Performance Measures Quarterly Report for the period ending 31 December 2020

Summary

This report provides an update on the performance measures that Gas Industry Co monitors. These measures track the performance of:

- Gas (Switching Arrangements) Rules 2008 (the Switching Rules);
- Gas (Downstream Reconciliation) Rules 2008 (the Reconciliation Rules); and
- Gas Governance (Critical Contingency Management) Regulations 2008 (the CCM Regulations).

Explanatory details about the charts can be found in the Appendix to this report.

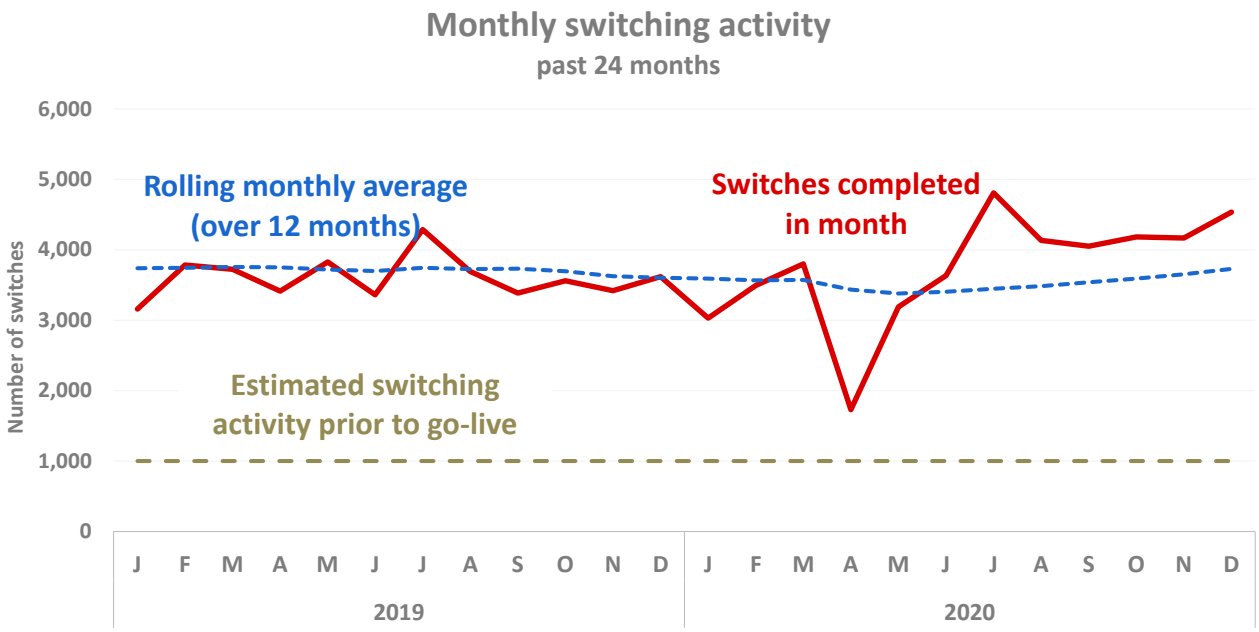
Updates in this Report:

- As a result of the COVID-19 Alert Level 4 lockdown, switches in April 2020 fell to the lowest level since the Switching Rules commenced in 2009. They recovered in the remainder of the June quarter, after the lockdown was lifted, and were unusually high throughout the September and December quarters.
- There are 12 distinct retail brands, owned by 10 parent companies.
- In the past 12 months, there have been about 3,700 switches completed per month, which translates to an annual churn rate of about 15.3%.
- Over 75% of consumer switches are completed within three business days; 97% are completed within seven business days.
- Over 99.8% of gas customers are connected to a gate where seven or more retailers trade, suggesting that the gas retail sector is generally competitive throughout the North Island.
- Average annual unaccounted-for gas (UFG) stands at about 1.2% (compared with about 2% in 2009).
- Genesis is the largest retailer by customer share. Nova has the largest share of commercial and industrial customers.
- Nova is the largest retailer by volume market share.
- The maximum trade price on emsTradepoint reached a peak of $50 per gigajoule in July 2020.

Switching performance measures

The purpose of the Switching Rules is to enable gas consumers to choose, and alternate, efficiently and satisfactorily between competing retailers. This section contains information about how many consumers have switched and how long it has taken for a switch to be completed.

Chart 1: Monthly switching activity



- This chart shows the number of switches that have occurred on ICPs that have a status of either active-contracted (ACTC) or active-vacant (ACTV) at the time of switching. The statistics exclude switches that have been withdrawn.[1]
- There are about 3,700 switches per month, which translates to an annual churn rate of about 15.3%. Gas customers can switch retailers for many reasons, but the high level of activity in the gas retail market suggests that customers find changing retailer easy and can put pressure on retailers to offer competitive terms and pricing.
- See Chart A-1 in the appendix for a chart of switching activity since the start of the registry (March 2009).

[1] Withdrawn switches are those that have been reversed, either because they were originally entered in error or because the customer decided not to go ahead with the switch (this latter situation is a "win-back" when the current retailer persuades the customer to stay). On average, about 5.5% of initiated switches are subsequently withdrawn.

Chart 2: Regional switching activity

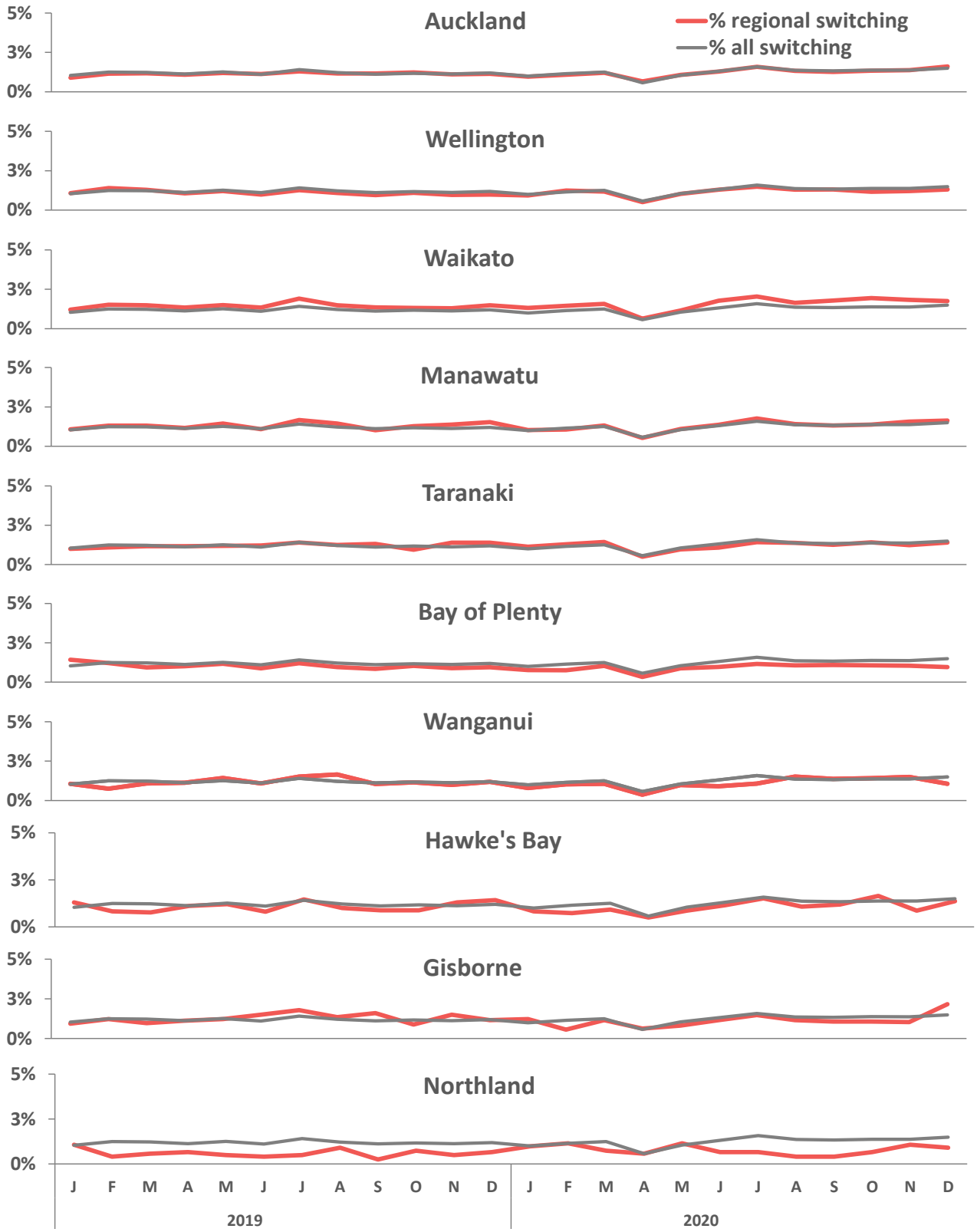
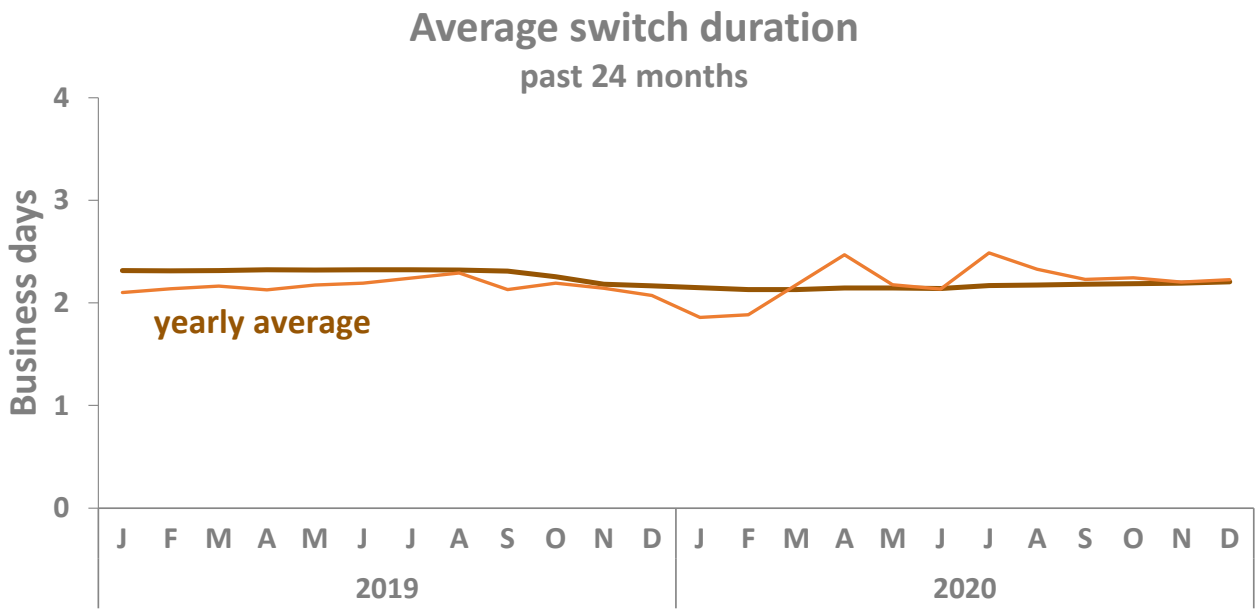
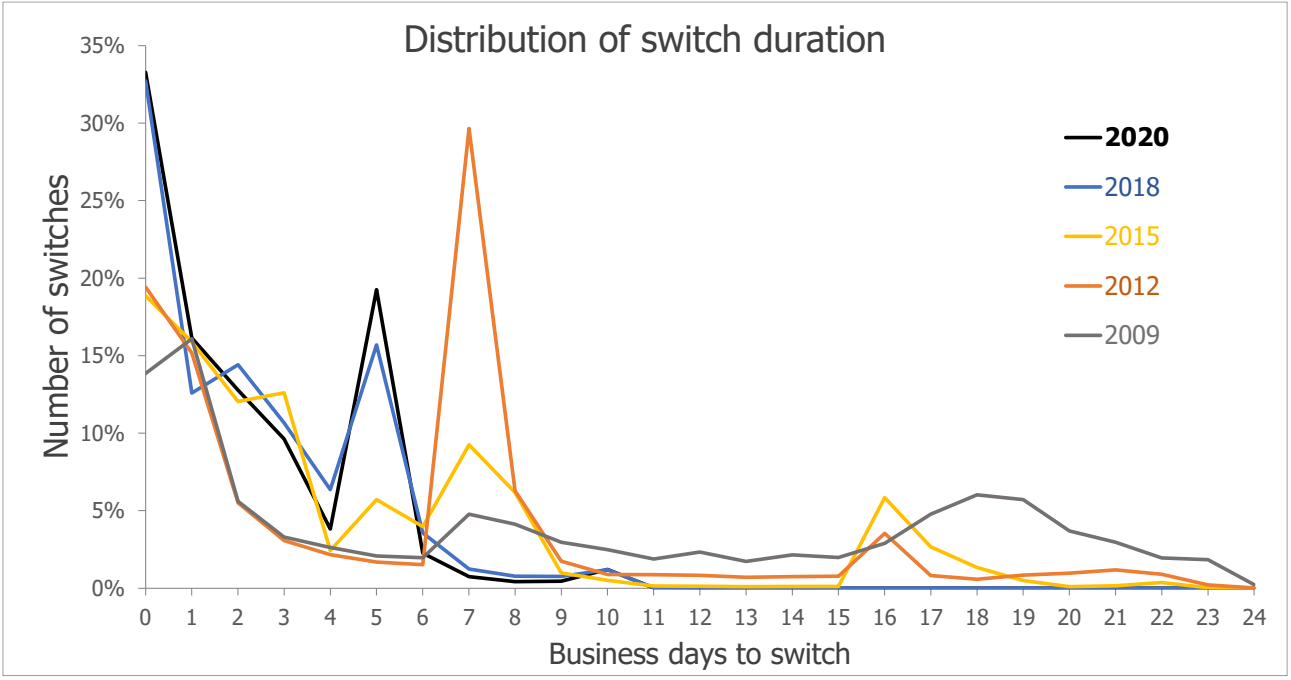


Chart 3: Time to process switches



- For the past two years, switching times have averaged between 2 and 2.5 business days. Previously, switches could take weeks to process.
- Data are for switches of ICPs with a status of either active-contracted (ACTC) or active-vacant (ACTV) at the time of switching.

