Jemena Gas Networks (NSW) Ltd

2025-30 Access Arrangement Proposal

Attachment 8.1

Overview of JGN's Demand Forecast

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Overview

The demand forecast which comprises our customer number and gas consumption forecasts are an important component of our 2025 Plan (2025-30 Access Arrangement). We use the demand forecast to develop the following elements of our 2025 Plan:

1. Prices – forecast sales volumes are used to determine our prices. More information on how we set our prices is provided in *JGN-Att 10.1-Pricing*.

2. Capital expenditure (capex) – the number of new connections forecast is an input to our connection capex forecast. Our connections capex forecasting approach is outlined in *JGN-Att 5.1-Capital expenditure*.

3. Operating expenditure (opex) – the forecast gas throughput is used to forecast our unaccounted for gas costs, and customer numbers are an input to opex trend escalation. Further information on our opex forecast is provided in *JGN-Att 6.1-Operating expenditur*e.

Developing demand forecasts for our 2025 Plan is very challenging given the once-in-a-generation transformation of the energy system. Federal and New South Wales (NSW) Government decarbonisation policies (emissions reductions), improvements in energy efficiency, constrained supply, volatile wholesale gas prices, and growing competition from renewable electricity are all placing pressure on the role of natural gas in the energy mix.

The Australian Energy Market Operator (AEMO) forecasts residential and small commercial consumption to gradually decline in the short term, with electrification to reduce natural gas usage more significantly in the medium to longer term as the economy transitions to meet net zero emissions by 2050[1]. Future demand for gas networks is expected to decline due to changing consumer behaviours, and as a direct result of government policy which is focussed on electrification of households and small businesses.

The implications of the decisions that we make during the 2025 Plan period will be different depending on how the future unfolds. To better understand the long-term implications of the decisions that we must make during the 2025 Plan period, we developed a Future of Gas economic model which resulted in four Expert Panel scenarios (Electric Hare, Big Hydrogen, Electric Hare, and Big Tortoise set out in chapter 3 of our 2025 Plan). The Future of Gas model (*JGN-Att 7.4-Future of Gas analysis*, and *JGN-Att 7.8M-Future of Gas model*) shows that the earlier we start to address the risks presented by the energy transition, the smoother the pathway to net zero will be. Therefore, we need to act now.

Our 2025 Plan will implement strategic initiatives based on the best information currently available, and provides flexibility to adjust these initiatives in the future as new information becomes available.

Regardless of how we respond to the energy transition, we must also continue to meet our regulatory obligations relating to safety, reliability, security, and the environment, which are the key drivers of our expenditure forecasts. This includes meeting obligations under the National Gas Rules (NGR), including the mandatory connection of customers seeking the supply of gas from our network. Our 2025 Plan has accounted for these regulatory obligations through our planned capex and opex forecasts.

We engaged Core Energy & Resources (Core) to prepare an independent demand forecast for consumption on our network. Core has significant experience in energy forecasting, having prepared forecasts for AEMO and several network businesses, including JGN in the prior periods. Our demand forecast methodology applied by Core is consistent with methodology applied for our 2020-25 Access Arrangement (2020 Plan), taking into account AER comments made at that time, changes in circumstances (including the impact of COVID) and changing Government policy on greenhouse gas (GHG) emissions, including future gas use and the transition of the energy market as reflected in our four Expert Panel scenarios (in particular, the impact on connections resulting from changing our connections policy so that more customers are required to make an up-front contribution if they wish to connect to our network).

As our network has grown and we have connected more customers, total gas consumption has increased. Despite growth in customer numbers, we have continued to see a steady decline in consumption on a per customer basis

[1] AEMO 2024 gas statement of opportunities.

over the last 10 years. The reduction in consumption is driven by a combination of factors including energy efficiency improvements, appliance substitution, smaller dwellings and higher gas prices.

Since our draft 2025 Plan, Core has updated our forecast to incorporate the 2023 actual consumption information, updated external inputs (including Housing Industry Association of Australia information, testing of survey responses) and further information we have received from surveying our larger demand customers. This has resulted in little change in Core's forecast volume market (referred to by Core as Tariff V) demand and customer numbers, and a slight increase of 0.6% higher demand market (referred to by Core as Tariff D) demand over the 2025-30 period.

The demand forecast for the 2025 Plan[2] is:

Table 1: JGN's demand forecast for the 2025 Plan

Forecast Element	2025-26	2026-27	2027-28	2028-29	2029-30	Average % change 2026-2030
Volume market (GJ)						
Residential Demand	27,950,597	27,757,484	27,308,683	26,661,912	25,665,813	-1.70%
Commercial Demand	12,560,188	12,217,736	11,794,816	11,295,550	10,646,065	-3.63%
Demand market (GJ)						
Industrial ACQ[3] Demand	45,468,176	46,109,915	44,328,131	42,106,612	41,709,173	-2.12%
Industrial MDQ[4] Demand	238,101	240,094	223,824	214,353	213,143	-1.83%

Source: *JGN-Core Energy-Att 8.2-Demand Forecast Report*

Given changes in government policy and the resulting energy market transition, our demand forecast is expected to decline over the 2025-30 period:

- Residential demand is forecast to decline by an average annual rate of -1.7% between RY2026[5] and RY2030 due to a negative rate of growth in net connections (compared with historical levels) and an ongoing reduction in average demand per connected customer resulting from the transition of the energy market
- Small business demand is forecast to decline by an average annual rate of -3.63% between RY2026 and RY2030 also due to a negative rate of growth in net connections (compared with historical levels) and an ongoing reduction in average demand per connected customer resulting from the transition of the energy market
- Industrial demand is forecast to decline by an average annual rate of -2.12% for ACQ and -1.83% for MDQ between RY2026 and RY2030 due to major changes in the ways industrial customers source and use energy, to enhance profitability and meet sustainability standards.

2 The final forecast from Core differs immaterially from that used by JGN within its models. The difference in residential and small business demand equates to less than one connection per annum (per segment).

3 Annual Contract Quantity.

4 Maximum Daily Quantity.

5 Regulatory Year (RY) commences 1 July to 30 June.

Structure of this document

The document is structured as follows:

1. This overview summarises Jemena Gas Networks (NSW) Ltd's (JGN's) demand forecast for the 2025-30 period
2. Section 1 presents an overview of what we have heard from our customers, and how we have incorporated this into our 2025 Plan
3. Section 2 provides an overview of the approach Core adopted in preparing our demand forecast
4. Section 3 provides an overview of our current period demand performance
5. Section 4 provides an overview of Core's demand forecast for our residential and small business customers
6. Section 5 provides an overview of Core's demand forecast for our industrial customers
7. Section 6 sets out usage of the pipeline and customer numbers, and section 7 forecast pipeline capacity details.

Demand attachments

Table 2: Demand attachments

Attachment	Name	Author
8.2	Demand Forecast Report – 2024	Core Energy & Resources
8.3	Demand Forecast Report Addendum	Core Energy & Resources
8.4M	NSW Demand Forecast Model – confidential	Core Energy & Resources
8.5M	NSW EDD Index Model – confidential	Core Energy & Resources
8.6M	Weather Normalised Demand Model – confidential	Core Energy & Resources

1. What we have heard from our customers

Our consultation on our demand forecast was completed in two stages:

1. we developed a Future of Gas economic model with four gas demand outlooks out to 2050 to help us understand and manage the challenges presented by the energy transition
2. Core completed independent demand forecast which we provided in our Draft 2025 Plan.

1.1 Gas demand scenarios

To ensure that we manage the challenges presented by the energy transition with initiatives in a balanced manner that is fair to customers, we developed our Future of Gas model (*JGN-Att 7.4-Future of gas analysis*, and *JGN-Att 7.8M-Future of gas model*) with four gas demand outlooks out to 2050. The modelling enabled us to assess the initiatives and understand how best to manage affordability and mitigate asset stranding risks and intergenerational equity issues in the long run as the energy system transitions

We undertook significant consultation in developing our Future of Gas model which resulted in four Expert Panel scenarios (Electric Hare, Big Hydrogen, Electric Hare, and Big Tortoise set out in chapter 4 of our 2025 Plan). The Future of Gas model shows that the earlier we start to address the risks presented by the energy transition, the smoother the pathway to net zero will be. Therefore, we need to act now.

We engaged Blunomy to project the gas demand in our network to 2050 for the four plausible future scenarios (*JGN-Blunomy-Att 7.5-Long term demand forecast*). The projections included customer numbers in each segment (i.e. residential, commercial and industrial) and the gas consumption by the type of gas (i.e. natural gas, biomethane, and hydrogen) expected to be available at the time.

We also engaged with our customers to understand their future likely needs and how it will impact our demand forecast. This included:

- engaging with our largest customers via a survey to understand their demand requirements over the 2025-30 period and to get insights into the role they could see renewable gas playing in their decarbonisation pathway
- based on Business NSW guidance, we established two small business customer focus groups to understand their unique perspectives around gas use, the future of gas, the energy transition to net zero and to consider the initiatives we explored with the Customer Forum.

Our customers told us they want us to consider fairness in context of the energy transition, and its impacts on both existing and future generations, and on our more price-sensitive customers

1.2 Feedback on our draft 2025 Plan

As part of our draft 2025 Plan, we asked:

- Are there any other key factors or information sources you think should be incorporated into the forecasting approach?
- Do you think the alignment shown between JGN's forecasts and AEMO’s scenarios helps provide confidence in the projected trends?
- Given the forecast decline in gas demand, do you think the initiatives discussed in other sections of the 2025 Draft Plan are appropriate to retain network viability amid energy transition uncertainties?

We only received informal feedback from Ausgrid that we reconcile our demand forecast with those produced by AEMO in its Integrated System Plan (ISP). We note that Core has compared its demand forecast to AEMO’s gas statement of opportunities, which we consider a more relevant comparison given that it is AEMO’s forecast of annual gas consumption and maximum gas demand, and reports on the adequacy of central and eastern gas markets to supply forecast demand over a 20-year outlook period. We have set out the comparison in section 4.4 and 5.2.

2. Approach to demand forecast

In accordance with rule 74(2) of the NGR our demand forecast are estimated on a reasonable basis and represent the best forecast possible given the current circumstances.

In supporting the NGR requirements we engaged Core to prepare an independent demand forecast for our network. Core has significant experience in energy forecasting, having prepared forecasts for AEMO and several network businesses, including JGN in the prior periods. Core's report is available at *JGN-Core Energy-Att 8.2 – Demand Forecast Report.*

The demand forecasting methodology applied by Core is consistent with our approach for the 2020 Plan, taking into account AER comments, changes in circumstances (including the impact of COVID) and changing Government policy on GHG emissions including future gas use and the transition of the energy market as reflected in our four Expert Panel scenarios (in particular, the impact on connections resulting from changing our connections policy so that more customers are required to make an up-front contribution if they wish to connect to our network). Although the methodology is consistent to that applied for the 2020 Plan, the development of JGN's gas demand forecast for the 2025 Plan has required a far greater degree of research, analysis, and modelling of expected changes in circumstances which are expected during the 2025-30 period.

We split our customer base into two markets:

1. The **volume market** which consists of residential and commercial customers (small business and commercial customers) who use less than 10TJ of gas per year and are generally charged on how much gas they consume[6].
2. Our **demand market** consisting of our largest customers who consume more than 10TJ a year. These customers are charged on how much capacity they require or on throughput.

Figure 1 shows how we classify our customers, and their consumption and size of our market[7].

[6] The exception is the small number of customers on VRT tariff.

[7] At 30 June 2023.

Figure 1: How we classify our customers

Market type			JGN Market size	Consumption
Volume customers under 10 terajoules per year		**Residential:** Homeowners or tenants that use gas for domestic purposes. This includes heating, hot water and cooking.	97.67% (1,468,796)	31.16% (28.4 petajoules)
		Commercial: Small businesses and commercial owners using gas for heating in offices or shops, hot water for medical equipment sterilisation, and for commercial cooking like restaurants and bakeries.	2.3% (34,574)	14.64% (13.3 petajoules)
Demand customers Over 10 terajoules per annum		**Industrial:** Substantial users that need gas for very high heat including chemical production, steel, manufacturing or electricity generation.	0.03% (380)	54.2% (49.4 petajoules)

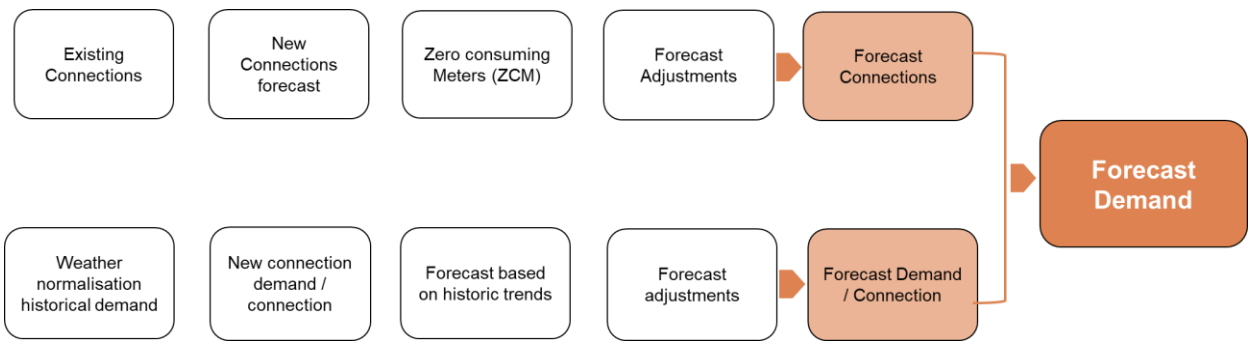
Core applies a different forecasting approach for each market, which are discussed below.

