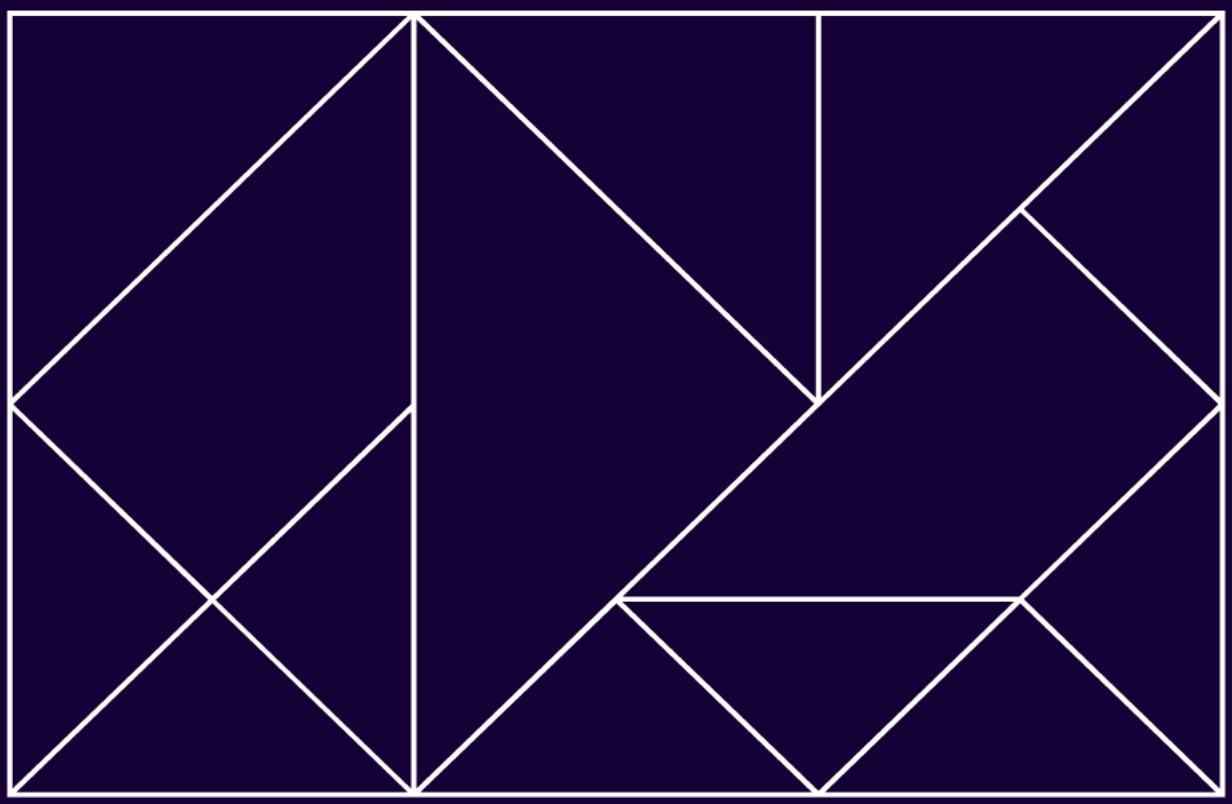
ACIL ALLEN

Review of Jemena Gas Network's revised demand forecasts

Review of JGN's revised demand and customer number forecasts for the Australian Energy Regulator 2025-2030

14 April 2025



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1 Introduction

On 15 January 2025, Jemena Gas Networks (NSW) Ltd (JGN) submitted its revised access arrangement proposal to the AER for the period 1 July 2025 to 30 June 2030, which was informed by a set of detailed revised demand and customer number forecasts for the JGN gas distribution network produced by CORE Energy and Resources.

ACIL Allen have been commissioned by the Australian Energy Regulator to review JGN's revised gas demand and customer number forecasts for the 2025-30 Access Arrangement period. Specifically, we have been asked to provide advice and comment on:

- The reasonableness of JGN's modelling of gas disconnection rates and new connection rates on its network (in the residential and commercial sections of its network), and whether it has taken into account all relevant information and made reasonable assumptions around the rate of disconnections and new connections.
- The reasonableness of JGN's adjustments to gas usage per customer (in the residential and commercial sections of its network), and whether JGN has considered relevant information and made reasonable assumptions when adjusting this figure from the historically observed rate.
- ACIL Allen has also been asked to provide advice on alternative inputs and assumptions in the demand forecast where ACIL Allen has considered JGN's underlying assumptions and inputs to be unreasonable.

This report is set out as follows:

- Section 2 reviews CORE Energy's revised forecasts of JGN's gas demand and customer numbers over the next Access Arrangement period.
- Section 3 presents a revised set of gas demand and customer number forecasts after incorporating a number of changes based on our assessment of the reasonableness of Core's revised forecasts.

2 Review of CORE Energy methodology and approach

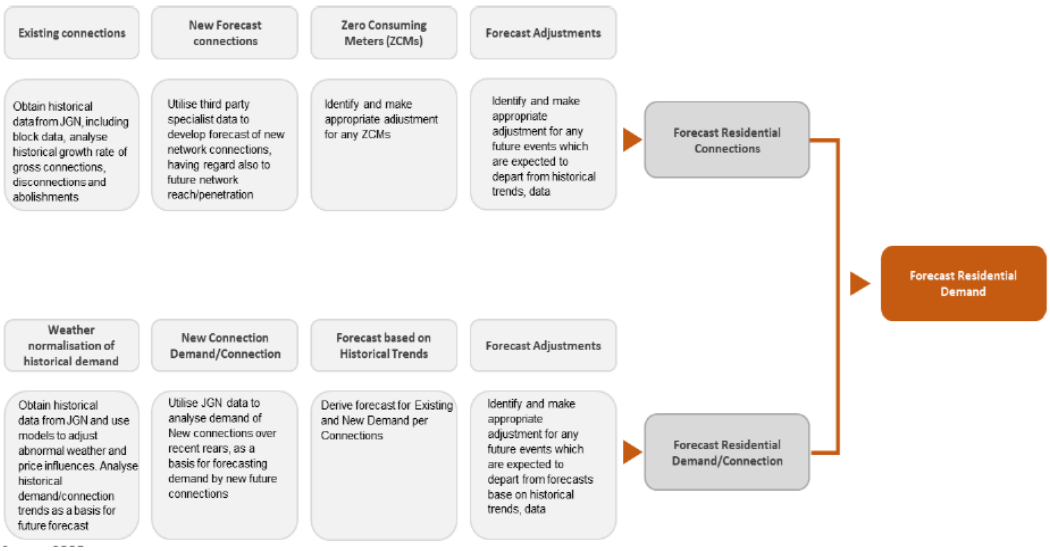
This section describes and reviews the methodology and approach adopted by CORE Energy and Resources in forecasting residential and small business gas demand and customer numbers for JGN.

2.1 Residential demand and customer numbers

Overview

CORE approaches the problem of forecasting residential demand by separately modelling the average demand per connection and the number of residential connections. The product of the two sets of forecasts gives the total residential demand. **Figure 2.1** below from CORE's report[1] dated 17 April 2024 shows the separate components involved in the forecasting methodology.

Figure 2.1 Overview of residential demand forecasting methodology



Source: CORE Energy and Resources

[1] CORE Energy, Jemena Gas Networks (NSW) Gas Access Arrangement, July 2025 to 30 June 2030, 17 April 2024.

