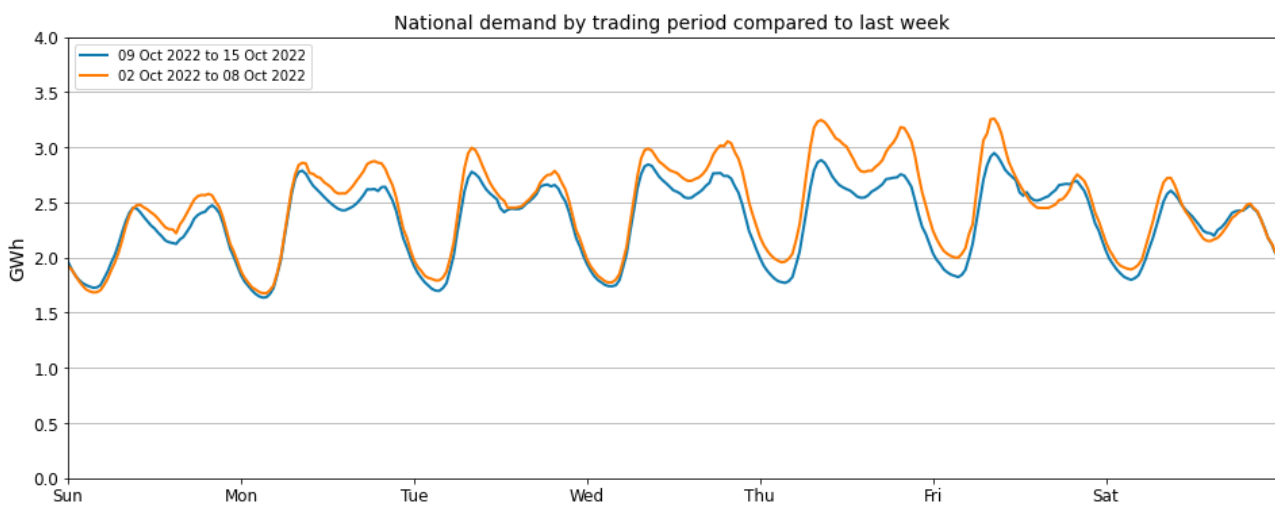
Figure 4: Residual plot of estimated daily average spot prices



5. Demand

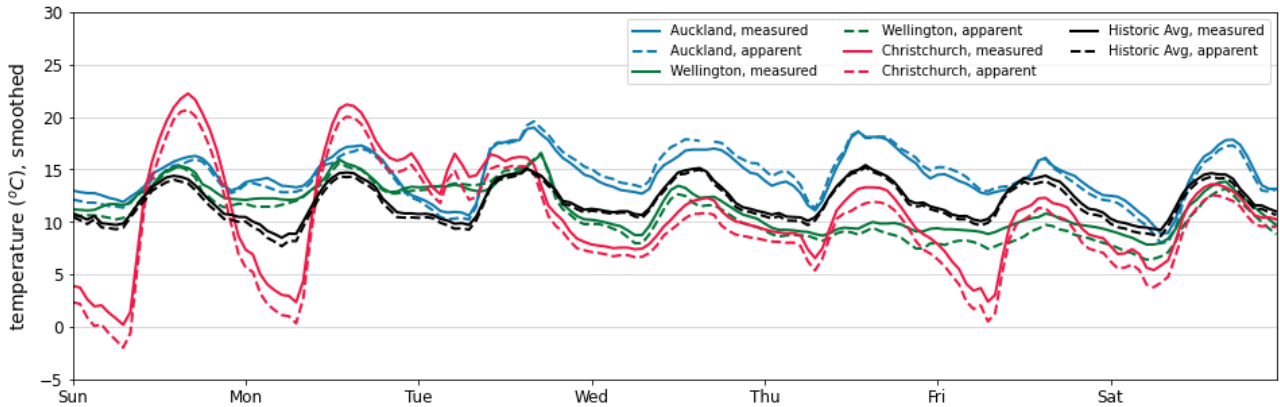
- 5.1. Figure 5 shows this week's national grid demand compared to the previous week. Demand between 9 and 15 October was mostly lower when compared to the previous week. This is likely due to the warmer temperatures, with the previous week experiencing a polar front, and school holidays. Lower demand this week likely helped keep prices low.

