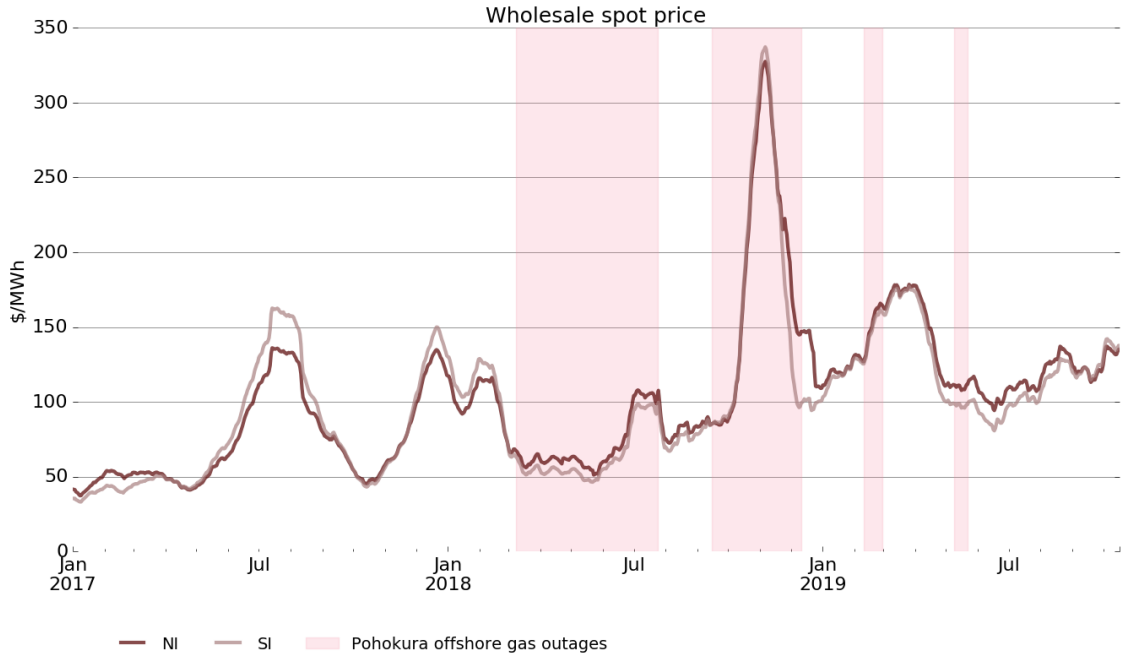
Electricity spot price increases

The market performance team actively monitors aspects of the electricity market. In this short report we have analysed the increased wholesale prices since mid-2018.

Wholesale spot electricity prices started departing from long term averages around June/July 2018. This short report describes the drivers for this. We also look at forward prices and announced gas field outages. From this we anticipate that high and volatile spot prices are likely to continue through 2020. The rest of this report sets out the reasons for this conclusion.

Figure 1: Spot prices since 2017 and Pohokura outages



The drivers for increased wholesale prices since mid-2018

Since mid-2018 the fundamental drivers for increased prices appear to reflect an increase in the gas supply risk and a tighter gas supply market along with a developing low hydro situation which extended into 2019.

A timeline of events that have likely contributed to the price increases.

- **March 2018 – July 2018**

  First Pohokura outage - a prolonged unplanned outage at Pohokura (New Zealand's largest gas production facility) was required to repair an undersea gas pipeline from the offshore facility.

- **September 2018 – December 2018**

  Second Pohokura outage - a valve issue forced a second prolonged unplanned outage to the offshore production facility.

- **February 2019 and May 2019**

  Third and fourth planned Pohokura gas production outages for a well intervention campaign.

- **March 2019**

  New Zealand hydro storage hitting 1% Electricity Risk Curve.

- **First half 2019**

  Dry North Island hydro conditions affecting Mercury's Waikato River hydro generation.

- **All of 2019**

  Increased wholesale spot gas prices all year.

Although wholesale electricity prices started increasing during the first Pohokura outage (June 2018), wholesale prices ramped up significantly during the second outage (especially during October 2018). This is shown above in Figure 1.