2.2 Residential demand and customer numbers

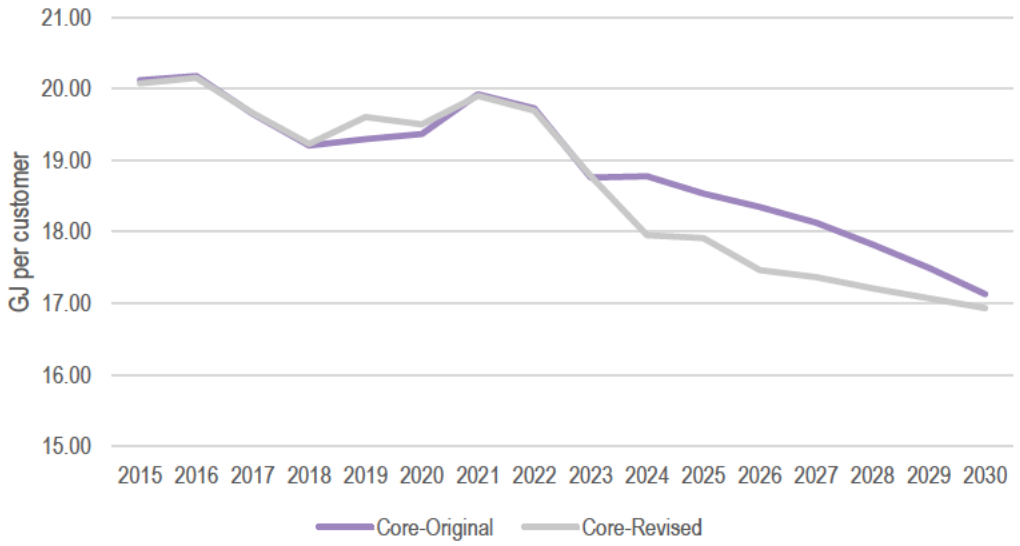
Demand per connection

The demand per connection is calculated by dividing the total residential gas usage in a given financial year by the average number of residential customers in the same financial year. The average number of customers is calculated as the average of the opening and closing customer numbers in that period. Total connections are driven by new connections to the network and disconnections from the network.

CORE apply an annual rate of decline in residential demand per connection that is based on historical data. The base rate of decline is 0.82% per annum. CORE apply this rate of decline in every year of the next regulatory period. Moreover, there is an additional downward adjustment which is due to electrification. In 2026 it amounts to 0.015 GJ per connection and rises steadily to reach 0.03 GJ per connection by 2030.

Figure 2.2 shows the original Core residential demand per connection forecast against the forecast submitted in JGN's revised submission. The figure shows that the forecast has been adjusted downwards to reflect a significant decline in the actual weather corrected demand per connection of 17.95 GJ per connection compared to the original 2024 forecast of 18.78 GJ per connection.

Figure 2.2 Demand per connection forecasts, CORE Energy, original versus revised



Source: CORE Energy

ACIL Allen considers that a downward adjustment in the starting point for the demand per connection is reasonable given the decline in actual demand in 2024. However, it is important to recognise that the decline in demand per connection in 2024 may be driven by factors other than a structural shift away from gas towards electric appliances. The historical data series used by CORE only corrects for weather variation over time. It does not incorporate factors such as the decline in real disposable incomes over the last few years and cost of living pressures which are likely to add a cyclical component to the decline in demand per connection in 2024. Moreover, the lower demand may be partly attributable to non-weather related randomness.

It is ACIL Allen's view that the appropriate 2025 starting point for demand per connection is not the 2024 actual weather corrected demand, but some combination of the 2024 actual and the point on the fitted trend line. However, it is also reasonable to assume that the lower observed demand in 2024 is partly driven by a

structural shift away from gas towards electric appliances. For this reason, we propose that the 2025 starting point be derived from both the 2024 actual and the predicted demand from the fitted long run linear trend line applying a 50% weight to each. ACIL adopt this approach in the next section to derive an alternative set of demand per connection forecasts.

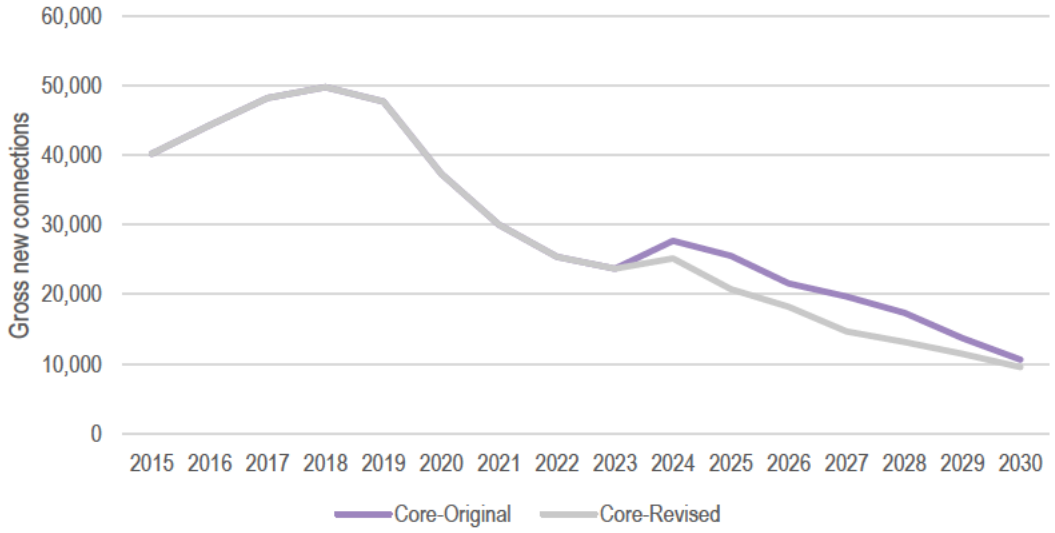
Number of gross connections

Customer numbers are disaggregated into existing connections, new forecast connections and disconnections from the network in any given year. New connections are a function of the number of dwelling completions and the market penetration rate of those new completions.

Housing completions are derived from HIA's forecasts of NSW dwelling commencements. They are split into multi dwelling developments and detached houses. Commencements are subject to two separate lag factors to capture those commencements that are completed within 12 months and those completed within 12 and 24 months.

CORE's revised forecasts of residential gross connections were adjusted downwards, citing a downward revision in HIA's dwelling commencement forecasts. **Figure 2.3** below shows CORE's original residential gross new connection forecasts and their revised forecast. The figure shows that CORE have adjusted the new connections forecast significantly downwards. Over the next regulatory period from 2025 to 2030, CORE have reduced the total number of connections by a cumulative sum of 20,692 connections. In percentage terms the average annual decline in new connections between the original and revised forecasts is 18.5%. Over the full five-year period, the revised gross new connections are 19.1% fewer than the original.

Figure 2.3 Gross new connections, CORE Energy, original versus revised



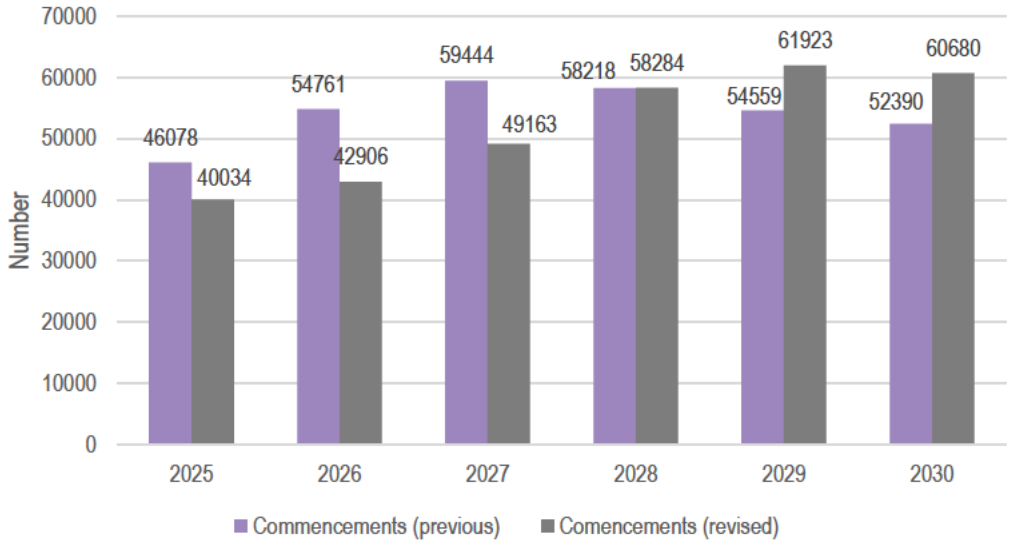
Source: CORE Energy

CORE adopted an approach consistent with its methodology used for its original forecast, using an updated forecast of HIA dwelling commencements as the basis for its adjustment. **Figure 2.4** shows the 12-month lag of the HIA's previous and updated dwelling commencements forecasts. **Figure 2.5** and **Figure 2.6** split the HIA's dwelling commencements into detached and multi-unit developments respectively.