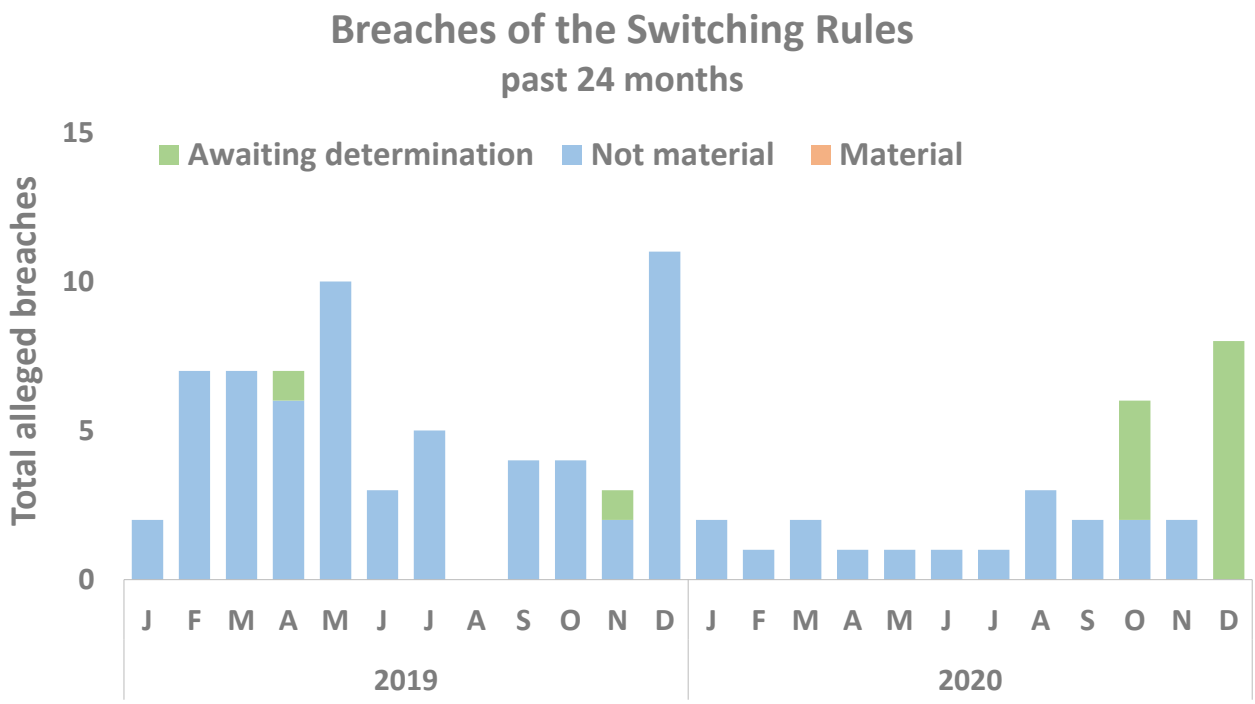
Chart 4: Distribution of switching duration



- This chart shows the distribution of switching times for the calendar years of 2009, 2012, 2015, 2018 and 2020.
- In 2009, half of the switches were completed within seven days, while a quarter of switches took 17 days or more. By 2012, three-quarters of switches took place in seven days or less. In 2015, there was a shift to completion within three days. In 2017, another pattern emerged, where about a quarter of switches happened in less than a day and another third were completed in

two business days. Since 2018, about one-third of switches have been completed in less than a day, and nearly all switches have taken fewer than seven days.

Chart 5: Number and severity of breaches of the Switching Rules

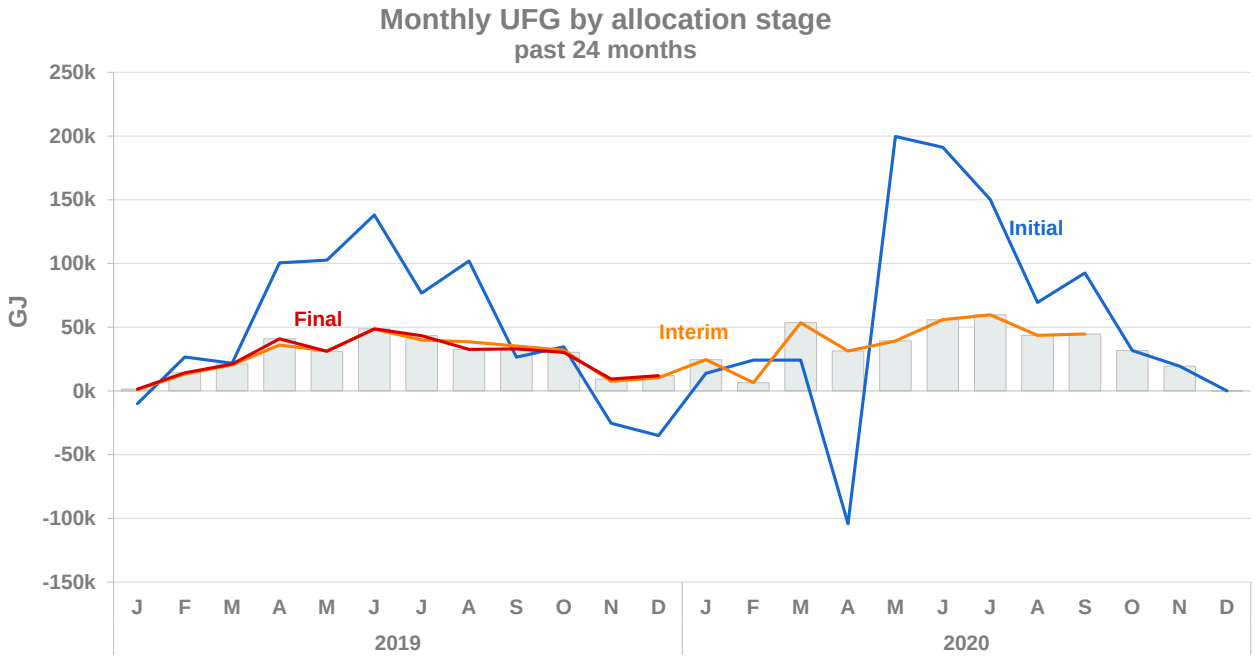


- This chart shows the breaches alleged each month by the registry operator. These allegations are generally for breaches of the rules that govern the mechanics of switching a gas consumer and include such things as late responses to switching notices.
- The chart does not show the breaches alleged during performance audits, which tend to be related to the accuracy of information on the registry and the procedures that participants follow to maintain this information. Errors in registry participants' data handling procedures can give rise to hundreds of individual instances of rule breaches, which would be misleading to include in the chart above.

Allocation and reconciliation performance measures

The Reconciliation Rules enable the fair, efficient, and reliable downstream allocation and reconciliation of downstream gas quantities. Under these rules, the amount of gas leaving the transmission system is allocated to the retailers whose customers have used the gas. Tracking unaccounted-for gas volumes is a useful way of monitoring the effectiveness of the rules and the accuracy of retailers' consumption estimations and meter readings.

Chart 6: Volumes of unaccounted-for gas (UFG)



- There is often a peak in positive UFG in the months heading into winter as mass market retailers underestimate the amount of gas their customers have used. Conversely, initial UFG for the spring months tend to be negative as retailers often overestimate the amount of gas their customers have used. This year both these features were exacerbated by the COVID-19 Alert Level 4 lockdown that occurred during March, April, and May 2020. The lockdown resulted in unpredictable gas usage which was difficult for retailers to estimate. However, both highly positive and negative UFG values tend to be resolved by more accurate data in later allocation stages.
- Note that this chart uses the initial allocation produced by the allocation agent following month-end, not the D+1 allocation results.[2]
- See Chart A-3 in the appendix for a chart of UFG since the start of the Reconciliation Rules.

[2] The initial allocation produced by the Allocation Agent is a "bottom up" approach whereby each of the retailers submits data based on a combination of actual meter readings (historical estimates) and consumption estimates since the last meter reading (forward estimates). In that context, UFG is a meaningful measure of the difference between the aggregate estimates and the volumes that have entered the network. By contrast, D+1 is a system for dividing the network volumes among retailers and that process does not produce UFG figures that are comparable with the bottom-up approach to allocation.

Chart 7: Percentage of UFG

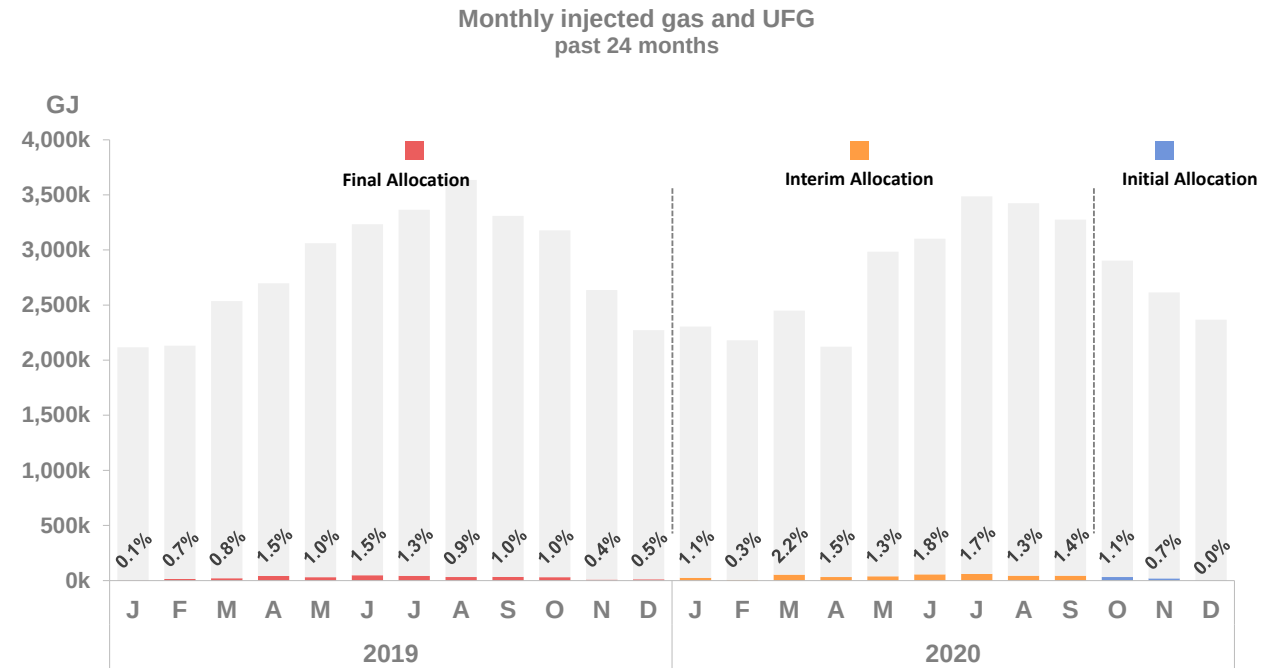
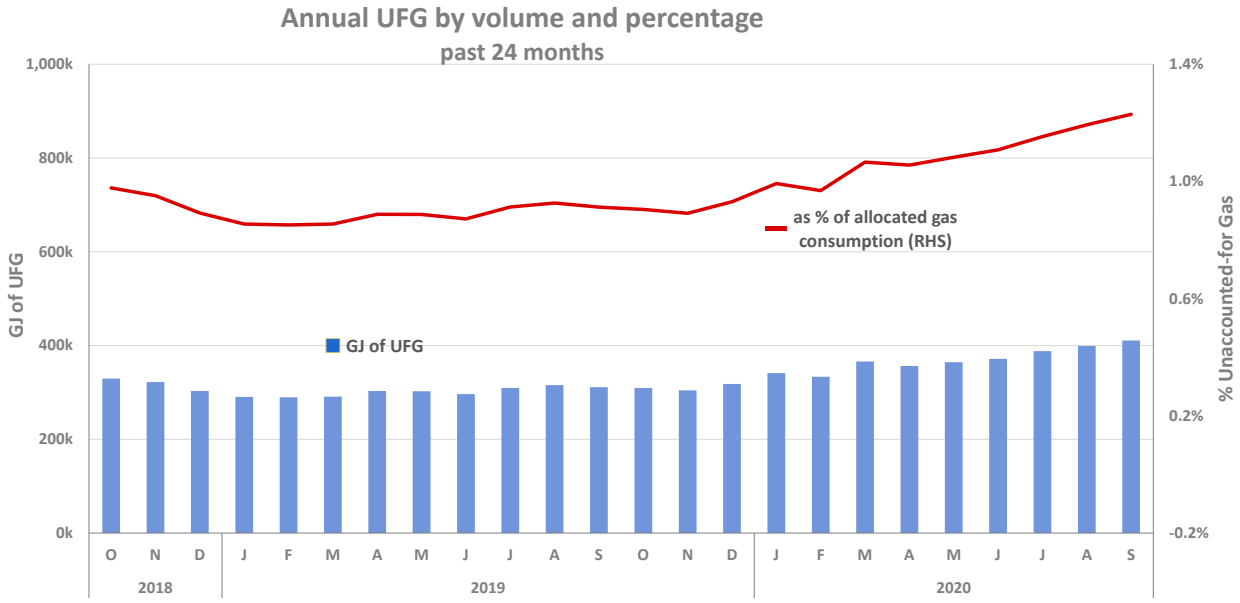
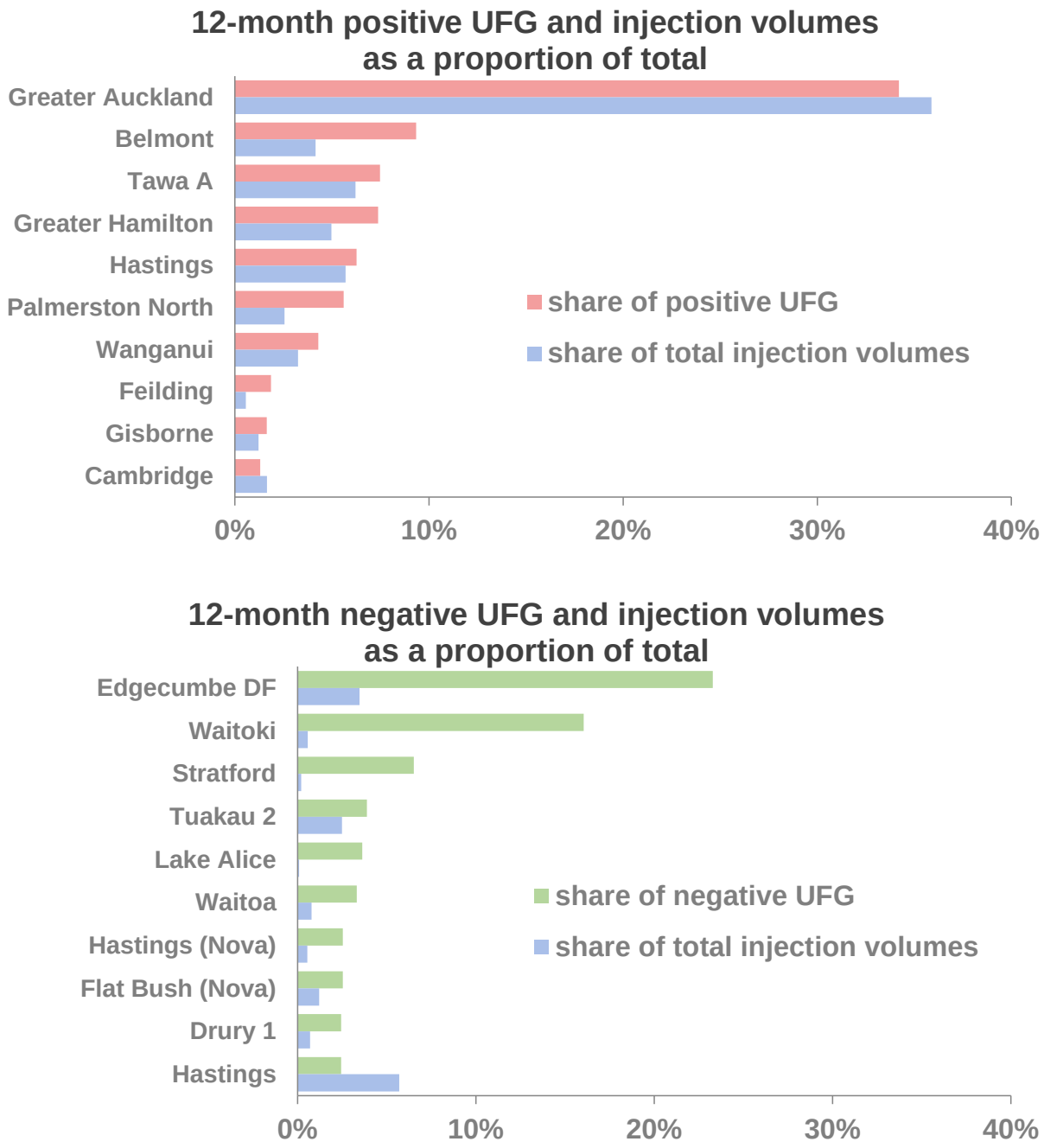


Chart 8: Rolling 12-month UFG



- UFG is now around 411,000 GJ per year, about 1.2% of allocated gas consumption.