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 0 and 22 degrees.

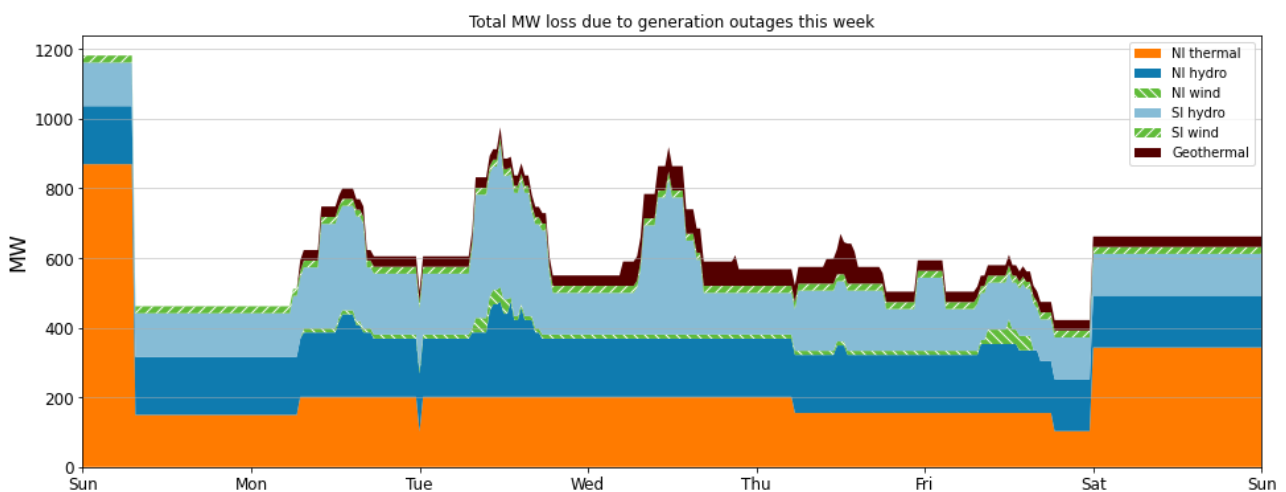
Figure 6: Temperatures across main centres