The lagged HIA forecasts of dwelling commencements have been revised lower in 2025, 2026 and 2027 for multi-unit developments and total dwelling commencements, are unchanged in 2028, and are revised higher

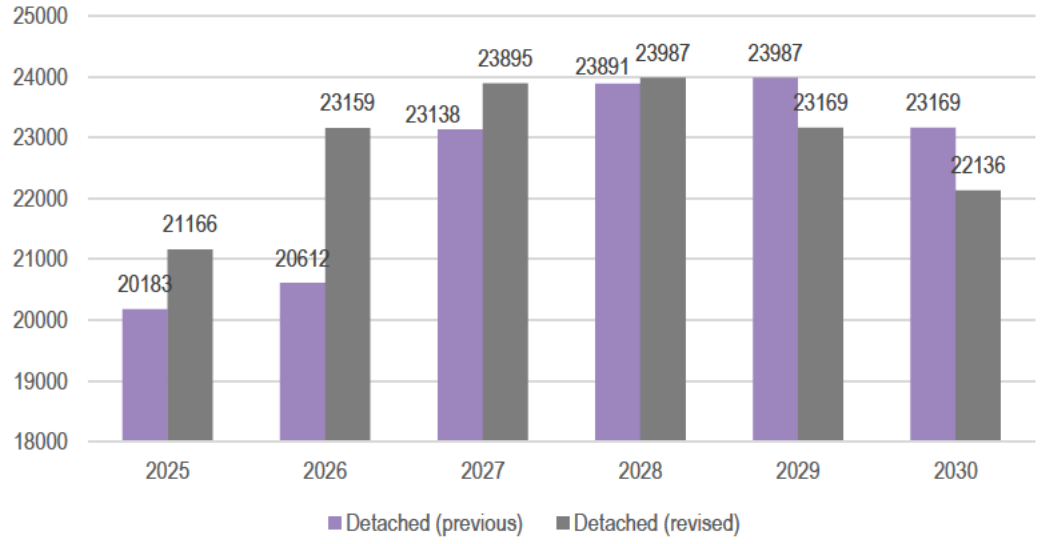
again in 2029 and 2030 (see **Figure 2.7**). For detached dwelling commencements, HIA's forecasts have been adjusted higher between 2025 and 2027 inclusive, before being been reduced in 2029 and 2030.

Figure 2.4 HIA dwelling commencements (lagged by 12 months), previous versus revised



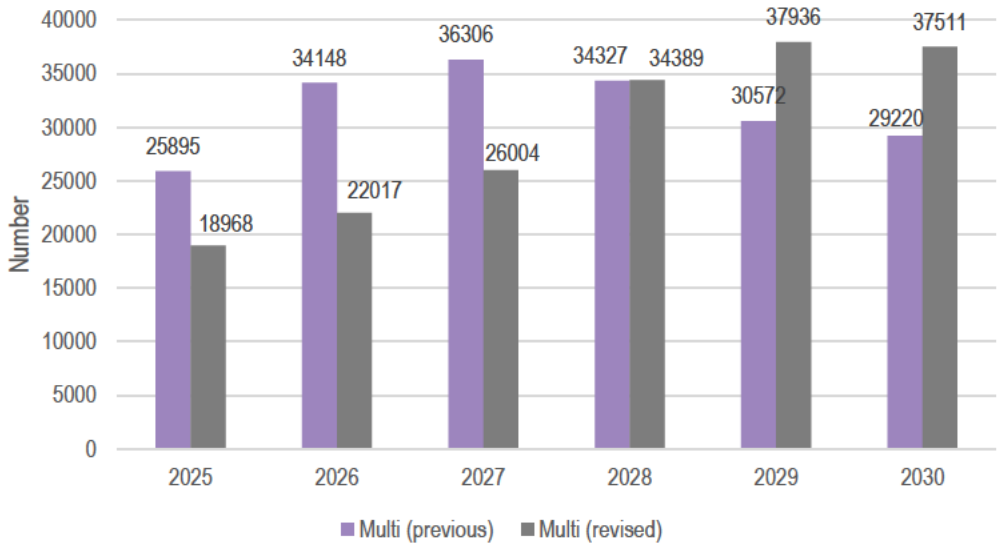
Source: CORE Energy

Figure 2.5 HIA detached dwelling commencements (lagged by 12 months), previous versus revised



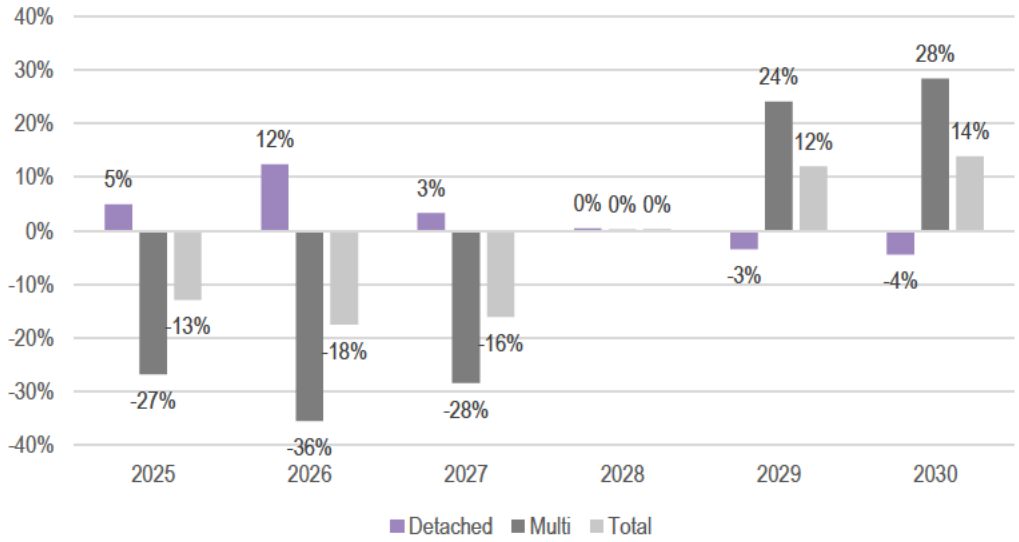
Source: CORE Energy

Figure 2.6 HIA multi-unit dwelling commencements (lagged by 12 months), previous versus revised



Source: CORE Energy

Figure 2.7 Percentage change in HIA's forecast dwelling commencements (lagged) between JGN's initial and revised submission