Chart 9: Gas gates where UFG is the highest

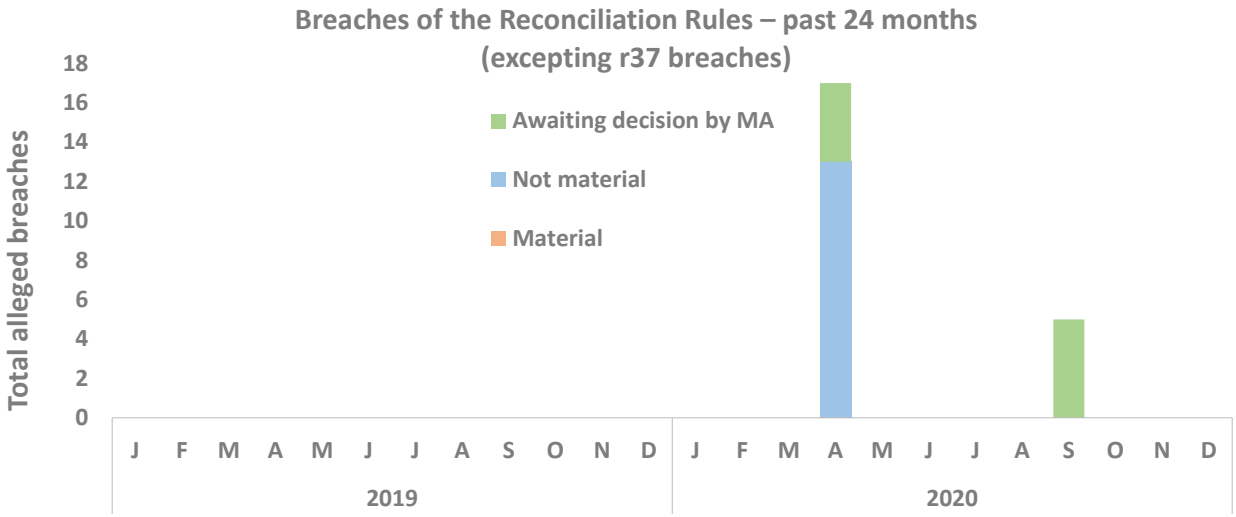


These charts show the gates that experience the largest share of total UFG, compared to their share of total gas gate deliveries at shared gas gates. These charts use 12 months of the most recent interim and final allocation data available: in this case October 2019 through September 2020.

- The 10 gates shown in the top chart account for 79% – about 395,000 GJ – of the positive UFG experienced over the past 12 months.
- The 10 gates shown in the bottom chart account for about 67% (about 57,000 GJ) of the negative UFG experienced in the past 12 months.

- Some of the gas gates shown have been determined to be global one-month gates, since, among other things, they have a high proportion of industrial load. The global one-month methodology assigns a share of the actual UFG experienced in a month to industrial consumers, in contrast to the usual calculation method, which assigns industrial load an annual average amount of UFG.
- In the first chart, Hastings and Cambridge are global one-month gates; Edgecumbe DF, Waitoa, Tukakau 2, Lake Alice, Waitoa, Hastings (Nova), Flat Bush (Nova), Lake Alice, Hastings (Nova) and Hastings are in the second chart.

Chart 10: Number and severity of breaches of the Reconciliation Rules



- This chart shows the breaches alleged each month by the allocation agent. They generally relate to matters relating to the provision of monthly consumption data by retailers and daily injection information by retailers.
- This chart excludes rule 37 breaches. Rule 37 requires initial consumption information submitted by retailers to be within a percentage of accuracy of the consumption information submitted for the final allocation. In June 2019, Gas Industry Co as Market Administrator issued a guideline regarding rule 37 breaches. That guideline states that, in the absence of any other information, there is no likelihood that an individual breach will raise a material issue, so the allocation agent does not need to allege such breaches (see https://www.gasindustry.co.nz/dmsdocument/5031).
- The chart also excludes the breaches alleged in the course of performance audits. These allegations relate to such things as metering requirements and procedures for converting meter readings to energy. Errors in participants' systems and procedures can give rise to hundreds of individual instances of rule breaches, which would be misleading to include in the chart above.

Audits commissioned

Event audits

No event audits were commissioned in this quarter.

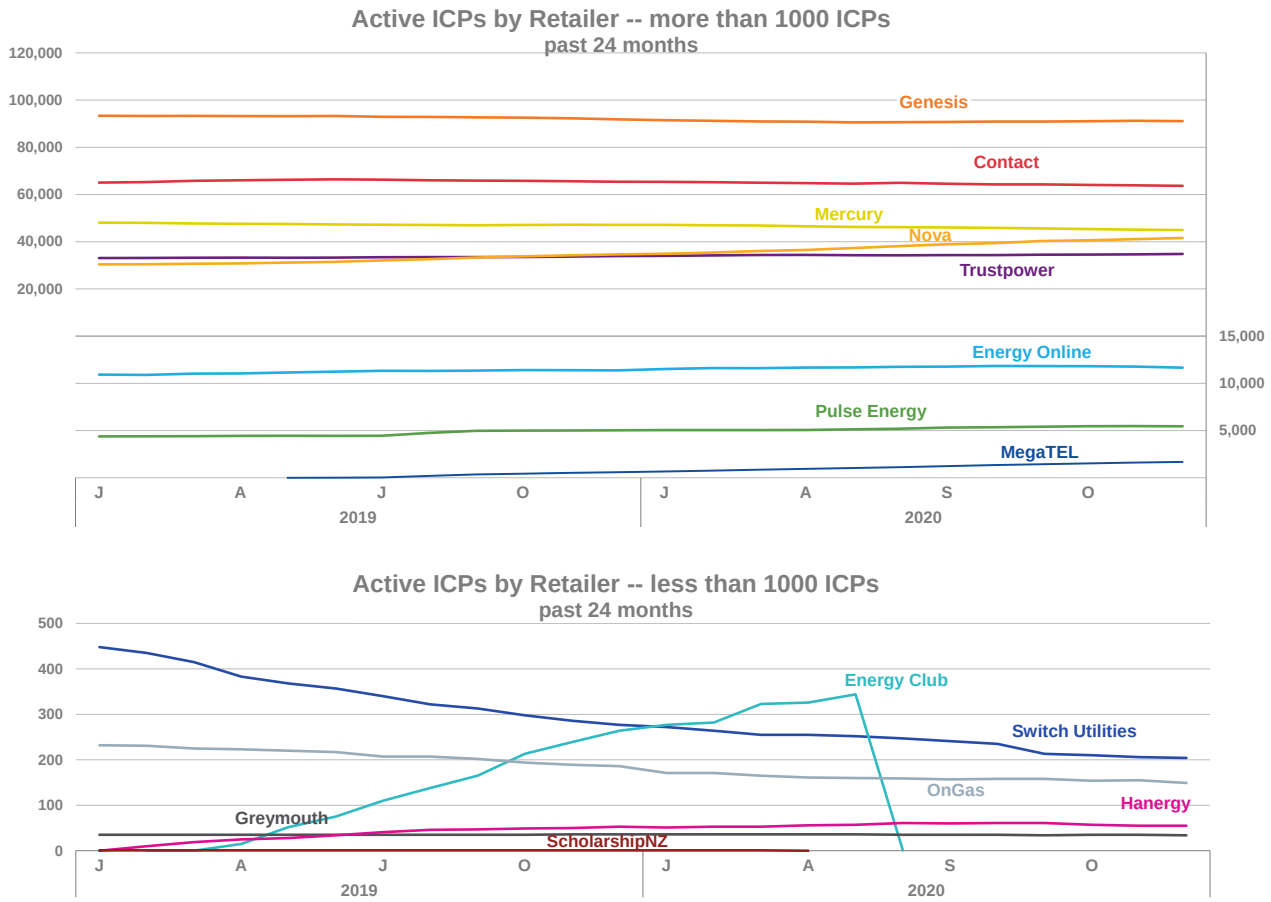
Performance audits

Gas Industry Co commenced the fourth round of performance audits under the Switching Rules and the Reconciliation Rules in 2020. Four audits have now been completed and six are currently underway. The audit round is expected to continue until the end of 2021.

Market competition performance measures

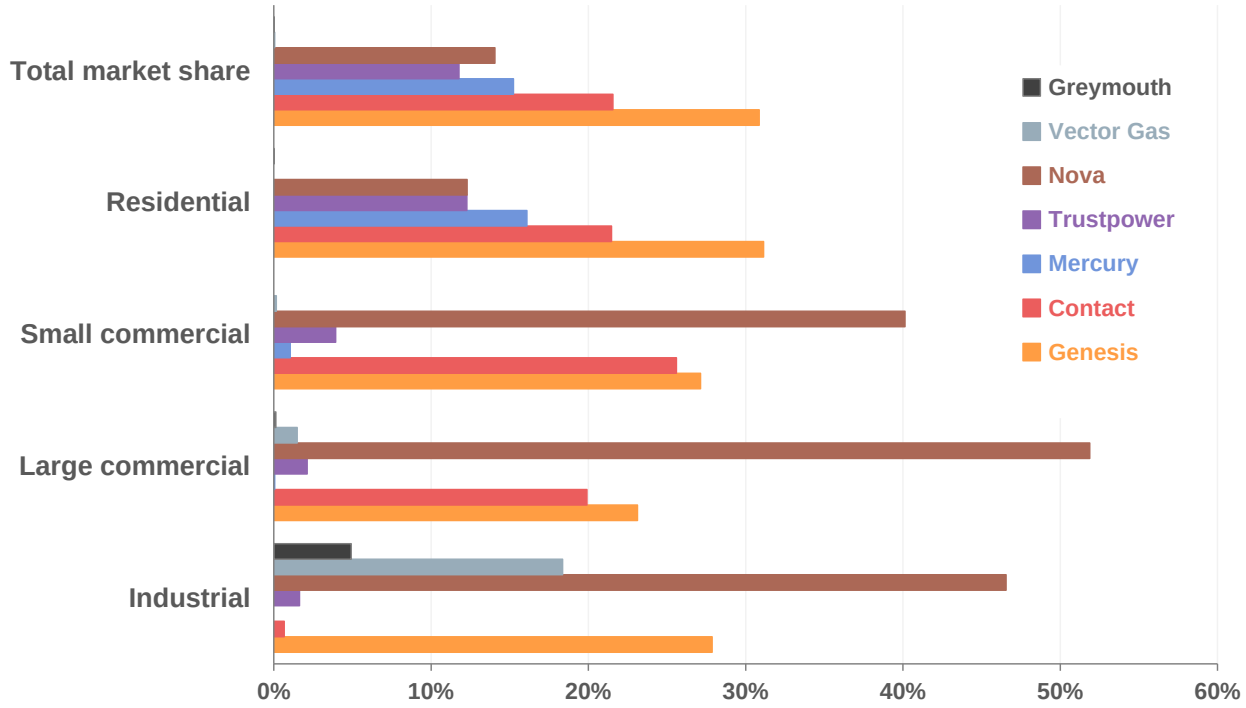
This section includes measures that provide information about the competitiveness of the downstream gas market. It includes measures on aspects of market share and customer switching behaviour.

Chart 11: Market share of ICPs by retailer



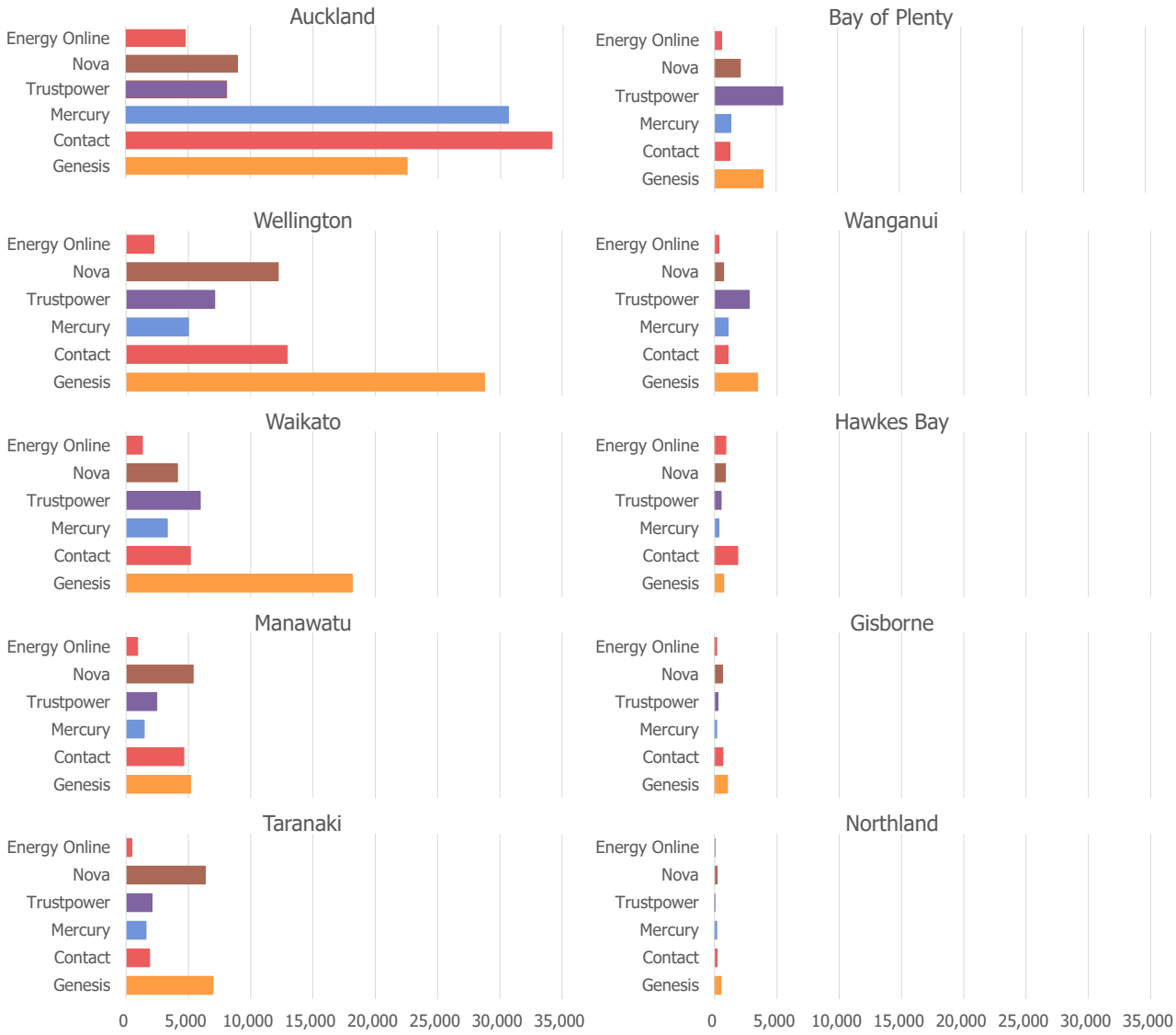
- There are 12 distinct retail gas brands, owned by 10 different retail companies (Energy Online is owned by Genesis Energy; MegaTEL by Nova Energy).
- The charts above show the largest retailers – those with more than 1000 ICPs – in the top chart, and the smaller retailers in the bottom chart.