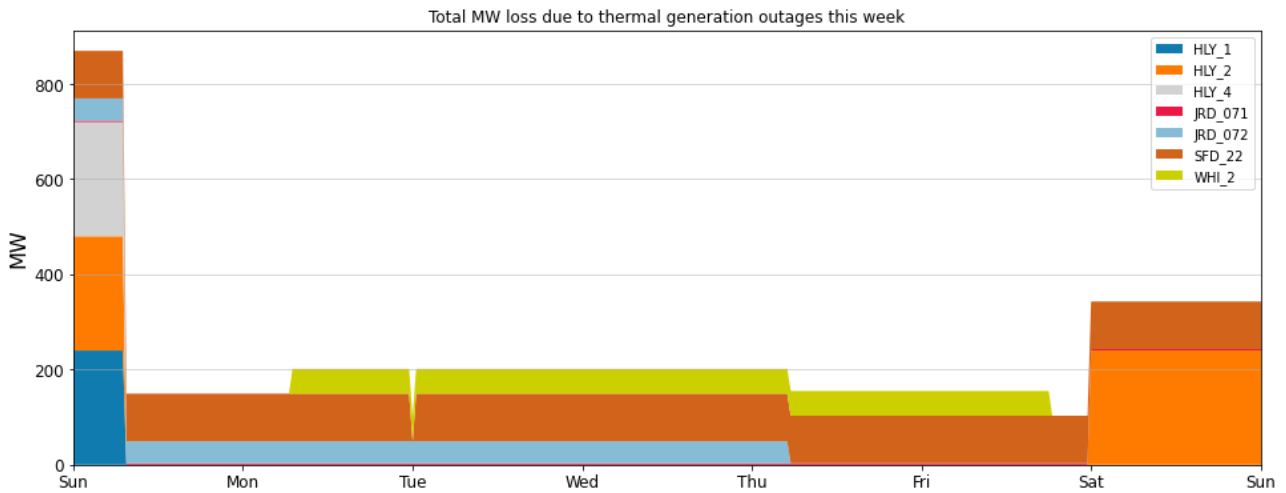


6. Outages

- 6.1. Figure 7 shows generation capacity on outages. Total capacity on outage decreased from ~1200 MW on Sunday to between 400-900 throughout the week. This is a reduction from the previous week.
- 6.2. With regards to thermal outages, the second Stratford peaker remains on outage. On Sunday, Huntly 1, 2, and 4 as well as Junction Road were on outage. Whirinaki (unit two) was on outage between Monday and Friday, with Huntly 2 going on outage again on Saturday. Note that the dip from the Stratford peaker between Monday and Tuesday is due to the outage rolling over to a separate POCP notice.

Figure 7: Total MW loss due to generation outages





7. Generation

7.1. This week wind generation, as seen in Figure 8, varied between 20 and 700 MW. Wind generation hovered between 500- 700 MW on Sunday and Monday, before dramatically dropping off on the on Tuesday, reaching just 20MW that evening. Wind generation then increased to roughly 600 MW on Thursday evening, before declining throughout Friday and Saturday. High wind this week likely contributed to low prices.