Source: ACIL Allen calculations based on HIA data

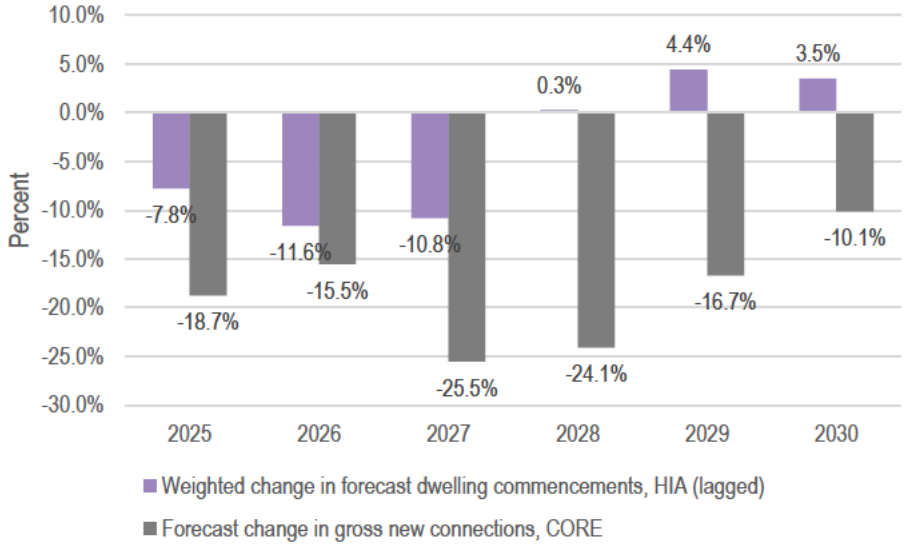
ACIL Allen analysed the change in CORE Energy's change in residential connections between the initial and revised submission by comparing the change in residential connections with the change in HIA's lagged dwelling commencements. In our view, the downward revision to new residential connections is not consistent with the revised HIA forecasts.

Figure 2.8 shows the change in new connections forecast between CORE's initial and revised forecasts against the change in HIA's revised dwelling commencements forecasts (lagged by 12 months). HIA's forecasts are presented as a weighted average of the percentage change in its detached and multi-unit development forecasts. The weights are created using the projected breakdown of CORE's annual new connections into detached and multi-unit dwellings.

It is evident from **Figure 2.9** that CORE's revised residential connections forecasts have been revised to be significantly lower than justified by HIA's adjustment to its dwelling commencement numbers. Over the next regulatory period, CORE have reduced its annual residential connections forecasts by an average of 18.5%, while HIA's average reduction is only 3.7%. Based on HIA's revisions, CORE's forecasts should be declining between 2025 and 2027, before increasing slightly between 2028 and 2030.

ACIL Allen therefore considers it appropriate for an adjustment to be made to CORE's revised residential connections forecast.

Figure 2.8 Change in gross connections forecast (CORE) versus weighted average change in lagged dwelling commencements (HIA)



Source: ACIL Allen calculations

Number of disconnections

CORE has developed its residential disconnection forecasts based on following three factors:

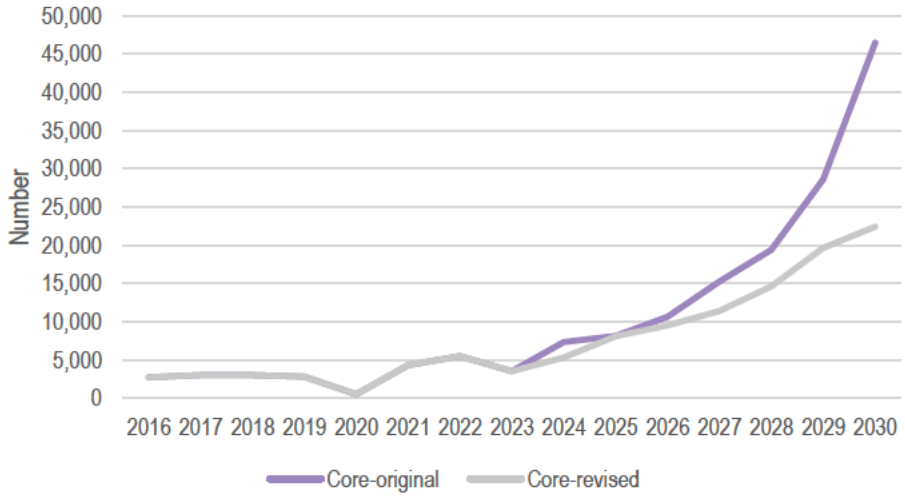
- The historical base percentage of opening connections observed to the end of 2024.
- The historical growth rate in disconnections as a percentage of opening connections over time
- Future growth in disconnections because of electrification trends

CORE Energy have revised the trajectory of disconnections and abolishments to reflect a slower rate of increase over the next regulatory period.

Figure 2.9 below shows the original and revised forecast disconnections and abolishments over the next regulatory period.

By 2030, CORE have reduced the number of disconnections and abolishments from 46,482 to 22,430. ACIL Allen considers that the revised set of forecasts of disconnections represent a more reasonable scenario going forward. We therefore recommend that the AER accepts the revised disconnection and abolishment forecasts without amendment.

Figure 2.9 Net disconnections and abolishments, CORE Energy, original versus revised



Source: CORE Energy

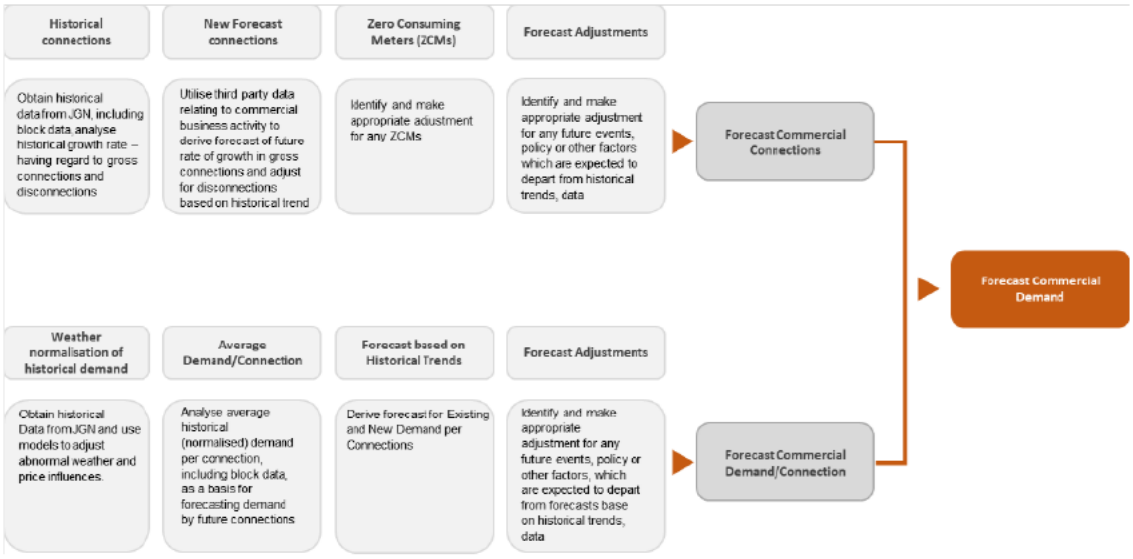
2.3 Small business gas demand and customer numbers

Overview

The approach taken to small business demand and customer numbers is similar to that taken for the residential customer class. Just like the residential sector, small business demand forecasts are generated by the product of forecast demand per connection and forecast customer numbers.

Figure 2.10 below is a summary diagram that CORE include in their forecasting report summarises the steps involved.