Chart 112: Customer market share by consumer segment



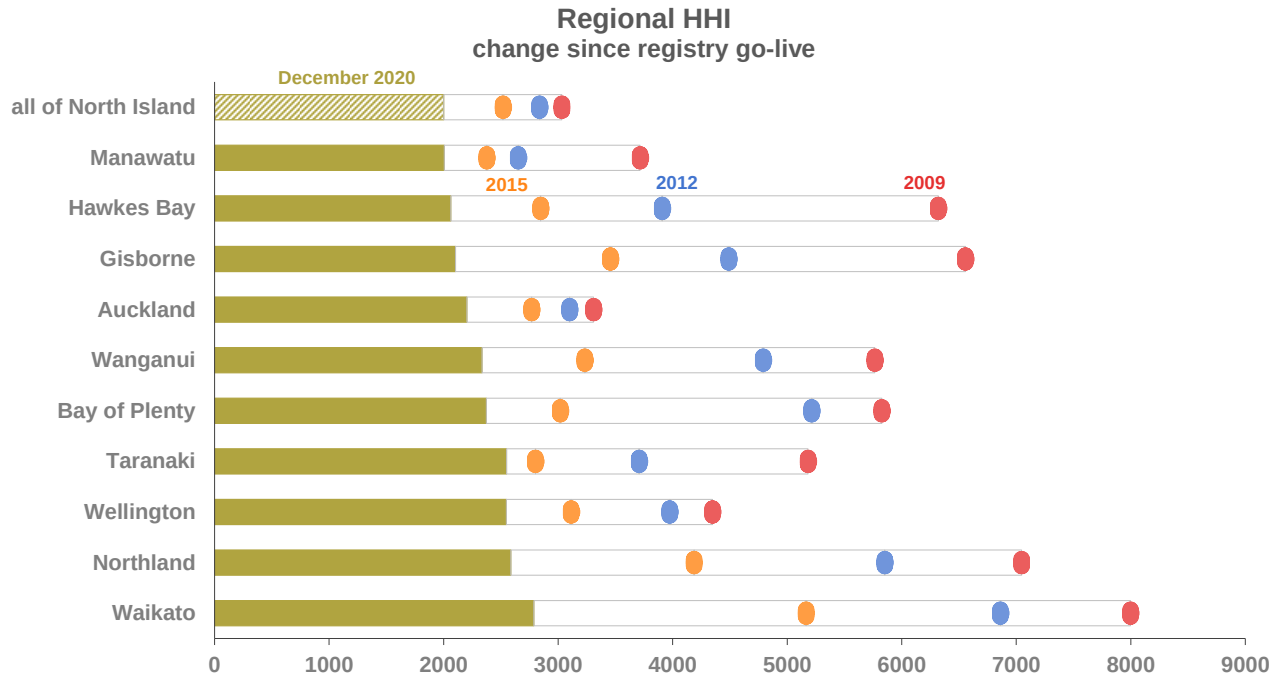
- In this chart, consumer segment is inferred from the load shedding category listed on the gas registry for each consumer site. The top set of bars shows total market share and uses the same set of data as the previous chart. The other sets of bars show how some retailers are more dominant in specific sectors of the retail gas market. Nova, for example, has a large proportion of market share in the commercial and industrial sectors, while Greymouth has a focus on large industrial customers.
- The chart includes the retail brands that have more than 5% of market share in a category.

Chart 12a: Customer market share by region



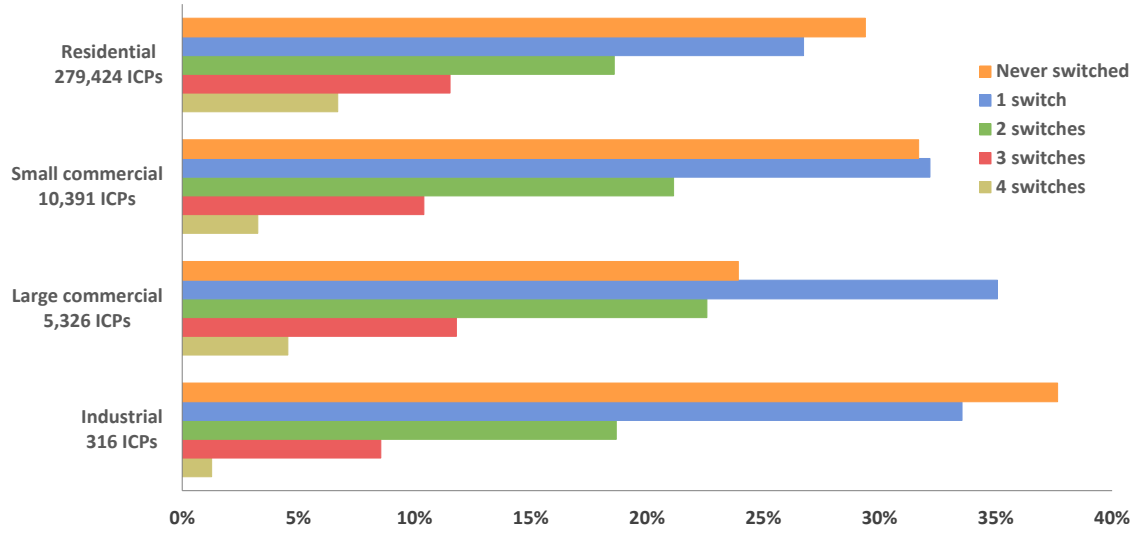
- This chart shows the number of ICPs for each retailer in each geographical region. The retailers shown each have over 3% of total customer market share.

Chart 13: Herfindahl–Hirschman Index (HHI)



- The HHI has decreased in all regions since 2009, indicating that the retail market is becoming less concentrated across the North Island.
- Nationally, the HHI stands at 2,001, in comparison to 3,033 in February 2009 (the start of the registry).

Chart 124: Switching by consumer sites since 2009

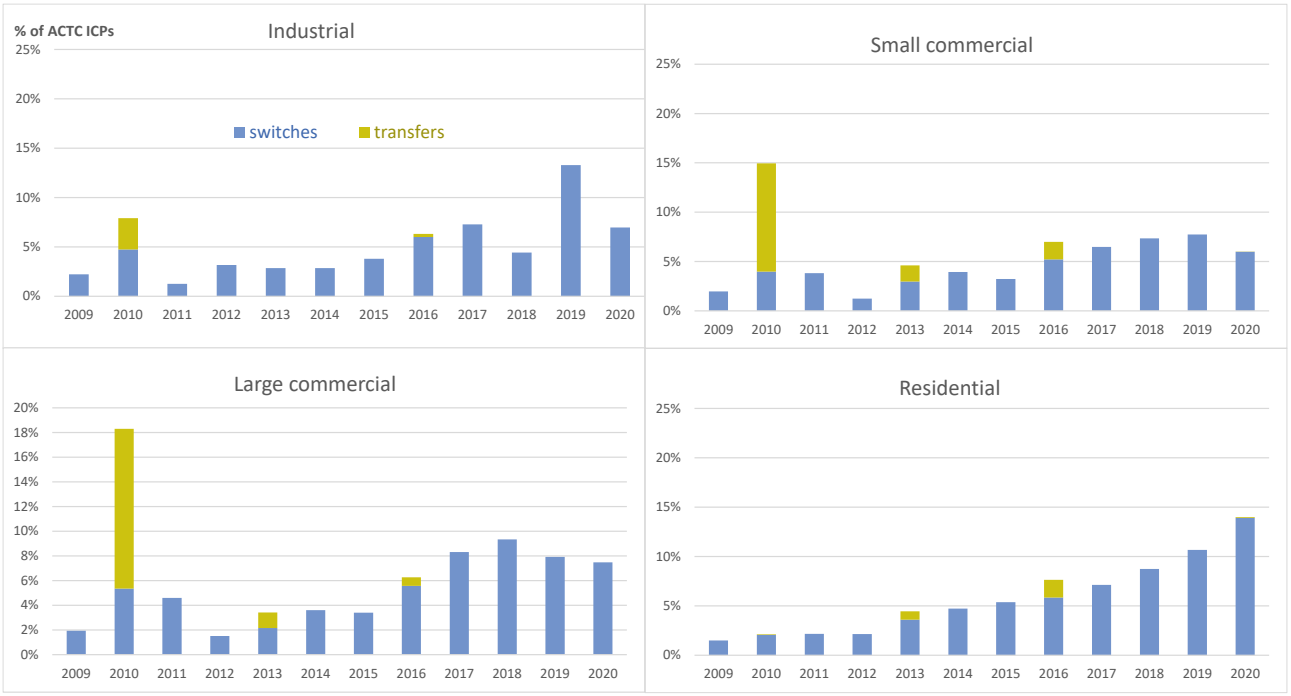


As with Chart 11, consumer sites in this chart and the next are categorised based on the load shedding category recorded in the gas registry. This chart includes both customer-initiated switches and transfers from one retailer to another.

Sites that have switched retailer at least once since the start of the gas registry (February 2009) include:

- 71% of residential consumer sites
- 68% of small commercial sites
- 76% of large commercial sites; and
- 62% of large industrial sites.

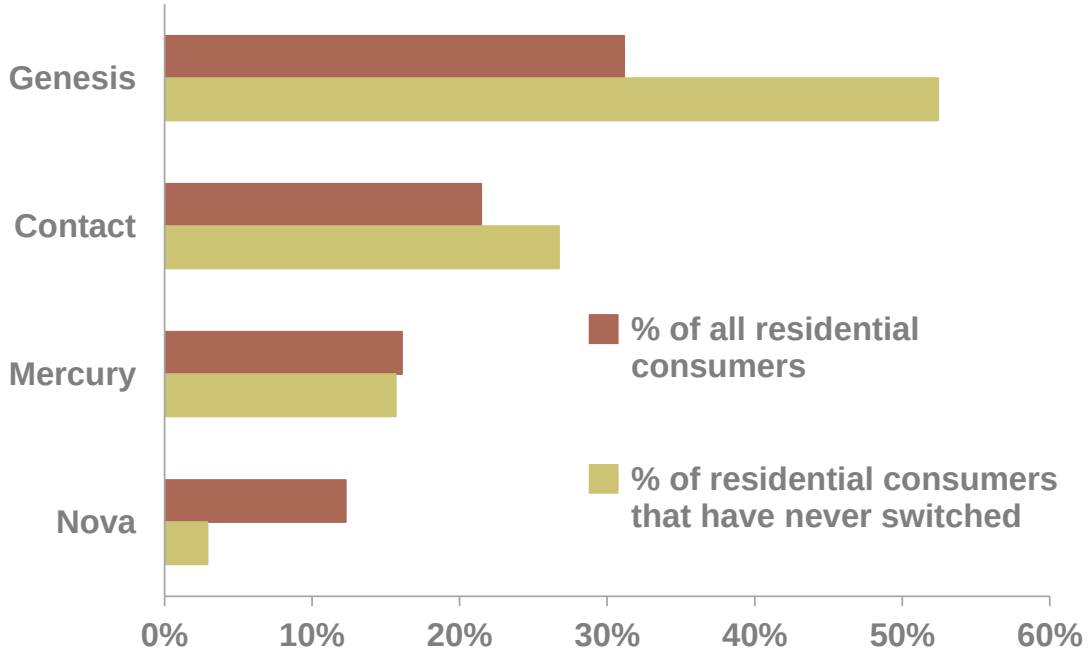
Chart 14A: Customer sites by last switch date



This chart shows the last switch date for consumer sites that have changed retailer at least once since the start of the gas registry. For example, 2017 was the last time just over 7% of residential consumers switched retailer; 14% last switched in 2020.

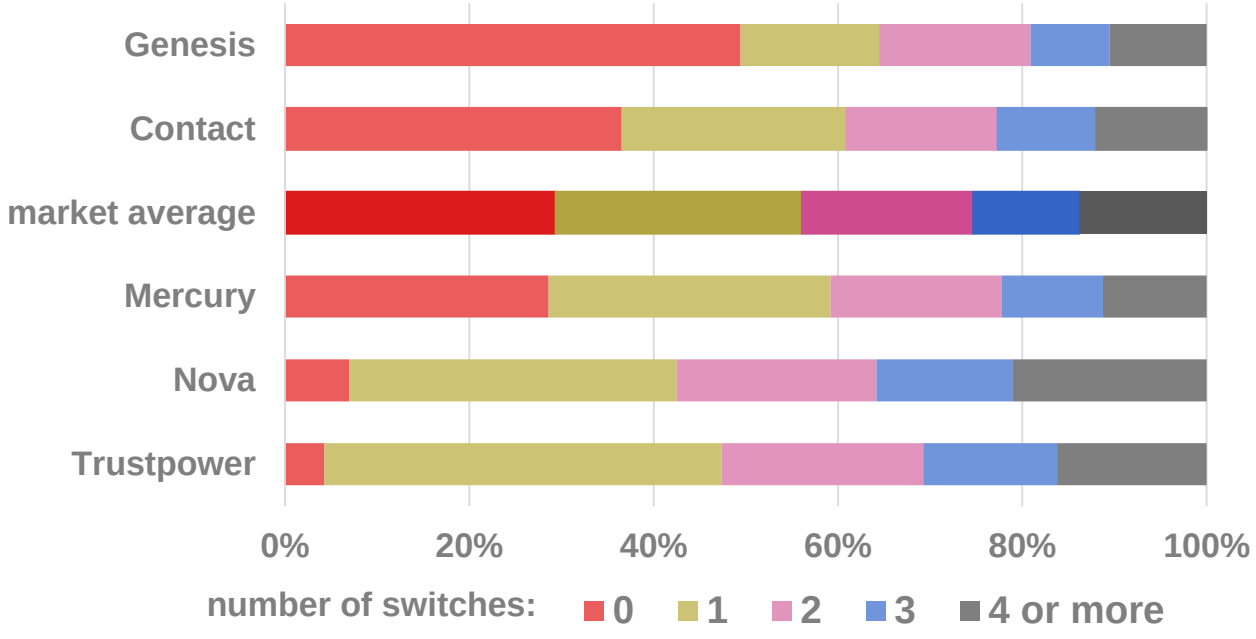
Consumer-requested switches (in blue) are distinguished in these charts from transfers (in olive green), which have happened when one retailer has taken over the customer base of another. Such transfers include the transfer of E-Gas customers to Nova Energy in 2010; the amalgamation of Auckland Gas (2010-2011) and Bay of Plenty Energy (2013) with Nova Energy; and the transfer of Energy Direct customers to Trustpower (2016). The olive green data points show, for example, that about 13% of large commercial customer sites and 11% of small commercial sites last switched retailer when they were transferred in 2010.