Drivers for the high price increases, especially during the second Pohokura outage appear to relate to a tight gas market reacting significantly to the reduction of gas produced by the Pohokura field. Additionally, a higher gas demand from both the dairy industry (Fonterra) and Methanex's methanol operation likely contributed to the increase in spot gas prices during this time.

This contrasts with the first Pohukura outage which was during low dairy industry gas usage and was also semi coordinated with a Methanex production outage.

The resulting high gas price translated into the electricity market with increased energy offers from North Island thermal generation. This is illustrated in **Error! Reference source not found.** and Figure 3 below which shows the quantity weighted average thermal offer price (over all North Island thermal plant) against spot gas prices (available from www.bgix.co.nz/prices).

Figure 2: Maui gas spot prices and thermal offers

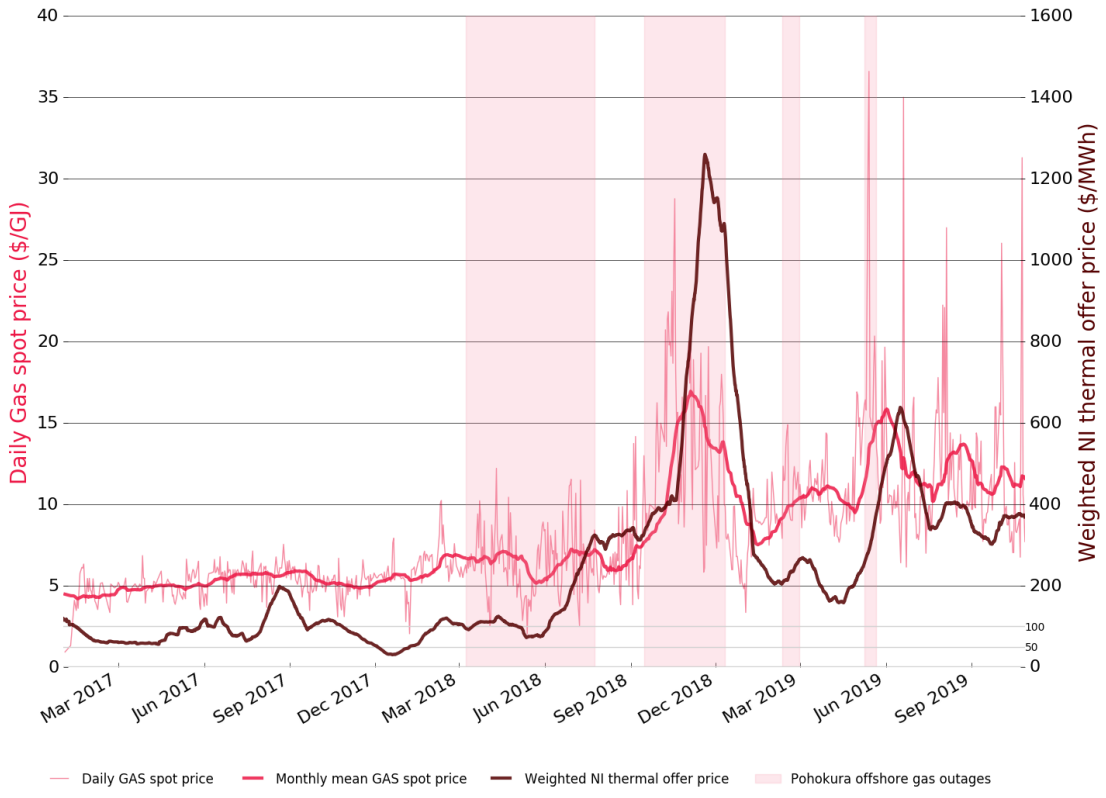
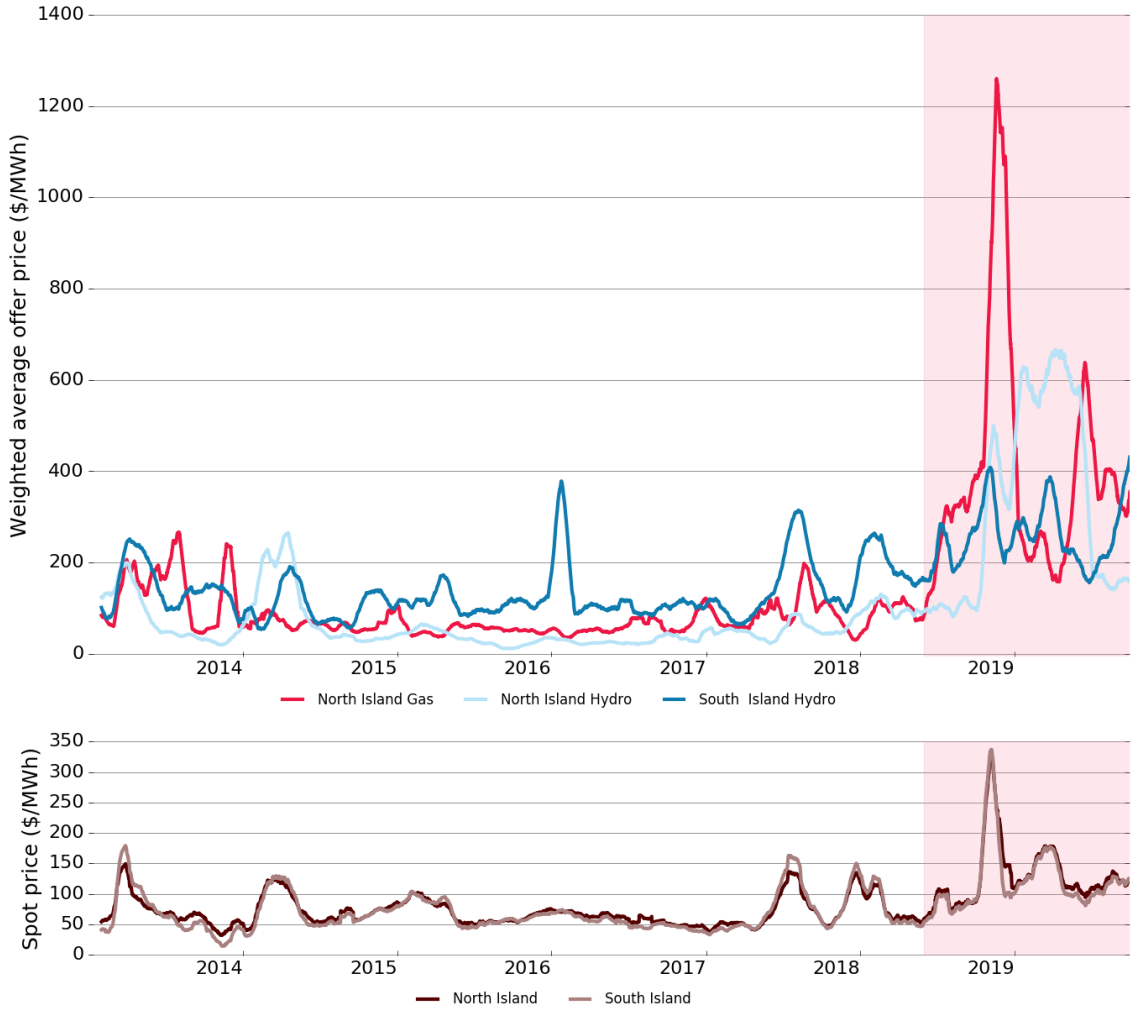