Figure 2.10 Overview of small business demand forecasting methodology



Source: CORE Energy

Demand per connection

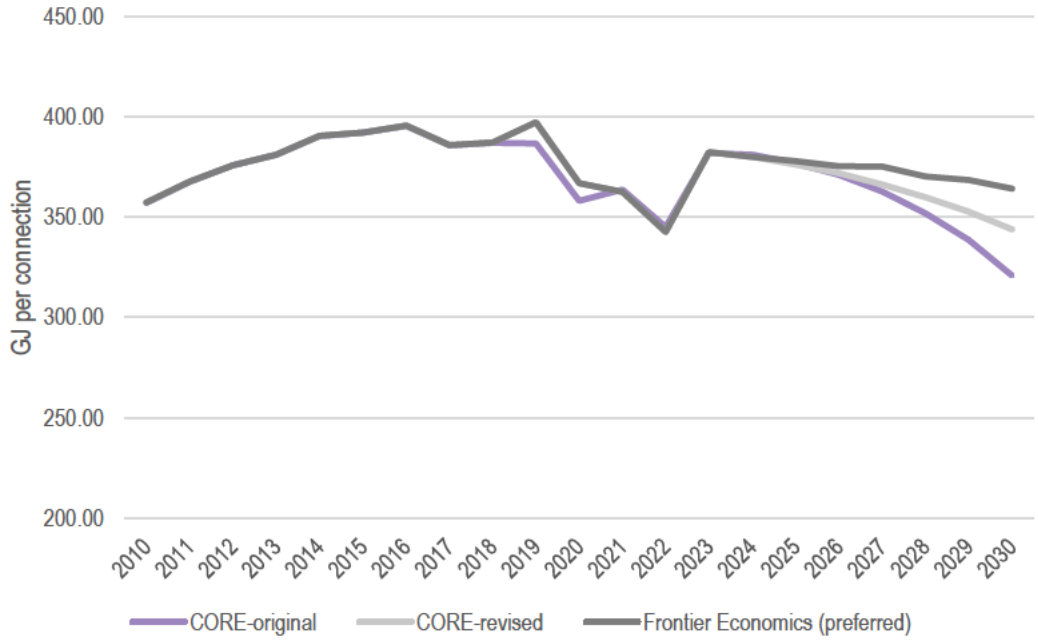
Demand per connection for the small business category is also driven by the rate of historical change in the weather normalised demand per connection that is adjusted based on CORE Energy's judgement and analysis.

Figure 2.11 below shows CORE's original and revised small business demand per connection forecast to 2030. CORE has revised its original forecast upwards in response to ACIL Allen's review. Between 2025 and 2030, CORE's revised small business demand per connection forecast shows an annualised rate of decline of 1.78% per annum compared to its original forecast which was projected to decline at an annualised rate of 3.16% per annum over the same period. By 2030, CORE is now projecting demand per connection to decline from 380.0 GJ per connection to 343.9 GJ in 2030.

JGN engaged Frontier Economics to review the AER's draft decision of JGN's demand forecasts. As part of this review, Frontier reviewed and compared ACIL Allen's alternative forecasts to CORE's and provided a set of alternative forecasts. Frontier's preferred regression model produced an alternative forecast for small business demand per connection which is also shown in **Figure 2.11**. Under the Frontier preferred model, demand per connection declines at an annualised rate of 0.73% per annum, reaching 364.1 GJ per connection in 2030.

The historical trend in demand shows a strong uptrend between 2010 and 2016, before stabilising between 2017 and 2019. From 2020 to 2022, the data is affected by the Covid pandemic. In our view, the historical decline in small business per connection after 2018 supports Frontier's trajectory over that of CORE's revised forecast. Between 2019 and 2024, the annualised rate of decline in demand per connection was 0.88% per annum. If we take 2018 as the starting point the rate of decline reduces to 0.31%. These rates of historical decline are more in line with Frontier's proposed forecast trajectory than CORE's. For this reason, ACIL Allen recommends that Frontier's preferred model forecasts be adopted as an alternative.

Figure 2.11 Small business demand per connection, CORE Energy, original versus revised



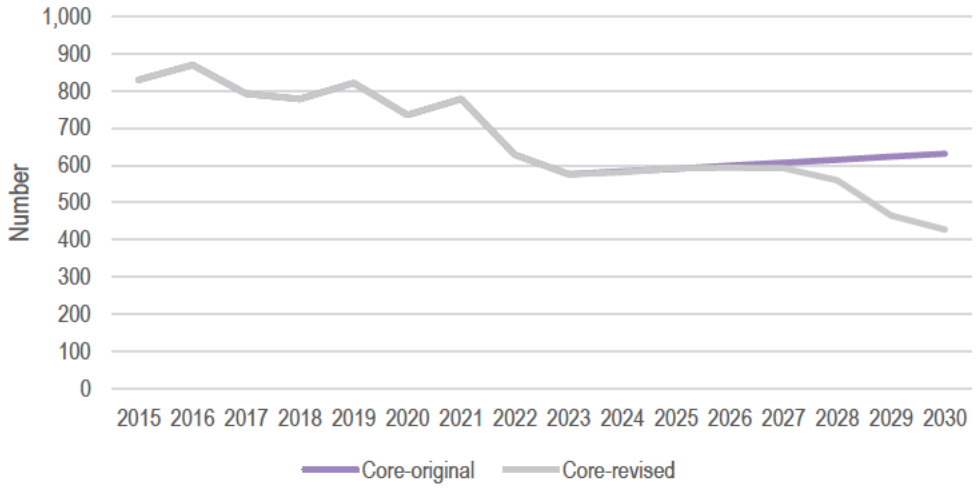
Source: CORE Energy and Frontier Economics

Number of connections

Customer number forecasts are determined by new connections and disconnections from the network. These are based on historical rates of connection and disconnection that are adjusted in the forecast period based on CORE Energy's expert judgement.

Figure 2.12 shows CORE's original and revised forecast gross small business connections to the JGN network. From 2018 to 2024, there were an average of 700 new connections every year. New connections commenced a downward trajectory after 2019, falling from 821 to a low of 581 in 2024. CORE then project a decline off this low base, with an average forecast of 538 new connections between 2025 and 2030.

Figure 2.12 Gross small business connections, CORE Energy, original versus revised



Source: CORE Energy

ACIL Allen considers CORE's revised gross small business connection forecasts to be reasonable. The forecasts and the lower projected levels are consistent with CORE's analysis.

ACIL Allen do not propose an alternative set of connection forecasts in this instance.

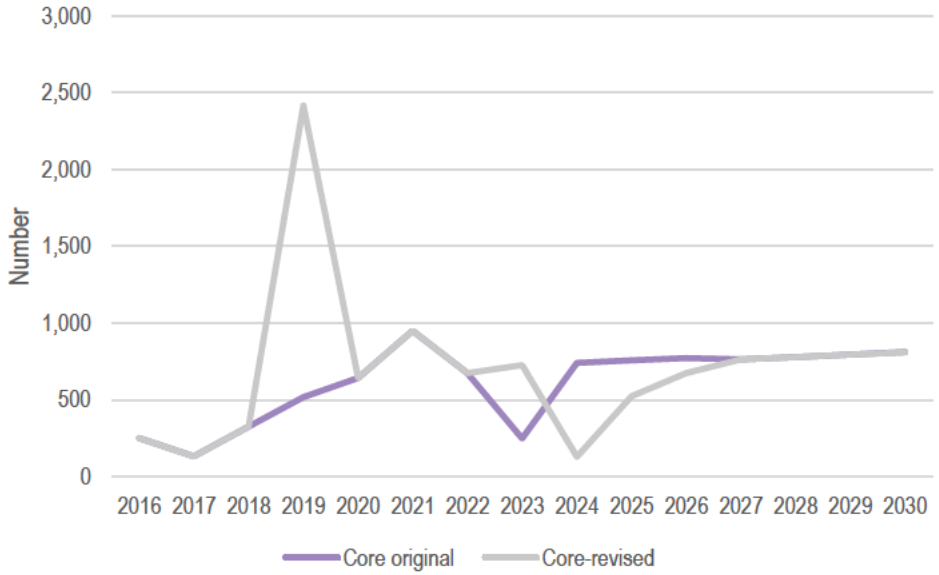
Number of disconnections

CORE's original and revised forecasts of small business disconnections are shown against historical disconnections in **Figure 2.13** below. CORE's revised forecasts of small business disconnections increase gradually from 525 in 2025 to 811 in 2030. Over the six-year period to 2030, CORE forecasts an average of 725 small business disconnections from JGN's network. Between 2020 and 2024, the average number of disconnections was 625.

