Performance Measures Quarterly Report for the period ending 30 June 2017

1 Summary

This report provides an update on the performance measures that Gas Industry Co monitors on a regular basis. The purpose of these measures is to track the performance of the Gas (Switching Arrangements) Rules 2008 (the Switching Rules), the Gas (Downstream Reconciliation) Rules 2008 (the Reconciliation Rules), and the Gas Governance (Critical Contingency Management) Regulations 2008 (the CCM Regulations), both in terms of activity related to these governance arrangements and the competitive outcomes that they foster. The Report also tracks transmission pipeline balancing measures, as a means of informing Gas Industry Co's work on this issue.

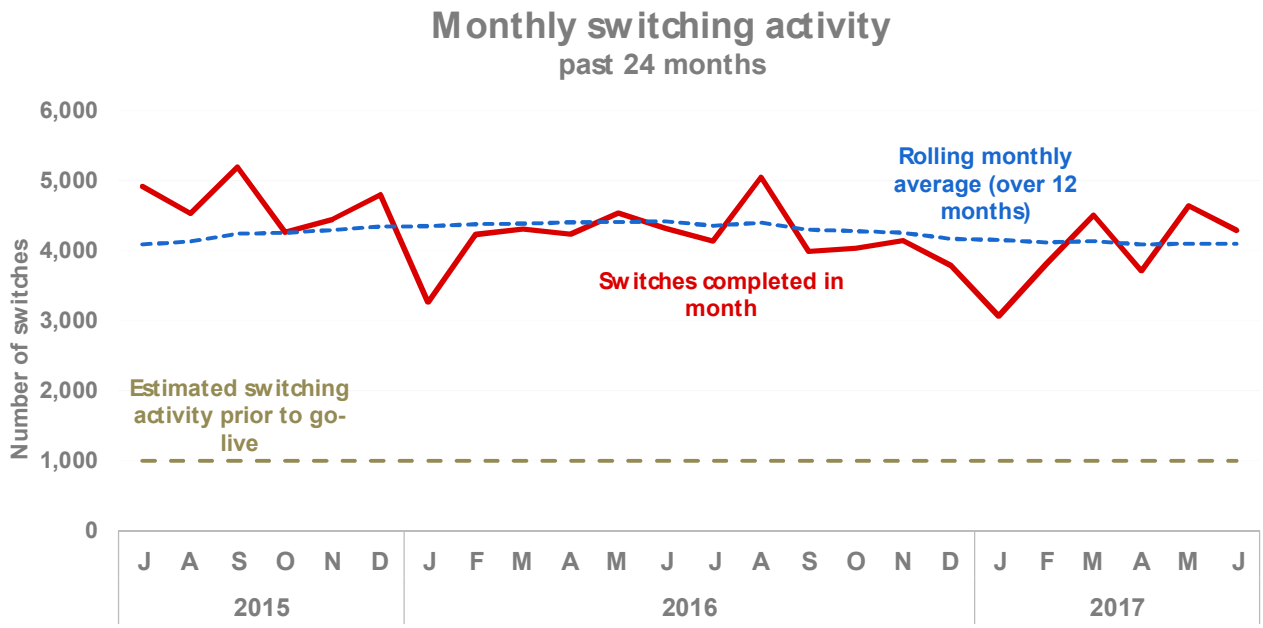
Explanatory details about the charts can be found in the Appendix to this report.

Highlights of the Report:

- About 4,100 gas consumers switch gas supplier each month; about 18% of gas customers switch supplier each year.
- So far in 2017, 76% of customer switches have been completed within three business days.
- 63% of residential consumer sites have switched retailer at least once in the past eight years; 66% of small commercial and 79% of large commercial sites have switched at least once.
- Over 99% 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) over the past year stands at about 0.8% (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, Genesis, and Vector Gas are the largest retailers by volume market share.

2 Switching performance measures

Chart 1: Monthly switching activity



- About 4,100 consumers switch gas supplier each month.
- The churn rate for the last 12 months is about 18%. 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.
- 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.
- Note that this chart excludes the transfer of Energy Direct customers to Trustpower from August – October 2016.
- See Chart A-1 in the appendix for a chart of switching activity since the start of the registry.

Chart 2: Regional switching activity

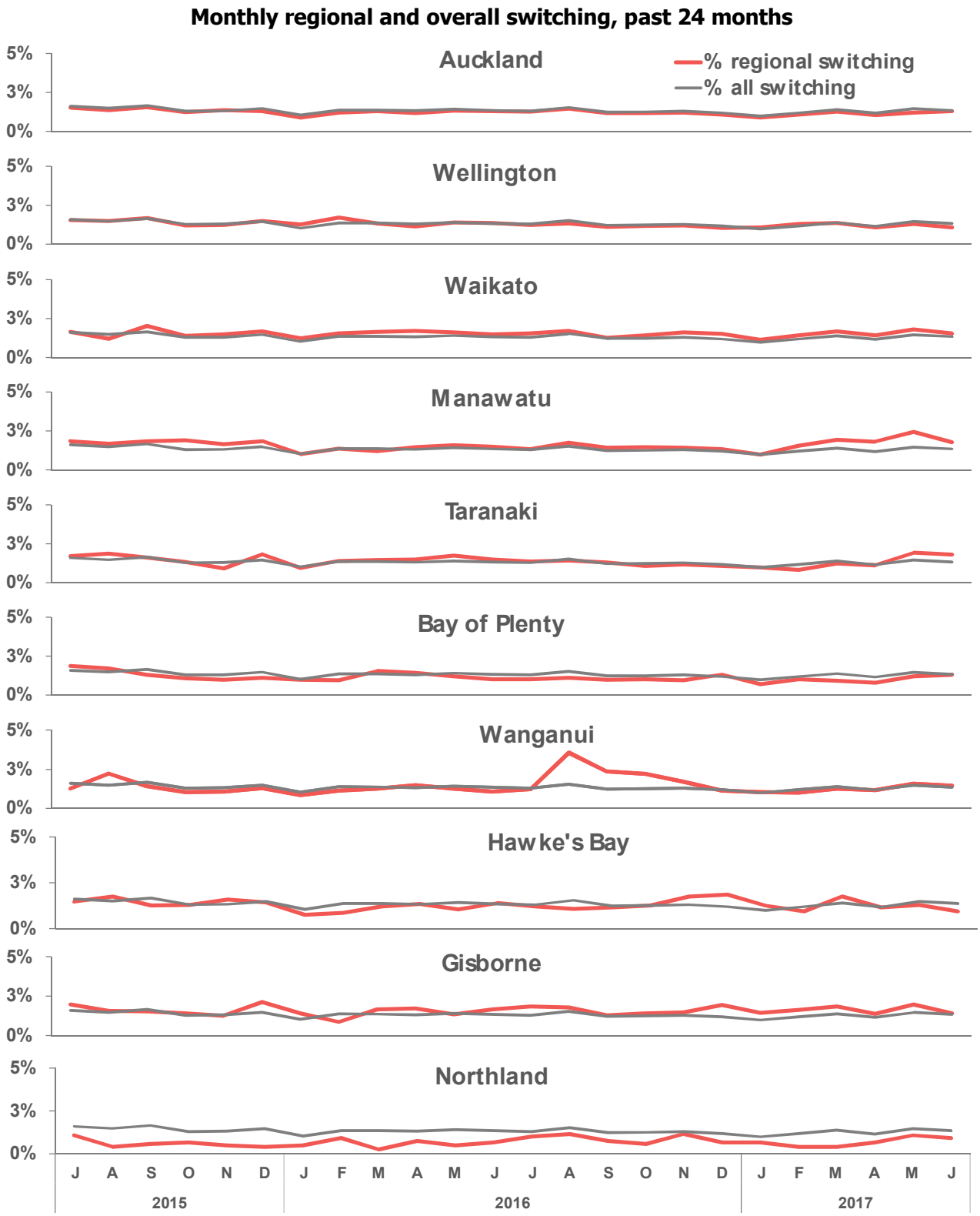
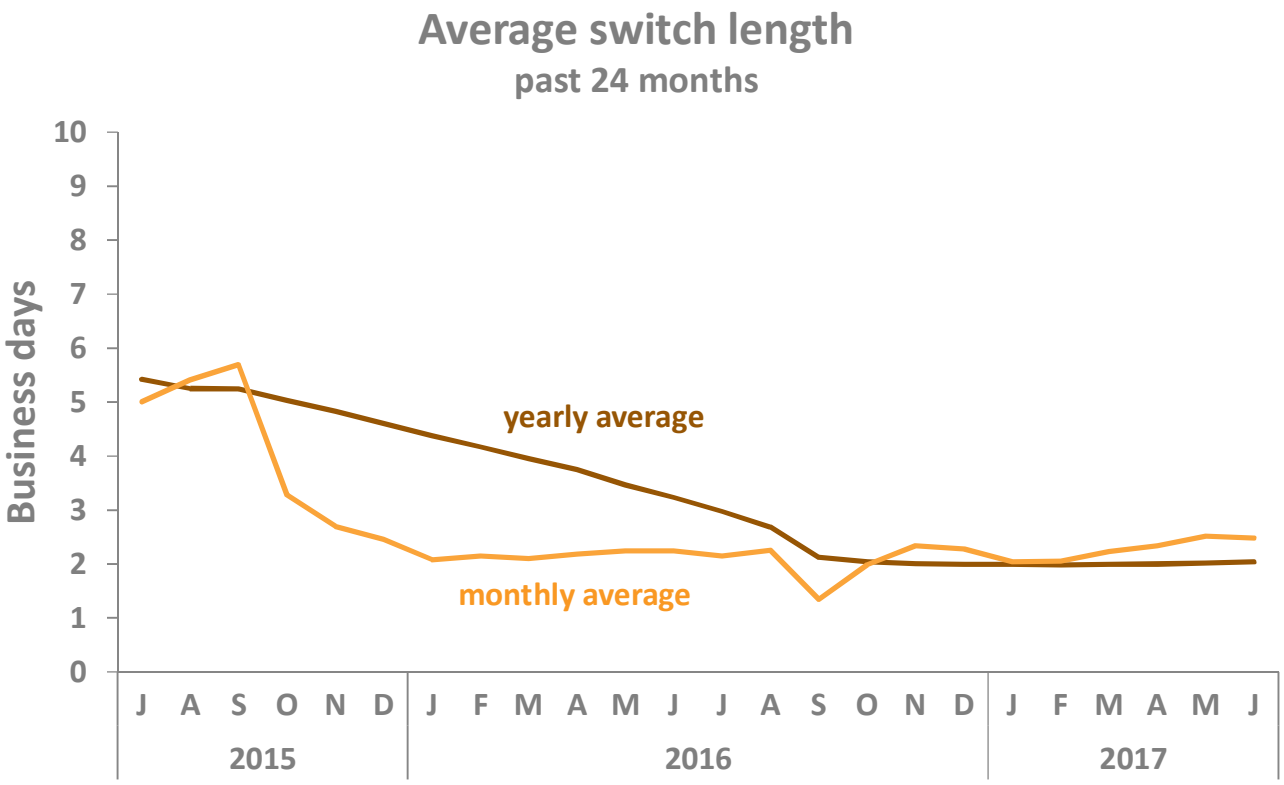
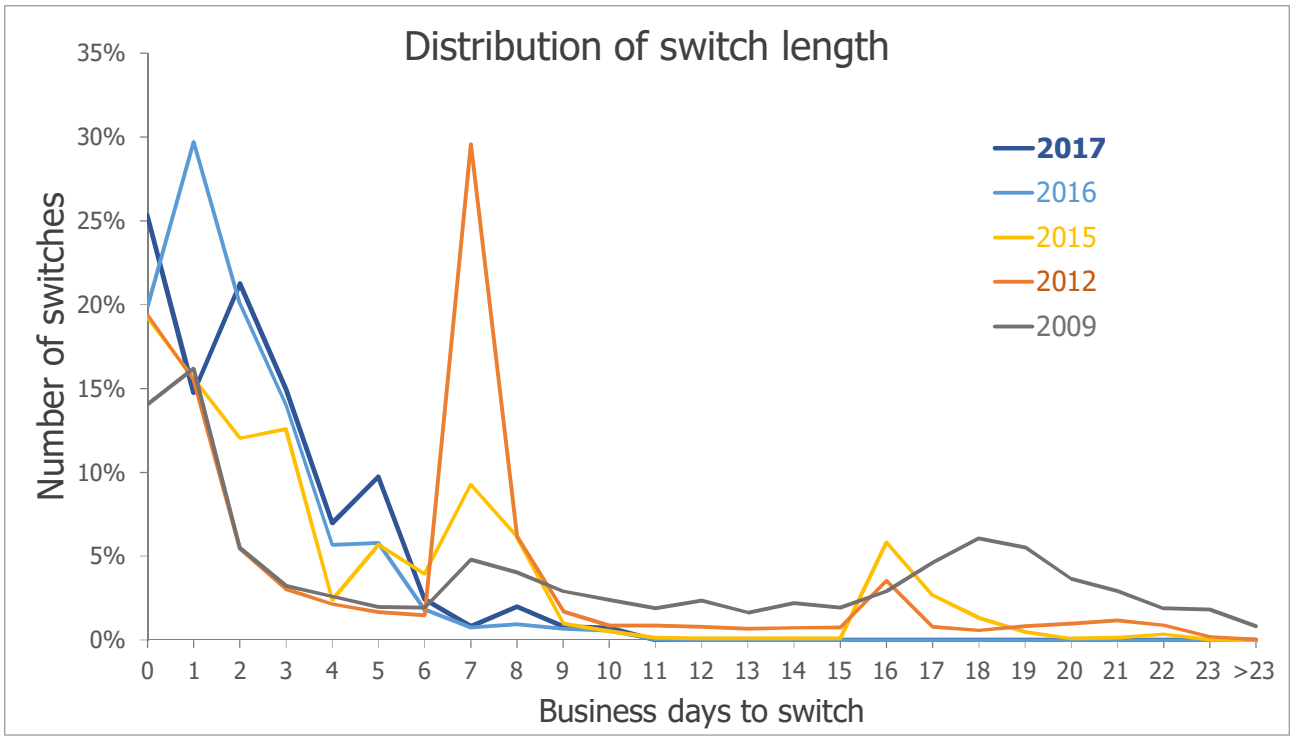