Figure 8: Wind Generation

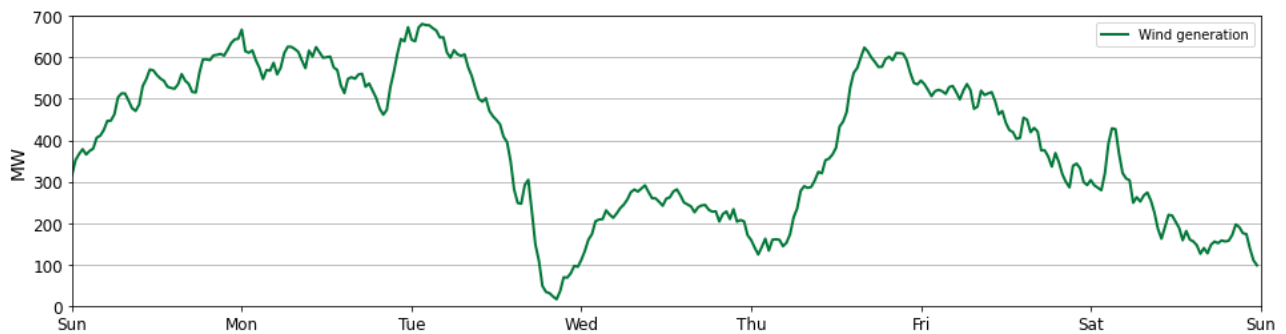
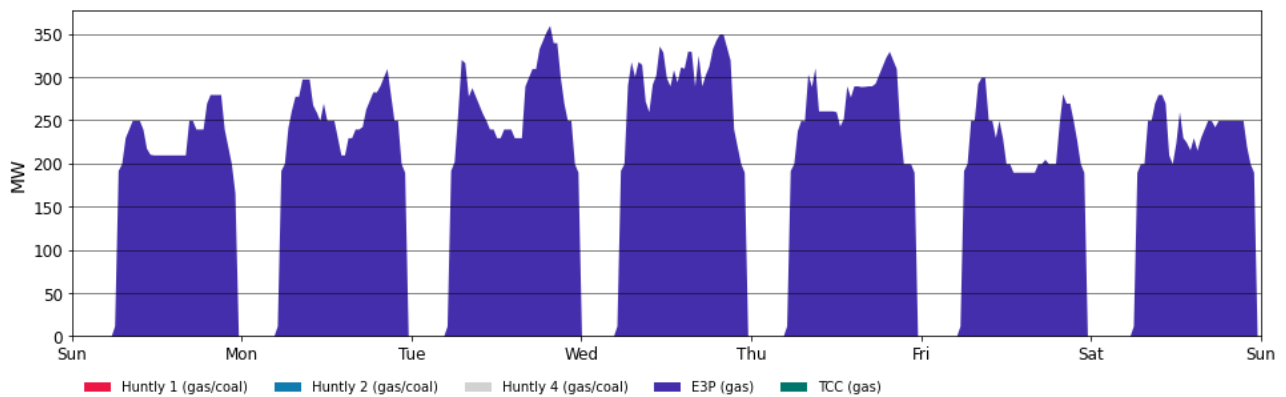
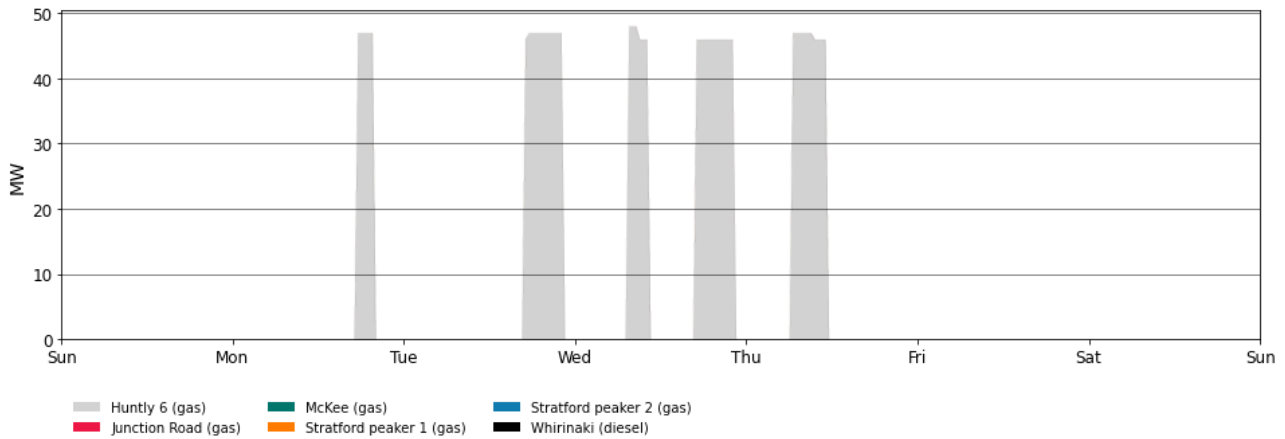


Figure 9 shows generation of thermal baseload and thermal peaker plants between and 9-15 October. Only E3P ran during the day as baseload this week.

Figure 9: Thermal Generation





7.2. There was also less generation from thermal peakers with only Huntly 6 dispatched during peak times between Monday and Thursday - which were the days with lower wind. The need for less thermal generation likely helped keep prices low this week.

7.3. As a percentage of total generation, between 10 and 16 October, hydro generation totalled 71.6 per cent, geothermal 15.6 per cent, thermal 4.8 per cent and wind 6.8 per cent.