CORE is projecting a slightly higher level of disconnections relative to the recent past. ACIL Allen considers the small business disconnection forecasts to be reasonable. They are higher than those observed historically, but they increase in a steady and orderly fashion and do not deviate substantially from the numbers of disconnections that have been observed in the past.

ACIL Allen do not consider that an alternative set of disconnection forecasts are required in this case.

Figure 2.13 Small business disconnections, CORE Energy, original versus revised



Source: CORE Energy

3 Revised gas demand and customer number forecasts

In this section we present the revised residential demand per connection, revised residential disconnections and revised small business demand per connection forecasts.

3.1 Revised residential demand per connection

Methodology

As discussed in section 2.2, ACIL Allen argued that a suitable starting point for the forecasts is some point between the observed actual in 2024 and the fitted point from a fitted regression model. This approach recognises that the low demand per connection figure in 2024 is partially driven by a structural shift in demand and partially driven by recent economic factors. A conservative weighting for each of 50% was considered reasonable.

The model fitted to the historical data was a simple linear trend with a dummy variable accounting for covid in 2020 and 2021. The units are in GJ/per annum, and the annual average decline in residential consumption per customer declines by 0.17 GJ per year.

It was not necessary to correct for weather related variation in usage because the base level historical data had already been weather normalised by CORE Energy using their method. ACIL Allen took the weather normalised data as a starting point, so it was not necessary to make any additional adjustments or corrections for weather.

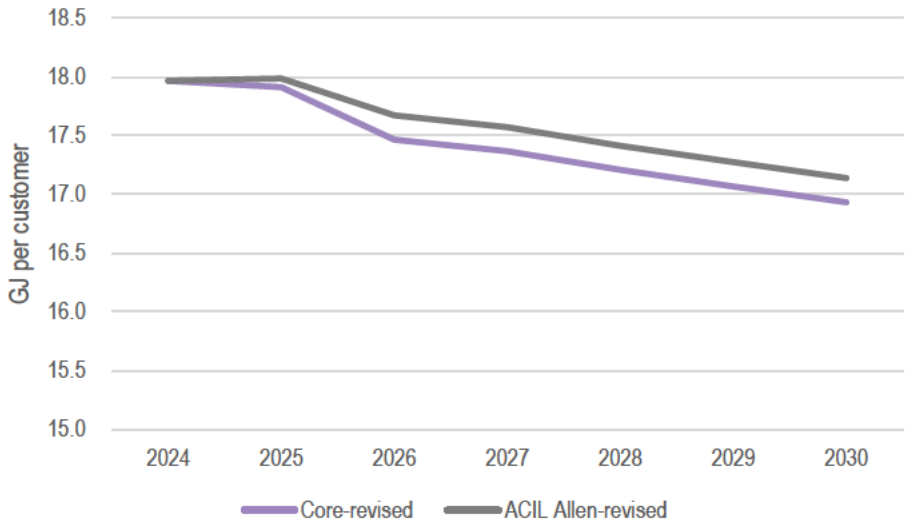
Results

Figure 3.1 shows the amended residential demand per connection projection alongside CORE Energy's original forecast.

Under our projection, residential demand per connection is projected to decline by -0.96% per annum over the period from 2025 to 2030, reaching 17.14 GJ per connection in 2030. This decline is only slightly slower than CORE Energy's forecast decline of 1.12% per annum over the same period.

Under CORE Energy's revised forecasts, residential demand per connection falls to 16.93 GJ by 2030. By 2030, the ACIL Allen adjusted forecast lies just 1.2% above CORE Energy's revised forecast. Both CORE's revised and ACIL Allen's adjusted forecast lie significantly below their original forecasts, reflecting the considerable decline in demand per connection in 2024.

Figure 3.1 Residential demand per connection, CORE revised versus alternative, GJ per connection



Source: ACIL Allen and CORE Energy

Table 3.1 Residential demand per connection, CORE revised versus alternative, GJ per connection

Year	CORE revised	ACIL Allen revised	% Difference
2024	17.97	17.97	0.0%
2025	17.91	17.99	-0.4%
2026	17.46	17.67	-1.2%
2027	17.37	17.57	-1.1%
2028	17.21	17.41	-1.2%
2029	17.07	17.27	-1.2%
2030	16.93	17.14	-1.2%
Annualised rate of change (2024-2030)	-0.98%	-0.78%	
Annualised rate of change 2025-2030	-1.12%	-0.96%	

Source: ACIL Allen and CORE Energy

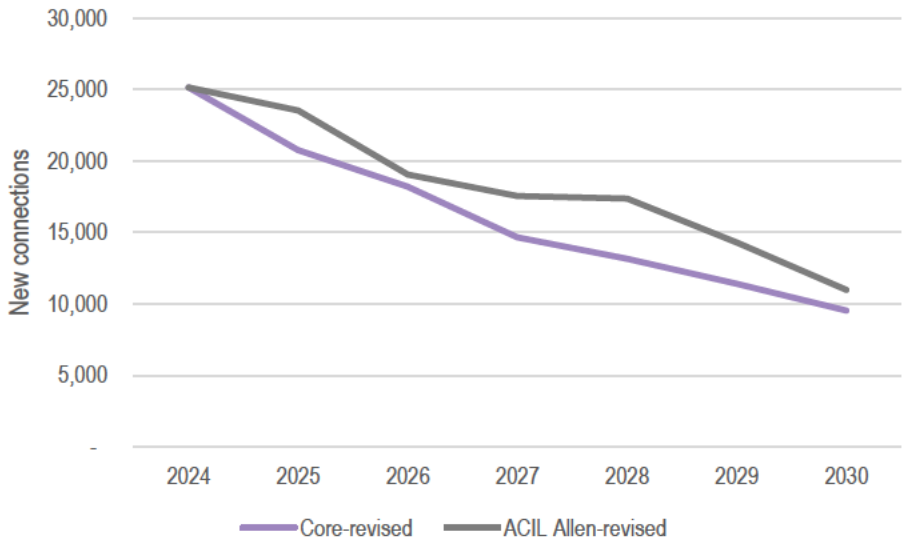
3.2 Revised residential customer gross new connections

In section 2.2, we compared the revised CORE residential gross connection forecasts against the change in the 12-month lag of HIA's dwelling commencement forecasts and concluded that the change in CORE's residential gross connections forecasts were not justified by the change in HIA's dwelling commencement projections over the next regulatory period.

To correct for this inconsistency, ACIL Allen have adjusted CORE Energy's original forecasts in proportion to the change in the 12-month lag of HIA's dwelling commencement forecasts. The HIA detached and multi - unit forecast changes were combined into a single annual change using the detached and multi-unit forecast residential connections as weights.

The results are shown below in **Figure 3.2** and **Table 3.2**. From 2025 to 2030, CORE forecast a total of 87,727 new residential connections. ACIL Allen's adjustment results in a total of 102,841 new residential connections.