Figure 3: Weighted average offer prices and the spot price

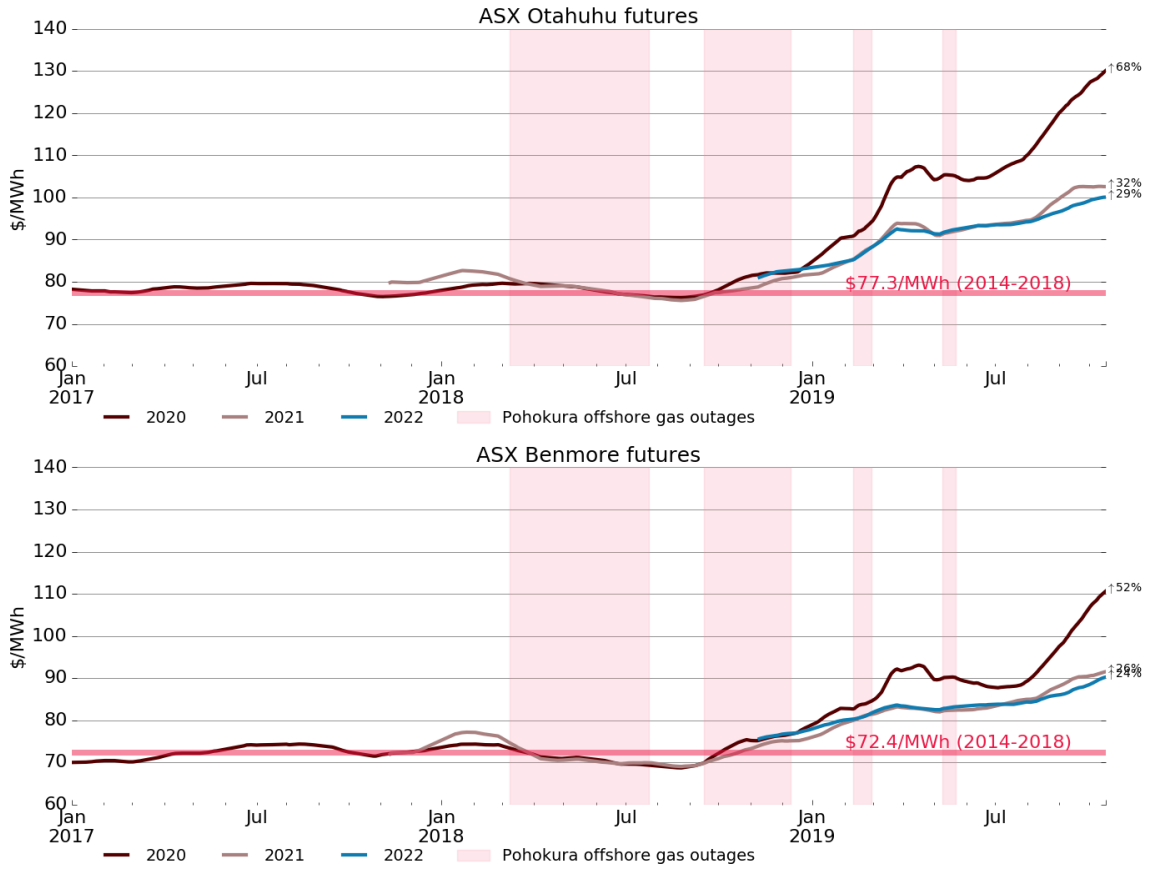


An interesting observation from this chart is that North Island thermal offers appear to have increased more than the likely additional cost of gas (if gas is purchased from the gas spot market). For example, until mid-2018 spot gas prices of ~$6/GJ translated to a weighted thermal offer price of around $100/MWh. More recently, spot gas prices of ~$12/GJ have translated to a much higher weighted offer price of around $500/MWh.

Volatile and high spot prices are likely to continue

In the longer term, the departure/increase in future prices for the next 3 to 4 years appears indicative of a change in the fundamental drivers used to price electricity. In particular, the increasing impact of a tighter gas market appears to be leading to higher longer term wholesale electricity prices, as illustrated below in Figure 4.

Figure 4: Forward prices for 2020, 2021 and 2022



Planned future disruptions in the first quarter of 2020 are driving prices even higher for quarter one 2020.

- **March 2020**

  Planned Pohokura outage to carry out regulatory and integrity-based inspections and to complete critical maintenance. This was disclosed on 29 July 2019 at www.gasindustry.co.nz/industry-notifications/.

- **January 2020 – June 2020**

  Inspection of the Pohokura undersea pipeline and possible consequent maintenance work.

- **February 2020**

  Ahuroa Gas Storage facility shut down for its four yearly regulatory inspection and testing of pressure vessels, pipework and other safety critical equipment.