2.1 Volume market customers

Core has used an econometric model to forecast gas consumption across the 1.5 million customers in the volume market, by determining the relationship between gas demand and variables like weather and energy efficiency of appliances. It also used data from the Australian Bureau of Statistics (ABS) to factor economic trends that can influence gas use. Core then combined the average gas consumption forecast with a forecast of customer numbers to forecast the total gas consumption.

Core's general approach to developing demand forecast for the volume market (referred to by Core as tariff V) customers is shown in Figure 2, which is consistent with the approach used by Core, and adopted by JGN, in the 2020 Plan and accepted by the AER.

Figure 2: Core approach to volume market demand forecast



Source: *JGN-Core Energy-Att 8.2-Demand Forecast Report*

Gas consumption by residential and small business customers is materially influenced by weather, including during seasonal winter heating season. Accordingly, Core has analysed the weather impact on historical residential and small business consumption and modelled to remove the impact of abnormal weather conditions, to provide an appropriate, 'normalised' historical trend in demand per connection for consideration for demand forecasting purposes.

Core has developed a model to facilitate weather normalisation analysis which has been used for residential and small business segments. The model is materially consistent with the one used for JGN's 2020 Plan in which the normalisation methodology for volume market customers is based on AEMO's effective degree days (EDD) forecasting guidelines. This approach involves the derivation of an EDD Index and the application of that index to historical actual demand per connection to arrive at normalised historical demand per connection. Further details on how Core has adjusted for weather normalisation are set out in chapter 3 of *JGN-Core Energy-Att 8.2-Demand Forecast Report*.

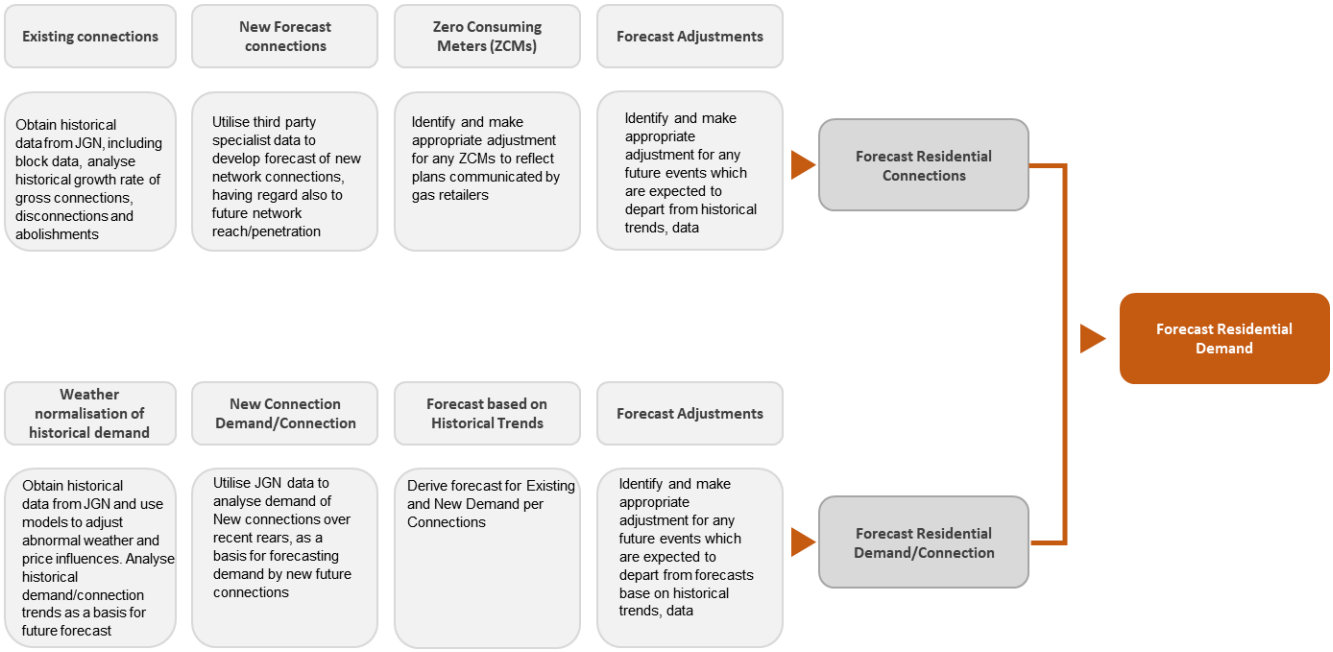
The following sections provide details on inputs sourced by Core in developing residential and small business customers forecasts.

2.1.1 Volume market – residential customers

Figure 3 summarises Core's approach to forecasting demand for residential customers. Key steps in methodology are as follows:

- Analysis of historical residential connection numbers, temporary disconnection and abolishment data from JGN. Due to the material impact of COVID on demand during 2020-2022, Core has focused its analysis on the period from RY2009 to the end of RY2019 while considering any other facts of relevance during the period to RY2023.
- Forecast disconnections based on the historical average of disconnections as a percentage of the year-opening number of connections, and adjusting for any factors which vary between the forecast and historical periods.
- Forecast the number of new connections based on independent forecasts of dwelling commencements in NSW (developed by the Housing Industry Association of Australia (HIA)) and consideration of the average historical relationship between dwelling commencements in NSW and new connections and number of disconnections based on the average historical rates:
  - Recognising the changing policy environment, not all dwellings will connect to our network. Some households will choose not to connect to gas, while others will be outside of our network area. To reflect this, Core reviewed the historical ratios of connections and dwelling construction trends and forecast the ongoing ratio for the 2025 Plan period (including ABS data to support analysis of energy and gas use trends and economic factors). The forecast ratio considered the historical trend and also factored in growth in dwelling construction outside the JGN network area. The forecast also allowed for an increase in electrification of new dwellings as observed through disclosures from developers, builders and certain industry associations.
- Allocate new connections to dwelling types (single, medium density and high-rise dwellings) based on dwelling information provided by the HIA.
- Weather normalise the data as set out in section 2.1 above to identify the trend in forecast consumption per connection. Forecasts of consumption per connection are developed for each dwelling type, reflecting different average levels of consumption per connection.
- Adjust the forecast trend in consumption per connection for any new drivers or changes in existing drivers that are not included in this historical trend which are expected to influence demand per connection including economic activity, government policy, appliance switching and building and appliance efficiency trends.
- Multiply consumption per connection by connection numbers to forecast total demand.

Figure 3: Volume market - residential demand forecast methodology



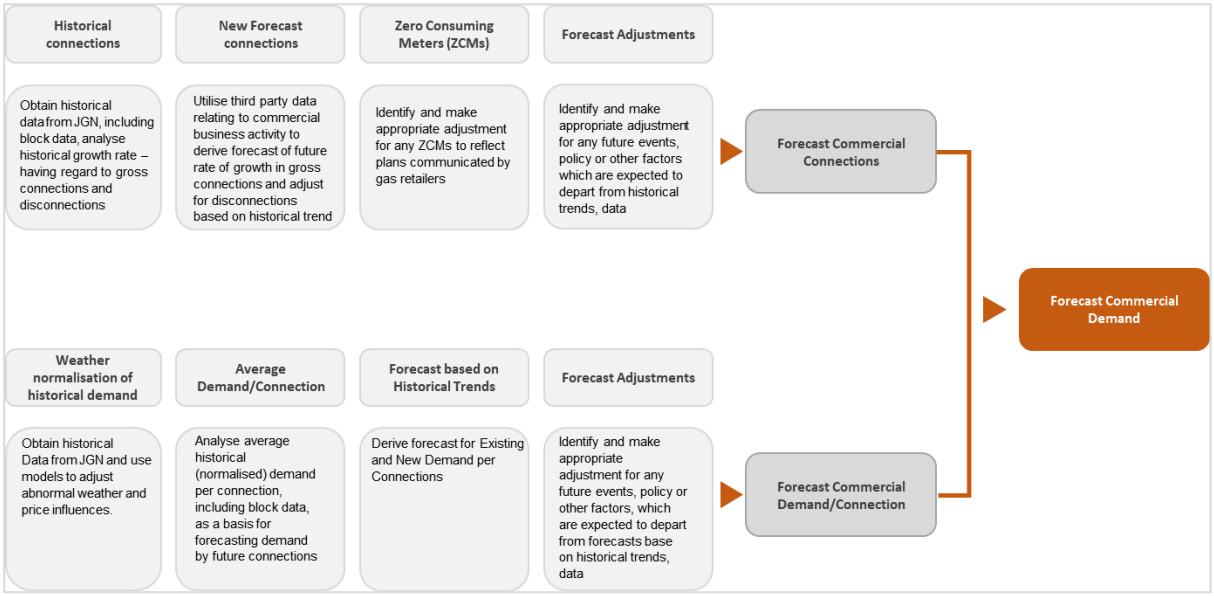
Source: *JGN-Core Energy-Att 8.2-Demand Forecast Report*

2.1.2 Volume market – small business customers

Figure 4Figure 3 summarises Core's approach to forecasting demand for small business customers. Key steps in methodology are as follows:

- Analysis of historical small business connection numbers data from JGN, which is used to forecast the number of net new connections.
- Weather normalise the data as set out in section 2.1 to identify the trend in forecast consumption per connection.
- Adjust the forecast trend in consumption per connection for any new drivers or changes in existing drivers that are not included in this historical trend which are expected to influence demand per connection including economic activity, government policy and appliance mix trends.
- Multiply consumption per connection by connection numbers to forecast total demand for the small business segment of the volume market.

Figure 4: Volume market - small business demand forecast methodology



Source: *JGN-Core Energy-Att 8.2-Demand Forecast Report*

2.2 Demand market – industrial customers

A different approach was applied by Core to forecast the demand (ACQ and MDQ) for our demand market customers. Due to the smaller number of these large customers, it is feasible to consider known load changes of these customers. To assist with this process, we surveyed the top 20 customers covering 22 sites to understand their plans around their future gas usage. These customer sites account for 66% of the 2022 ACQ.

Core's approach to developing the forecast for demand market customers is:

1. Analyse individual customer data, and customer cluster data based on ANZSIC[8] classes, including historical demand trends and relationships (including between MDQ with ADQ[9] (ACQ/365)), using data provided by us.
2. Consider the survey information obtained by us as an input to its forecasting model, and any known closures and load changes advised by us or identified by Core.
3. Analyse the customers in sector groups to differentiate between hospitals, manufacturers, etc., and observe for relationships between each sector's consumption with weather trends and economic activity. When a trend was identified, Core used it to forecast consumption in the future.
4. Research and analysis of third-party data to assess factors that are expected to impact ACQ demand of individual customers and customer clusters data based on ANZSIC classes.

8 Australian and New Zealand Standard Industrial Classification.

9 Average Daily Quantity.

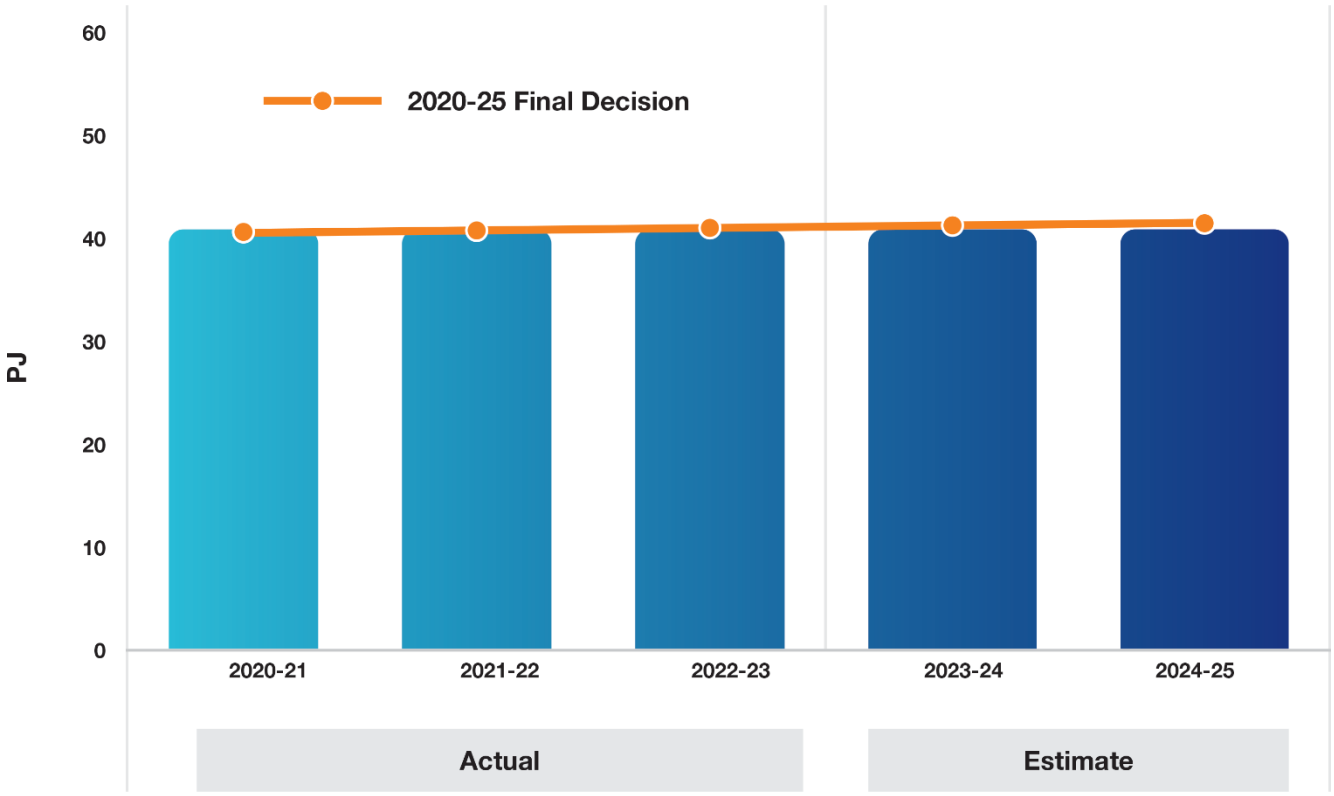
3. Review of historical demand

This chapter sets out our actual demand for residential, small business and industrial customers.