Figure 3.2 Residential gross connections, CORE revised versus ACIL Allen alternative



Source: ACIL Allen and CORE Energy

Table 3.2 Residential gross connections, CORE revised versus ACIL Allen alternative

Year	CORE revised	ACIL Allen revised	% Difference
2024	25,148	25,148	0.0%
2025	20,746	23,542	-11.9%
2026	18,208	19,054	-4.4%
2027	14,662	17,562	-16.5%
2028	13,153	17,382	-24.3%
2029	11,418	14,313	-20.2%
2030	9,539	10,988	-13.2%
Annualised rate of change (2024-2030)	-14.92%	-12.89%	
Annualised rate of change 2025-2030	-14.39%	-14.13%	

Source: ACIL Allen and CORE Energy

3.3 Revised small business demand per connection

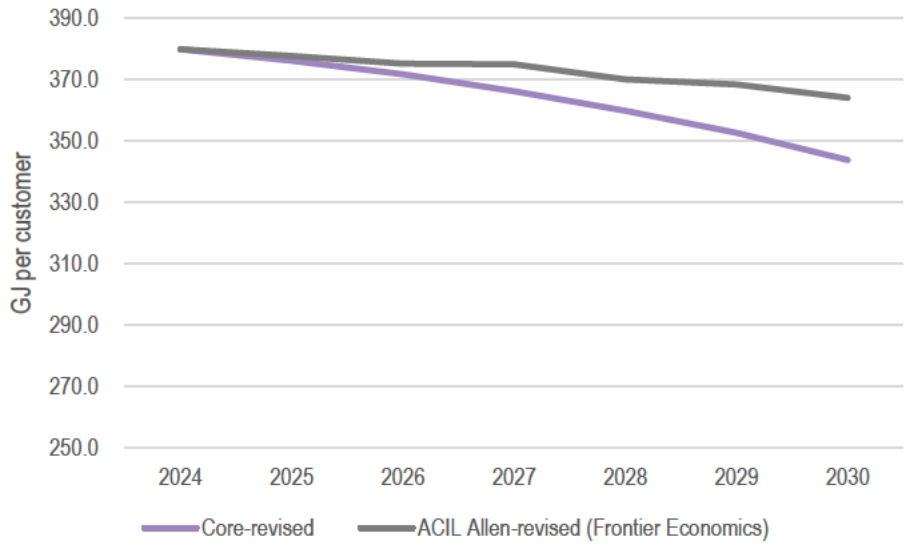
In section 2.3 ACIL Allen argued that the Frontier Economics preferred forecasts which were generated as part of their review of the AER draft decision were more plausible than CORE's when considering the recent historical behaviour of small business demand per connection. The two sets of forecasts are presented below.

Results

Under CORE's revised forecasts, small business demand per connection is projected to decline from 380 GJ in 2024 to 343.9 GJ in 2030. This is equivalent to an annual decline of 1.8% per annum from 2025 to 2030. Small business demand per connection is forecast to be 364.1 GJ in 2030 under the alternative forecasts. By 2030, the alternative forecast lies 5.6% above CORE Energy's revised forecast.

As we have stated previously, we consider that this a more reasonable trajectory of decline than that proposed by JGN. The results are shown in **Figure 3.3** and **Table 3.3**.

Figure 3.3 Small business demand per connection, CORE revised versus alternative, GJ per connection



Source: ACIL Allen and CORE Energy

Table 3.3 Small business demand per connection, CORE revised versus alternative, GJ per connection

Year	CORE-revised	ACIL Allen-revised (Frontier Economics)	% Difference
2024	379.98	379.98	0.0%
2025	376.18	377.79	-0.4%
2026	371.85	375.25	-0.9%
2027	366.27	375.07	-2.3%
2028	359.86	370.20	-2.8%
2029	352.67	368.51	-4.3%

Year	CORE-revised	ACIL Allen-revised (Frontier Economics)	% Difference
2030	343.85	364.13	-5.6%
Annualised rate of change (2024-2030)	-1.65%	-0.71%	
Annualised rate of change 2025-2030	-1.78%	-0.73%	

Source: ACIL Allen and CORE Energy

3.4 Total revised residential demand and customer number forecasts

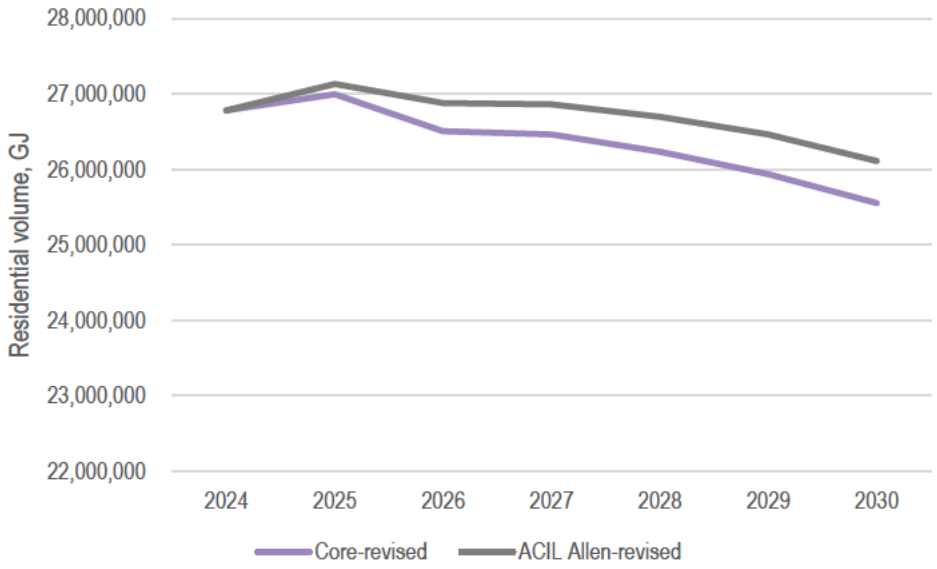
Demand

In this section, we present the revised residential demand and customer number forecasts incorporating ACIL Allen's amendments to customer connections and residential demand per connection.

Figure 3.4 and **Table 3.4** below present ACIL Allen's alternative residential demand forecasts against CORE Energy's revised forecasts.

Under CORE's revised forecasts, residential demand is forecast to decline from 26.78 million GJ in 2024 to 25.55 million GJ in 2030, equating to an annualised decline of 1.1% per annum over the 5-year period from 2025 to 2030. ACIL Allen's amended forecasts follow a more modest decline, reaching 26.11 million GJs in 2030. This is equivalent to an annualised decline of 0.76% per annum. By 2030, ACIL Allen's amended forecasts are 2.1% higher than CORE Energy's revised forecast.

Figure 3.4 Residential demand, CORE revised versus alternative, GJ



Source: ACIL Allen and CORE Energy

Table 3.4 Residential demand, CORE revised versus alternative, GJ

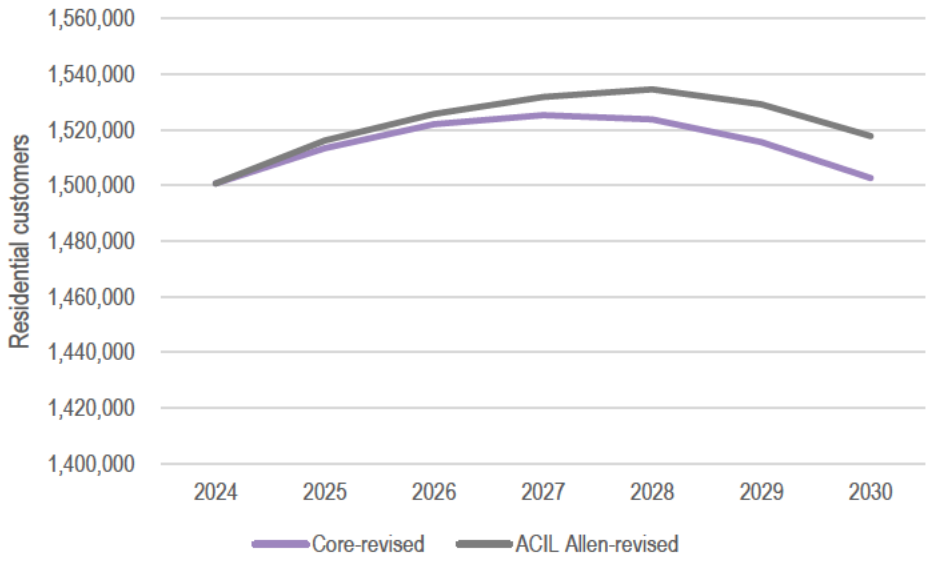
Year	CORE revised	ACIL Allen revised	% Difference
2024	26,777,580	26,777,580	0.0%
2025	26,993,854	27,130,057	-0.5%
2026	26,504,264	26,876,704	-1.4%
2027	26,462,334	26,859,444	-1.5%
2028	26,232,747	26,695,145	-1.7%
2029	25,937,406	26,461,122	-2.0%
2030	25,552,391	26,109,722	-2.1%
Annualised rate of change (2024-2030)	-0.78%	-0.42%	
Annualised rate of change 2025-2030	-1.09%	-0.76%	

Source: ACIL Allen and CORE Energy

Customer numbers

ACIL Allen's amended residential customer forecasts are expected to increase by 0.02 per cent per annum over the period from 2025 to 2030, reaching 1.518 million customers (see **Table 3.5**). This is 1.0% higher than CORE Energy's forecast which declines by -0.14% per annum over the same period. The higher ACIL Allen forecast reflects the upward adjustment in residential connections over the period. Residential disconnections were not amended, and CORE Energy's numbers were retained.