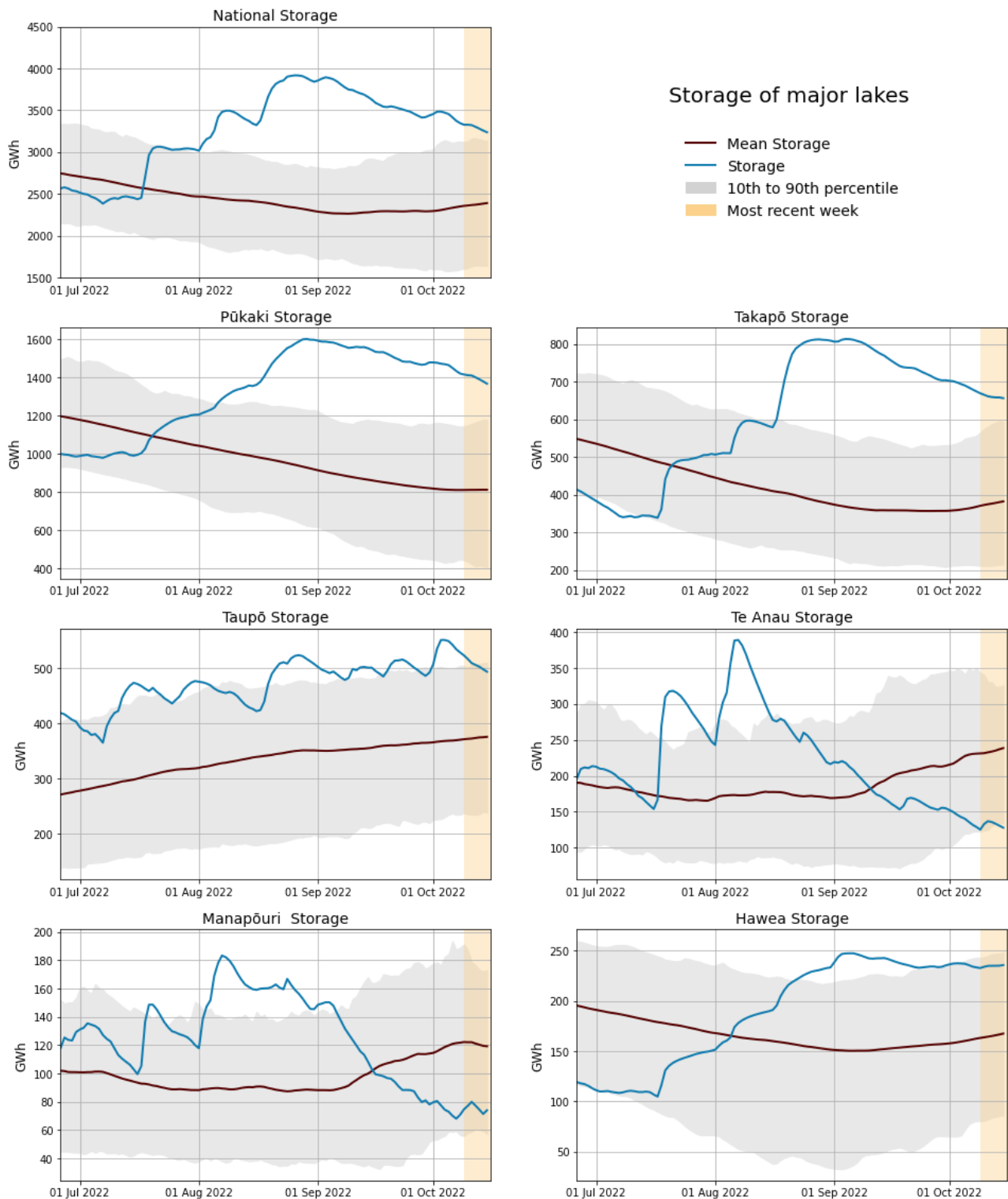
8. Storage/Fuel Supply.

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 well above usual for this time of year at around 81 per cent of nominally full. Most major lakes continue to remain above their historic 90th storage percentile, except Te Anau and Manapōuri, which have fallen close their historic 10th percentiles.