Chart 15: Residential consumer sites that have never switched



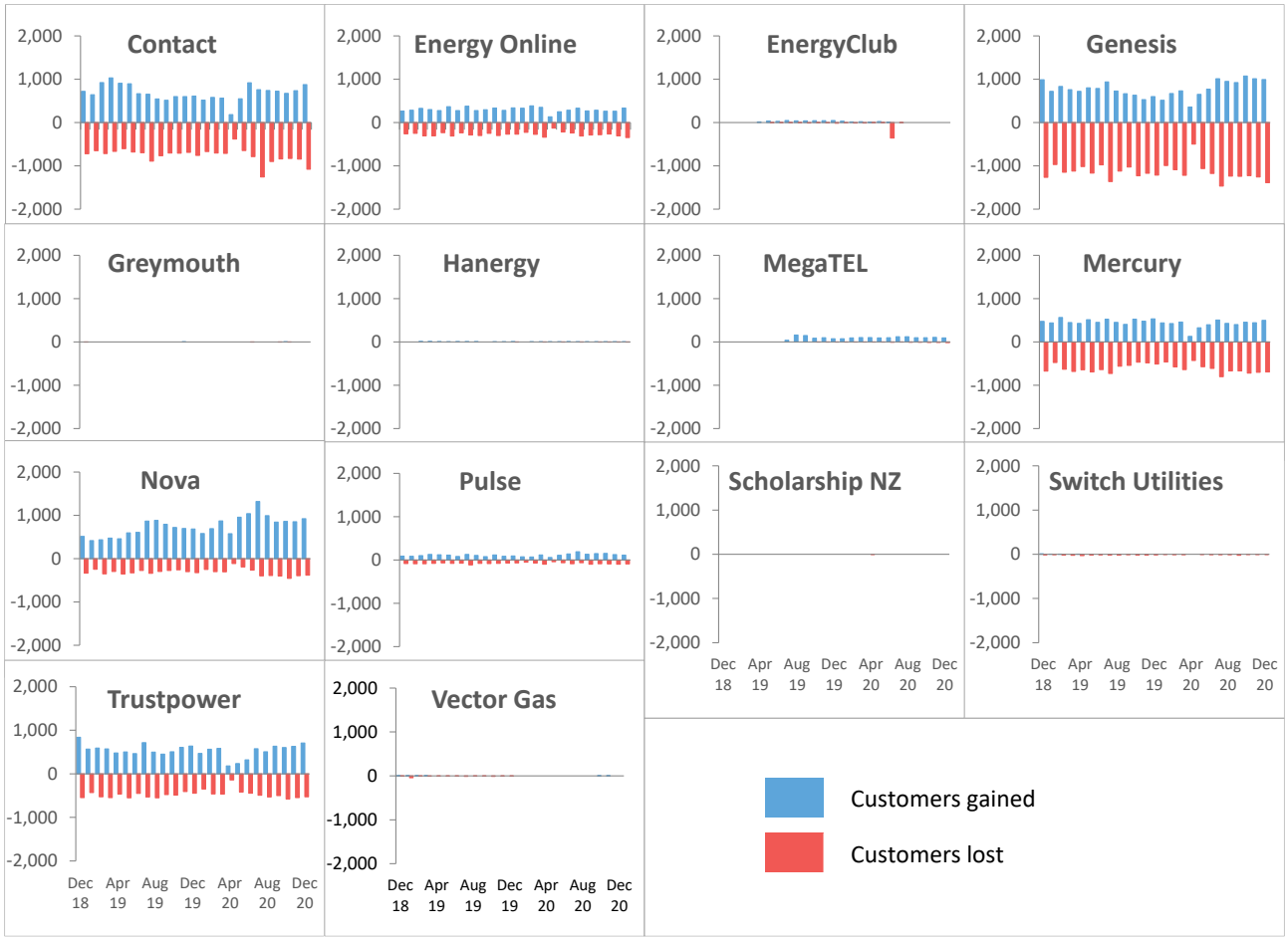
- This chart compares retailers' market share of all residential consumers with their share of residential consumer sites that have never switched since the start of the gas registry in February 2009.
- It shows, for example, that Genesis has about 31% of the total residential market, and about 52% of the residential consumer sites that have not switched retailers in that time.
- The chart focuses on existing mass market retailers that were in operation at the start of the gas registry. In contrast, new entrant retailers have mostly built up their customer bases through customers switching to them.

Chart 15a: Residential customers by number of switches



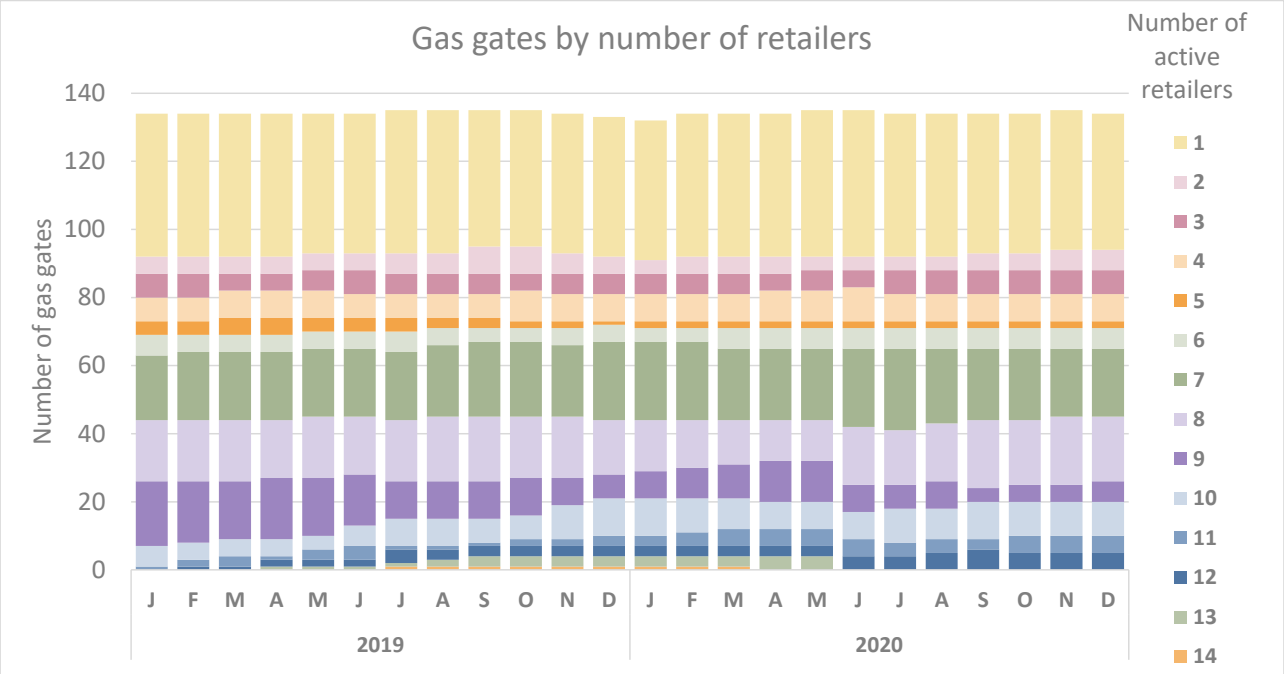
- This chart provides another way to think about residential customer switching. The third bar repeats the data on residential switches from chart 14 above: 29% of residential consumer sites have never switched retailer; 27% have switched once; 19% have switched twice; 12% three times, and 14% four or more times.
- The other bars enable comparison with retailers' residential customer bases. 49% of Genesis customers, for example, have never switched; the proportion is 37% for Contact customers.
- In contrast, Trustpower has built its customer base almost entirely through switching: 43% of its customers have switched once; 22% twice; and 15% three times. (Trustpower is also retailer to a small number of newly created ICPs that have never switched.)
- This chart includes retailers with at least 5% of the residential consumer market.

Chart 16: Switching activity by retailer



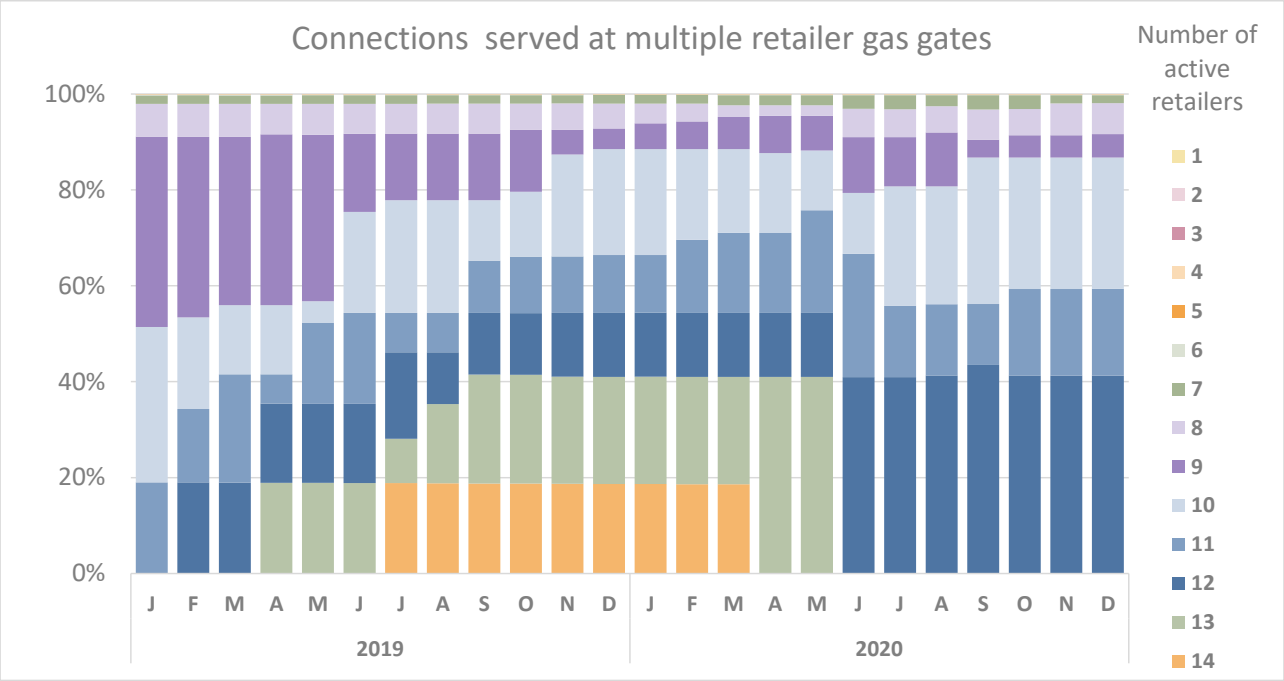
- This chart shows the numbers of ICPs gained and lost by retailers over the past two years. The blue bars show the number of customers gained by the retailer each month, and the red bars show the numbers of customers lost.
- As shown by these charts, although the net changes in number of customer ICPs may not change significantly from month to month for some retailers, there is a lot of underlying switching activity, particularly for the mass market retailers Contact, Genesis, Mercury, and Trustpower.

Chart 17: Gas gates by number of retailers



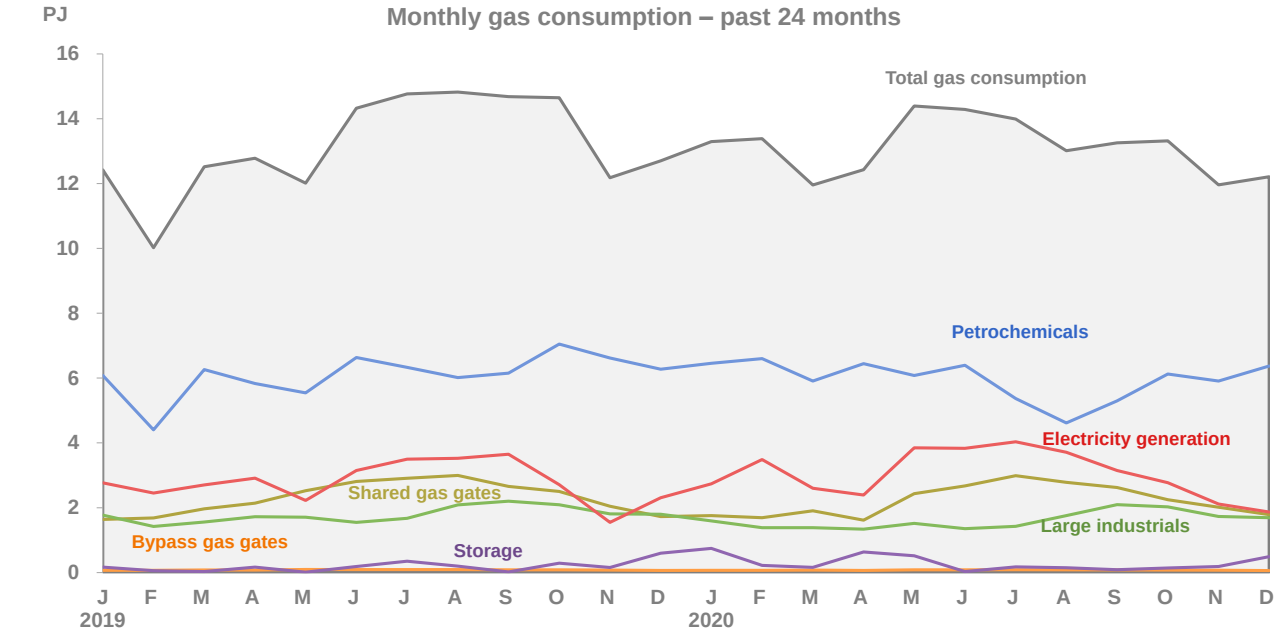
- All 12 current retailers trade at four gas gates representing parts of Greater Auckland, and HTV11301, part of Greater Hamilton.
- Most of the single-retailer gates are gates that are dedicated to a single customer. The five Nova bypass gates, which serve commercial and residential consumers, are also single retailer. In addition, there are a few gates with a small number of ICPs that all happen to have the same retailer.

Chart 18: Connections served by multiple retailers



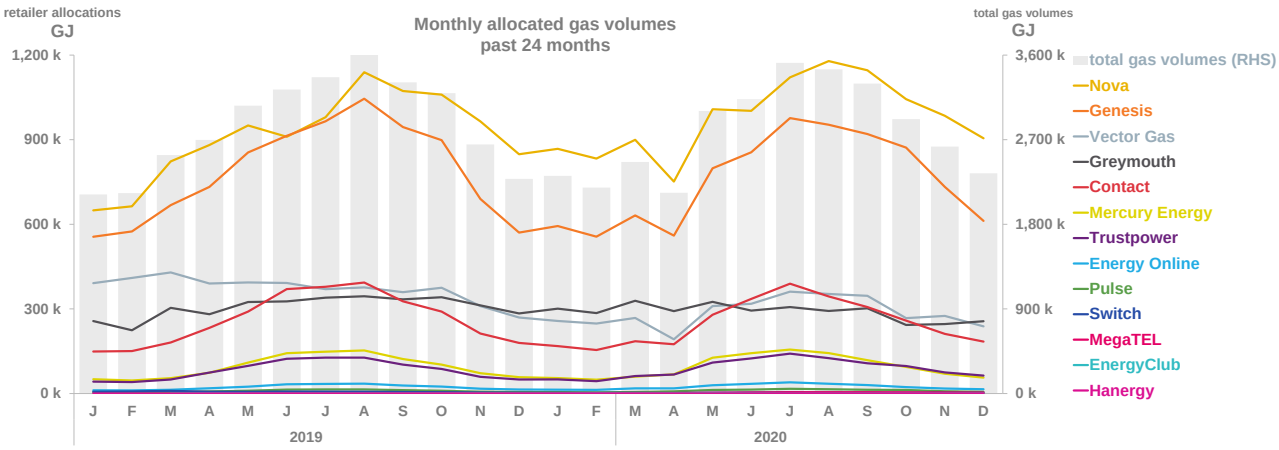
- Over 99% of gas consumers are connected to a gate where seven or more retailers trade.

Chart 19: Total gas volumes



- This chart shows the seasonality of gas usage by different sectors, as well as the effects of planned and unplanned outages of production stations and petrochemical plant.
- Note that these data reflect only the gas delivered through the open access transmission pipelines. Gas volumes flowing through private pipelines are not included.