3.1 Volume market demand

Figure 5 shows that the total volume market demand over the current 2020 Plan period is expected to be very close to the AER's Final Decision for our 2020 Plan, which was based on our revised demand forecast prepared by Core and submitted to the AER for approval as part of our 2020 Plan.

Figure 5: JGN actual and estimate volume market demand over the 2020-25 period (PJ)



Whilst we expect that our total volume market demand will be relatively flat over the 2020-25 period as shown above, there has been a trend over the 2015 to 2025 period of reduced average demand per customer which has been offset by increased residential connections. This is shown in Figure 6 and Figure 7 respectively. Whilst the actual and estimated consumption per customer has been consistent with the AER's Final Decision for the 2020-25 period, actual and estimated connections have been below the AER's Final Decision in RY2022 and RY2023, and are expected to be below in RY2025.

Figure 6: Volume market actual and estimate consumption per customer 2016 to 2025 (GJ/customer)

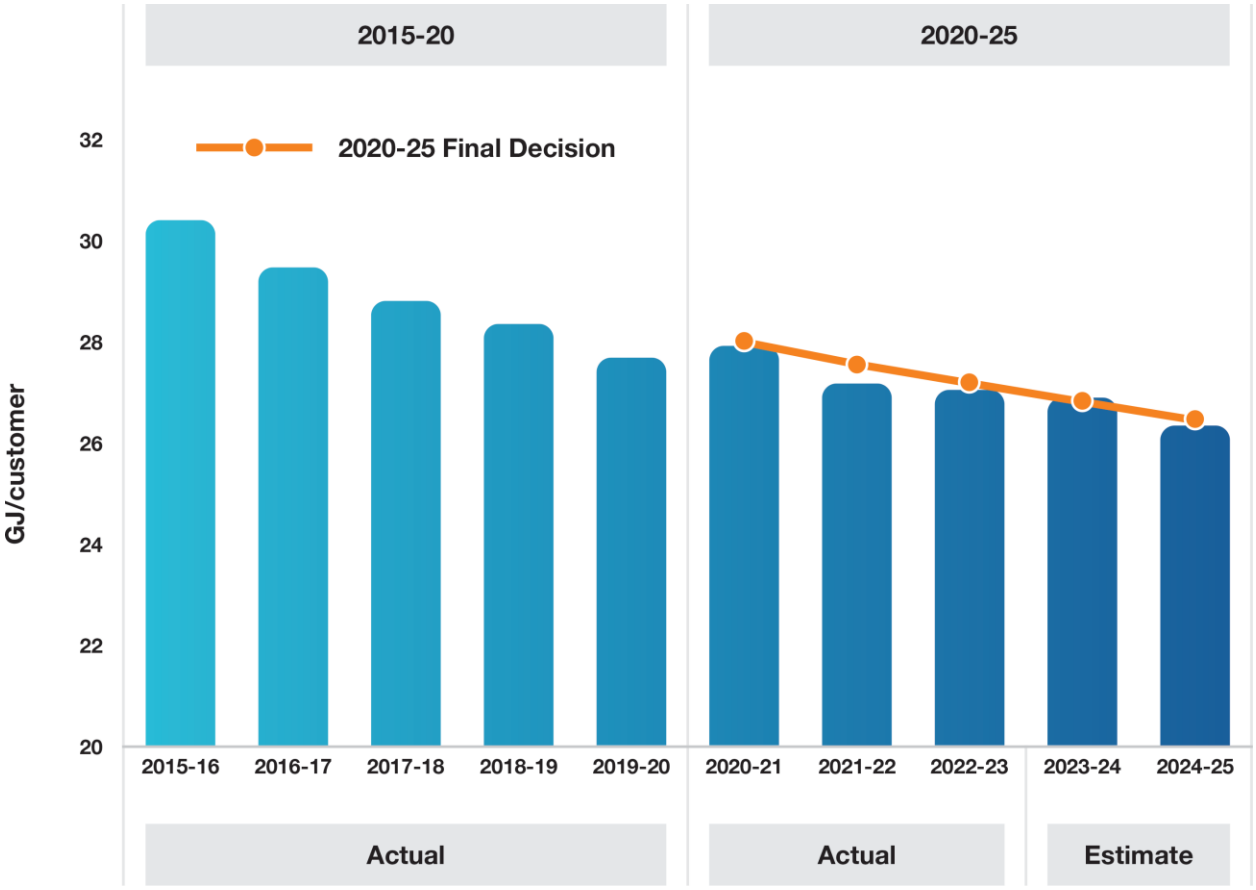
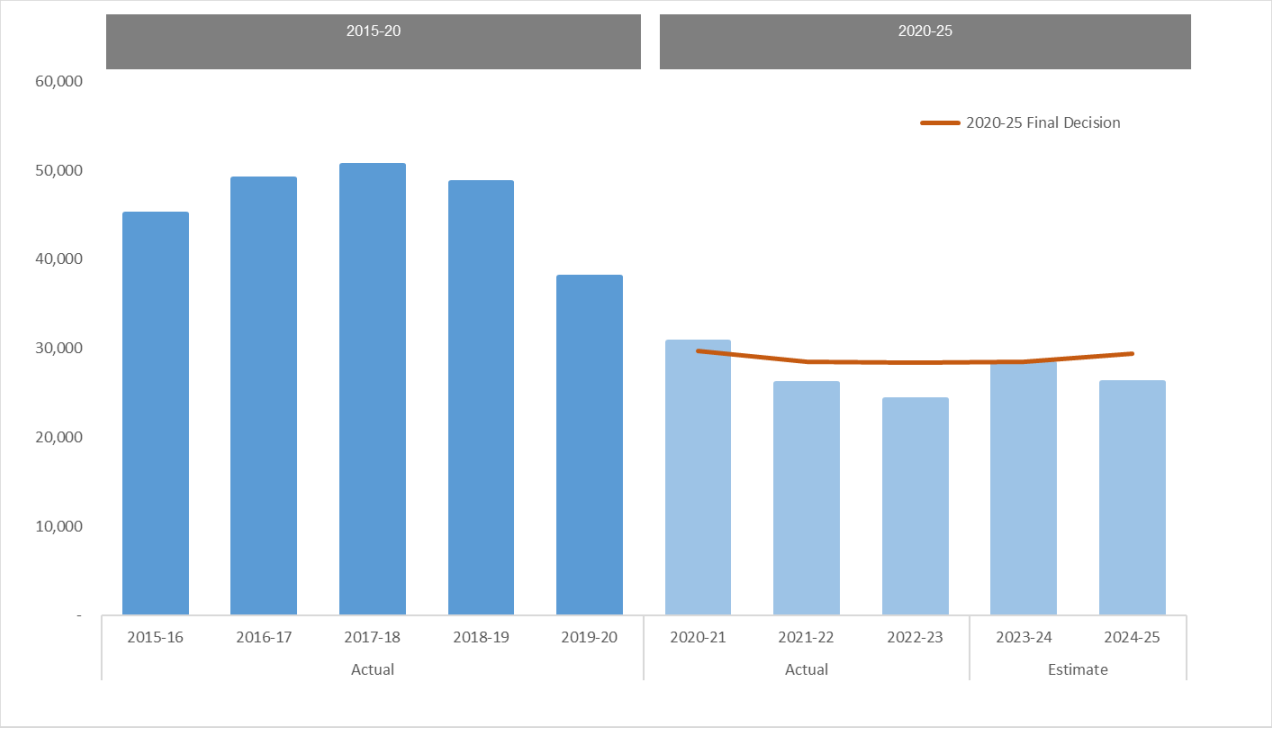


Figure 7: Volume market actual and estimated new connections 2016 to 2025 (number)



We discuss the residential and small business components that make up our total volume market demand below, based on analysis prepared by Core.

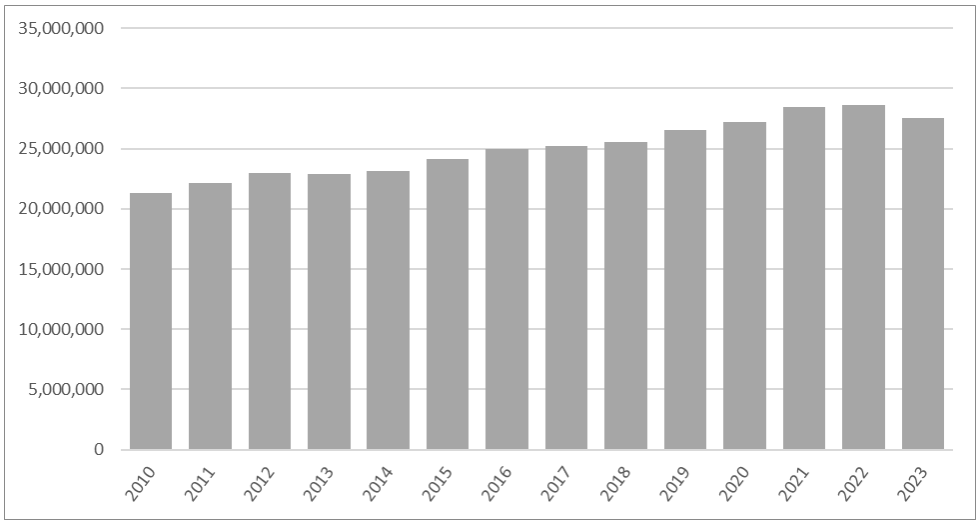
3.2 Volume market – historical residential demand and connections

In analysing historical trends, Core has considered the actual demand outcomes over the 2009-2023 period. As mentioned earlier, Core notes that the impact of COVID on demand during the calendar years 2020-2022 period, and the following customer recovery phase in 2023, makes data over 2020 to 2023 unsuitable as an indicator of long-term demand trends. Core's analysis is set out below.

3.2.1 Residential demand

Residential normalised demand increased by an average annual rate of approximately 2.12% between 1 July 2009 and 30 June 2019, due to a growth in connections of 2.91%, offset partially by a fall in average consumption per connection of -1.06% as shown in Figure 8 below.

Figure 8: JGN residential weather normalised demand (GJ)



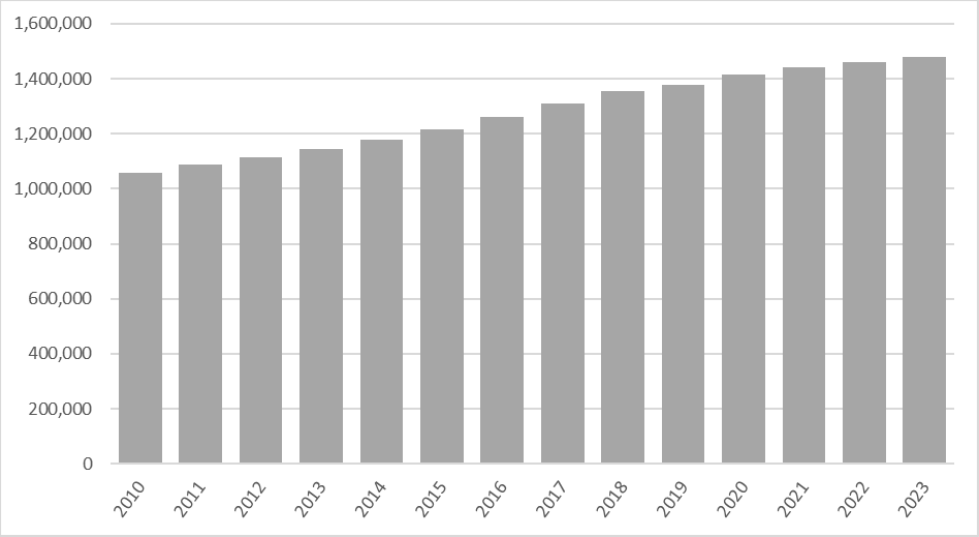
3.2.2 Residential connections

Closing connections are impacted by:

- New connections – the number of new gas customers who connect during the year
- Abolishments – the number of JGN customers who abolish their gas connection
- From 2020, Temporary Disconnections – the number of JGN connected customers which disconnect and do not reconnect during the year.