8.3. With the abundance of hydro generation in the South Island, the flow at the HVDC has been primarily northwards during the day, but southwards overnight.

Figure 10: Hydro Storage

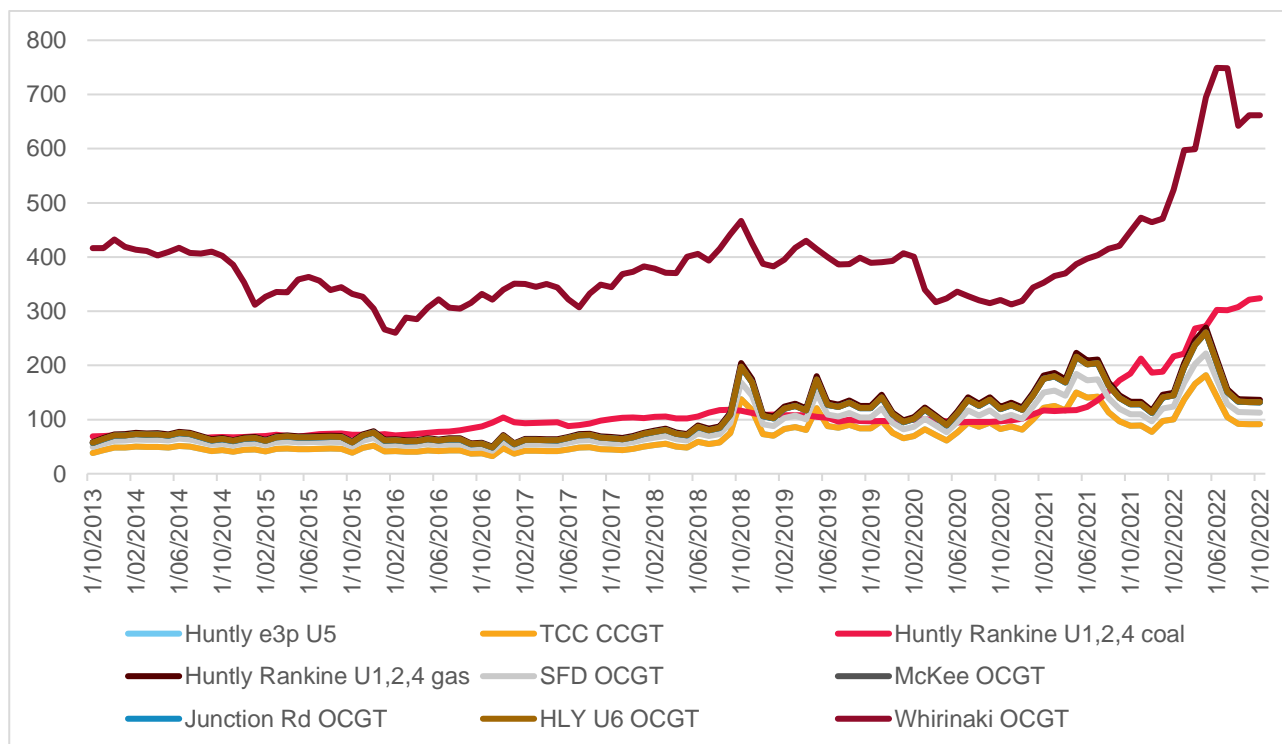


9. Price versus estimated costs

- 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 opportunity cost of storage) for thermal fuels can be 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, while the SRMC of diesel has decreased since June and coal fuelled plants has increased.
- 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