Chart 3: Time to process switches



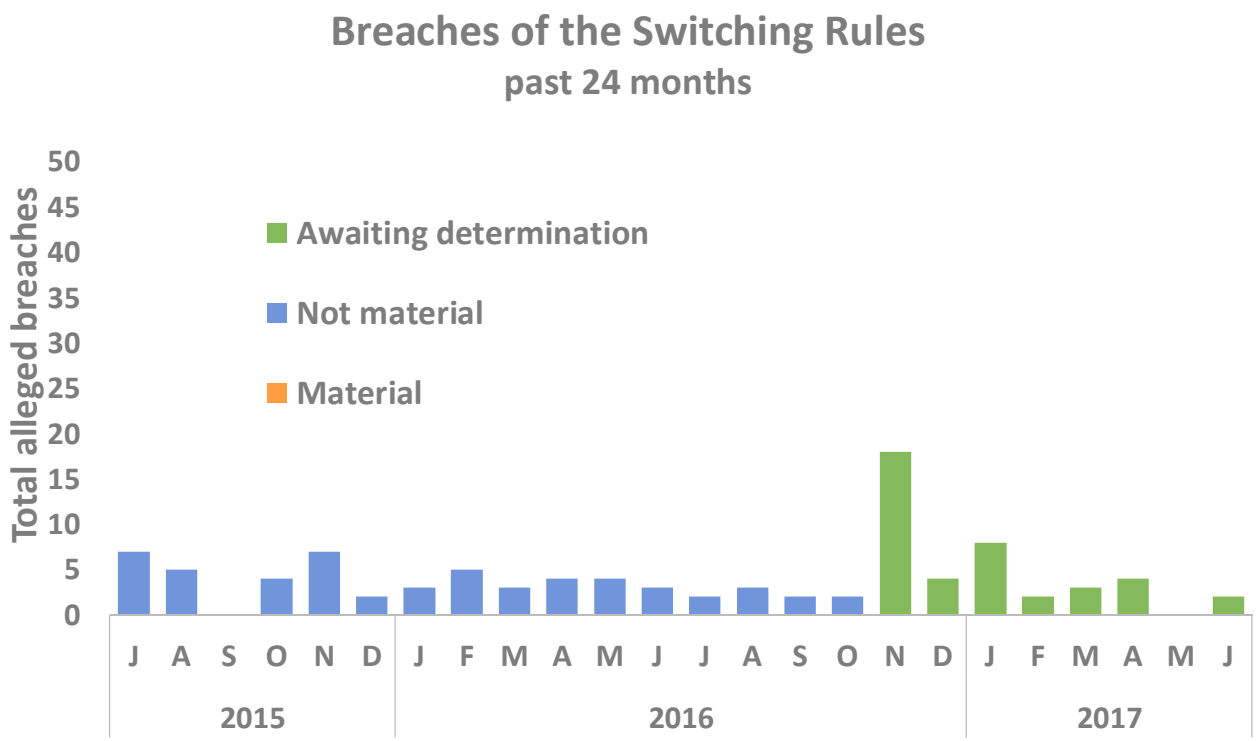
- Switching times have fallen markedly in the past two years. At the start of 2015, switches took a little over six days, on average. Switching times now average between 2 and 2.5 business days.
- Data are for switches of ICPs with a status of either active-contracted (ACTC) or active-vacant (ACTV) at the time of switching.

Chart 4: Distribution of switching length



- This chart shows the distribution of switching times for the calendar years of 2009, 2012, 2015, 2016, and 2017.
- The chart shows the change in switch length over time. In all years, there were some switches that took place within two days. In 2009, over half of switches took at least seven days to complete. 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 2016, 84% of switches were completed within three days. Thus far in 2017, another pattern has emerged, where about a quarter of switches happen in less than a day and another 36% are completed in two business days.

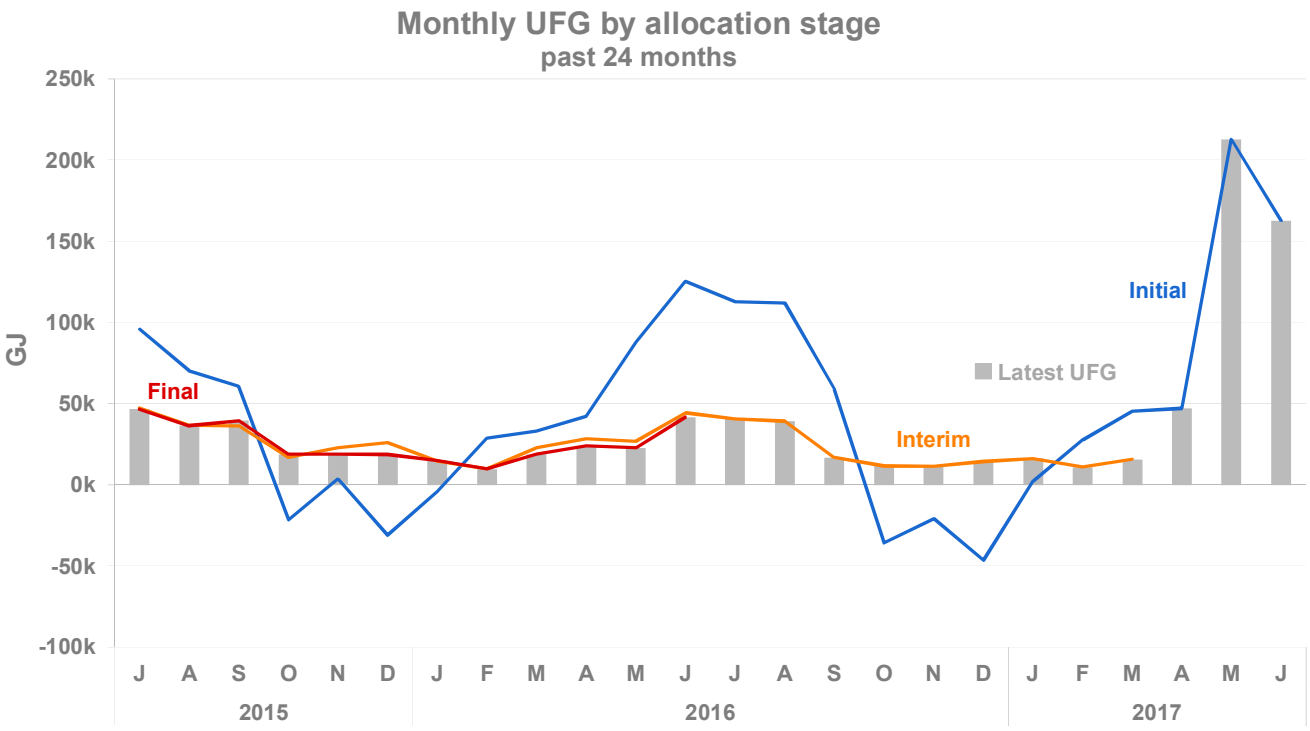
Chart 5: Number and severity of breaches of the Switching Rules



- Most of the Switching Rules breaches reported each month are alleged by the registry operator.
- In contrast, bulk of the breaches from November and January were alleged as a result of performance audits commissioned under the Switching Rules.

3 Allocation and reconciliation performance measures

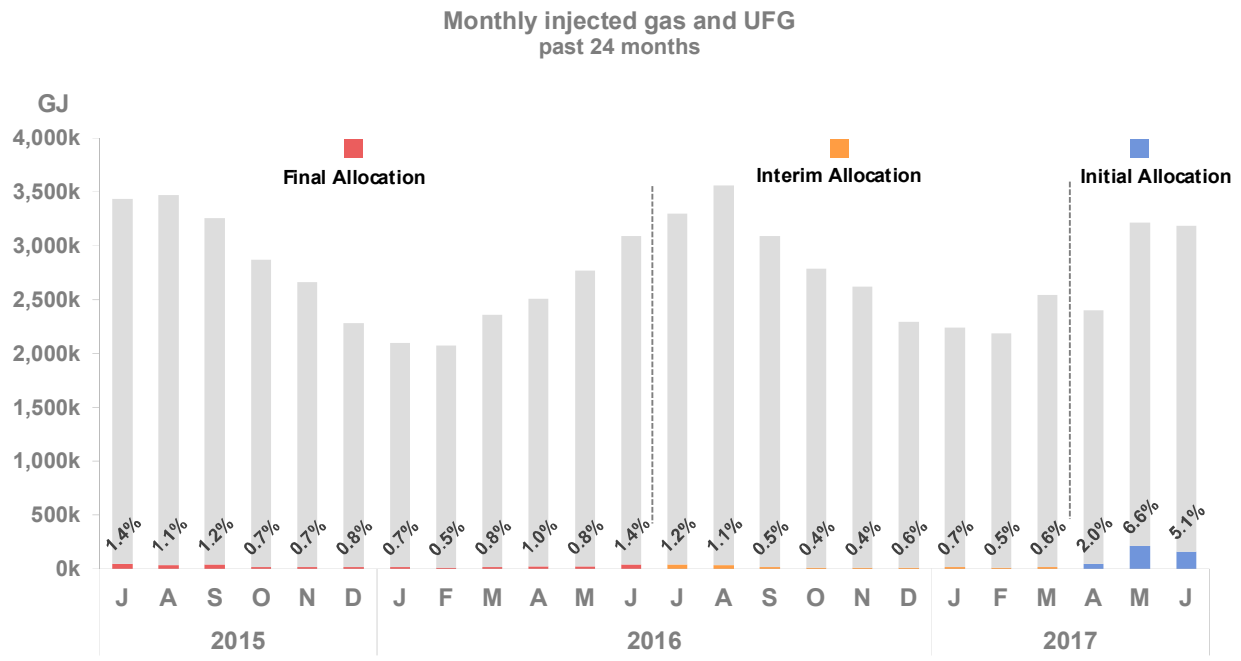
Chart 6: Volumes of unaccounted-for gas (UFG)



- Note that this chart uses the initial allocation produced by the allocation agent at the end of the month, not the D+1 allocation results.[1]
- See Chart A-2 in the appendix for a chart of UFG since the start of the Reconciliation Rules.