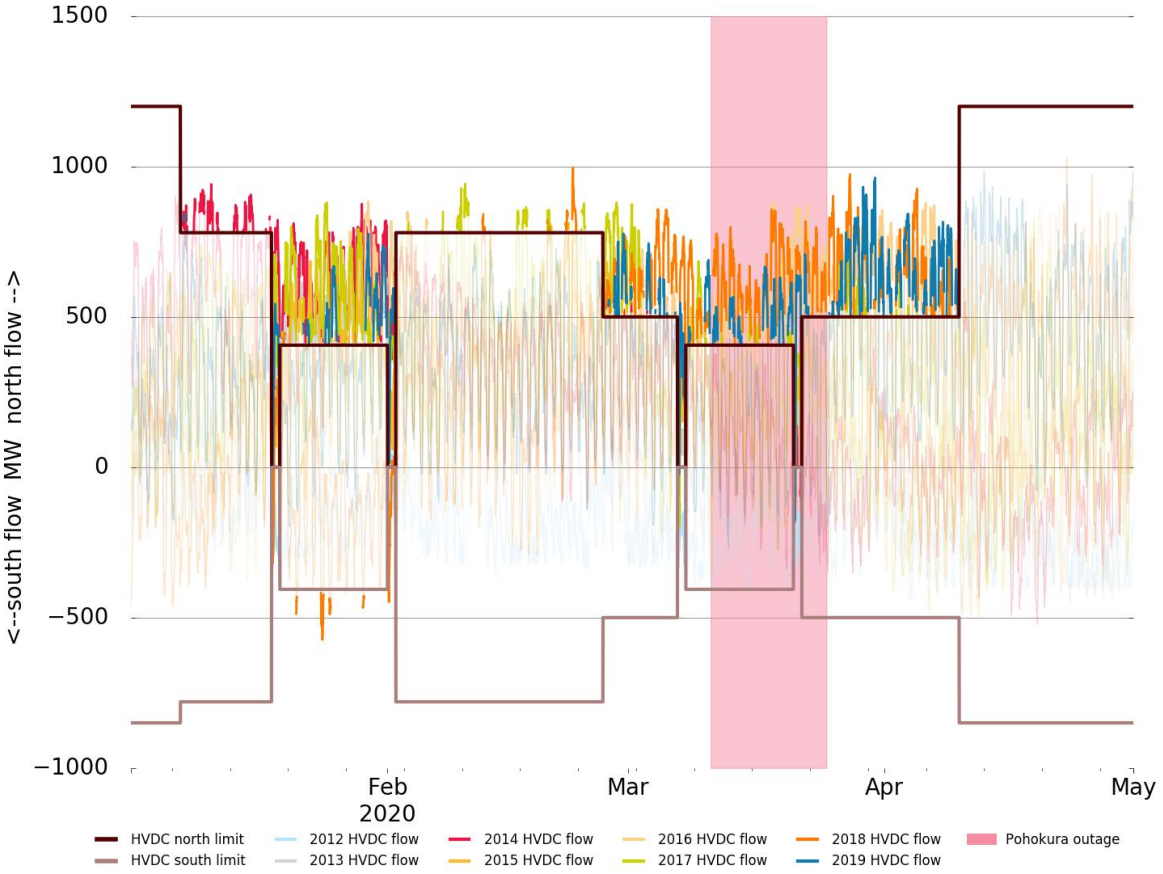
- **Third quarter 2020**

  Drivers for quarter three 2020 prices may reflect forecast tighter gas supply conditions during the dairy season.

In addition there is a co-incident outage on Transpower's HVDC link for a major control system upgrade on Pole 2 from January – March 2020.