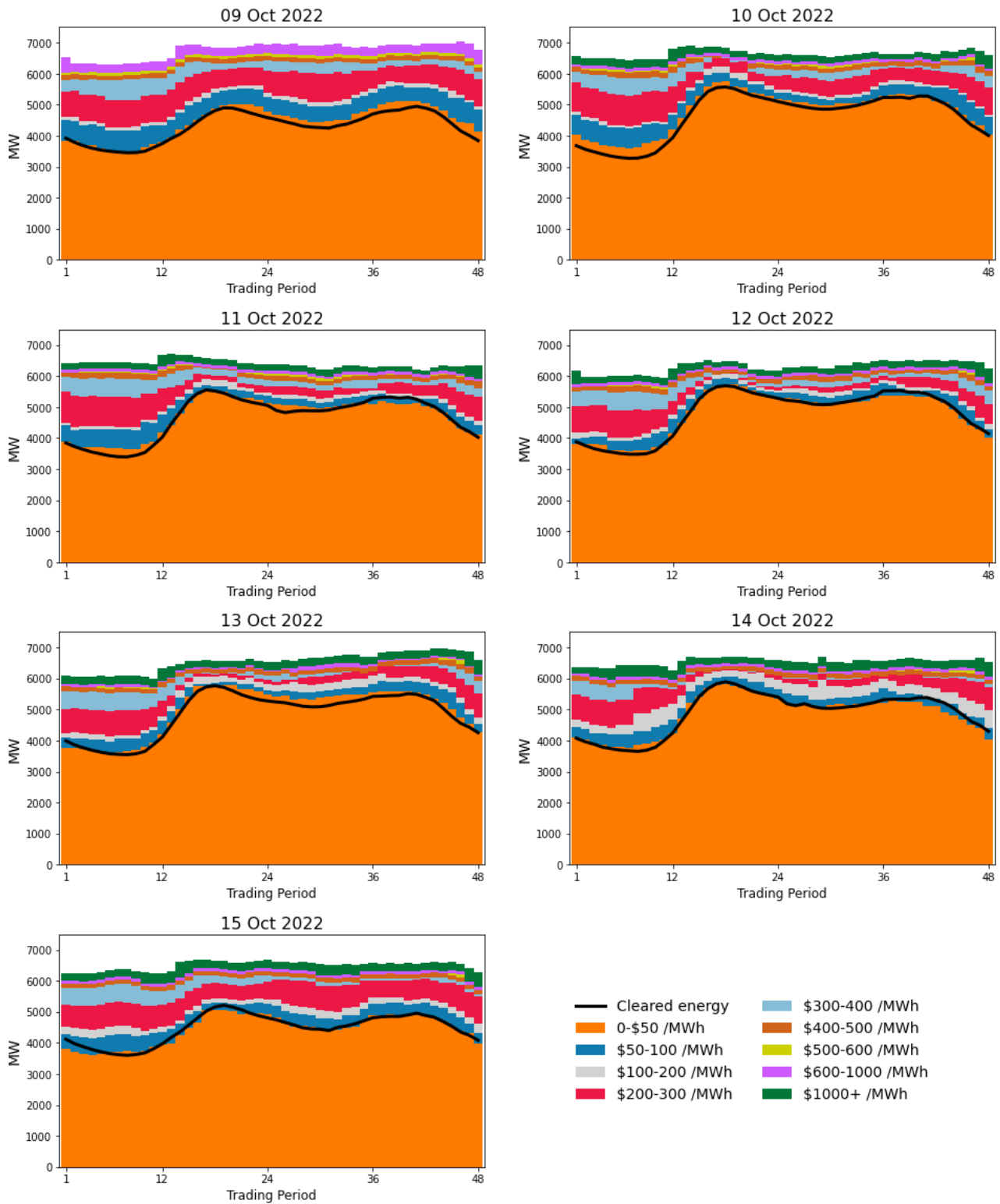
10. Offer Behaviour

- 10.1. Figure 12 and Figure 13 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 fell in either the \$0-50/MWh or \$50-100/MWh bands. Previously the unusual abundance of hydro changed the offer stack and had less mid-priced generation offers and more lower priced generation offers. Now, however, with lakes Te Anau and Manapōuri approaching their 10th percentile, the majority of offers from the Manapōuri power station are priced between \$200-300/MWh.

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.