Chart 20: Allocated gas volumes



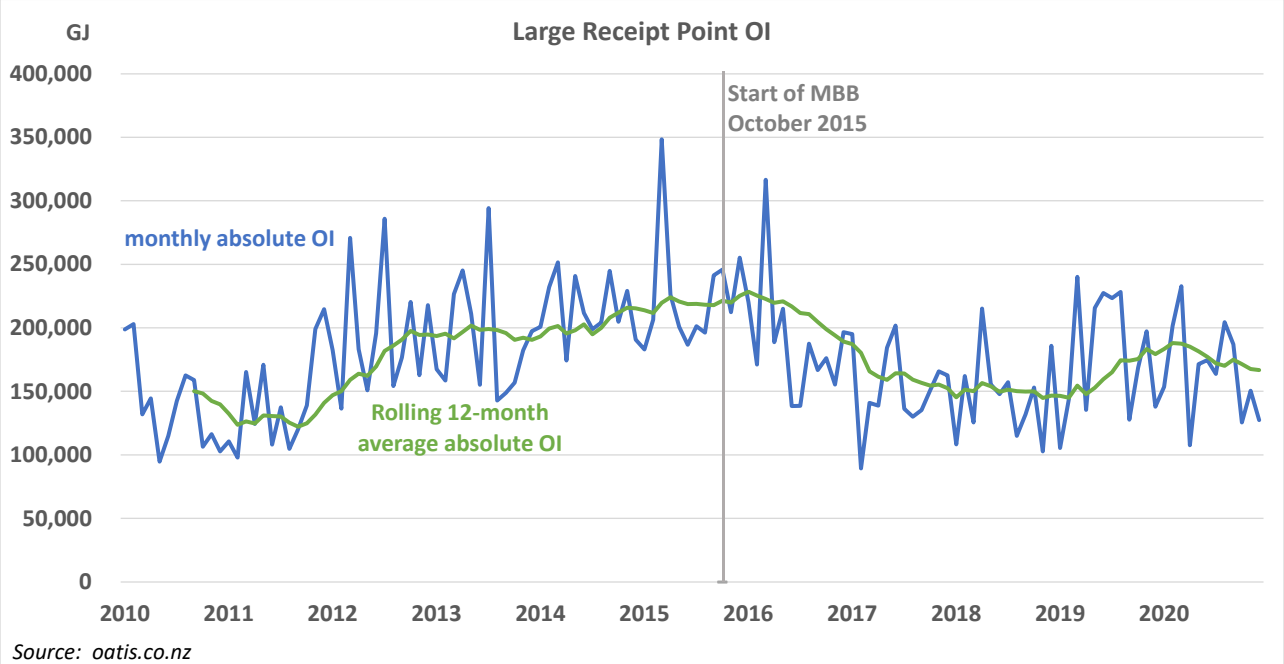
- Note that the scale of the total gas volumes, on the right-hand side, is three times the scale of the left-hand axis, which shows individual retailer volumes.
- Allocated volumes for Scholarship NZ (which was an active retailer between February 2018 and March 2020) are not large enough to be seen on this chart.
- The data are from a mix of allocation stages: Final through August2019; Interim for September 2019 through June 2020; and Initial for July through September 2020. Note that the initial allocation data are those initially produced by the allocation agent, not the D+1 allocations that were used to replace the initial allocations.

Pipeline balance

Chart 21: Balancing gas volumes (no longer tracked since June 2017)

Gas Industry Co no longer tracks balancing gas volumes in this report, as changes to pipeline operations and the transition to market-based balancing (MBB) in October 2015 mean that secondary balancing volumes are no longer relevant as a performance measure. Instead, this report focusses on primary balancing in the following two charts.

Chart 22: Receipt point operational imbalance (OI)



Source: oatis.co.nz

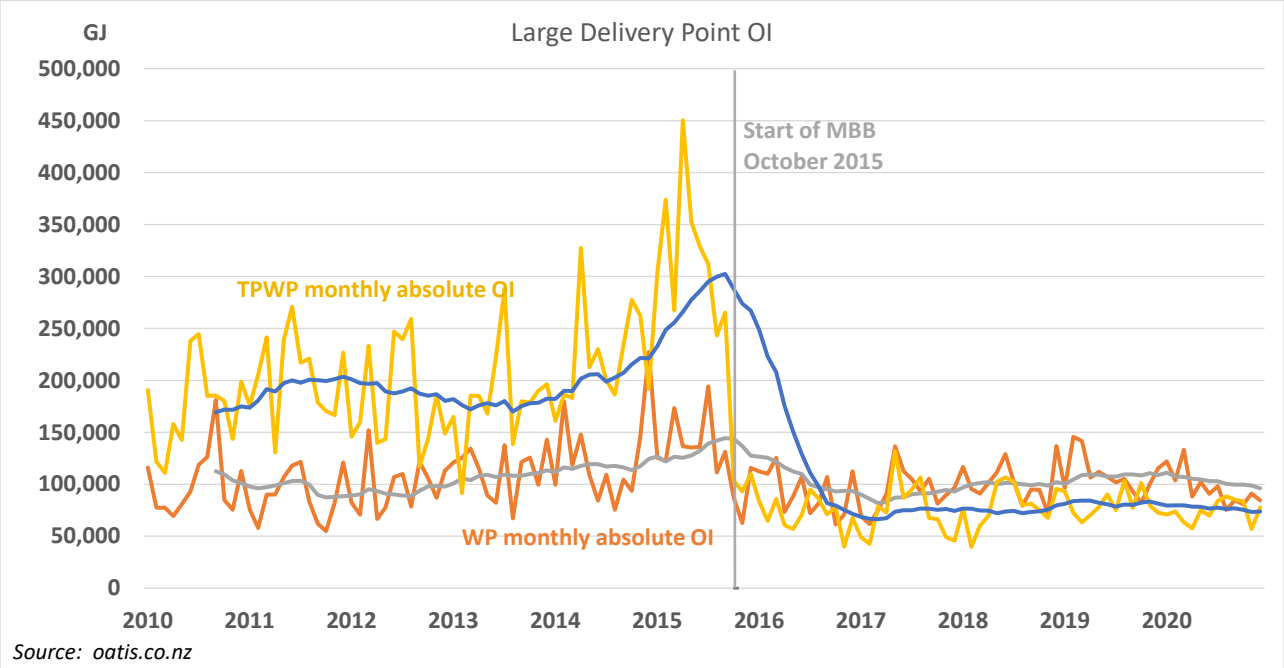
One of the expectations of MBB was that it would improve primary balancing; that is, that pipeline users would strive to match their actual gas flows with the quantities of gas that they scheduled. For welded parties on the Maui pipeline, the daily difference between the two quantities is termed operational imbalance (OI).

The chart above was constructed by calculating the absolute value of OI on a daily basis for each large receipt welded point on the Maui Pipeline (with the exception of Frankley Road). These values were then summed by month and plotted as the blue data series above. The data plotted in green represent the rolling average of the previous 12 months of monthly OI data.

As observed in Gas Industry Co's *Review of Market-Based Balancing*,[3] dated November 2016, management of the receipt welded points changed very little immediately after the introduction of MBB. More recent data do show a downward trend in OI, commencing about June 2016.

[3] Available at http://www.gasindustry.co.nz/dmsdocument/5420

Chart 23: Delivery point operational imbalance (OI)



Source: oatis.co.nz

This chart shows the OI at large delivery welded points on the Maui pipeline: the yellow line shows data from the transmission pipeline welded points (TPWPs) Pokuru and Rotowaro; the orange line shows the Bertrand Road, Faull Road, Ngatimaru Road, Mokau Compressor Station, and Huntly Power Station delivery points. The Frankley Road bi-directional point is again excluded from this analysis.

Unlike the previous chart, this chart does show a marked difference in OI from October 2015, the start of MBB, particularly in the TPWP OI. In *Review of Market–Based Balancing*, Gas Industry Co considered that there were two likely causes of these changes: the incentive provided by mandatory daily cash-outs and the improved information available as a result of D+1 allocations and notifications of cash-out shares, which probably increased shippers' ability to manage their daily positions.

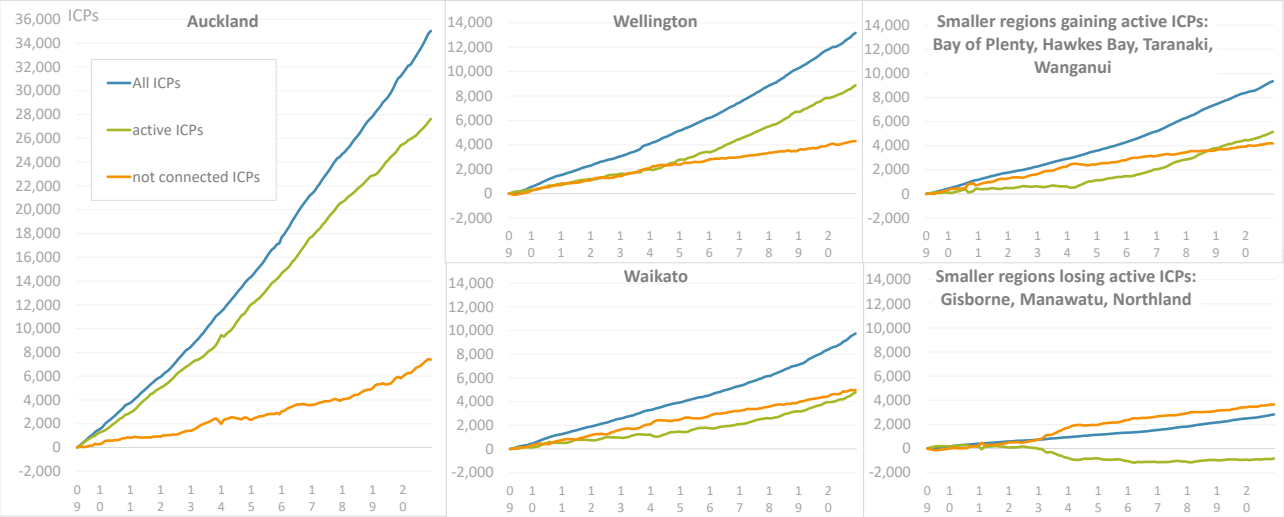
Critical contingency management performance measures

The Critical Contingency Management Regulations provide for the effective management of critical gas outages and other security of supply contingencies without compromising long-term security of supply.

There were no critical contingencies during the quarter.

Distributor and meter owner performance measures

Chart 24: Regional increases in ICP numbers since 2009

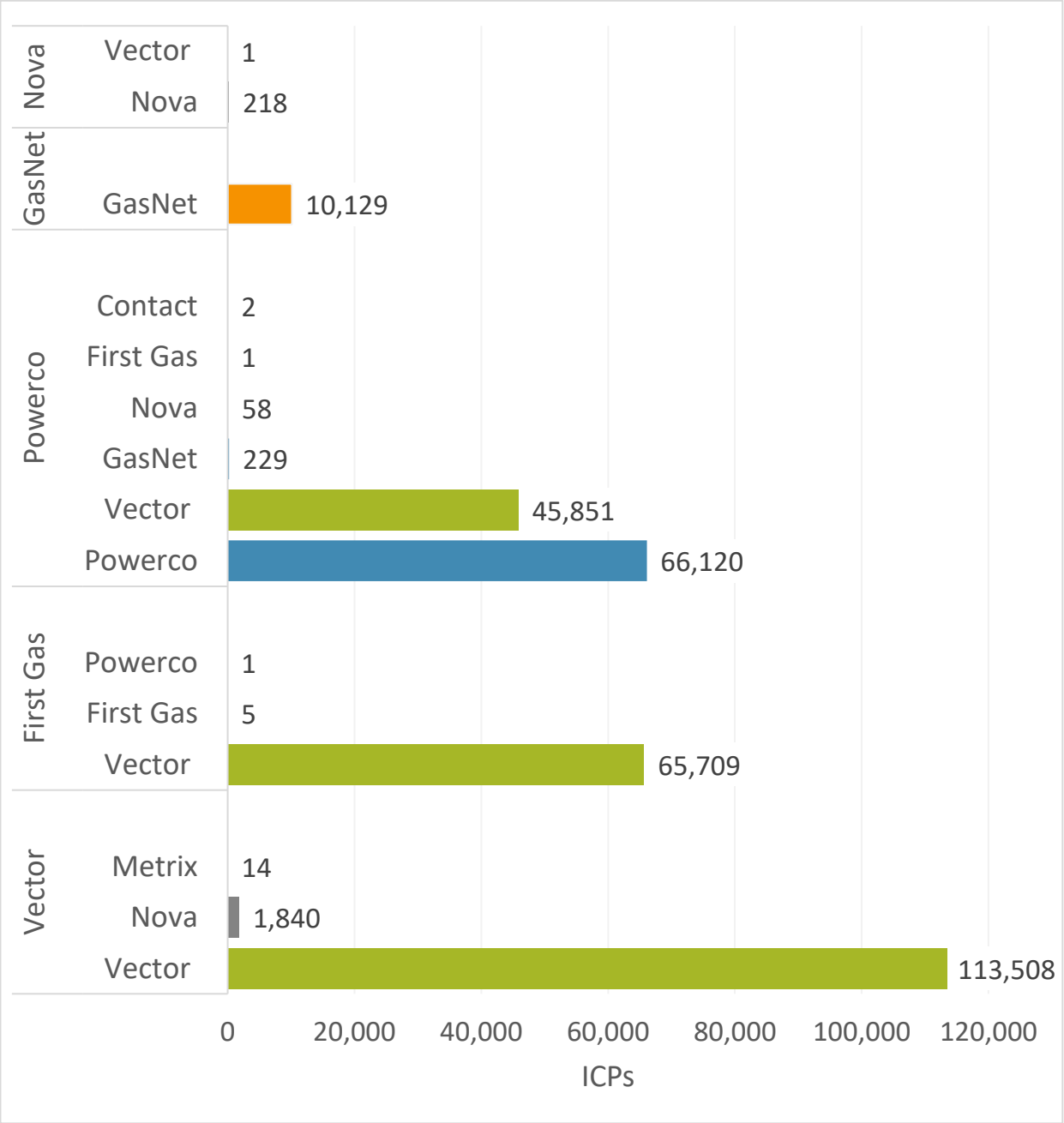


This series of charts shows regional changes in ICP numbers. The blue data series shows the cumulative increase in total ICPs since the start of the gas registry in 2009. The green data series shows the cumulative increase in active ICPs – ICPs that have a status of either active-contracted (ACTC) or active-vacant (ACTV). The orange data series is the difference between the two and shows the cumulative increase in ICPs that are not connected and inactive, either because there is no longer a gas consumer at that site or because the site was never connected to a consumer in the first place.

The five charts all use a similar scale, so that the data can be compared across regions. The largest increase in ICPs has occurred in Auckland, the region with the largest number of gas consumers. This region has had an increase of nearly 28,000 active ICPs since 2009, and only about 7,000 additional inactive ICPs. Wellington, the second largest region, has had about 32% of Auckland's growth in active ICPs but about 58% of its growth in disconnected ICPs. In Waikato, the third largest region, disconnections have outnumbered the increase in active ICPs by about 4%.

The smaller regions are grouped by those that have increased the numbers of active ICPs and those that have not. Overall, in the gaining regions of Bay of Plenty, Hawke's Bay, Taranaki, and Wanganui, the increase in active ICPs has outpaced the increase in disconnected ICPs by about 17%. The regions of Gisborne, Manawatu, and Northland have all experienced a net decrease in active ICPs, despite the creation of about 2,800 new ICPs in those regions.

Chart 25: Meter ownership by distribution system



This chart shows the number of active ICPs (with a status of either active-contracted (ACTC) or active-vacant (ACTV) in the gas registry) by meter owner within each distribution network. While there are several metering providers in the gas market, the chart shows that, in most distribution networks, there is a dominant provider.