There has been a dramatic increase in the closing customer numbers over the 2009-23 period, primarily due to new connections associated with the Sydney housing boom. Since the peak of connecting over 50,000 new customers in RY2018, new gas connections have reduced, with just over 26,000 new customers connecting in RY2022. Residential closing connections increased by an average annual rate of 2.91% between 1 July 2009 and 30 June 2019, as shown in Figure 9 below.

Figure 9: JGN historical residential connections (number)



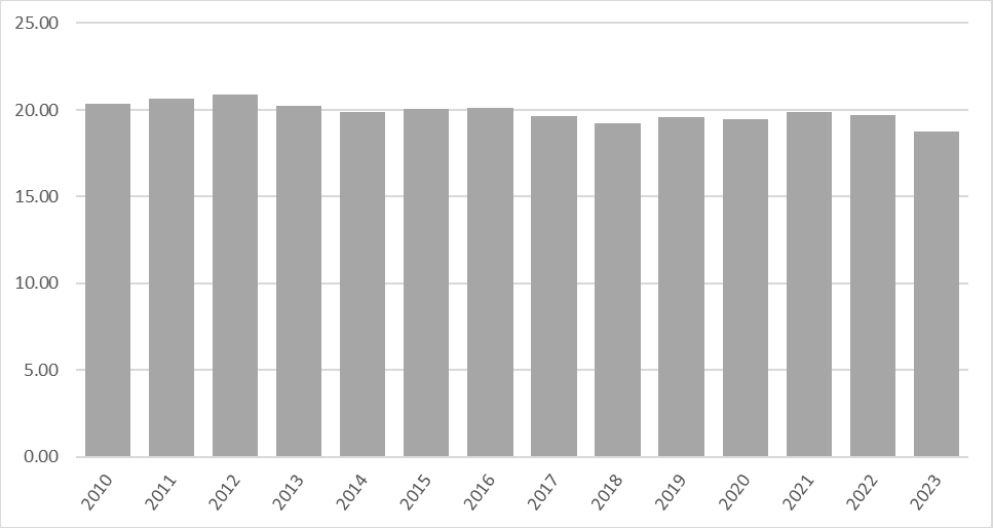
3.2.3 Residential demand per connection

As shown in Figure 10, residential demand per connection decreased at an average annual rate of -1.06% between 1 July 2009 and 30 June 2019. This resulted from:

- A change in customer mix with the percentage of medium density and high rise customers increasing relative to the number of detached housing connections. Medium density and high rise customers have a lower average consumption than a free standing house.
- Replacement of existing gas appliance with new more efficient gas appliances which have lower gas consumption e.g. replacing a storage hot water system with an instantaneous system.
- Electrification trends including:
  - substitution of electricity (i.e. more efficient electricity air conditioning, increasing solar and battery storage penetration)
  - advances in building and appliance efficiency and lower levels of appliance penetration (lower water and or space heating penetration) resulting in lower gas consumption
  - bans to new gas connections that have been imposed by several NSW councils[10].

[10] Waverly Council, City of Sydney, Parramatta, Canterbury-Bankstown have all proposed or implemented bans on new gas connections.

Figure 10: JGN residential demand/connection (GJ/connection)

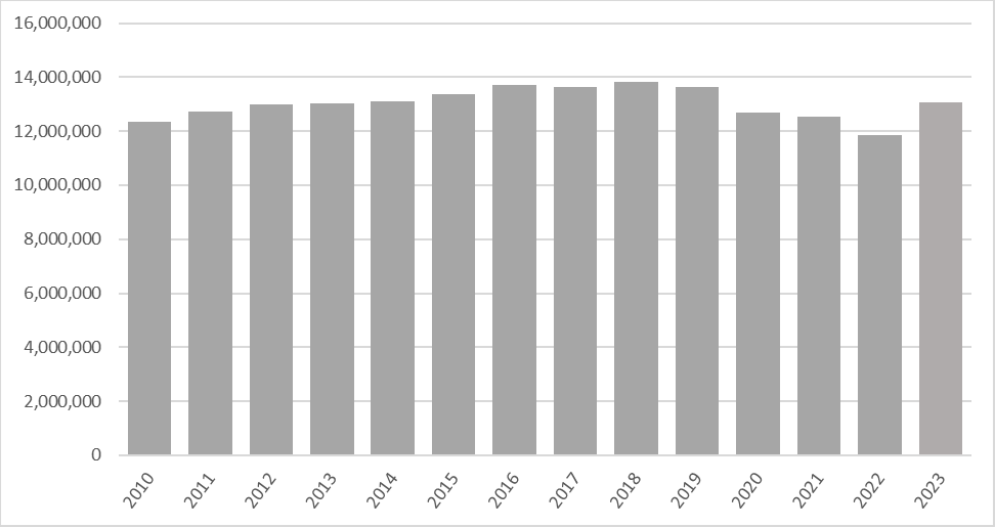


3.3 Volume market – historical small business demand and connections

3.3.1 Small business demand

Figure 11 shows that small business demand exhibited a consistent growth between RY2010 and RY2016 before flattening and commencing a decline during RY2019, with the decline rate extending during COVID impacted years between RY2020-22, due to falling demands and customer numbers. Post COVID, demand increased in RY2023, but remained below 2019 (pre COVID) levels. The average annual rate of growth between RY2009 and RY2019 was 0.9%. This trend was driven by increased average demand per customer as shown in Figure 12 (flat connections) and Figure 13 (increased average demand per customer).

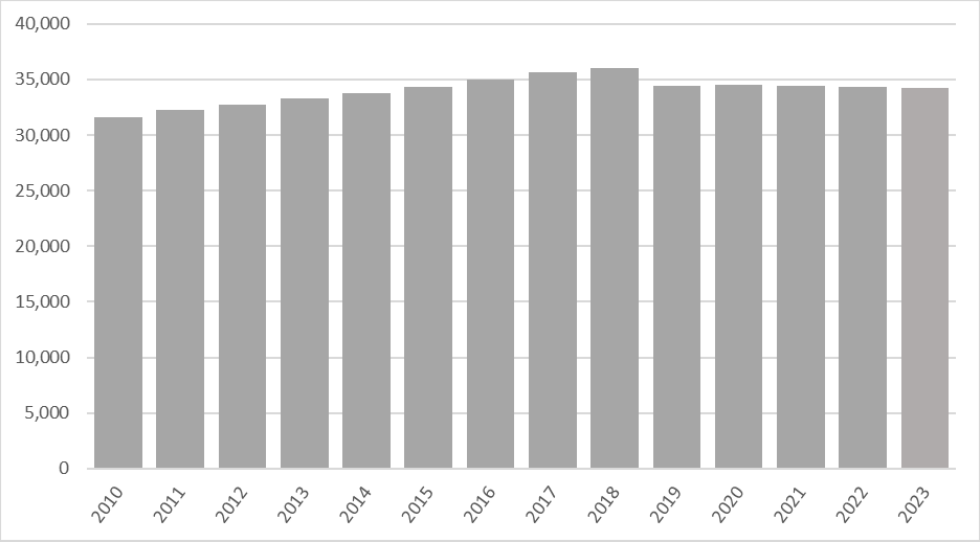
Figure 11: JGN historical small business demand (GJ)



3.3.2 Small business connections

Figure 12 shows that small business connections have grown continually between RY2010 and RY2018 before commencing a decline in RY2019 and beyond, with an average annual rate of growth of 0.06%.

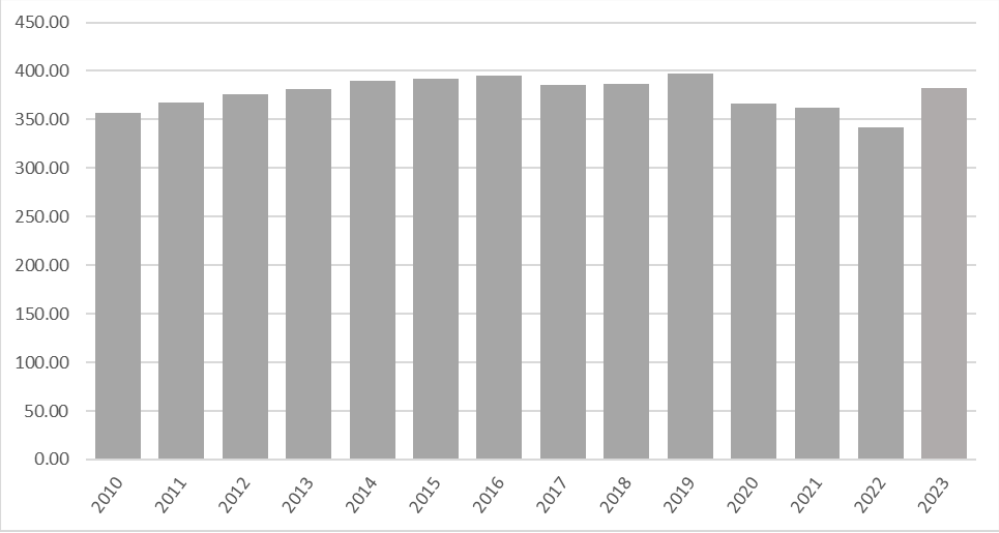
Figure 12: JGN historical small business closing connections (number)



3.3.3 Small business demand per connection

Figure 13 shows that small business demand/customer growth rate continued to reduce between RY2010 and RY2019 with an average growth in demand/customer of 0.91% before reducing further during subsequent COVID impacted years.

Figure 13: JGN historical small business demand/connection (GJ/connection)



3.4 Demand market – historical industrial demand

Most of our demand customers end up paying chargeable demand based on a daily usage. This means that our demand customers' total consumption can increase more than their chargeable demand, which has occurred over the 2009 to 2025 period.

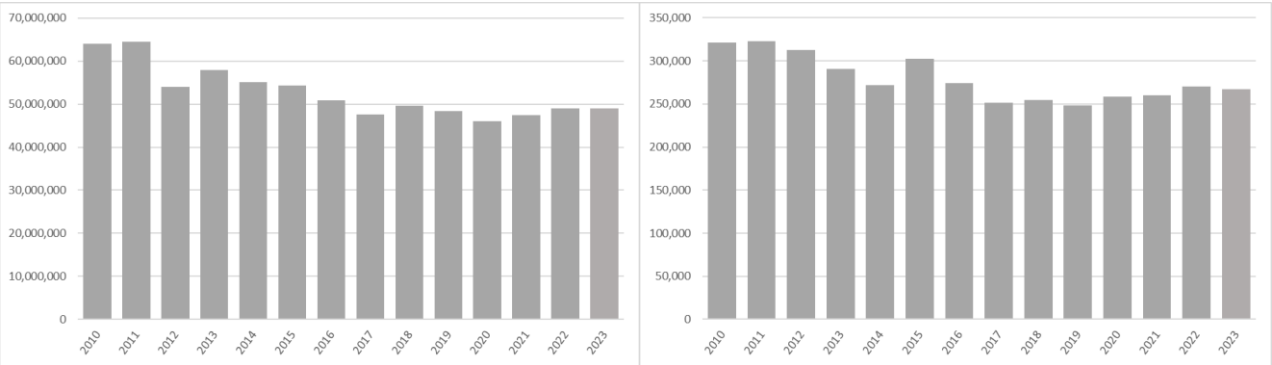
Figure 14 shows that the total demand market demand over the current 2020 Plan period is expected to be above the AER's Final Decision for the 2020 Plan, largely driven by increases in actual load for four large customers compared with the 2020 Plan forecast. The difference for these four customers varies between 3PJ and almost 6PJ p.a.

Figure 14: Total demand gas market actual and estimated consumption over 2016 to 2025 period (PJ)

Figure 15 shows that historical industrial ACQ and MDQ have a general declining trend to RY2019, before increasing modestly during RY2020 to RY2022 due to the impact changing consumption by a few large customers, and not a systematic trend across industrial customers more broadly. The average annual decline over RY2010 to RY2019 is as follows:

- ACQ: -2.81%
- MDQ: -2.58%.