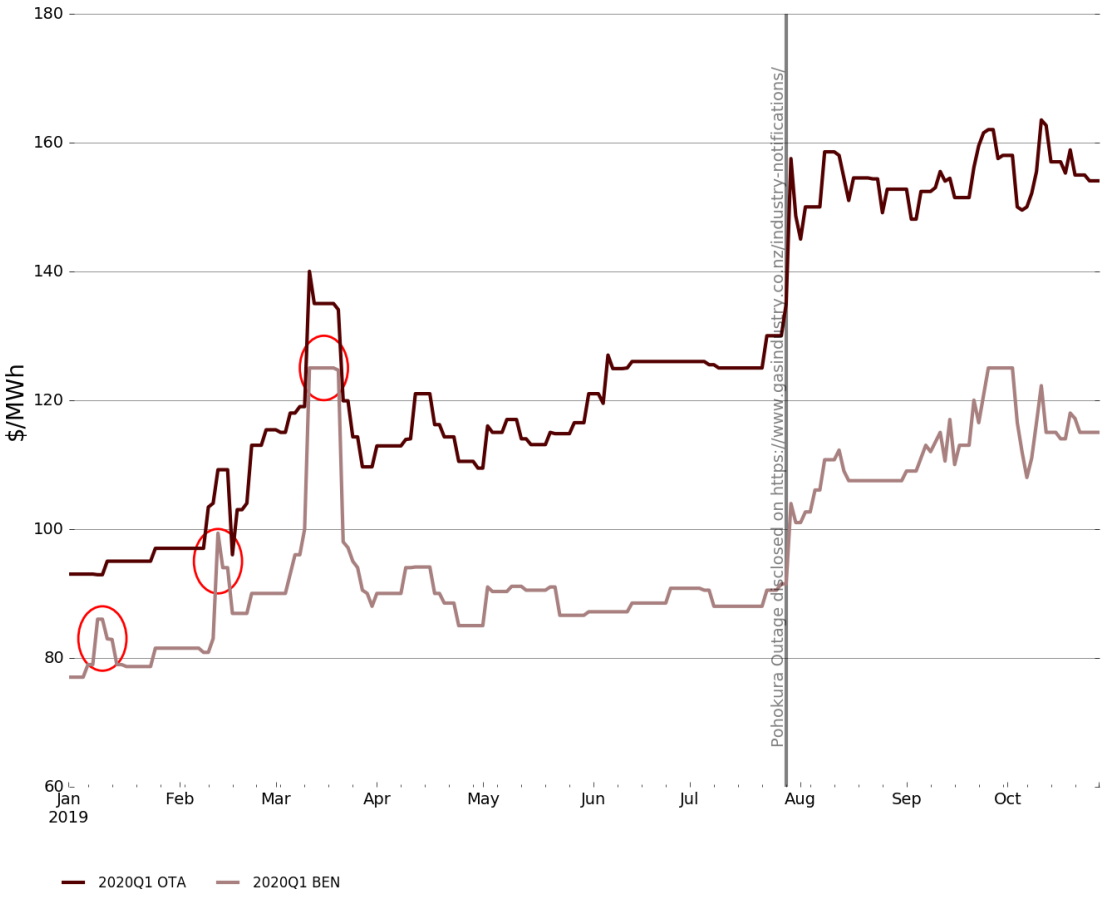
The illustration below plots historic HVDC flow (from 2012) vs estimated quarter one 2020 HVDC constraints. Along with the recent gas market conditions in the North Island, this provides confidence that the probability of the HVDC link being constrained during quarter one 2020 is high. This is most obvious during March 2020 when two HVDC bi-pole outages (on Saturdays) coincide with the planned Pohokura outage.

Figure 5: Historic HVDC flow and HVDC capacity by time of year



Prior to the Pohokura gas disclosure, and with only Transpower's HVDC outage known, traded prices of the ASX future contract for quarter one 2020 at Otahuhu and Benmore indicated some uncertainty around price separation between the North and South Islands (due to the decreased transfer limits arising from the HVDC outage). This is indicated in Figure 6 by the red circles which at the time would indicate very little price separation due to the HVDC outage. Since the Pohokura gas outage was disclosed on 29 July 2019 (vertical line on the chart), prices at both Benmore and Otahuhu have increased significantly.

Figure 6: Q1 2020 forward contract price



ASX monthly contract prices are also signalling price separation with significant prices seen for the March 2020 Otahuhu contract, as illustrated below in Figure 7 below.

Trading for the March 2020 monthly contracts has been light given the significance of the co-incident outages during quarter one 2020.

In summary, we think the notified gas field outages are causing forward market participants to price the risk of high spot prices, raising forward contract prices for 2020; this is not a surprising result. In the longer term, the experiences in 2018 seem to have made electricity market participants more aware of what can go wrong in the gas supply chain, as well as the importance of gas to price formation, and these are being priced into longer term forward contracts.

Figure 7: March 2020 monthly ASX contract prices