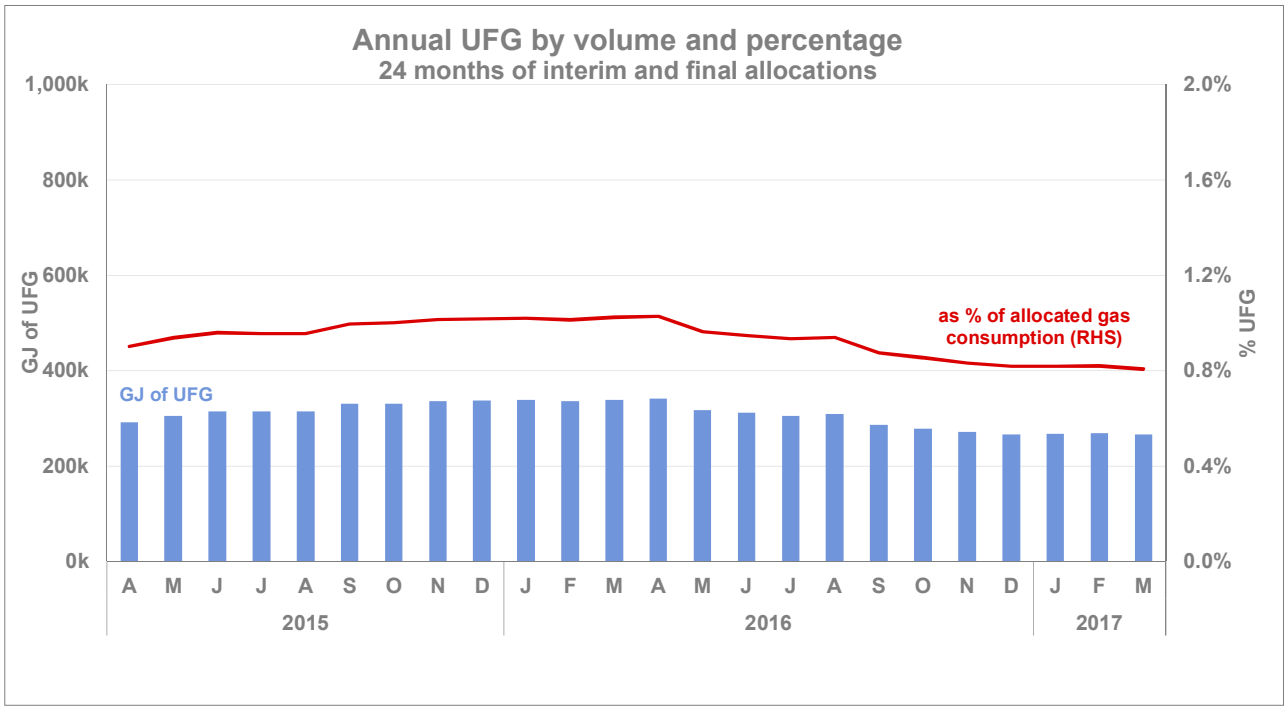
[1] The initial allocation produced by the Allocation Agent is a "bottom up" approach whereby each of the retailers submits data based on a combination of actual meter readings (historical estimates) and consumption estimates since the last meter reading (forward estimates). In that context, UFG is a 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



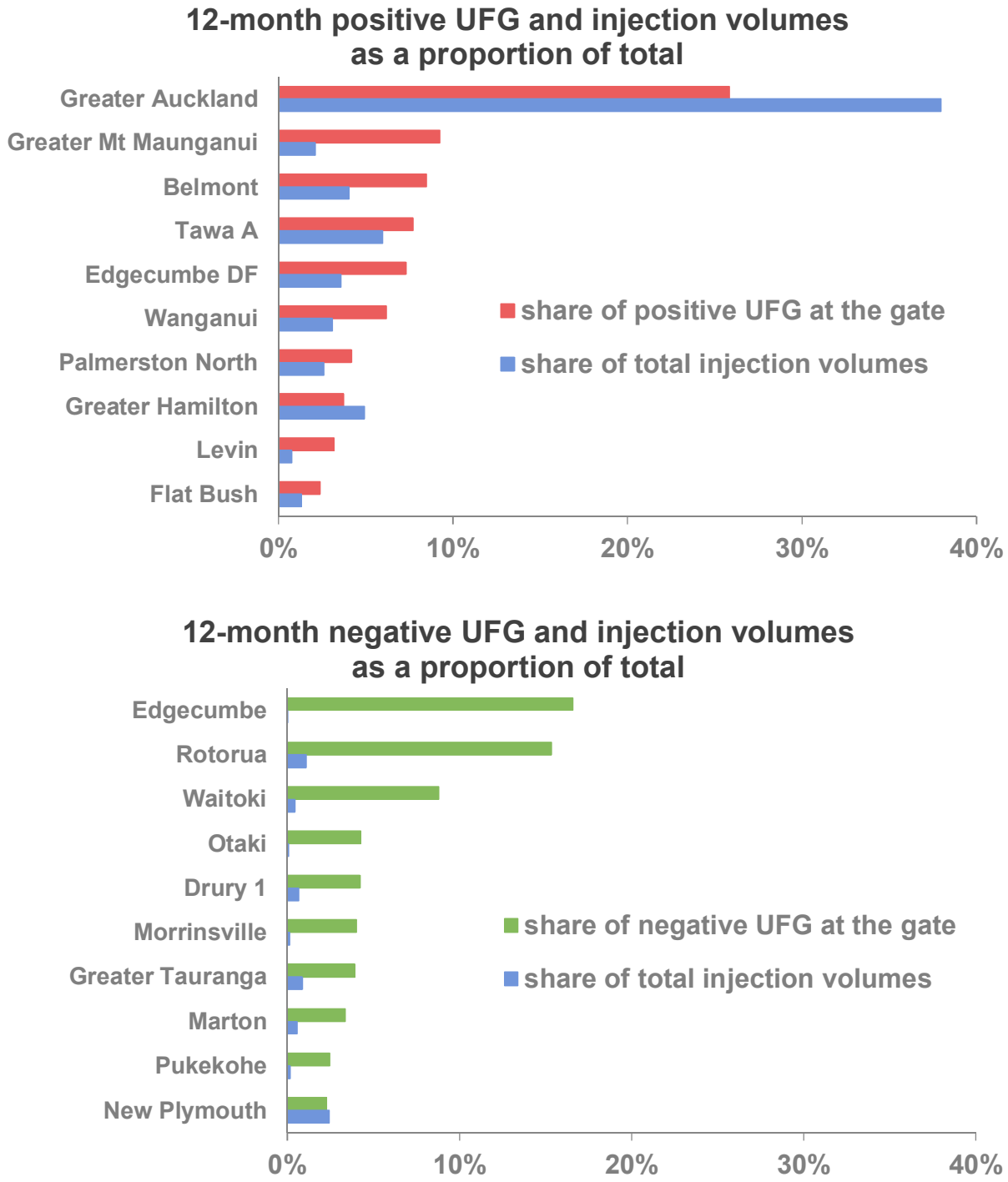
- UFG tends to be higher as a percentage when total volumes are high. This trend most likely due to UFG attributable to mass market consumption.

Chart 8: Rolling 12-month UFG



- In volume terms, annual UFG has decreased dramatically since 2009, when UFG was about 600,000 GJ per year. In the past 12 months, UFG totalled about 266,000 GJ, about 0.8% of allocated gas consumption.

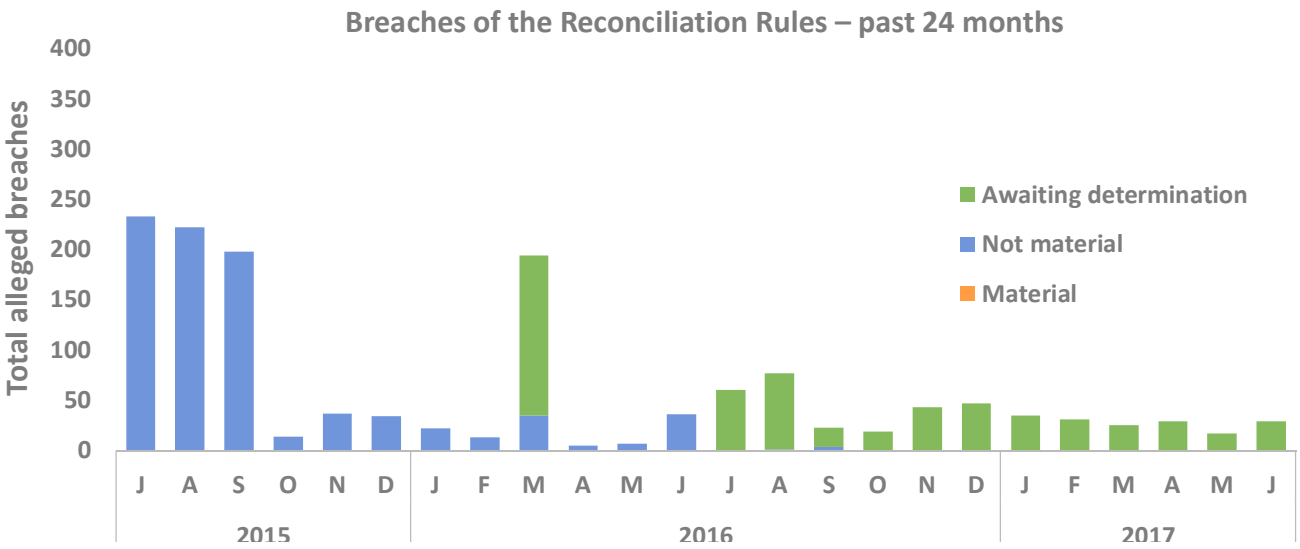
Chart 9: Gas gates where UFG is the highest



- 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, April 2016 through March 2017.

- The 10 gates shown in the top chart account for 78% – about 268,000 GJ – of the positive UFG experienced over the past 12 months.
- The 10 gates shown in the bottom chart account for about 65% (about 50,000 GJ) of the negative UFG experienced in the past 12 months.
- A number 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, Edgecumbe DF and Flat Bush are a global one-month gates; Marton is in the second chart.