Figure 15: JGN historical ACQ (GJ) and JGN historical MDQ



4. Volume market demand forecast

Our volume market demand forecast for the 2025 Plan period is summarised as follows:

Table 3: JGN's volume market demand forecast for the 2025 Plan

Forecast Element (GJ)	2025-26	2026-27	2027-28	2028-29	2029-30	Average % change 2026-30
Residential Demand	27,950,597	27,757,484	27,308,683	26,661,912	25,665,813	-1.70%
Commercial Demand	12,560,188	12,217,736	11,794,816	11,295,550	10,646,065	-3.63%

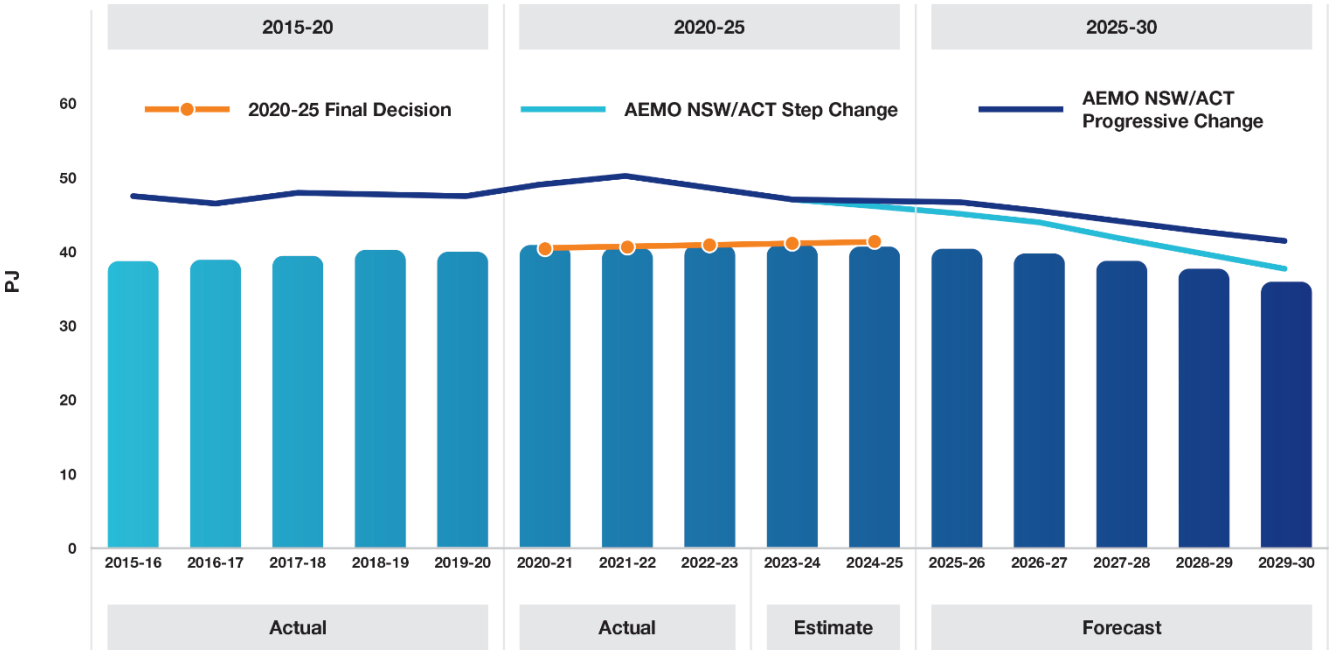
These are discussed further below.

4.1 Total volume market – residential customers and commercial customers

For the volume market, Core is forecasting a decrease in the number of customers connected to our network and a decrease in the average gas consumed (consistent with historical trends) over the 2025 Plan period.

Figure 16 shows the actual and forecast consumption from our network against the total consumption across the whole of NSW and the ACT, as reported and forecast by AEMO in the 2024 Gas Statement of Opportunities (GSOO)[11]. About 80% of the residential and commercial gas consumption across the whole of NSW and the Australian Capital Territory (ACT) is from within our network. The remainder comes through other networks, such as the Canberra network which has higher average consumption per customer due to the relatively colder climate, and large customers directly connected to the transmission networks.

Figure 16: JGN volume market gas consumption (PJ)



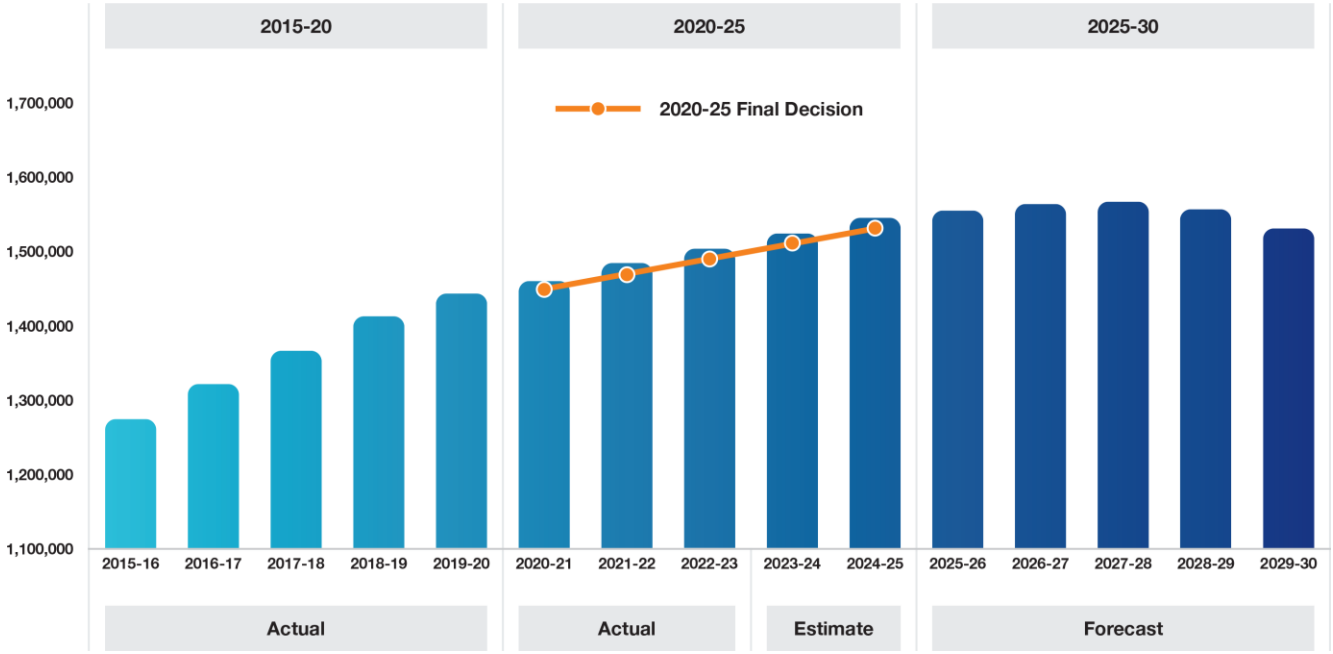
[11] AEMO, Gas Statement of Opportunities, March 2024.

Core has forecast that the total number of customers on our network will start reducing towards the end of the 2025-30 period as shown in Figure 17. This is due to the forecast of the number of customers connecting to the gas network being less than the number of connections being abolished or temporarily disconnected each year. The forecast reductions in the number of new customers connecting is being driven by:

- Lower residential and commercial development and construction rates across NSW
- Changes to our connections policy which will result in fewer connections being provided free of charge
- Changes to the Building Sustainability Index (BASIX) making it easier for all electric homes to meet BASIX standards and requiring solar panels to be installed to supplement a 5-star gas hot water system (which was commonly used to meet the required energy standards)
- More households using electric appliances, including solar and reverse cycle air conditioning, responding to government incentives in this area
- Planning rules in NSW encouraging electrification in new buildings.

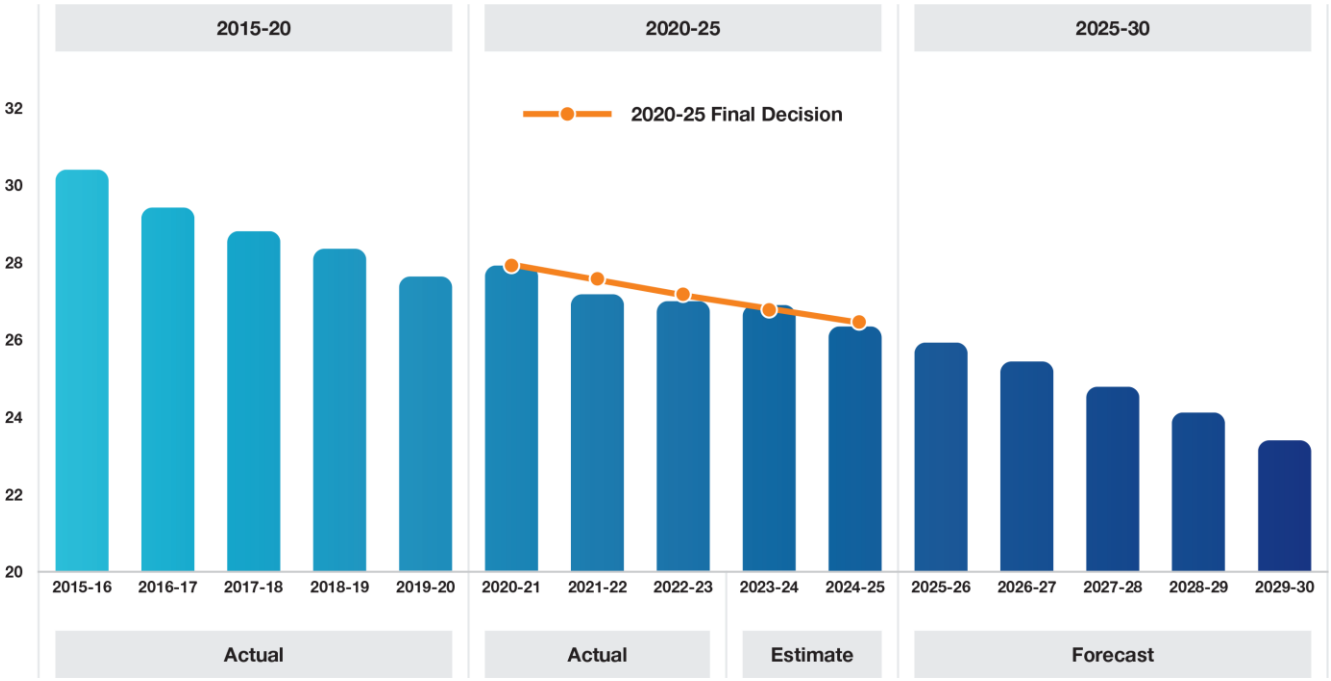
The reduction in total customer numbers is further enhanced by Core forecasting an increase in the number of customers seeking to either abolish or temporarily disconnect from gas as a consequence of choosing to electrify their homes and no longer use gas.

Figure 17: Total customers (volume market - number)



Core is forecasting an ongoing reduction at an increased rate in gas consumption per customer for the volume market for the 2025-30 period as shown in Figure 18.

Figure 18: Volume market average consumption per customer (GJ/customer)

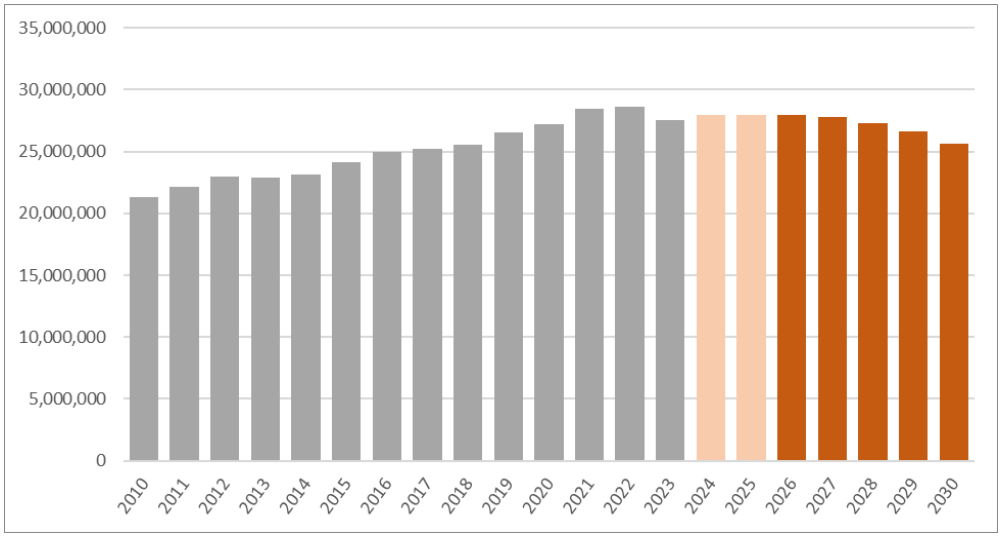


The following sections on residential and small business gas consumption per connection and customer numbers give more detail on the drivers for this reduction.

4.2 Residential volume demand

Core forecasts modest growth in demand during the RY2024-25 period, relative to the pre COVID years, before plateauing in RY2026 and declining thereafter. Core forecasts that our residential volume demand is forecast to fall by an average annual rate of -1.70% over the 2025 Plan period due to declines in customer numbers and a reduction in average demand per connected customer, as shown in Figure 19.