Figure 3.5 Residential customer numbers, CORE revised versus alternative, Number



Source: ACIL Allen and CORE Energy

Table 3.5 Residential customer numbers, CORE revised versus alternative, Number

Year	CORE revised	ACIL Allen revised	% Difference
2024	1,500,703	1,500,703	0.0%
2025	1,513,345	1,516,141	-0.2%
2026	1,522,019	1,525,661	-0.2%
2027	1,525,266	1,531,807	-0.4%
2028	1,523,777	1,534,546	-0.7%
2029	1,515,538	1,529,203	-0.9%
2030	1,502,648	1,517,761	-1.0%
Annualised rate of change (2024-2030)	0.02%	0.19%	
Annualised rate of change 2025-2030	-0.14%	0.02%	

Source: ACIL Allen and CORE Energy

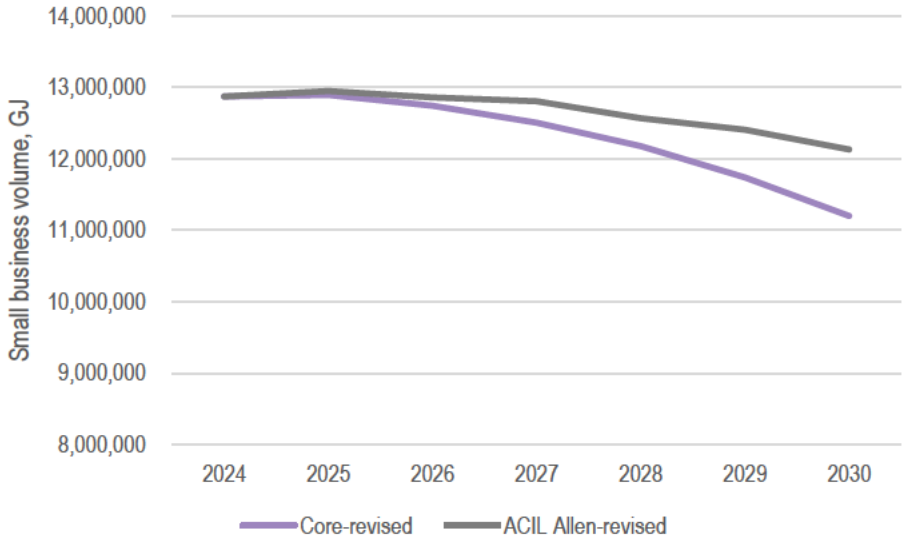
Small Business

Demand

Figure 3.6 and **Table 3.6** below present the alternative small business demand forecasts against CORE Energy's revised forecasts. It can be observed from the figure that the two sets of forecasts are closely aligned up to the end of 2026, before diverging.

ACIL Allen's revised small business demand forecasts decline at a rate of 1.3% per annum between 2025 and 2030, reaching 12.13 million GJ's of gas, compared to 11.20 million GJ's under CORE's revised forecasts. By 2030 ACIL Allen's revised forecasts exceed CORE Energy's original forecasts by 7.7%. This is due to the upward adjustment made to the demand per connection projections as well as a small upward adjustment to Small business customer numbers discussed in the following section.

Figure 3.6 Small business demand, CORE revised versus alternative, GJ



Source: ACIL Allen and CORE Energy

Table 3.6 Small business demand, CORE revised versus alternative, GJ

Year	CORE revised	ACIL Allen revised	% Difference
2024	12,871,981	12,871,981	0.0%
2025	12,893,351	12,948,633	-0.4%
2026	12,742,457	12,858,931	-0.9%
2027	12,505,099	12,805,431	-2.3%
2028	12,176,588	12,566,933	-3.1%
2029	11,739,460	12,408,416	-5.4%
2030	11,200,869	12,131,153	-7.7%
Annualised rate of change (2024-2030)	-2.29%	-0.98%	
Annualised rate of change 2025-2030	-2.78%	-1.30%	

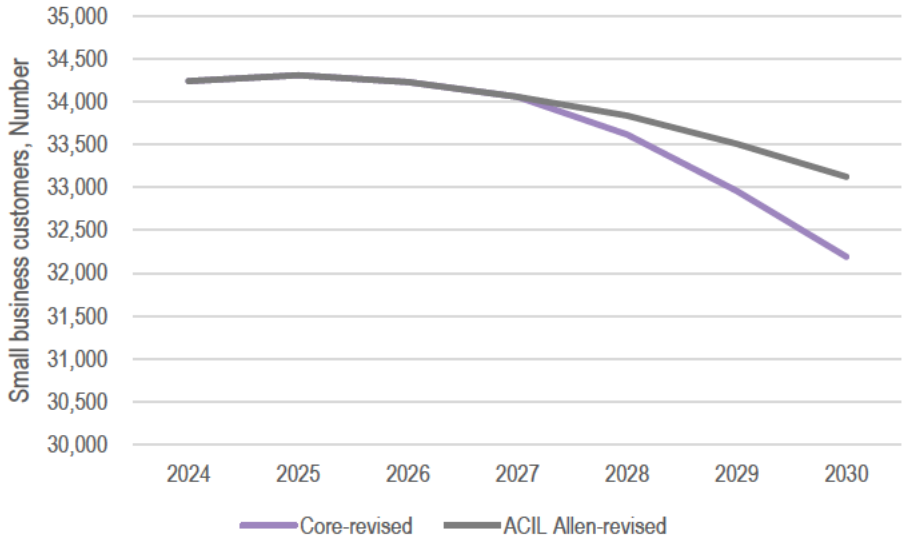
Source: ACIL Allen and CORE Energy

Customer numbers

ACIL Allen accepted both CORE's revised small business connections and disconnections forecasts. However, due to an error in CORE's forecast model which incorrectly double counts the number of net connections in 2028, 2029 and 2030, CORE underestimate the total number of small business customers by approximately 1,000 customers in 2030.

Figure 3.7 and **Table 3.7** show the corrected small business customer numbers forecasts. By 2030, Small business customers are expected to reach 33,124; 2.8% higher than CORE's revised forecast.

Figure 3.7 Small business customer numbers, CORE revised versus alternative, Number



Source: ACIL Allen and CORE Energy

Table 3.7 Small business customer numbers, CORE revised versus alternative, Number

Year	CORE revised	ACIL Allen revised	% Difference
2024	34,241	34,241	0.0%
2025	34,308	34,308	0.0%
2026	34,227	34,227	0.0%
2027	34,056	34,056	0.0%
2028	33,617	33,837	-0.6%
2029	32,958	33,507	-1.6%
2030	32,192	33,124	-2.8%
Annualised rate of change (2024-2030)	-1.02%	-0.55%	
Annualised rate of change 2025-2030	-1.27%	-0.70%	

Source: ACIL Allen and CORE Energy