Natural gas trades on emsTradepoint

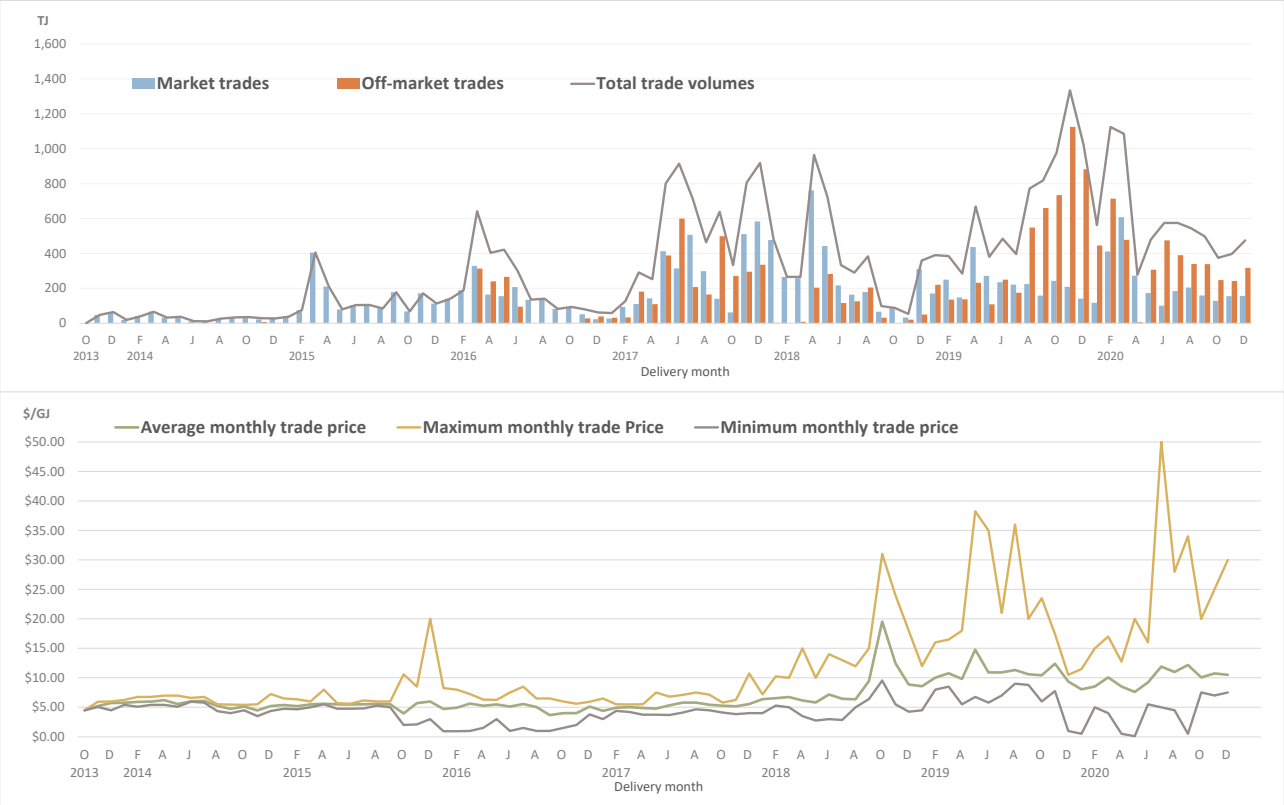
emsTradepoint is an online platform established in 2013 that enables the anonymous trading of natural gas and provides a mechanism for price discovery for its members. It also provides a clearing and settlement service for gas trades that are made off the market.

The charts below show gas volumes conducted on emsTradepoint – both traded volumes and off-market trades – as well as monthly average, maximum, and minimum prices. Since its inception, annual volumes of gas traded on emsTradepoint have increased more than 20-fold. Prices from

2013 through 2017 were generally less than $6.00/GJ; but average prices in the past few months have been in the $8-12/GJ range.

In the past 24 months, trade volumes have varied between 53 to 1335 TJ per month; and at prices ranging from $0.10 to $50 per GJ. The diminished volumes and high prices during last three months of 2018 appear to be due to a shortage of gas in the market at that time, caused by the loss of production from the offshore wells at Pohokura as repair work was undertaken. In May 2019, there was a brief unplanned outage at Kupe that coincided with further work at Pohokura. It was during this time that the highest-ever prices were recorded on emsTradepoint: $38.25 per GJ. There was a notable drop in trades in April 2020, likely caused by the COVID-19 Alert Level 4 lockdown.

Chart 26: Monthly trade volumes and prices on emsTradepoint



Explanatory notes

Introduction

This appendix provides context and additional information about the industry performance measures contained in the body of the report.

Paragraph headings refer to charts in the main report.

Switching performance measures

All the switching charts include only switches that occurred on open-access distribution networks; switches from open-access to bypass networks (or vice versa) would not be recorded as a switch in the gas registry. Additionally, the charts include only those switches that occurred to customer sites that had a status of active-contracted (ACTC) or active-vacant (ACTV) in the registry (to exclude the transfer of inactive sites from one retailer code to another). The charts also exclude switches that were subsequently withdrawn; that is, switches that were reversed, either because they were originally entered in error or because the customer decided not to go ahead with the switch. (On average, about 5.5% of switches are subsequently withdrawn.)

The charts also exclude bulk transfers of customers associated with events such as retailer amalgamation or the purchase of a retail customer base. Specifically, the charts exclude the transfer of E-Gas customers to Nova Energy in November 2010; the amalgamation of Auckland Gas (June 2011) and Bay of Plenty Energy (March 2013) with Nova Energy; the transfer of Energy Direct customers to Trustpower (August-October 2016); and the transfer of EnergyClub customers to Contact (June 2020).

Chart 13: Monthly switching activity

Prior to the gas registry going live in March 2009, there were approximately 1,000 switches per month, and the annual churn rate was approximately 4.8%.

For the past five years, the rolling monthly average has been between 3,600 and 4,000 switches per month. The churn rate (defined as the number of switches in 12 months divided by the total number of gas consumers) has varied in that time from 14.2% to 17.9%. By comparison, electricity switching rates have varied from about 18% to about 21% in the same time period.

For context, the chart below shows customer switching trends since March 2009, when the registry went live.

Chart A- 1: Monthly switching since March 2009

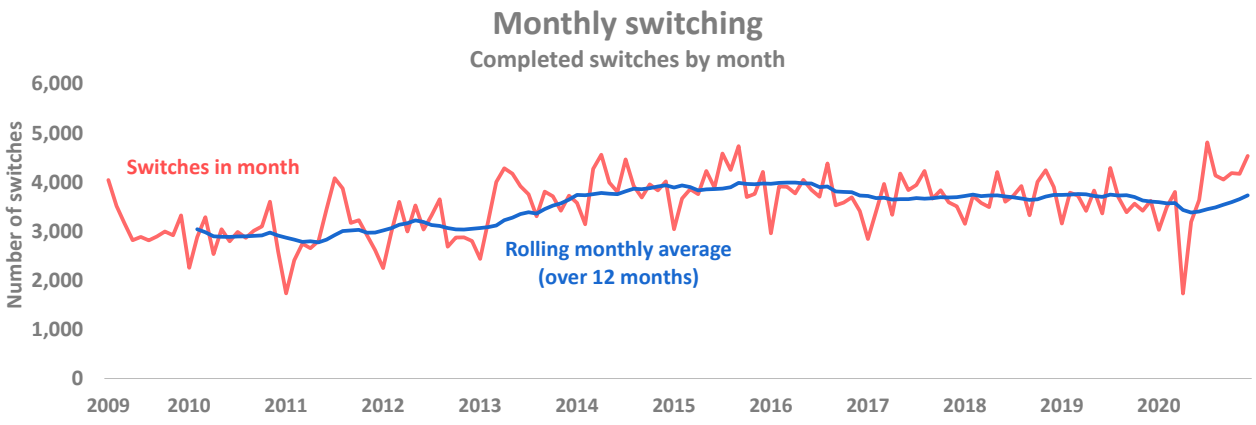


Chart 14: Regional switching activity

These charts compare regional switching rates with total switching rates. The grey line is the same in all the charts and shows the number of switches in a month as a percentage of active customer sites (ACTC and ACTV ICPs) across all North Island gas consumers. The data include both move switches (where a property is switched at the request of an incoming tenant or homeowner) and standard switches (where a gas customer decides to switch the retailer that supplies their existing location). As that grey line shows, monthly switching generally involves between about 1.0% and 1.5% of total North Island gas customers in a month.

The red line in each chart shows the number of switches in that region as a percentage of ICPs in that region. Auckland and Wellington switching rates tend to be similar to the North Island rates, since a large proportion of gas customers are located in those regions. Differences emerge in the smaller regions and show both long-term trends and the effects of regional marketing campaigns.

Chart 15: Time to process switches

The time to process switches has fallen markedly since the commencement of the Switching Rules and the associated inception of the gas registry. Prior to those events, switching could take weeks or months to complete. Once the registry went live, switching times dropped to about 10 days, and since then, switching times have dropped further, to an average of less than 2.5 business days.

Chart A- 2: Switch length since March 2009

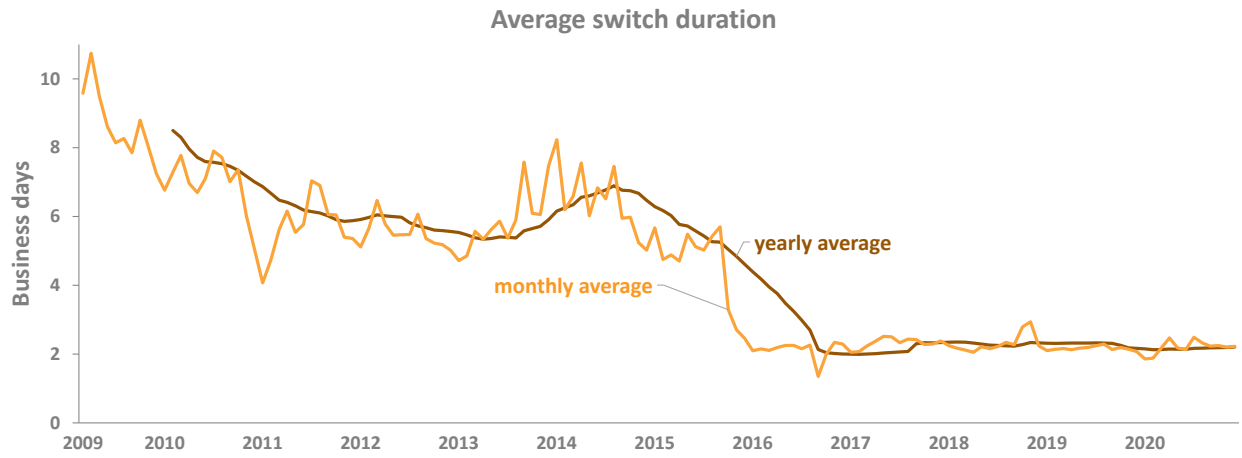


Chart 16: Distribution of switching length

These charts show the distribution of switching length since the start of the gas registry by calendar year. Since the start of the registry, switches have tended to occur within two days; or in seven days. Historically, switches taking zero to two business days were generally move switches (where a property is switched at the request of an incoming tenant or homeowner), while the majority of switches taking three or more business days were standard switches (where a gas customer simply decides to switch the retailer that supplies their existing location). Now most switches occur within three days.

Chart 17: Number and severity of breaches of the Switching Rules

Most breaches of the Switching Rules are alleged by the registry operator, though some have been alleged by other market participants. Breaches can also be reported by an auditor following an event audit or performance audit.

Allocation and reconciliation performance measures

Chart 18: Volumes of unaccounted-for gas (UFG)

Under the Reconciliation Rules, the amounts of gas that retailers estimate their customers have used are subtracted from the amounts of gas leaving the transmission system. The difference is UFG, which arises from technical losses on the system, metering inaccuracies, and retailer estimation errors. UFG imposes a cost on the market: it is gas that retailers are allocated and must pay for, but cannot sell. Tracking UFG is a way of monitoring these costs and the efficiency of the retail market. This transparency should assist the industry to take steps to reduce UFG where it is efficient to do so.

The chart compares total UFG quantities by consumption month and allocation stage (initial, interim or final). The grey bars show UFG based on the most recent data available.

Changes in UFG from one allocation stage to another are largely due to mass market retailers' consumption submissions becoming more accurate at later allocation stages. UFG tends to be most extreme at the initial allocation stage: in summer, UFG tends to be negative due to retailers' overestimations of customer consumption; and in winter, UFG tends to be positive due to retailers underestimating consumption. Generally, UFG volumes diminish considerably from the initial to the interim allocation stages. The final allocation stage reflects further minor adjustments to retailers' data, which can result in slightly more or less UFG, as shown by the orange and red lines in the chart below.

For context, the chart below shows UFG trends since October 2008, when the Reconciliation Rules went into effect.

Chart A- 3: UFG since October 2008

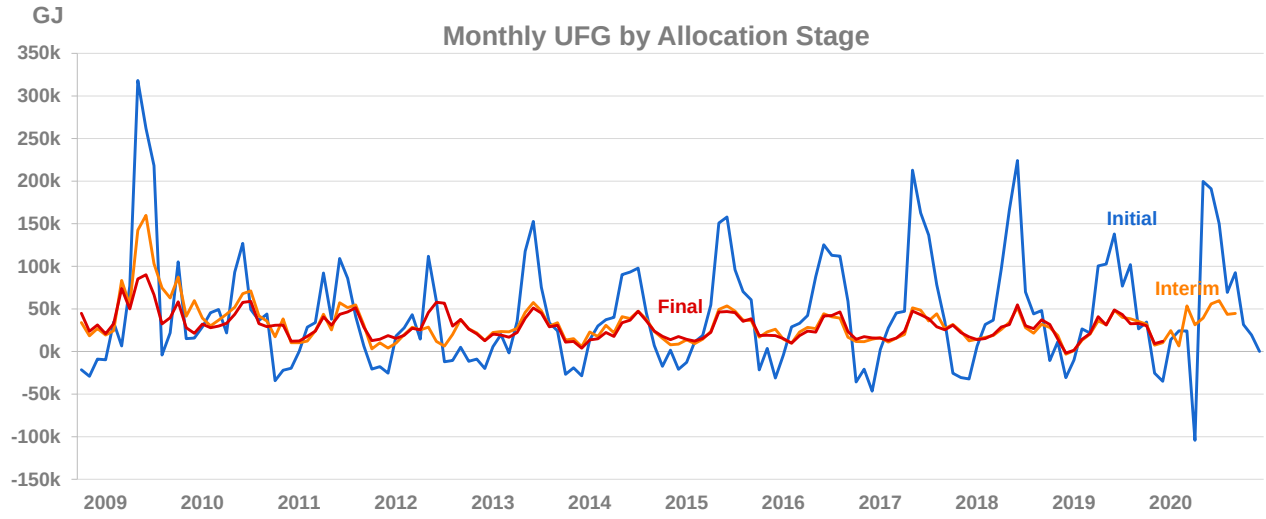


Chart 19: Percentage of UFG

This chart shows the amount of UFG in comparison with the total amount of allocated gas consumed each month. The grey bars show gas consumption at allocated gas gates, while the coloured bars show UFG volumes by allocation stage. The labels show the percent of UFG as a proportion of total allocated gas.

Chart 20: Rolling 12-month UFG

Another way to think about UFG is the amount recorded over a 12-month period. This chart shows rolling 12-month UFG figures, both as a GJ total and as a percentage of gas consumed. That is, each data point shows the amount of UFG recorded for that month and the preceding 11 months.

As initial data are often inaccurate, the chart includes only consumption months for which interim or final data are available. The figures in the chart are based on the most recent data available at the time of publication.

Chart 21: Gas gates where UFG is the highest

These charts show the gates with the largest volumes of positive and negative UFG over 12 months, according to the most recent final and interim data.

The first chart shows the 10 gas gates that had the highest volume of UFG, in terms of the percentage of total positive UFG experienced over the same time period. As a comparison, the chart also includes the percentage of total gate injections each gate represents; that is, the proportion of total gas consumption that is drawn from those gates.

The second chart shows negative UFG compared with gate injections.

Chart 22: Number and severity of breaches of the Reconciliation Rules

Most breaches of the Reconciliation Rules are alleged by the Allocation Agent. Breaches can also be reported by an auditor following an event audit or performance audit. Rule 37 breaches tend to be considered and settled in batches.

Market competition performance measures

Chart 23: Market share of ICPs by retailer

These two charts show the number of active contracted customer sites associated with each retailer over the past two years, as recorded by the gas registry.

Chart 24: Market share by consumer segment

This chart shows market share by consumer type, as shown in the gas registry. Note that the chart shows retailers that have more than 5% of the market share of any category.

Chart 12a: Market share by geographical region

This chart shows the number of customers served by each retailer by geographical region. For simplicity, the charts include only those retailers with over 3% of total customer market share.