Figure 19: JGN historical and forecast residential volume demand (GJ)



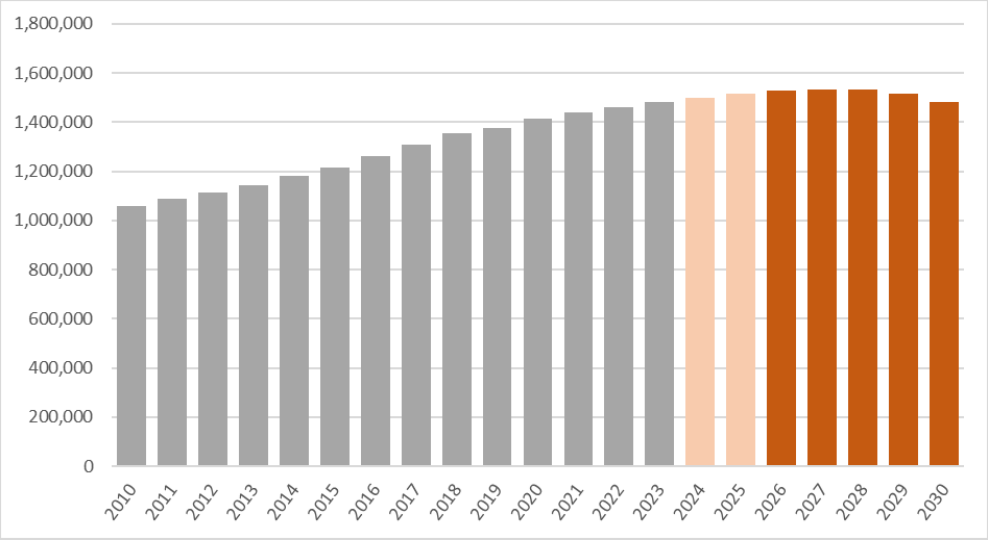
4.2.1 Residential connections

Core has forecast fewer net connections to our network over the 2025 Plan period compared to the 2020 Plan period. Core forecasts that our net connections will reduce by approximately 37,500 new connections, an average

annual decline of -0.49%, which is significantly lower than the 103,000 net increased connections we expect to connect over the current 2020-25 period as shown in Figure 20. This reduction is driven by:

- HIA data showing a material fall in dwelling commencement and completion activity over the forecast period
- a significant decline in penetration rate of new gas connections relative to the building activity. This is driven by:
  - material growth in dwelling activity in areas outside the JGN network area
  - a higher proportion of multi dwelling development activity which has a materially lower penetration rate than detached homes
  - forecast increase in full electrification of new dwellings – as observed through disclosures by developers, builders, and certain Councils[12]
- a moderate progressive increase in disconnections and abolishments until RY2027, after which point a material increase is considered most likely, and in an increase in abolishments, driven by changes in government policy and consumer preferences for alternative energy options.

Figure 20: JGN historical and forecast residential connections (number)



4.2.2 Residential gas consumption per connection

Core has forecast that our residential gas consumption per customer will continue to fall in the 2025-30 period but at a faster rate than recent historical rates with an average annual decline of -1.56% due to:

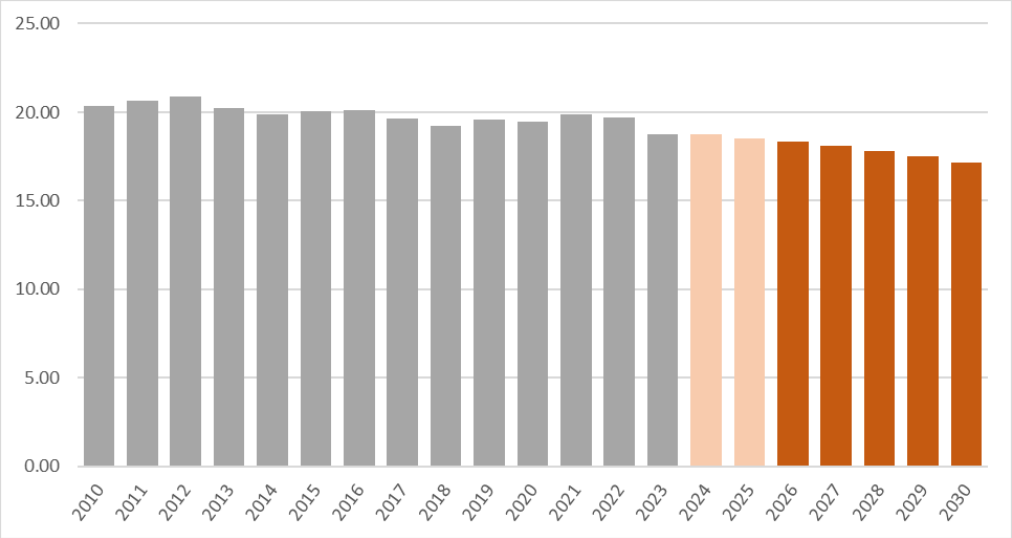
- forecast use of replacement gas appliances with higher efficiency star ratings as existing gas appliances are replaced and renovations take place, to meet the requirements of National Construction Code (NCC) 2022
- electrification trends including:
  - increasing solar and battery storage penetration as a substitute for gas
  - growing trend toward replacement of gas heating with reverse cycle air-conditioning when appliances are due to be replaced or during renovation

[12] Waverly Council, City of Sydney, Parramatta, Canterbury-Bankstown have all proposed or implemented bans on new gas connections.

  - recent changes to building standards which encourage new households to use electric appliances, rather than gas appliances - this represents a reversal of previous standards which created incentives for new households to connect to gas. Changes to BASIX make it easier for all electric homes to meet BASIX standards and requiring solar panels to be installed to supplement a 5-star gas hot water system (which was commonly used to meet the required energy standards). This means that there is a growing trend:
    - toward replacement of gas heating with reverse cycle air-conditioning when appliances are due to be replaced or during renovation
    - in use of alternative water heating technologies

- proposed changes to our connections policy (and our Model Standing Offer), which will require more customers to make an upfront contribution in order to connect to our network. We expect that this will discourage some potential customers from connecting as the energy market transitions.
- price elasticity
- high proportion of new multi-story dwelling connections which are demonstrated to have a lower demand/customer – due to smaller footprint, lower dwelling density and lower use of gas heating, in favour of reverse cycle air-conditioning.

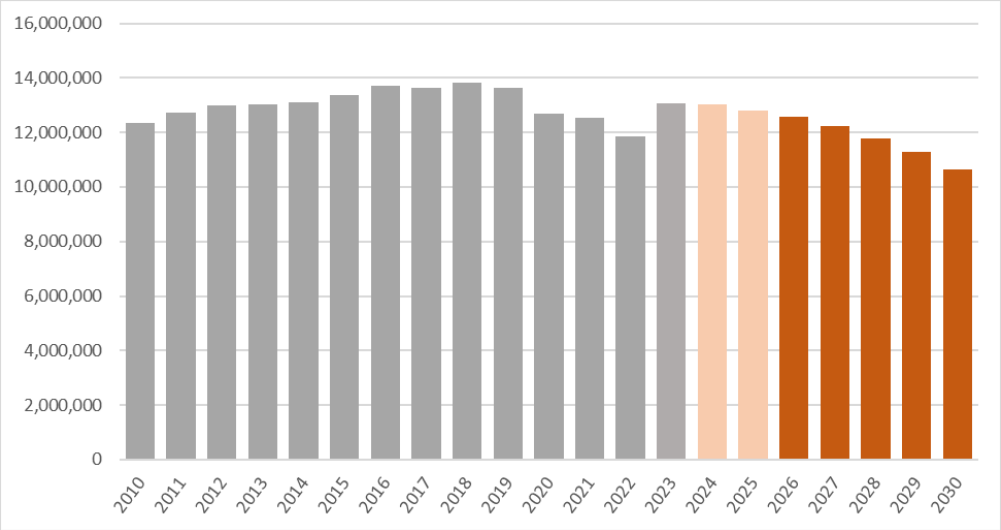
Figure 21:JGN historical and forecast volume average residential demand / customer (GJ/connection)



4.3 Small business volume demand

As shown in Figure 22, Core has forecast that our small business volume demand for RY2023 will reflect an estimated return in demand per connection toward RY2019 levels (one year prior to the COVID impacted period). Core forecasts that demand will remain relatively flat between RY2024 and RY2025 before commencing a more material downward trend of an average annual rate of decline of -3.63% over the 2025 Plan period due to a low rate of growth in both connections, and average demand per connected customer.

Figure 22: JGN historical and forecast volume small business demand (GJ)

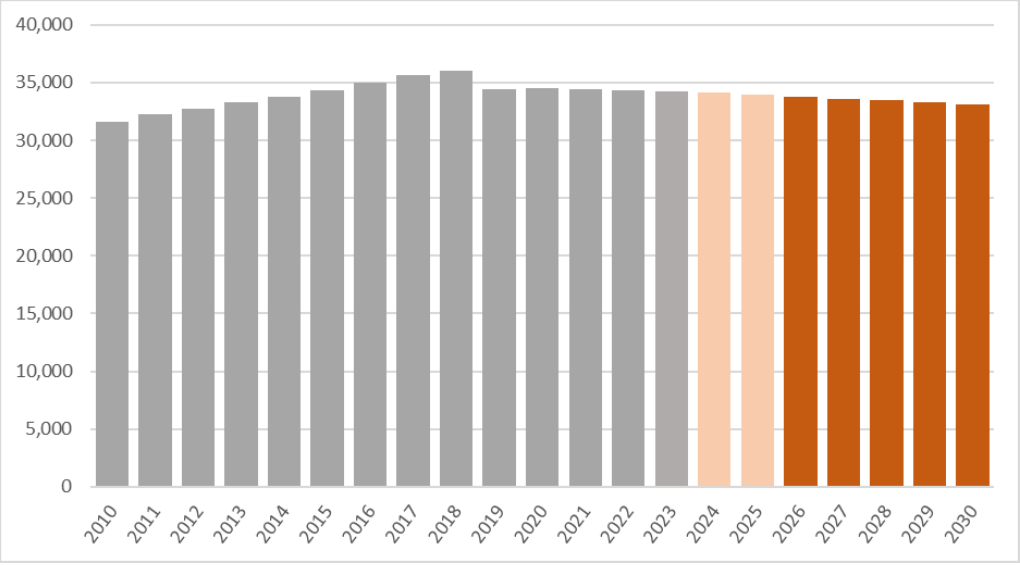


4.3.1 Small business connections

Figure 23 shows that Core forecasts our small business connections to fall modestly between RY2024 and RY2030, continuing a decline which is observable since RY2018. The forecast average annual decline in small business connections for the RY2026 to RY2030 period is -0.50% due to:

- an average annual appliance replacement rate of over 2,000 connections, assuming a 14-year replacement cycle
- a slower rate of growth in small business activity due to a lower rate of economic growth for several years which impact the forecast for the 2025-30 period (including RY2024 and RY2025 which influence the opening base of connections in the 2025-30 period)
- a trend toward substitution of gas appliances in favour of electrical alternatives, including growth in solar and battery use
- consumer response to assumed increases in gas cost relative to electricity, combined with national and state requirements to improve energy efficiency.

Figure 23: JGN historical and forecast small business closing connections (number)

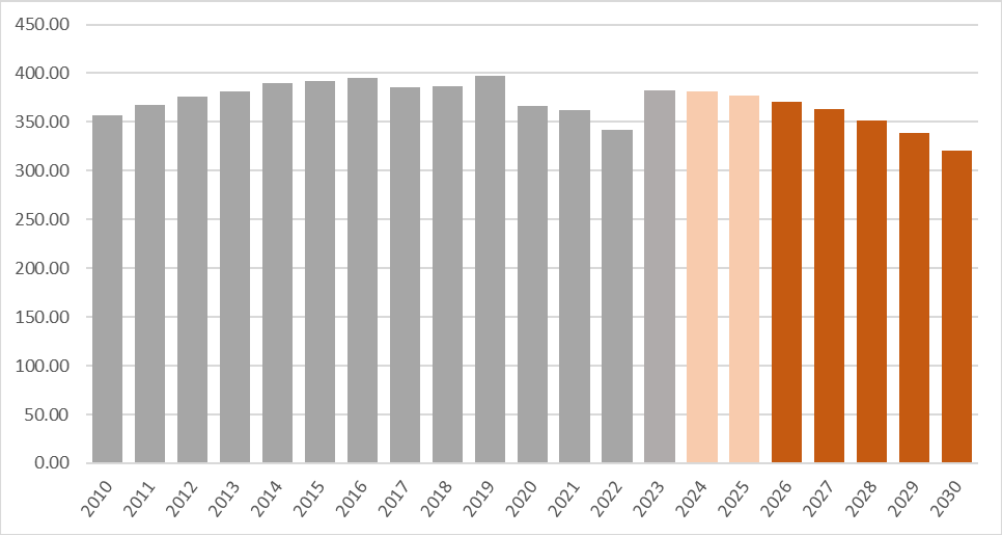


4.3.2 Small business gas consumption per connection

Figure 24 shows that Core is forecasting the consumption/customer for our small business customers to fall modestly over RY2024 and RY2025 before commencing a more significant decline. Core forecasts an average annual decline over the 2025-30 period of -3.15% due to:

- improvements in energy efficiency
- reduced gas use due to substitution of one or more appliance categories
- a trend toward electrification more broadly including:
  - electrification of new buildings and NSW planning laws favouring electrification, resulting in increasing solar and battery storage penetration within the existing customer category, which substitutes gas – although to a lower extent than residential
  - growing trends in using alternative water heating technologies and reverse-cycle air conditioning in commercial settings.