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



- In March 2016, a number of breaches were alleged in relation to the audit of the Greater Tauranga and Greater Mount Maunganui gas gates. Some are in relation to ICP mapping, and Gas Industry Co understands that First Gas is in the process of correcting these errors.
- Historically, the majority of breaches have occurred in relation to rule 37 – the rule that requires initial consumption information submitted by retailers to be within a percentage of accuracy of the consumption information submitted for the final allocation.
- In September 2015, the market administrator issued a guideline[2] on the materiality of rule 37 breaches, stating that instances where the volume involved is less than or equal to 200 gigajoules do not need to be alleged as a breach by the allocation agent, as there is no likelihood that those errors will raise material issues under the Reconciliation Rules. This change can be seen in the decrease in alleged breaches in October 2015.
- It has proven efficient for the Market Investigator (or, more recently, Gas Industry Co) to attempt to reach a settlement on batches of rule 37 breaches. The settlement of the 23 months up to and

[2] Available at http://gasindustry.co.nz/dmsdocument/5031.

including the consumption month of April 2015 (alleged in June 2106) has just concluded. The final batch of settlements will be for the May 2015 to November 2015 consumption months.

- Beginning in December 2015, the end-of-month initial allocations have been replaced with day-after daily allocations (known as D+1), which eliminate the need for rule 37 breach settlements.

Audits commissioned

Event audits

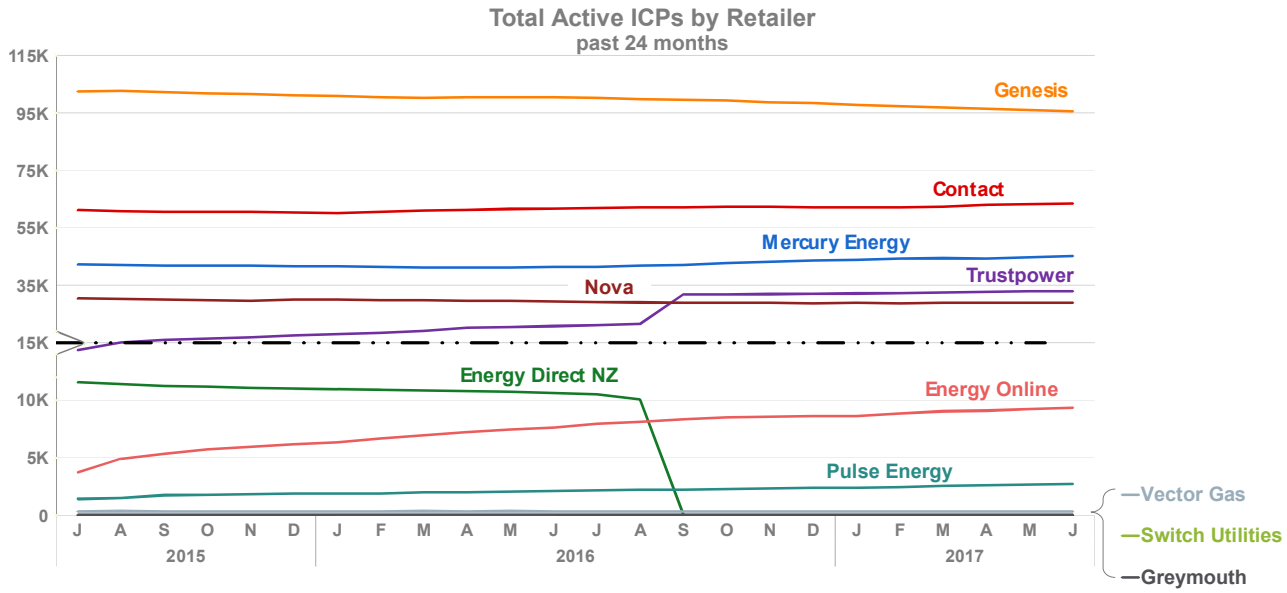
No event audits were commissioned in this quarter.

Performance audits

Gas Industry Co is continuing the current round of performance audits under the Switching Rules and the Downstream Reconciliation Rules. These are the first audits to be commissioned since the Switching Rules were amended in September 2015 to provide for regular performance audits of registry participants, defined as retailers, distributors, and meter owners. It is the third round of regular retailer performance audits under the Downstream Reconciliation Rules. The audits of Genesis Energy, Contact Energy, Trustpower and Nova Energy have been completed with four other retailer audits currently underway. Audits of distributors and meter owners are scheduled to begin shortly.

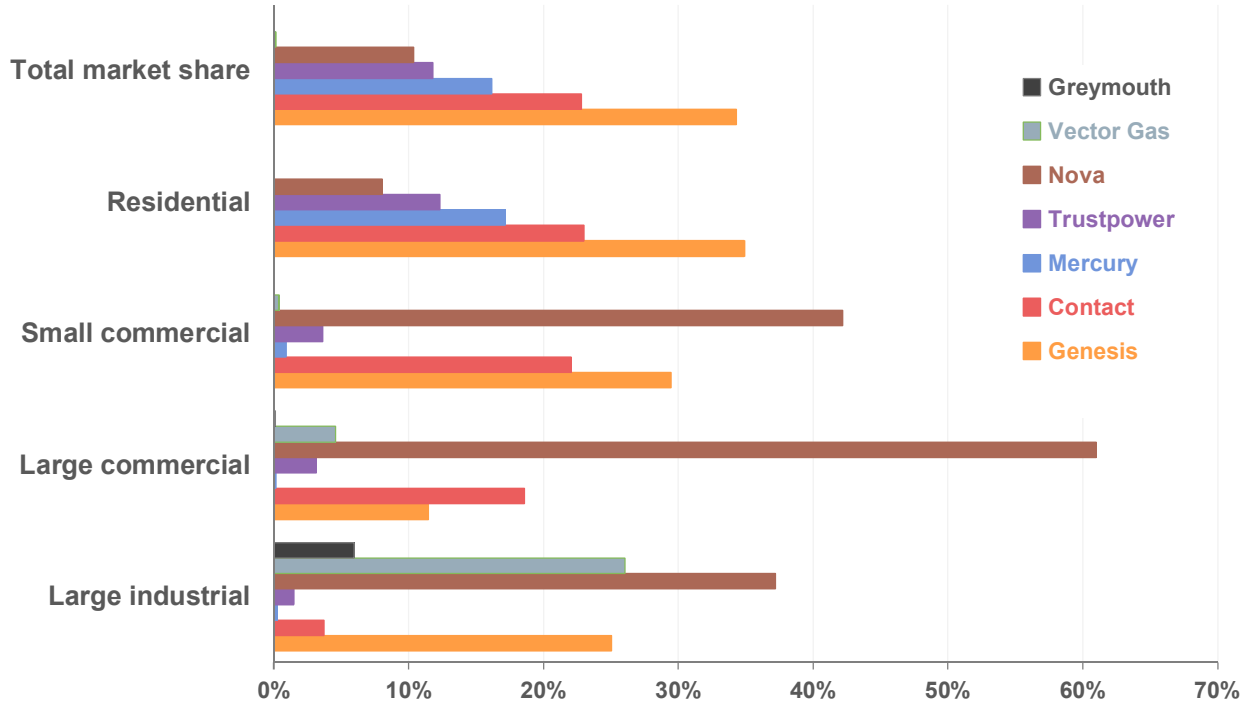
4 Market competition performance measures

Chart 11: Market share of ICPs by retailer



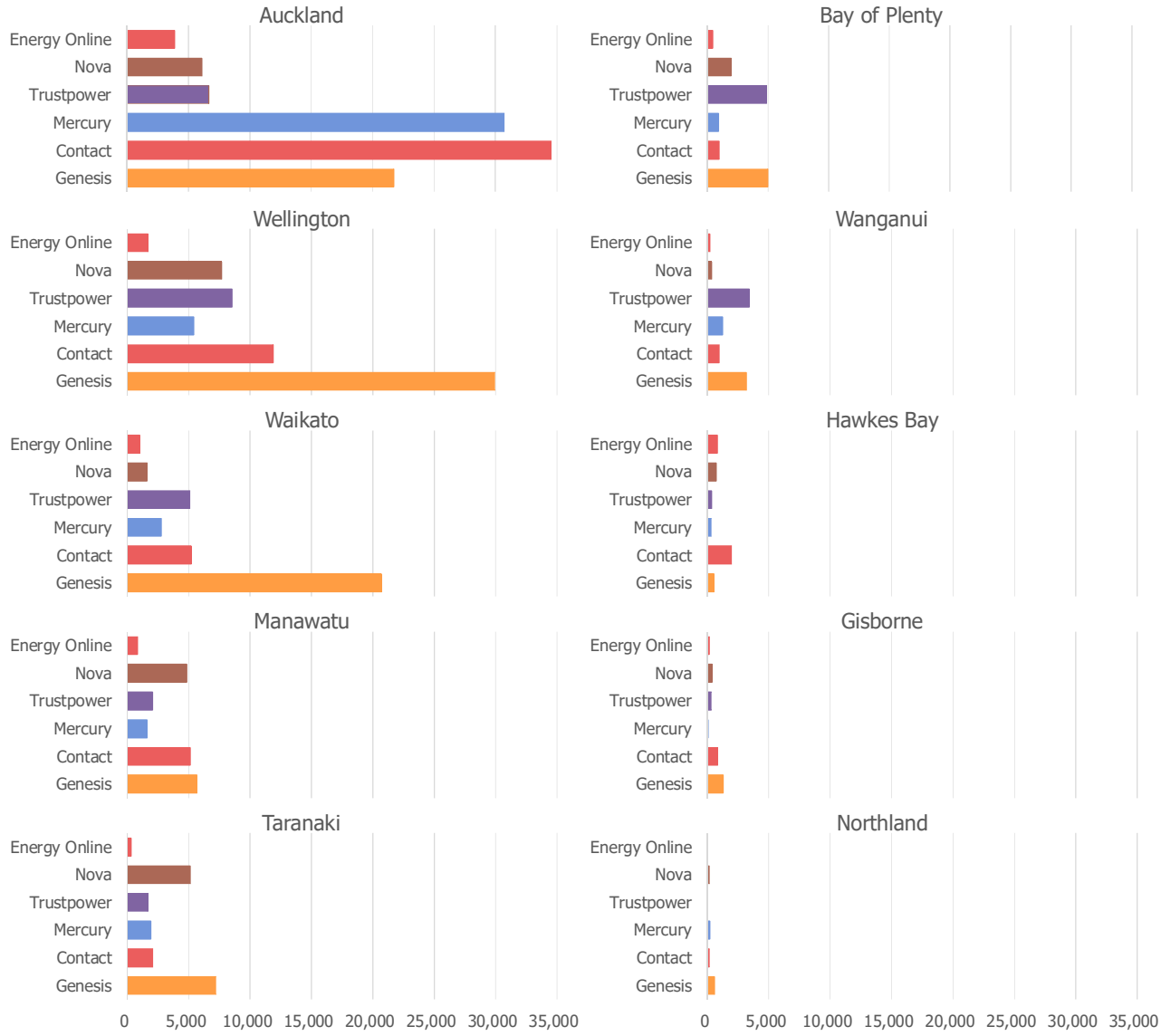
- This chart shows the contrast between the relative stability of customer numbers for the established retailers versus the growth of the new entrant retailers:
  - Trustpower, which entered the retail gas market in November 2013, is now the fourth largest retailer by customer share;
  - Pulse Energy entered the market in October 2014;
  - Switch Utilities entered in July 2015.
- Energy Online is a retail brand of Genesis Energy and has also been experiencing growth in customer numbers.
- There are 10 distinct retail brands, owned by nine different retail companies (Energy Online is owned by Genesis Energy).