Chart 25: Herfindahl–Hirschman Index

The Herfindahl–Hirschman Index (HHI) is one way of measuring market concentration by using size and number of competing firms. The index ranges from 0 to 10,000. A low score indicates a low level of market concentration, which arises when there are many small firms in the market, each with a small proportion of market share. Conversely, an HHI score of 10,000 represents a market with a single retailer. The measure is used because market concentration is often inversely related to market competition; that is, the more retailers there are, and the more that market share is spread among them, the greater the competition for customers is thought to be.

As a point of reference, the United States Department of Justice considers markets in which the HHI is between 1,500 and 2,500 to be moderately concentrated. Markets with an HHI of greater than 2,500 are considered highly concentrated.[4]

The bars in the chart shows the HHI of the retail gas market as at December 2019; for comparison, the HHI for the beginning of 2009, 2012, and 2015 are also shown. In all regions, the HHI has decreased, indicating that the retail gas markets in these regions have become less concentrated.

Until 1992, when the new Gas Act disestablished local exclusive franchise areas, gas retailing occurred through local vertically integrated monopolies. With the consequent onset of retail

[4] http://www.justice.gov/atr/public/guidelines/hhi.html accessed 1 May 2014.

competition, these former monopoly providers became 'incumbents', subject to competing retailers vying for customers in their areas. (A similar change occurred in the electricity sector). In most regions, there is still a dominant retailer, but the decrease in HHI shows that they have become less dominant in the past seven years. With the introduction of the Switching Rules, new retailers have entered the market and smaller retailers have increased their market share.

Chart 26: Switching by consumer sites since 2008

This chart shows the proportion of active contracted consumer sites by the number of times they have switched since the start of the registry, broken down by consumer type (as indicated by load shedding category in the registry).

Chart 14A: Customer sites by last switch date

Another measure of customer switching activity is the recency of their last switch. This set of charts shows, for customer sites that have switched at least once since the start of the registry, the year that the switch was put through. Customer-initiated switches are shown in blue, while transfers – switches that happened through the takeover of one retailer's customer base by another retailer – are shown in green.

Chart 27: Residential consumer sites that have never switched

This chart shows, for the residential consumer sites that have never switched retailer (since the start of the gas registry in February 2009), the proportion served by each retailer, compared to that retailer's market share of residential consumers.

Chart 15a: Residential customers by number of switches

This chart breaks down retailers' residential consumers by the number of times they have switched and compares those proportions with switches for the residential consumer market as a whole.

Chart 28: Switching activity by retailer

This chart shows the numbers of ICPs gained and lost by retailers over the past two years. The blue bars show the number of customers gained by the retailer each month, and the red bars show the numbers of customers lost.

As shown by these charts, although the net changes in number of customer ICPs may not change significantly from month to month for some retailers, there is a lot of underlying switching activity, particularly for the mass market retailers Contact, Genesis, Mercury, and Trustpower.

Chart 29: Gas gates by number of retailers

This chart shows, by month, numbers of gas gates by the number of active retailers. In this case, an active retailer means a retailer that has at least one active contracted ICP at that gas gate. Thirty-two gas gates are direct connect gates, meaning that they serve only one consumer, generally a large industrial consumer, and can have only one retailer active at that gate.

The majority of gas gates – about 100 – serve multiple consumers. The greater the number of retailers that trade at a gas gate, the greater is the potential competition for customers.

Chart 30: Connections served by multiple retailers

This chart plots the proportion of gas consumers who are served from the gas gates in the chart above; that is, consumers served at gas gates where multiple retailers trade. This chart shows, for example, that while only a handful of gas gates have more than nine active retailers, those gates tend to be the largest ones, since over 90% of all gas consumers are connected at these gates.

Chart 31: Total gas volumes

This chart shows the total amount of gas delivered by open-access transmission pipelines and consumed over the past two years by all gas users. The consumption data by use is from direct connect gas gates and gates where industrial load is greater than 80% of gate volumes (G1M

gates). There are also some industrial consumers connected to gas gates where the industrial load is less than 80%; these volumes are included in the shared gas gates data.

The top grey line shows total consumption; the coloured lines provide a breakdown by type of use.

Consumption for petrochemicals is shown in blue.

Gas usage for thermal electricity generation is shown in red.

The tan line shows the amount of gas used by consumers connected to shared gas gates. This represents the majority of commercial and residential consumers. There is a seasonality trend to the consumption, higher in winter and lower in summer.

The green line represents volumes of gas used by large industrials, including steel, wood products, dairy processing, and oil refining.

The purple line shows the volumes of gas going to storage.

The orange line represents gas used by consumers connected to the private pipelines owned by Nova.

Gas used by consumers connected to distribution pipelines (the tan line) is allocated by retailer and shown in the next chart.

Chart 32: Allocated gas volumes

This chart shows the gas volumes allocated to retailers at shared gas gates over the past two years, i.e. gas gates connected to a network that supplies multiple consumers. This includes gas used by industrial, commercial, and residential consumers, but it excludes gas volumes from direct connect gas gates; that is, from gas gates that supply a single consumer directly from the transmission system. For this reason, gas volumes supplied through direct connect gas gates to such industrial sites as thermal power stations, the oil refinery, and paper and chemical factories are not included in the chart.

The grey bars in the chart show total volumes of allocated gas (using the right-hand scale); company volumes are denoted by coloured lines and use the left-hand scale. The bars show the seasonality of gas consumption: higher in winter and lower in summer, and many of the retailers show similar patterns in their allocated volumes.

Nova Energy is generally the largest retailer by allocated volumes. Genesis has a load profile that strongly peaks in winter and troughs during the summer. Contact, Mercury, and Trustpower show similar – but less pronounced – winter peaking patterns. Greymouth's share of allocated gas, in contrast, is relatively steady throughout the year, reflecting its position as largely a supplier to industrial loads.

Pipeline balance

Chart 33: Balancing gas volumes (no longer tracked since June 2017)

The volume of gas in a pipeline relates to the gas pressure in the pipeline and needs to be maintained below the safe operating pressure limit for the pipeline and above the minimum required to maintain the supply of gas to consumers. On the Maui pipeline, pressures rise or fall as parties who inject gas into the pipeline over- or under-inject, and as parties who receive gas from the pipeline under- or over-take relative to their respective scheduled volumes. When a transmission owner or operator manages the gas inventory in a pipeline, it is referred to as *secondary* or *residual balancing*. Maui Development Limited (MDL) buys and sells balancing gas in order to manage gas volumes and thus maintain gas pressure within safety and operational limits.

Prior to 2008, secondary balancing services were essentially free to holders of legacy Maui gas contracts, but changes implemented at the end of 2008 to the Maui Pipeline Operating Code,

together with the arrangements in the Vector Transmission Code, meant that the costs associated with secondary balancing were generally recovered from pipeline users. In 2009, MDL instituted the Balancing Gas Exchange, an online platform that displayed pipeline balance conditions and enabled parties physically interconnected to the Maui pipeline to post offers to buy and sell balancing gas. These two changes provided gas transmission customers with an incentive to self-balance and greater information on which to base their balancing decisions.

The outcome was the significantly reduced volumes of gas needed to be purchased or sold by MDL to balance the Maui pipeline.

On 1 October 2015, MDL introduced market-based balancing (MBB) on the Maui pipeline, wherein welded points are cashed out at the end of each day for imbalances over a tolerance limit. The rationale for the change was to provide welded parties with even greater incentive to self-balance – that is, to engage in primary balancing, rather than relying on secondary balancing by the pipeline.

In January 2017, First Gas announced that it was changing the operation of its compressors across the transmission system, in order to reduce overall fuel gas costs and to increase the ability of the transmission pipeline to cope with unplanned production station outages. Two related aspects of this change were the increased use of the Mokau compressor station, which increased the use of fuel gas, and increased line pack on the Maui pipeline, which decreased the need for balancing gas transactions. Since not all purchases of fuel gas are publicly available, it is difficult from the available data to see an overall picture of the effect of the operational changes.

For these reasons, Gas Industry Co no longer tracks balancing gas volumes in this quarterly report, focussing instead on primary balancing as shown in charts 22 and 23.

Chart 34: Receipt point operational imbalance

On the Maui pipeline, shippers nominate gas to flow from a receipt welded point, a point where gas is injected into the transmission pipeline, to a delivery welded point, where it is either consumed by a large gas consumer such as Methanex or the Huntly Power Station, or transferred into another pipeline for delivery to smaller downstream customers. Once entered into the pipeline scheduling system and approved, these nominations become scheduled quantities.

Measured quantities, on the other hand, are the amounts of gas that physically flowed through a metering device at a welded point. Scheduled quantities are forecasts; measured quantities are what actually happened. Inevitably, there are differences between the two: forecasts may inaccurately predict actual demand on the day, or there are physical reasons why production stations or large users could not inject or offtake the volumes scheduled.

The difference between measured and scheduled quantities at a welded point is called operational imbalance. Positive imbalance at a welded point indicates that gas is being stored in the pipeline; negative imbalance shows that gas is being drawn from pipeline inventory (called line pack).Excess imbalance on a transmission pipeline can incur costs inefficiently, as it may require the pipeline operator to take a balancing action by buying or selling gas to make up for the change in line pack.

As noted above, MBB was implemented in October 2015, and a key component of the change was the introduction of daily cash outs for operational imbalance. This change was projected to increase the incentives for primary balancing and thus reduce daily operational imbalance.

Chart 22 shows operational imbalance at large receipt points on the Maui pipeline excluding the bi-directional Frankley Road welded point.

Chart 35: Delivery point operational imbalance

This chart shows operational balance at large delivery points on the Maui pipeline (again excluding Frankley Road). The yellow line shows data from the transmission pipeline welded points (TPWPs) Pokuru and Rotowaro, which feed the distribution networks in Bay of Plenty and Auckland, respectively. The orange line shows the Bertrand Road, Faull Road, Ngatimaru Road, Mokau Compressor Station, and Huntly Power Station delivery points, which are direct connections to large consumers.

Critical contingency management

The purpose of the CCM Regulations is to achieve the effective management of critical gas outage and other security of supply contingencies without compromising long-term security of supply. A copy of the CCM Regulations can be found at http://www.gasindustry.co.nz/work-programmes/critical-contingency-management/current-arrangements/regulations/. Information related to critical contingency management can be found on the CCO's website at http://www.cco.org.nz/.

Regional and meter owner market share

Chart 36: Regional ICP activity

This series of charts tracks the number of ICPs listed on the registry by date, region, and status. The green series shows active ICPs; that is, those with a status of ACTC and ACTV. The orange series shows all other statuses: NEW, READY. INACT (inactive-transitional), INACP (inactive-permanent), and DECR (decommissioned). NEW and READY statuses are used when an ICP has been newly created (prior to service installation) and when an ICP is ready to flow gas, respectively. In all regions, the number of NEW and READY ICPs has decreased compared to the start of the gas registry.

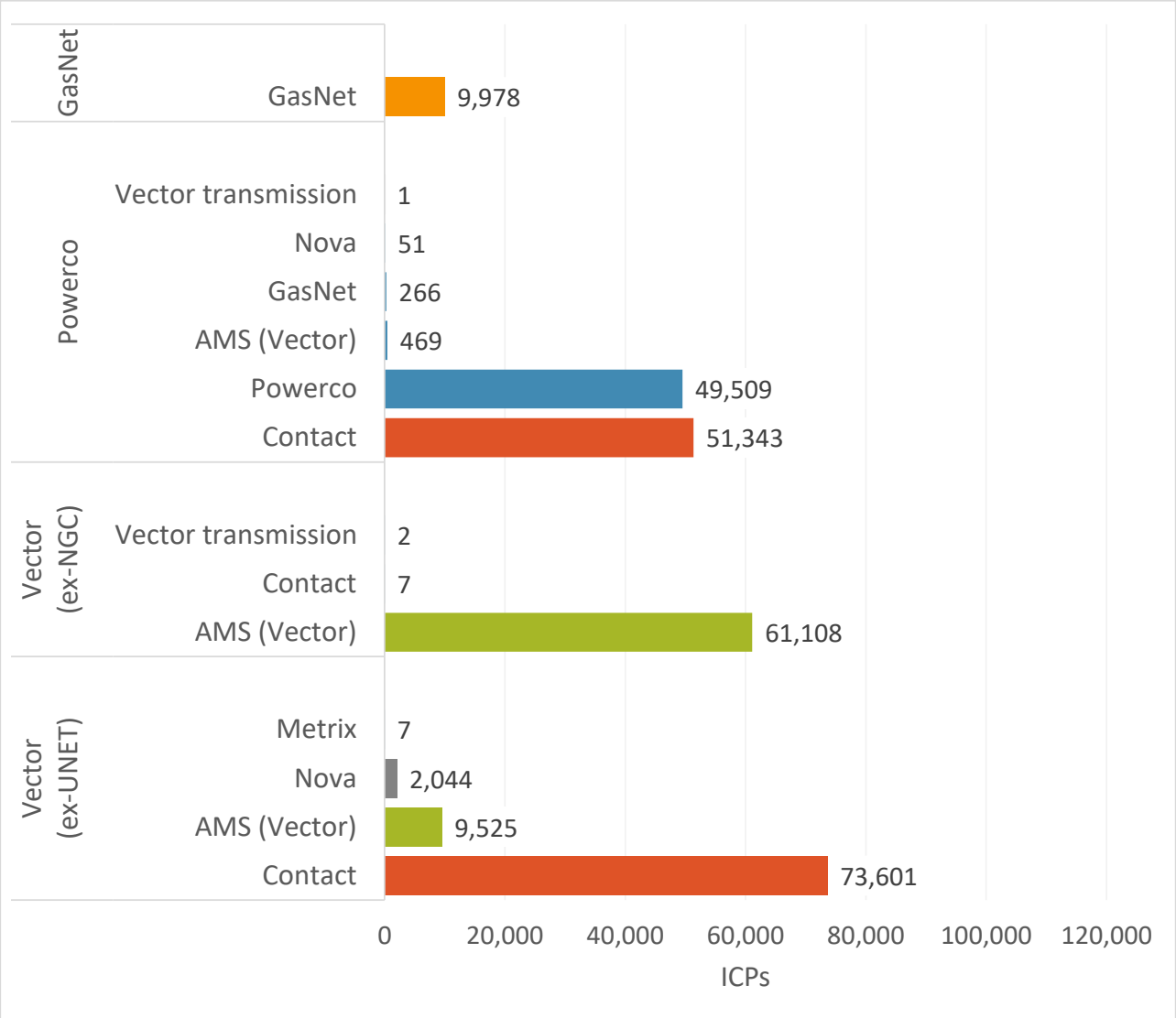
The other three statuses denote stages of disconnection. INACT denotes a transitional (non-permanent) disconnection; INACP is for a permanent disconnection; and DECR means that the ICP has been decommissioned, and the meter and service pipe have been removed.

Chart 37: Meter ownership by distribution system

There are two possible contributing factors to the apparent low level of metering competition within the distribution systems. A review of metering arrangements in 2016 revealed that, as there was little service differentiation between metering providers, retailers found it more efficient to contract with a single party to provide both network and metering services. Note that these circumstances are no longer applicable to First Gas's distribution system, as First Gas acquired the network from Vector but not its associated meters in 2016.

A second factor is the acquisition by Vector AMS of Contact's gas meters in 2013, which led to consolidation in the market. The chart below shows metering market shares as at April 2009, shortly after the start of the gas registry and prior to the sale of Contact's meters.

Chart A- 4: Historical meter ownership (as at April 2009)



Natural gas trades on emsTradepoint

Chart 38: Monthly trade volumes and prices on emsTradepoint

This chart reflects all the trades that have occurred on emsTradepoint since it began in October 2013. The top chart shows total monthly gas volumes, broken down into market trades and off-market trades (where emsTradepoint was used to settle and clear the trades).

The bottom chart shows the monthly volume-weighted average price, as well as the maximum and minimum prices of trades during the month. These prices include all the trades listed on emsTradepoint; that is, they include both market and off-market trades.