Figure 24: JGN historical and forecast small business consumption/connection (GJ)



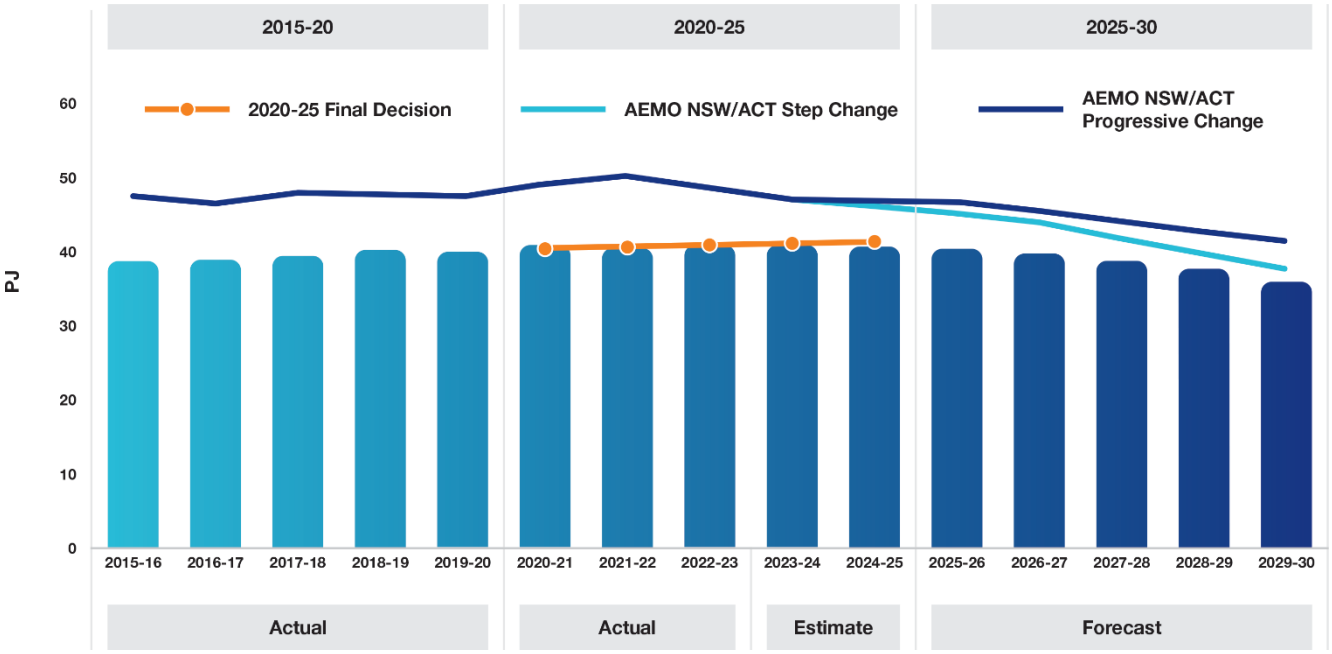
4.4 Validation of our volume market demand forecast

Core has compared its forecast against the latest forecast presented by AEMO within its 2024 Gas Statement of Opportunities (GSOO)[13] to check for alignment in forecast trend assumptions.

Figure 30Figure 25 compares the actual and forecast volume consumption from our network against the total consumption across the whole of NSW and the ACT, as reported and forecast by AEMO in the 2024 GSOO. About 80% of the residential and commercial gas consumption across the whole of NSW and the ACT is from within our network. The remainder comes through other networks (such as the Canberra network) which has higher average consumption per customer due to the relatively colder climate.

[13] AEMO, Gas Statement of Opportunities, March 2023.

Figure 25: Total volume market gas consumption (PJ)



In its 2024 GSOO, AEMO defines three scenarios:

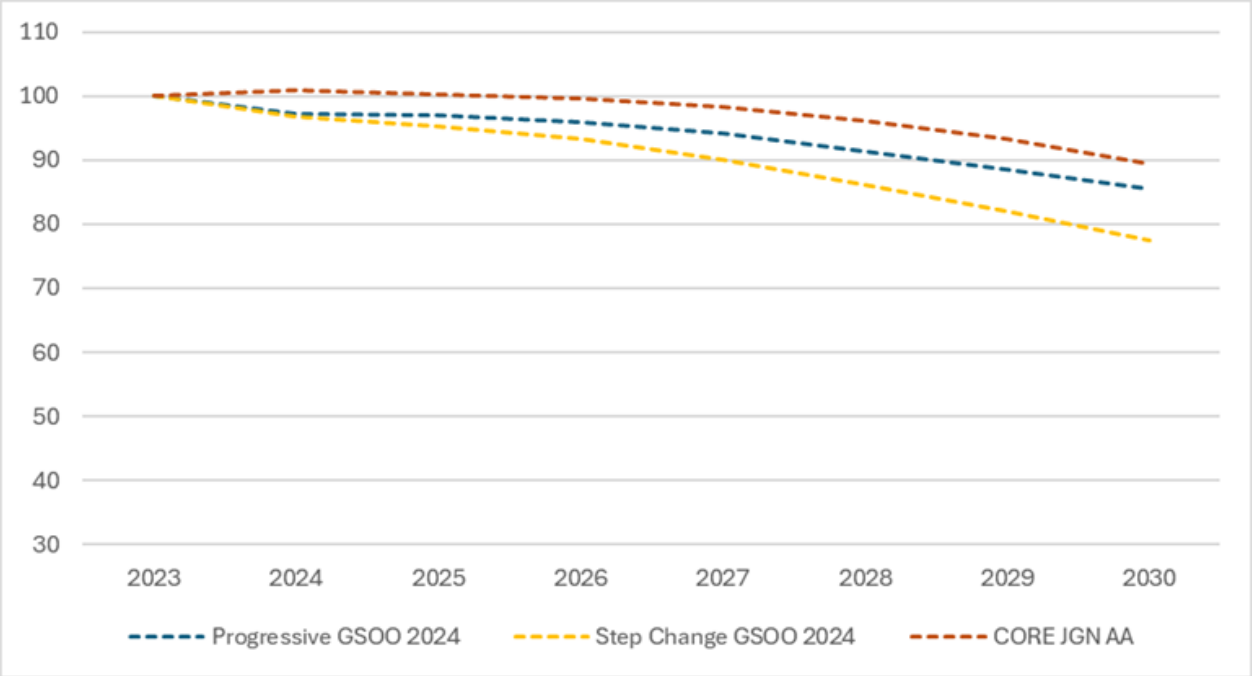
- Step Change – achieves a scale of energy transformation that supports Australia's contribution to limiting global temperature rise to below 2°C compared to pre-industrial levels - electrification is a key enabler. The 2024 GSOO Step Change scenario is comparable to the 2023 GSOO Orchestrated Step Change (1.8°C) scenario.
- Green Energy Exports – reflects very strong decarbonisation activities domestically and globally aimed at limiting temperature increase to 1.5°C, resulting in rapid transformation of Australia's energy sectors, including a strong use of electrification, green hydrogen and biomethane.
- Progressive Change – meets Australia's current Paris Agreement commitment of 43% emissions reduction by 2030 and net zero emissions by 2050.

Figure 26 compares the AEMO 2024 GSOO forecast against the Core forecast which shows that the Core volume market forecast is highly consistent with the index slope of the AEMO Progressive scenario throughout the 2025 Plan period, and materially above the AEMO Step Change scenario. Core 'considers the latest AEMO GSOO 2024 forecast provides strong validation of the Core JGN AA forecast for the R&C[14]/Tariff V customer demand.'[15]

[14] R&C is residential and commercial.

[15] *JGN-Core Energy-Att 8.3-Demand Forecast Report* Addendum, section 4.

Figure 26: Comparison of AEMO 2024 GSOO and Core forecast for volume market (2023=100)



5. Demand market forecast

Our demand market (industrial customers) forecast for the 2025 Plan period is summarised as follows:

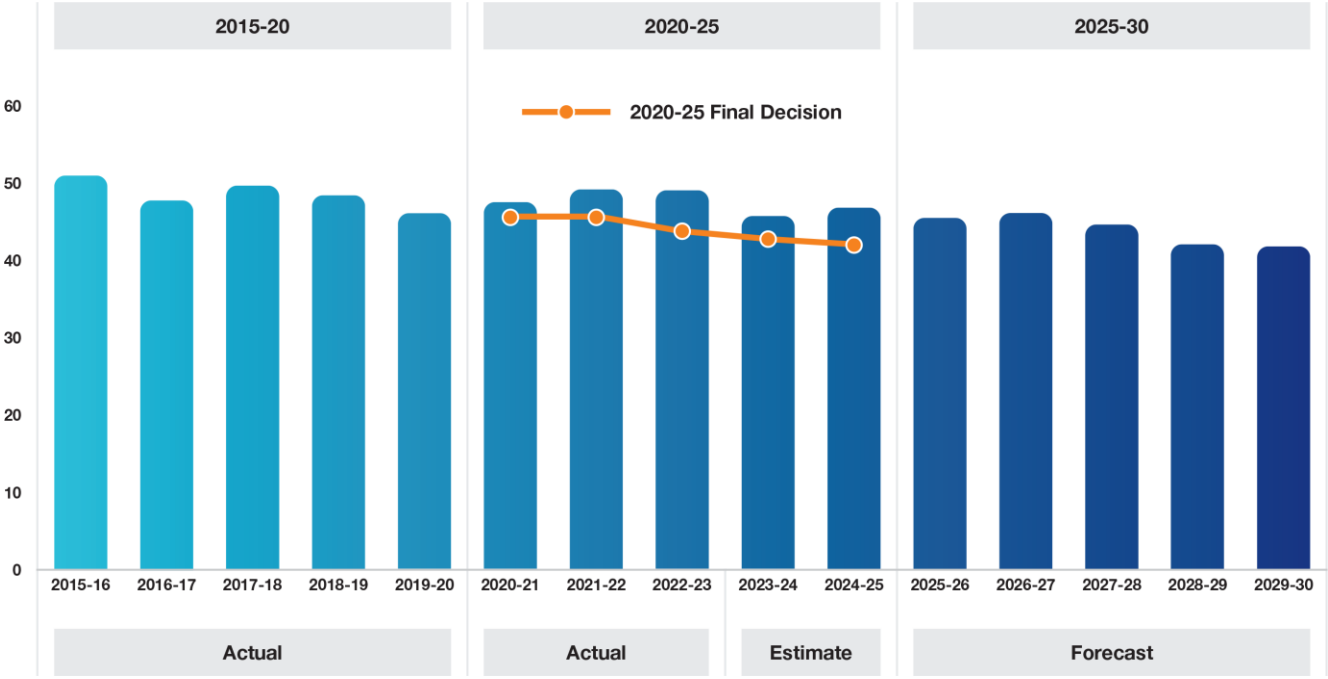
Table 4: JGN's demand market forecast for the 2025 Plan

Forecast Element (GJ)	2025-26	2026-27	2027-28	2028-29	2029-30	Average % change 2026-30
Industrial ACQ Demand	45,468,176	46,109,915	44,328,131	42,106,612	41,709,173	-2.12%
Industrial MDQ Demand	238,101	240,094	223,824	214,353	213,143	-1.83%

5.1 Our demand market forecast

Figure 27 sets out our actual, estimated and forecast demand market consumption over the 2016 to 2030 period.

Figure 27: JGN actual, estimated and forecast total demand market consumption over 2015-16 to 2029-30



Over the 2025-30 period Core forecasts that consumption by industrial customers is expected to decline by an average annual rate of -2.12% for ACQ and -1.83% for MDQ due to major changes in the ways industrial customers source and use energy, to enhance profitability and meet sustainability standards including:

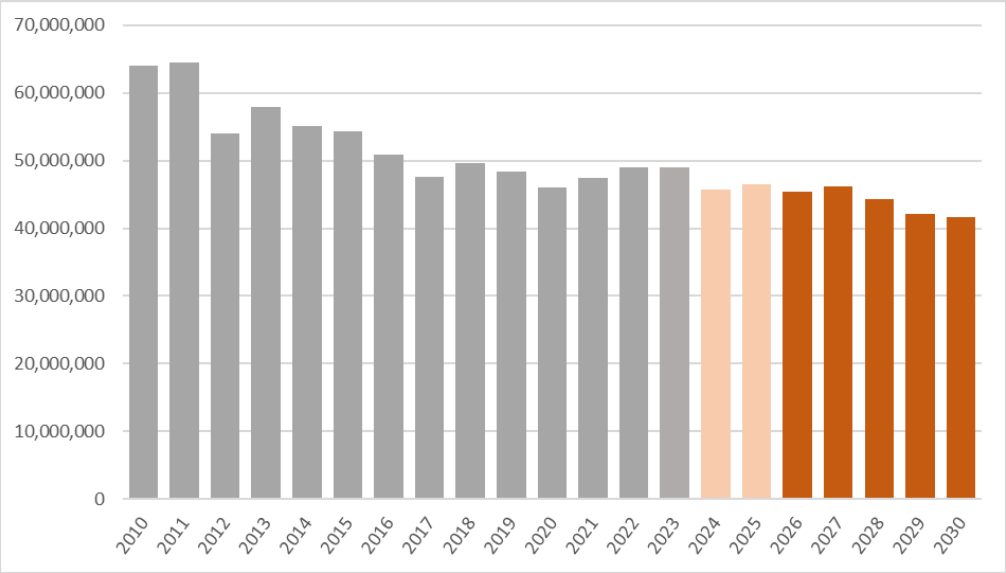
- use of new, more energy efficient heating and processing technologies
- greater use of alternative energy sources including solar, hydrogen and waste resources and behind the meter solutions
- changes in market competitiveness across certain sectors.

While a few of the larger customers who were surveyed are forecasting an increase in gas consumption as they move away from coal or other higher emission fuels to natural gas, other surveyed customers are forecasting a maintenance of, or reduction in, gas consumption. For the non-surveyed customers, their consumption is forecast to decline at an accelerated rate compared to the historical trend reflecting an electrification of the easier to electrify appliances/processes.