Chart 12: Customer market share by consumer segment



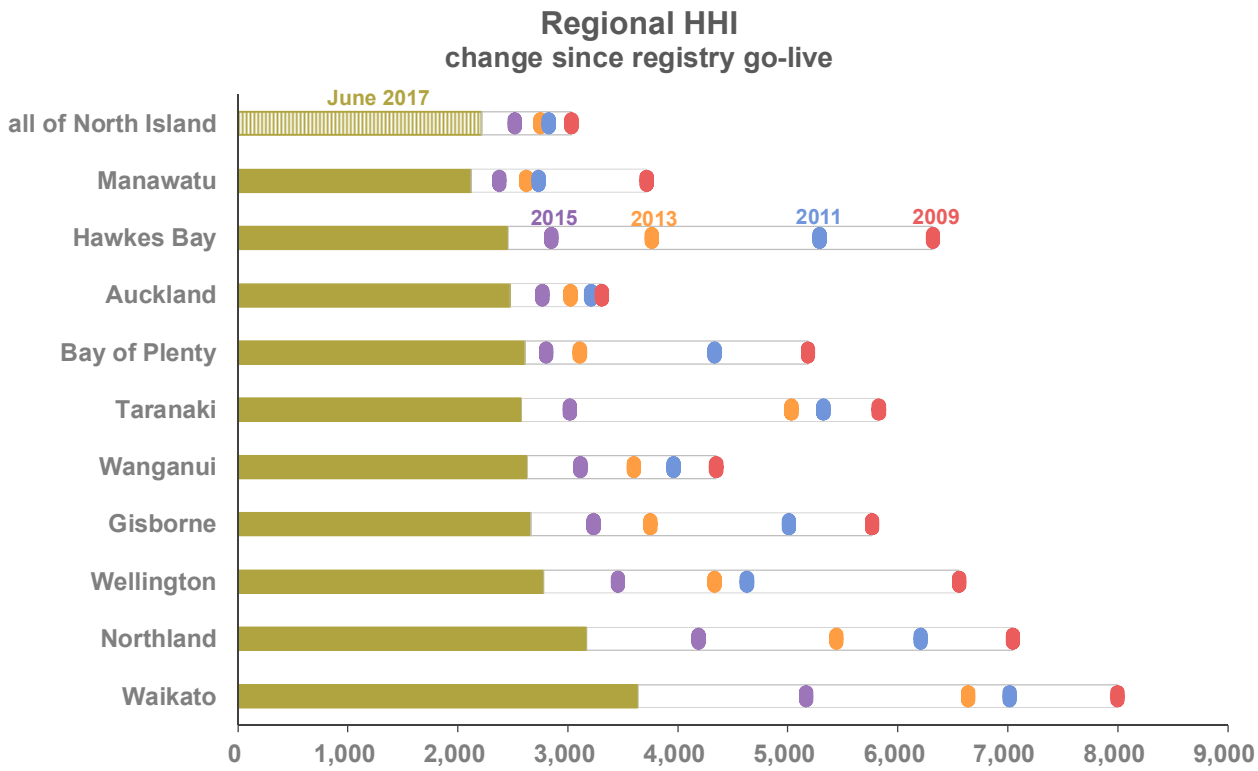
- In this chart, consumer segment is determined by the load shedding category listed on the gas registry for each consumer site. The top set of bars shows the same set of data as the previous chart. The other sets of bars show how some retailers are more dominant in specific sectors of the retail gas market. Vector Gas, for example, focusses on large industrial and large commercial customers, while Greymouth has a focus on large industrial customers.
- The chart includes the retail brands that have more than 4% of market share in a category.

Chart 12a: Customer market share by region



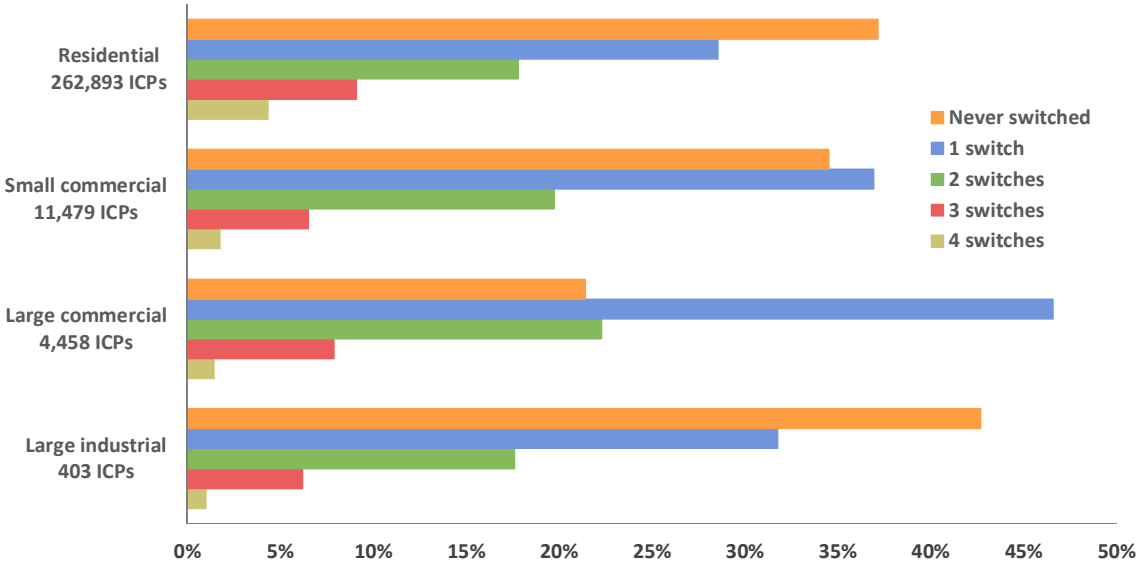
- This chart shows the number of ICPs for each retailer in each geographical region. The retailers shown each have over 3% of total customer market share.

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 2,214, in comparison to 3,033 in February 2009 (the start of the registry).

Chart 14: Switching by consumer sites since 2009

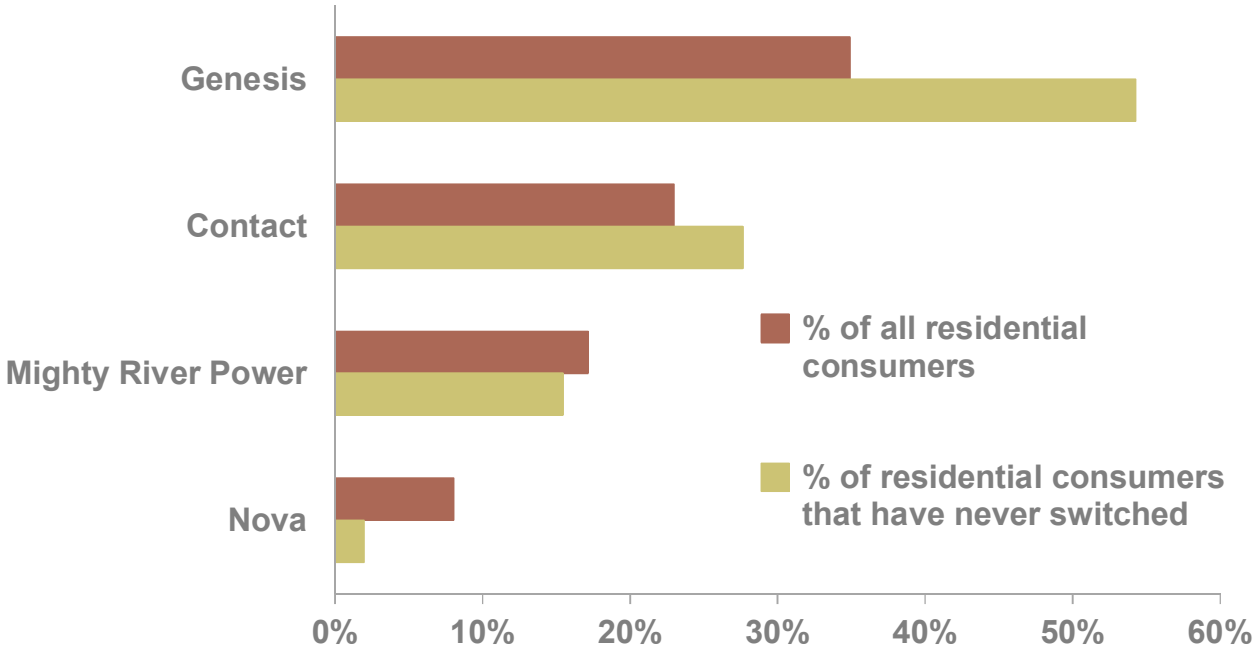


As with Chart 12, consumer sites in this chart and Chart 15 are categorised based on the load shedding category recorded in the gas registry.

- 63% of residential consumer sites
- 66% of small commercial sites
- 79% of large commercial sites; and
- 57% of large industrial sites

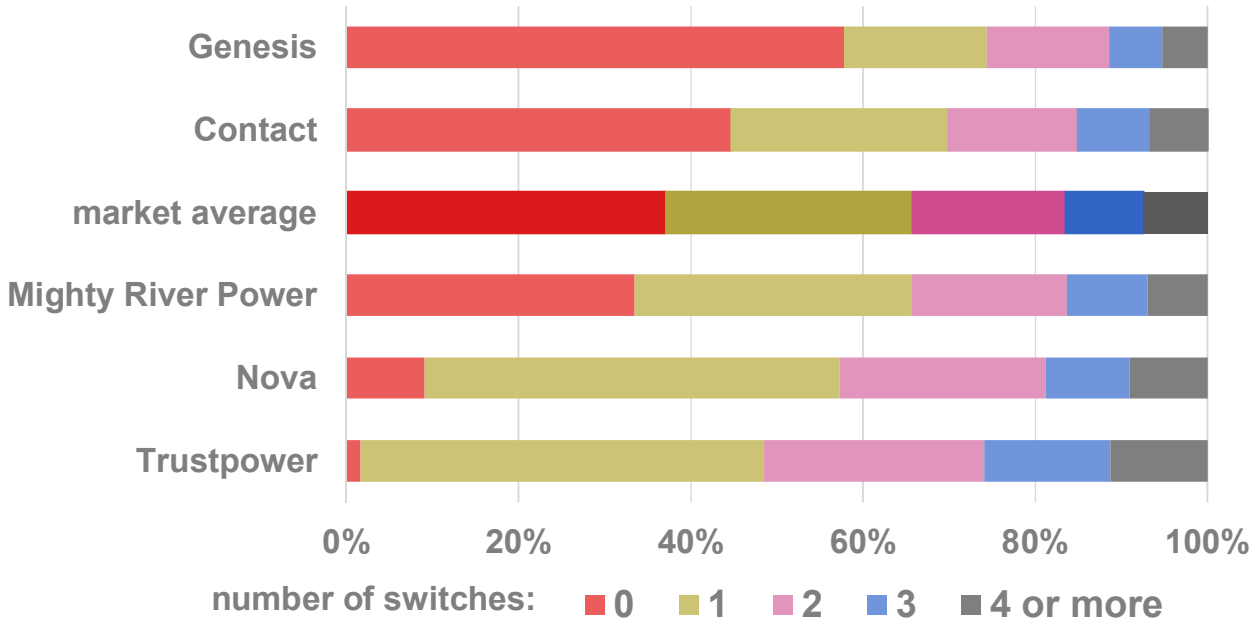
have switched retailer at least once since the start of the gas registry (February 2009).

Chart 15: Residential consumer sites that have never switched



- This chart compares retailers' market share of all residential consumers with their share of residential consumers that have never switched. It shows, for example, that Genesis has about 35% of the total residential market, and about 54% of the residential consumers that have not switched retailer since the start of the gas registry in February 2009.
- The chart focuses on the incumbent retailers that were in operation at the start of the gas registry. .