We note that whilst we forecast consumption for plastic manufacturer Qenos based on survey feedback, it has subsequently entered into voluntary administration in April 2024. Consequently, depending on whether Qenos remains a going concern we may need to adjust our demand forecast to account for any change in circumstances in our revised 2025 access arrangement in response to the AER's draft decision.

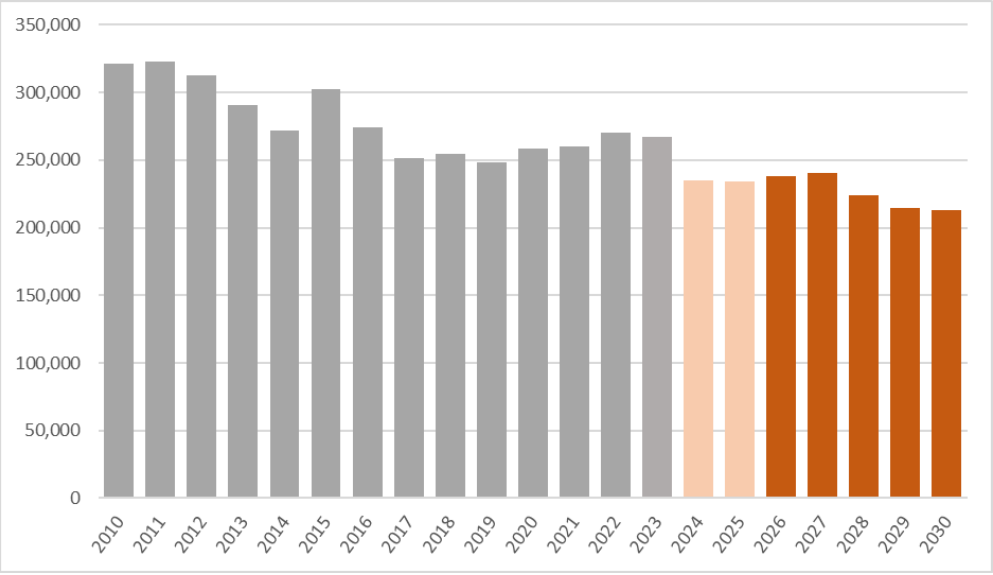
Core has analysed base ACQ to determine most likely movements in gas demand due to new initiatives by industrial customers to meet emission targets and to realise economic benefits associated with productivity improvements and changes in energy sources, away from gas. Figure 28 shows Core's forecast ACQ for JGN for RY2024 and RY2025, and over the 2025-30 period.

Figure 28: JGN historical and forecast ACQ (GJ)



Core has forecast MDQ using the results of the survey and for non-surveyed customers the forecast is based on the relationship between ACQ and MDQ observed historically. Figure 29 shows Core's forecast MDQ for JGN for 2024 and 2025, and over the 2025-30 period.

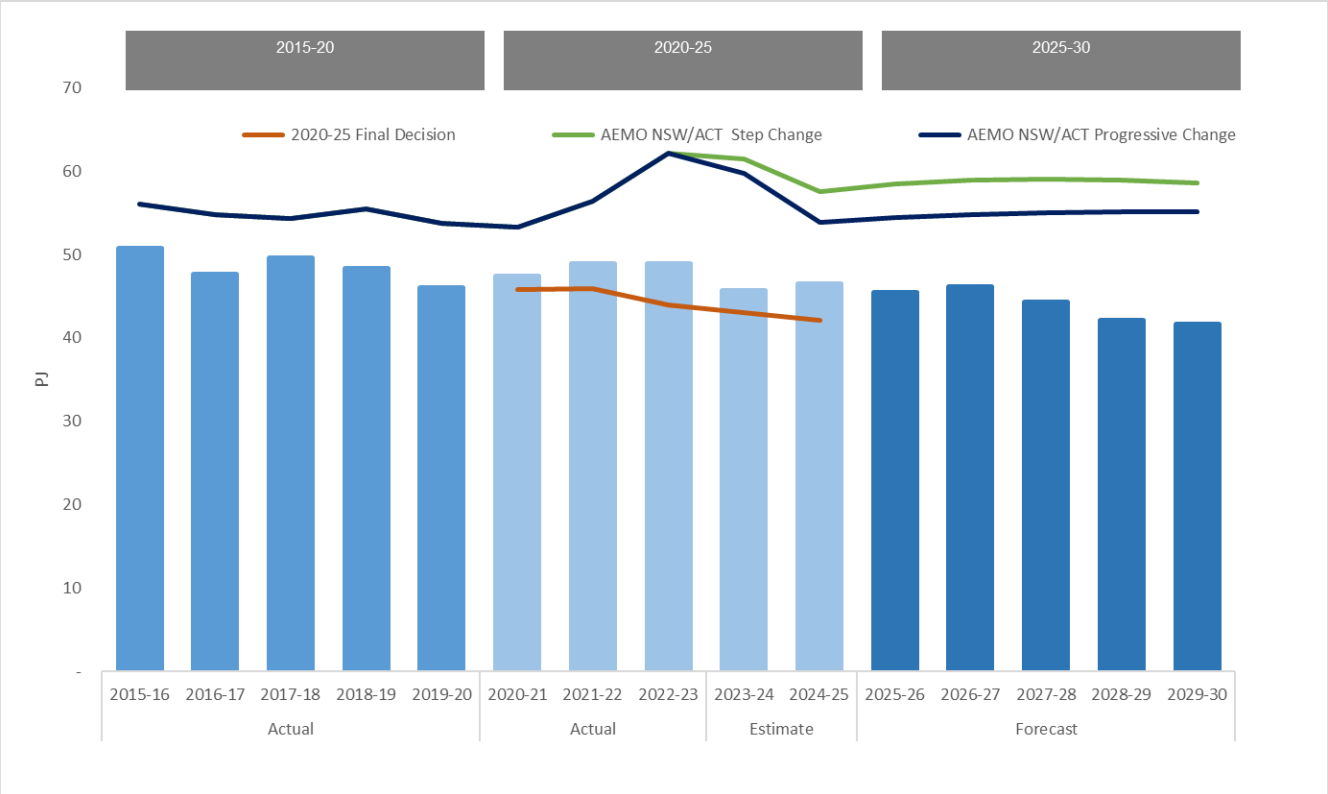
Figure 29: JGN historical and forecast MDQ (GJ)



5.2 Validation of our demand market forecast

Figure 30 shows the reductions in consumption forecast by Core compared with the AEMO's 2024 GSOO.

Figure 30: Total demand market gas consumption (PJ)

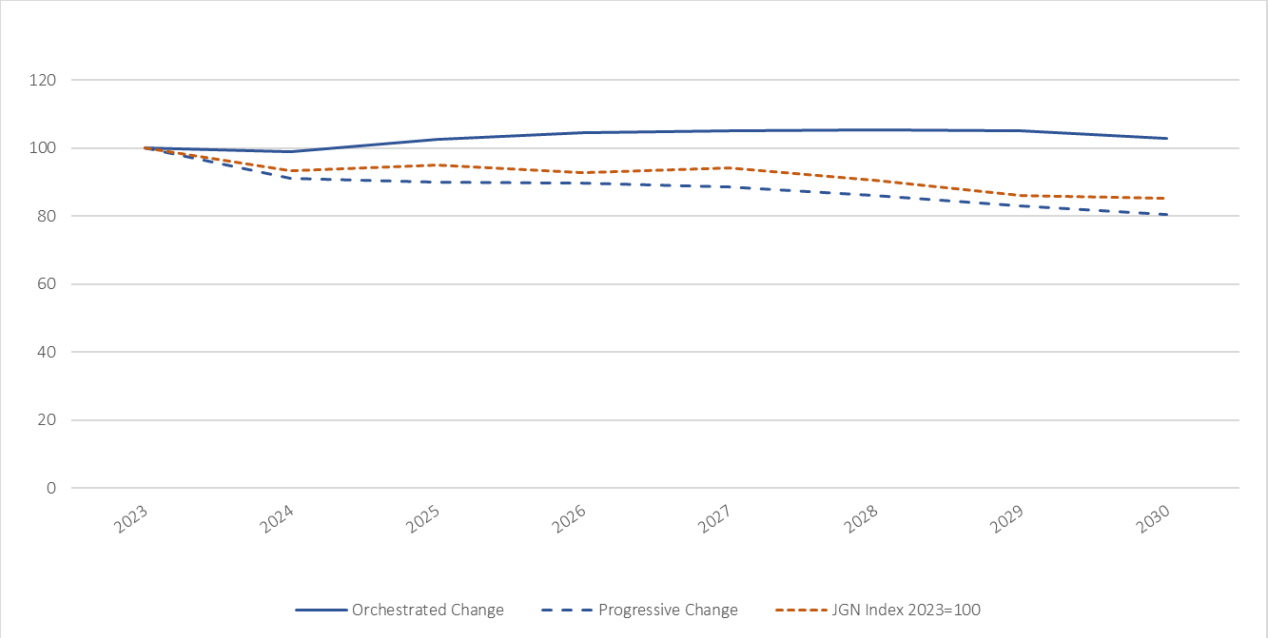


As noted earlier, the AEMO GSOO total demand market gas consumption includes gas consumption in NSW and the ACT, and gas consumed through distribution and transmission networks (we only offer gas on our NSW distribution network), which explains the gap between JGN's and AEMO's demand forecasts.

Figure 31 shows the comparison for the demand market segment (industrial demand) against the 2023 GSOO. The JGN forecast falls between the AEMO Progressive and Orchestrated Change scenarios, with closer relationship to the Progressive Change scenario, in terms of the rate of change in declining consumption. Core considers that the comparison 'provides strong validation of its demand market segment forecasts'[16].

16 *JGN-Core Energy-Att 8.2-Demand Forecast Report*, section 8.2.

Figure 31: Comparison of AEMO GSOO and Core forecast for JGN's demand market (2023=100)



Core has not completed a comparison against the 2024 GSOO given that AEMO has assumed a large increase in demand for power plants compared with what was assumed in the 2023 GSOO. The majority of gas powered generators are not within JGN's network, making the comparison less relevant. This results in a larger gap between our and AEMO's GSOO forecasts, making the comparison less relevant.

6. Usage of the pipeline and customer numbers

Rule 72(1)(a)(iii)(A) of the NGR requires that we show for the 2020-25 period the minimum, maximum and average demand for our network.

We generally do not use this kind of information to operate our network, nor do we forecast it, as localised demand rather than total demand is what drives our capex. More information on our how we plan and manage our network is provided in *JGN-Att 5.1-Capital expenditure*.

The minimum, maximum and average demand for our network is presented in Table 5 for the years we have actual data.

Table 5: Minimum, maximum and average daily load 2020 to 2023 (TJ)

	2020	2021	2022	2023
Minimum load	147.31	134.13	136.88	155.21
Maximum load	351.47	393.16	393.20	405.46
Average load	247.35	252.87	255.77	257.20

Rule 72(1)(a)(iii)(B) of the NGR requires that we show for the 2020-25 period the customer numbers in total and by tariff class. Table 6 sets out the total actual and forecast customer numbers for the 2020-25 period. We provide details of customer numbers by tariff class for RY2020 to RY 2023 in table 1.2 of the annual Regulatory Information Notices (RINs), and for RY2024 and RY2025 in *JGN-Att 7.6.2M-PTRM-Step 2*.

Table 6: Customer numbers 2020-21 to 2024-25

	2020-21	2021-22	2022-23	2023-24 (forecast)	2024-25 (forecast)
Residential	1,440,248	1,460,152	1,480,276	1,500,579	1,517,968
Small business	34,384	34,337	34,186	34,103	33,937
Total volume market	1,474,632	1,494,489	1,514,462	1,534,682	1,551,905
Total demand market	386	384	375	373	371
Total customers	1,475,018	1,494,873	1,514,837	1,535,055	1,552,276

7. Forecast pipeline capacity

Rule 72(1)(d) of the NGR provides that the access arrangement information must include to the extent practicable a forecast of pipeline capacity and utilisation over the 2025-30 period and the basis upon which the forecast has been derived. Capacity and utilisation information for a distribution network is not available or relevantly meaningful. Our network is a geographically dispersed network made up of interconnected pipes and there are a number of practical considerations governing why the calculation of capacity and utilisation is not practicable.

As per the Part 10 NGR disclosure requirements, Table 7 sets out the current maximum operating capacity for the large distribution pipelines under normal operating conditions. The firm capacity that is, or would, be available for sale in any month is subject to a number of matters including our obligation to meet delivery commitments to all Network users and customers, and the actions by third parties in relation to injection of gas into the Network. These delivery commitments vary on a daily, monthly and annual basis as customers join or leave the Network, or change their gas consumption patterns.

Actual daily and monthly flow data, and hourly flow data where available, is published on our website at https://www.jemena.com.au/gas/jemena-gas-network/jgn-service-and-access-information/ (see the 'Related Resources' section), providing information about historical volumes delivered through the large distribution pipelines in each month.

Table 7: Maximum operating capacity for large distribution pipelines

Large Distribution Pipeline	Maximum daily flow under normal operating conditions	Maximum daily flow under normal operating conditions
Wilton - Wollongong	29 TJ/day	31,000 scmh or 1,200 GJ/hr
Wilton - Newcastle	365 TJ/day	400,000 scmh or 15,500 GJ/hr