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: 37% of residential consumer sites have never switched retailer; 29% have switched once; 18% have switched twice; 9% three times, and 7% four or more times.
- The other bars enable comparison with retailers' residential customer bases. 58% of Genesis customers, for example, have never switched; the proportion is 45% for Contact customers.
- In contrast, Trustpower has built its customer base almost entirely through switching: 47% of its customers have switched once; 26% twice; and 15% three times. (Trustpower is also retailer to a small number of newly-created ICPs that have never switched.) Note that the transfers from Energy Direct would be counted as switches in this context.

Chart 16: Switching activity by retailer

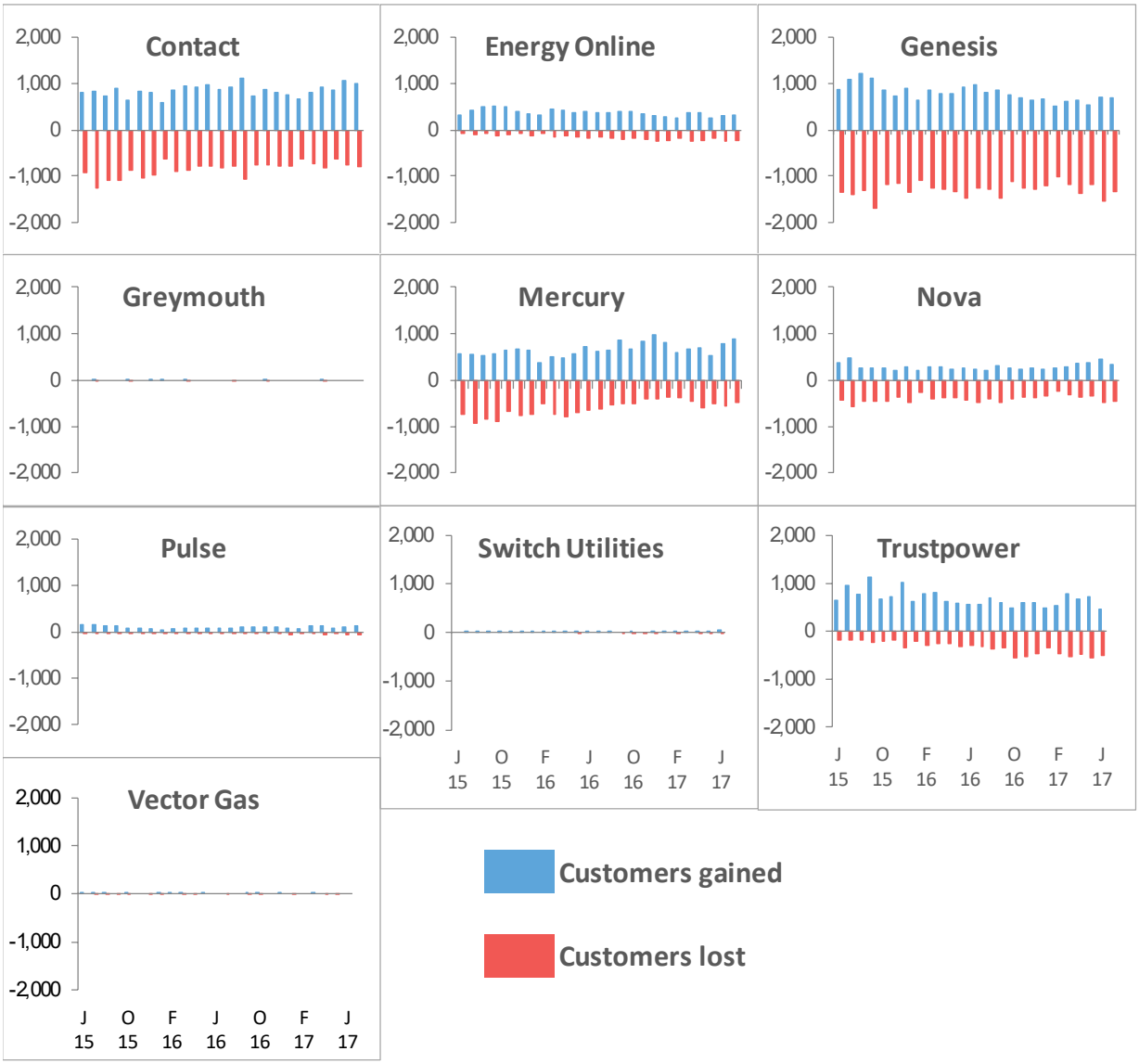
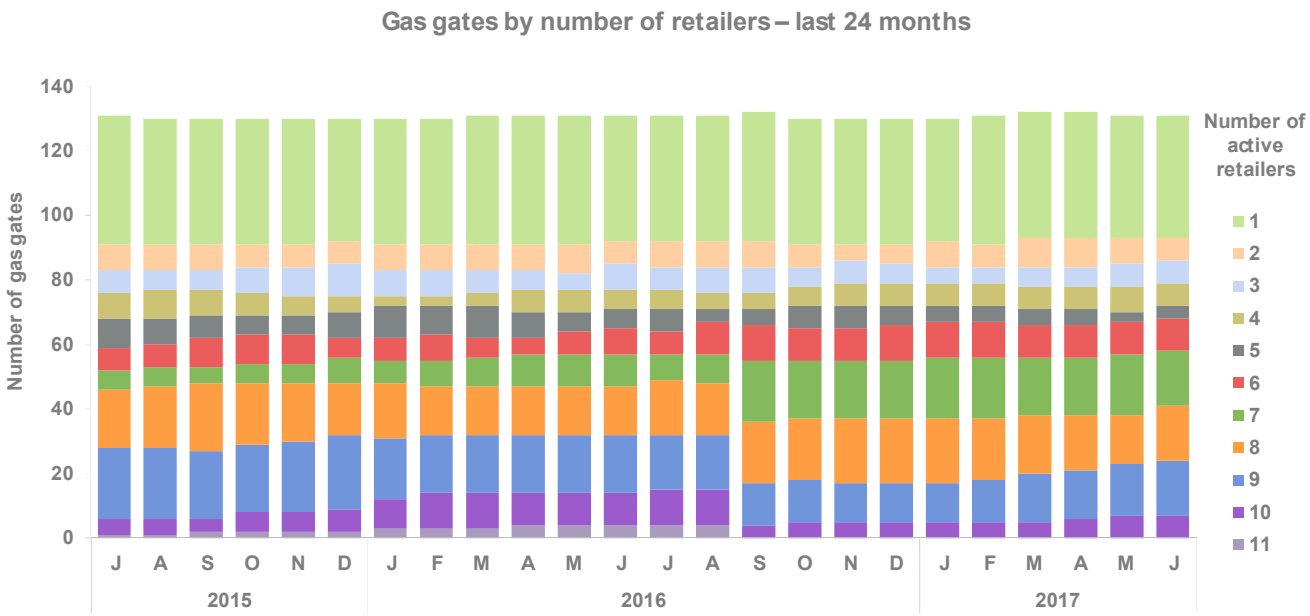
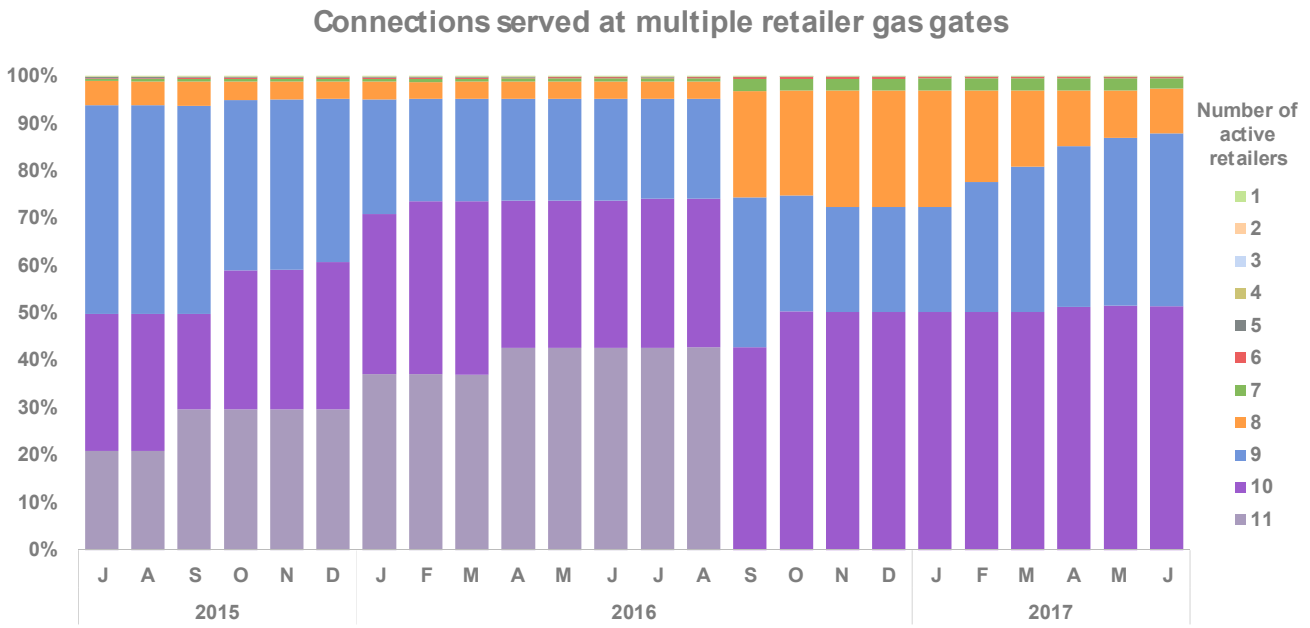


Chart 17: Gas gates by number of retailers



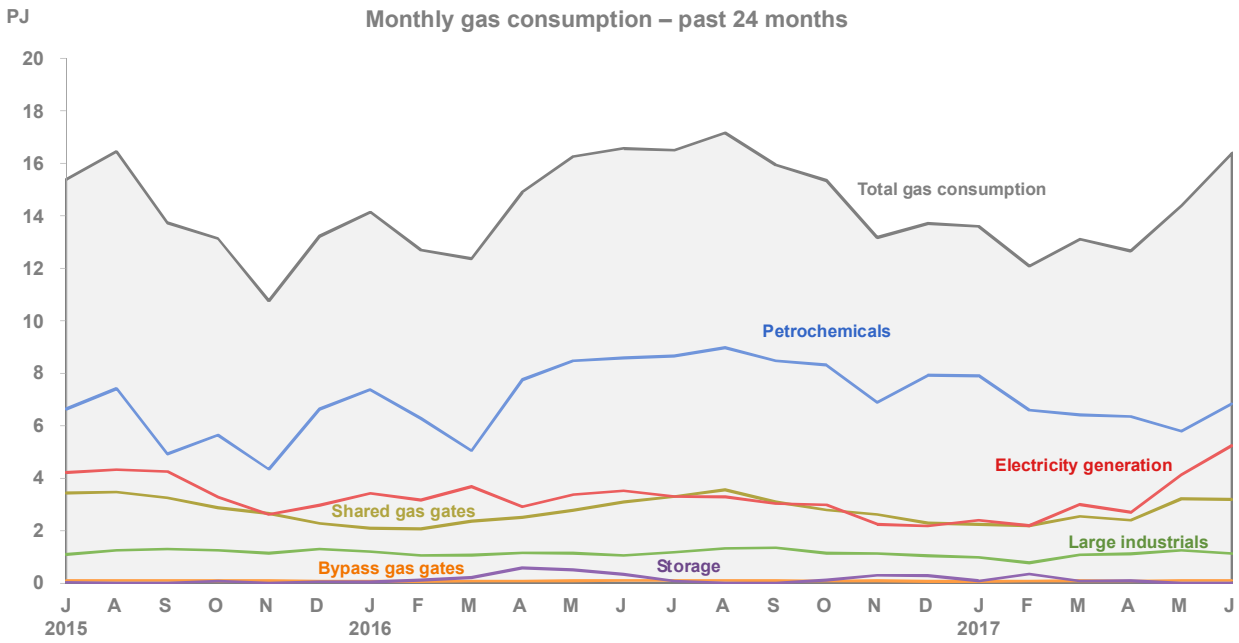
- With the amalgamation of Energy Direct and Trustpower, there are now ten retailers trading at some gas gates in Auckland and Wellington.

Chart 18: Connections served by multiple retailers



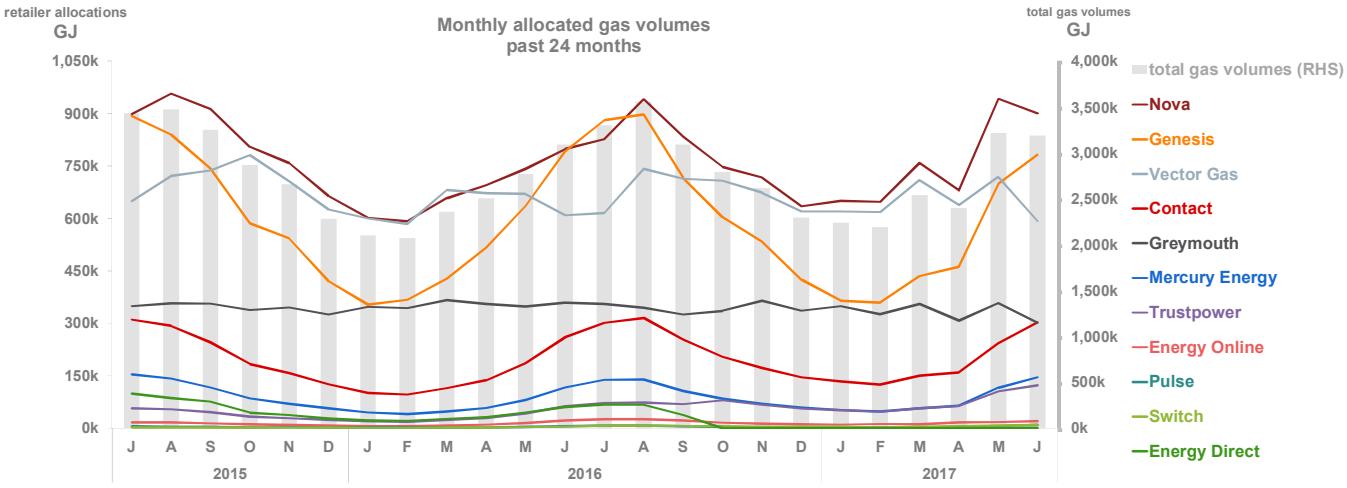
- Over 99% of gas consumers are connected to a gate where seven or more retailers trade.

Chart 19: Total gas volumes



- Note that these data reflect only the gas delivered through the Maui and First Gas transmission pipelines. Gas volumes flowing through private non-open access pipelines, such as to Methanex, are not included.

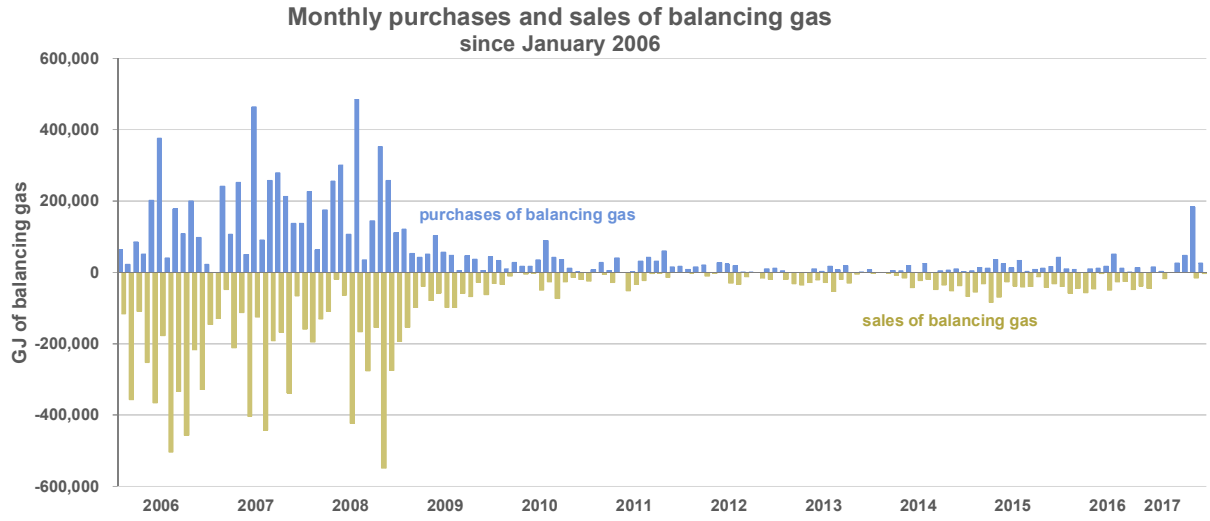
Chart 20: Allocated gas volumes



- The data are from a mix of allocation stages: Final through June 2016; Interim for July 2016 through March 2017; and Initial for April through June 2017. 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.

5 Pipeline balance

Chart 21: Balancing gas volumes



Source: MDL, bgx.co.nz, and bgix.co.nz

Gas Industry Co has tracked MDL's – and later, First Gas's – purchases and sales of balancing gas as a means of informing the industry and ourselves about the volumes of these transactions through time. Prior to 2008, balancing services were essentially free to holders of legacy Maui gas contracts, and for each of the calendar years 2006, 2007, and 2008, Maui transacted an average of 403,000 GJ of balancing gas per month. Changes implemented at the end of 2008 to the Maui Pipeline Operating Code (MPOC) meant that interconnected parties and gas shippers became responsible for imbalances that they created, and the volumes of secondary balancing gas fell accordingly. From 2010 to 2014, monthly balancing gas volumes were about 35,000 GJ.

In 2015, Market Based Balancing (MBB) was implemented. This set of arrangements was designed to target the costs of secondary balancing (i.e. balancing undertaken by the transmission operator) to parties that were out of balance. A review of MBB published in November 2016[3] by Gas Industry Co found that, since October 2015, imbalance on the pipeline had decreased, both on the Maui and ex-Vector transmission pipelines, indicating that shippers had improved in balancing their own positions (primary balancing). However, this improvement in primary balancing did not result in a decrease in secondary balancing volumes: from October 2015 to December 2016, balancing gas volumes averaged about 52,000 GJ per month.

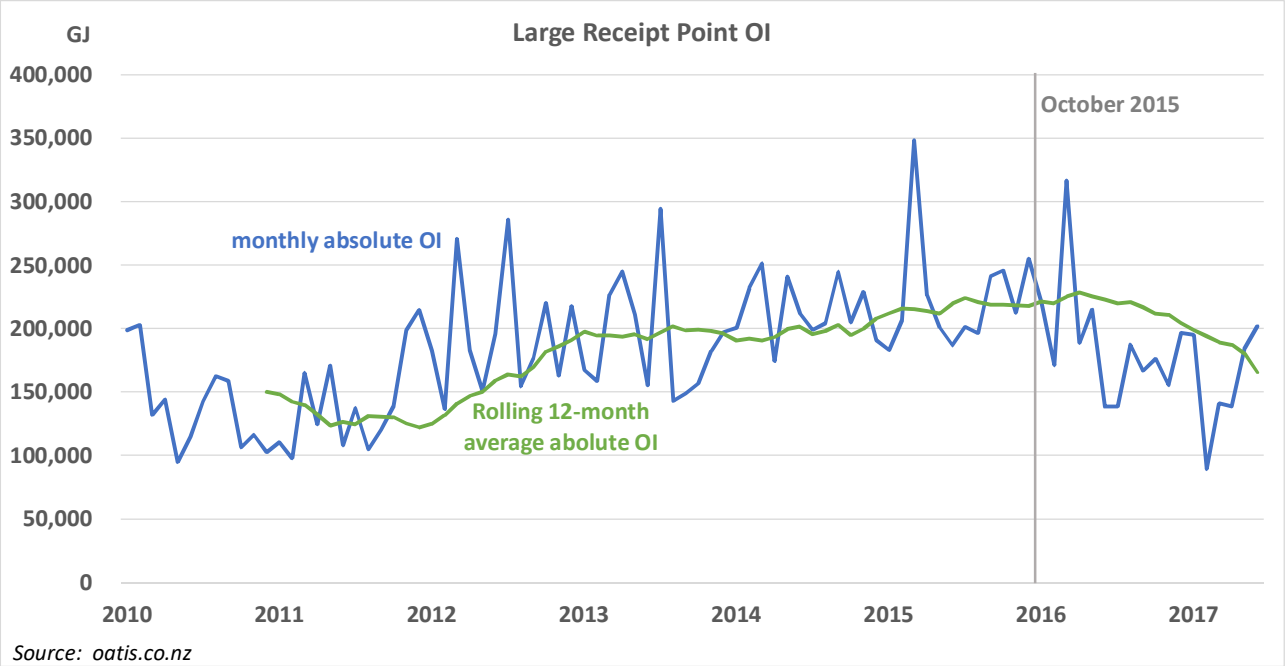
In January 2017, First Gas announced that it was changing the operation of its compressors across the transmission system, in order to reduce overall fuel gas costs and to increase the ability of the transmission pipeline to cope with unplanned production station outages. One aspect of this change is the increased use of the Mokau compressor station, which can be seen in the increase in fuel gas transactions on the BGIX since January. Another aspect of the operational change is increased linepack

[3] *Review of Market-Based Balancing*, published November 2016. Available at http://www.gasindustry.co.nz/dmsdocument/5420

on the Maui pipeline, which in turn has decreased the need for balancing gas transactions. Since January 2017, balancing gas volumes have averaged 15,000 GJ per month.

Gas Industry Co no longer intends to track balancing gas volumes in this quarterly report. Secondary balancing volumes are less relevant now that MBB is in place. As well, the data series has become harder to interpret with the change in pipeline operations. As noted above, fuel gas volumes have increased on the BGIX while balancing gas volumes have decreased. However, other purchases of fuel gas are not publicly visible, so it is difficult to see an overall picture of the effect of the operational changes.

Chart 22: Receipt point operational imbalance



Source: oatis.co.nz

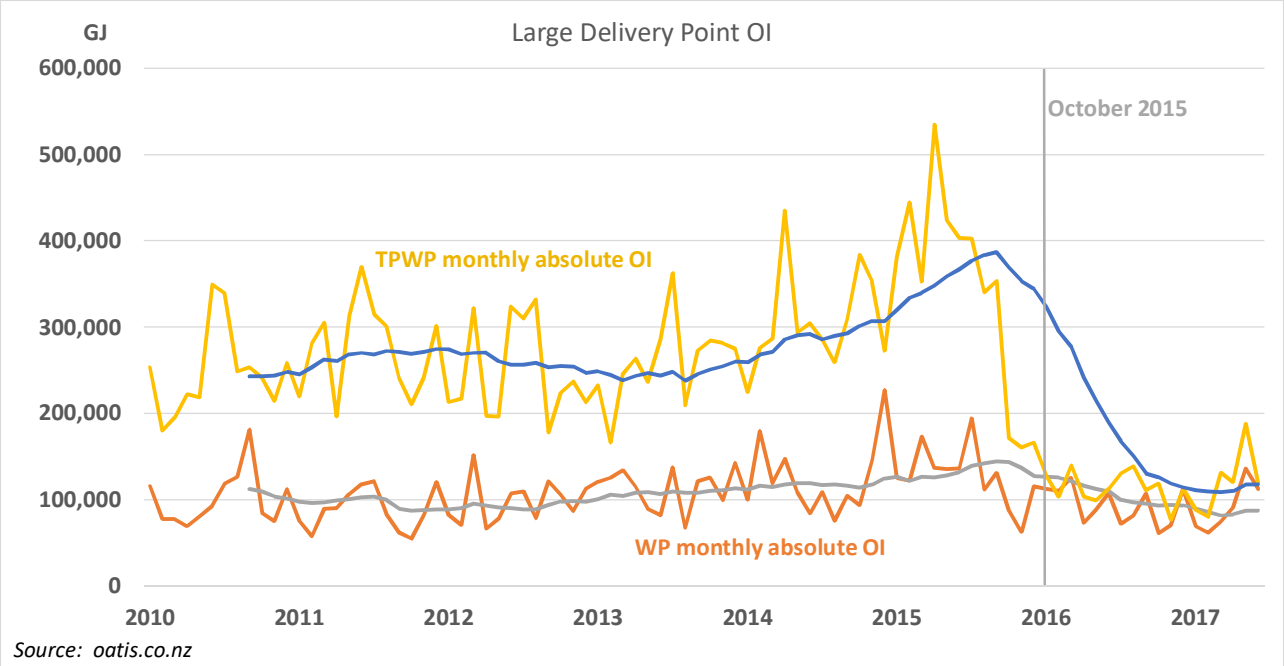
One of the expectations of MBB was that it would improve primary balancing; that is, that pipeline users would strive to match their actual gas flows with the quantities of gas that they scheduled. For welded parties on the Maui pipeline, the daily difference between the two quantities is termed operational 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*,[4] dated November 2016, management of the receipt welded points changed very little with the introduction of MBB. More recent data do show a downward trend in OI, commencing about June 2016.

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

Chart 23: Delivery point operational imbalance



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.

6 Critical Contingency Management performance measures

A critical contingency was declared by the critical contingency operator (CCO) at 10:50 on Tuesday 23 May 2017. The cause of the event was low linepack due to downstream delivery points taking significantly more gas than was being injected into the pipeline, which was exacerbated during a planned outage of the Pohokura Production Station. During the period of this outage, the imbalance between supply and demand caused pipeline linepack and pressures to fall to the point where the critical contingency threshold of 3 hours to 37.5 barg at the Kapuni Gas Treatment Plant was breached. The critical contingency was terminated at 18:15 the same day, after Pohokura returned to expected flows and the CCO considered that the supply of gas into the system was sufficient to meet expected demand.

As required under the CCM Regulations, the CCO has published an incident report, which outlines the events and the actions taken during the critical contingency; and a performance report, which assesses the effectiveness of the critical contingency arrangements. The performance report found that the

Critical Contingency Management Plan, the CCO Communications Plan and the CCO Information Guide were all effective in achieving the purpose of the Regulations and no amendments were required.

Tim Denne of Covec was engaged as the industry expert and determined the critical contingency price for the event to be $10.62 per GJ. This is the price that will be used to settle critical contingency imbalances incurred on the day.

Glossary

Critical contingency	A state of emergency on the transmission system characterised by falling or extremely low gas pressures. In such situations, the critical contingency operator has the authority to require consumers to stop using gas in order to balance the system, as set out in the Gas Governance (Critical Contingency Management) Regulations 2008.
Direct connect consumers	Large industrial consumers who are supplied gas directly from the transmission system via a dedicated gas gate.
Distribution system	System of lower pressure pipelines conveying gas from the transmission system to consumer sites.
Gas gate	A place where gas leaves the transmission system. Gas gates (most commonly) lead to distribution systems, which supply a number of different consumers. Some gas gates are direct connects, meaning that they supply a single large industrial consumer. A few gas gates supply private gas networks, which supply the customers of a single retailer.
Herfindahl–Hirschman Index (HHI)	Measure of market concentration. Generally, markets in which the HHI is between 1,500 and 2,500 are considered moderately concentrated. Markets with an HHI of greater than 2,500 are considered highly concentrated. For more information, see the Appendix.
ICP	Installation Control Point: the point where a consumer installation is connected to the distribution system. Used to describe a consumer site.
Move switch	A switch where the retailer supplying gas to a consumer site is changed to another retailer at the request of an incoming tenant or homeowner.
Reconciliation	The processes by which the volume of gas leaving the transmission system is allocated on a gate-by-gate basis to retailers with consumers at those gates; governed by the Gas (Downstream Reconciliation) Rules 2008. Reconciliation is done on a monthly basis, and each consumption month is calculated three times: in the month immediately after consumption month *(initial allocation)*; four months after consumption month *(interim allocation)*; and 13 months after consumption month *(final allocation).*
Registry	Database of information on consumer sites, including metering information, associated gas gate, and responsible retailer. Used to facilitate efficient and accurate switching.
Standard switch	A switch where a gas customer decides to switch the retailer that supplies its existing location.

Switching	The processes by which the retailer supplying a customer site is changed to another retailer, governed by the Gas (Switching Arrangements) Rules 2008.
Transmission system	System of high pressure pipelines that convey gas from gas processing facilities to a distribution system or to a direct connect consumer.
Unaccounted-for gas (UFG)	The difference between the amount of gas leaving the transmission system and retailers' estimates of their consumers' consumption. It is made up of technical losses on the system, metering inaccuracies, and retailer estimation errors. For more information, see the Appendix.

Explanatory notes

1 Introduction

This appendix provides context and additional information about the industry performance measures contained in the body of the report. Section numbering is consistent with the main report.

2 Switching performance measures

All of 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 (so as to exclude the transfer of vacant sites from one retailer code to another).

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; and the transfer of Energy Direct customers to Trustpower (August-October 2016).

Chart 1: 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%.

Since registry go-live, switching rates have more than quadrupled to over 4,000 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 13% to over 19%. By comparison, electricity switching rates have varied from about 11% 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

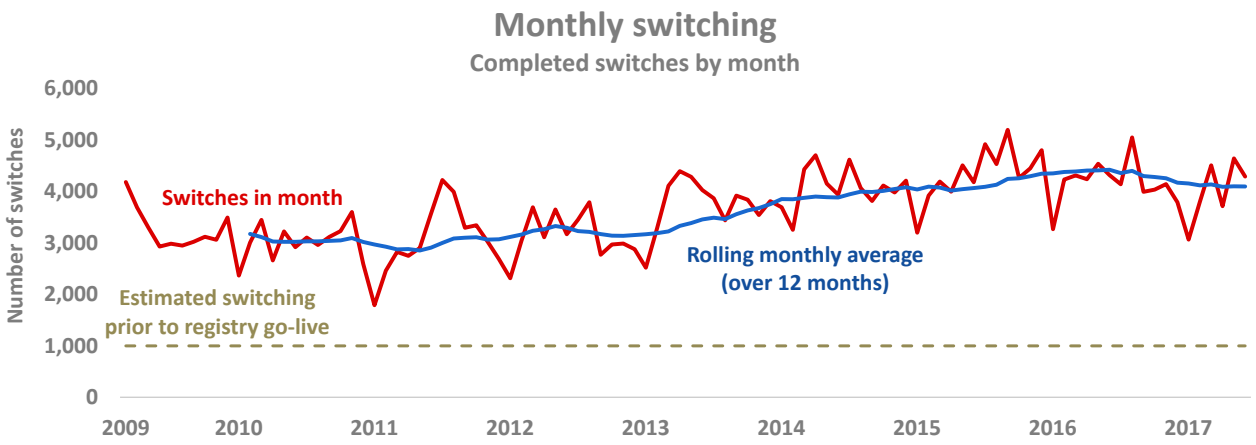


Chart 2: Regional switching activity

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 1.7% 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 3: 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 about 2.5 business days.

Chart 4: 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, the majority of switches occur within three days.

Chart 5: 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.

3 Allocation and reconciliation performance measures

Chart 6: 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- 2: UFG since October 2008

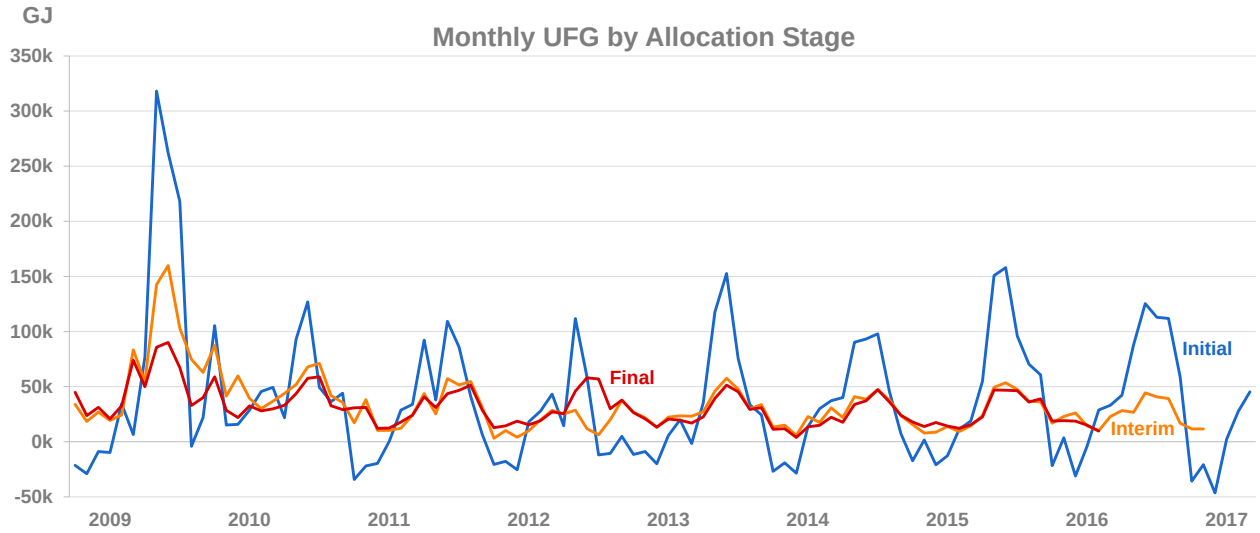


Chart 7: Percentage of UFG

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 8: 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 9: 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 10: 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.

4 Market competition performance measures

Chart 11: Market share of ICPs by retailer

This chart shows the number of active contracted customer sites associated with each retailer over the past two years, as recorded by the gas registry.

Chart 12: 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 4% 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 13: 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 a large number of 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.[1]

The bars in the chart shows the HHI of the retail gas market as at June 2017; for comparison, the HHI for the beginning of 2009, 2011, 2013, 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 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.

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

Chart 14: 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 15: 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 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

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. About 40 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 18: 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 nine or ten retailers are active at only a handful of gas gates, those gates tend to be the largest ones, since over 85% of all gas consumers are connected at these gates.

Chart 19: 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 top grey line shows total consumption; the coloured lines provide a breakdown by type of use.

- The red line shows gas usage for thermal electricity generation.
- Consumption for petrochemicals is shown in blue.

- 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 20: 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 peaks in winter and troughs during the summer. Contact and Mercury 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.

5 Pipeline balance

6 Chart 21: Balancing gas volumes

This chart shows the purchases and sales of balancing gas by month since January 2006.

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. Balancing gas transactions are now posted on the Balancing Gas Information Exchange, bgix.co.nz.

In June 2016, First Gas became the owner and operator of the Maui pipeline. The balancing gas chart shows balancing activity by MDL from 2006 until June 2016, and First Gas transactions from June 2016 to present.

Chart 22: 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, that gas is being drawn from pipeline inventory (called linepack). 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 linepack due to operational imbalance.

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 23: 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.