DRAFT DECISION
Jemena Gas Networks (NSW) Ltd
Access Arrangement

2020 to 2025

Attachment 12
Demand

November 2019

AUSTRALIAN ENERGY REGULATOR

Inquiries about this publication should be addressed to:

Australian Energy Regulator
GPO Box 520
Melbourne Vic 3001

Tel: 1300 585 165
Email: AERInquiry@aer.gov.au

AER reference: 63819

Note

This attachment forms part of the AER's draft decision on the access arrangement that will apply to Jemena Gas Networks (NSW) Ltd ('JGN') for the 2020–2025 access arrangement period. It should be read with all other parts of the draft decision.

The draft decision includes the following documents:

Overview

Attachment 1 – Services covered by the access arrangement

Attachment 2 – Capital base

Attachment 3 – Rate of return

Attachment 4 – Regulatory depreciation

Attachment 5 – Capital expenditure

Attachment 6 – Operating expenditure

Attachment 7 – Corporate income tax

Attachment 8 – Efficiency carryover mechanism

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Contents

Shortened forms

Shortened form	Extended form
ABS	Australian Bureau of Statistics
ACQ	Annual Contract Quantity
AER	Australian Energy Regulator
Capex	Capital expenditure
CD	Chargeable Demand
CORE	CORE Energy & Resources Pty. Limited
ENA	Energy Networks Australia
GFC	Global Financial Crisis
GJ	Gigajoule
GVA	Gross Value Add
HIA	Housing Industry Association of Australia
JGN	Jemena Gas Networks (NSW) Ltd
MDQ	Maximum Daily Quantity
NGL	National Gas Law
NGO	National Gas Objective
NGR	National Gas Rules
NSW	New South Wales
Opex	Operating expenditure
RIN	Regulatory Information Notice
RSA	Reference Service Agreement

12 Demand

This attachment sets out our assessment of the demand forecasts for JGN for the 2020–25 access arrangement period. Demand is an important input into the derivation of JGN's reference tariffs. It also affects operating expenditure (opex) and capital expenditure (capex), which are linked to network growth via new connections.[1]

12.1 Draft decision

Based on the information before us, we accept JGN's Tariff V demand forecasts for the 2020–25 access arrangement period as placeholders. We are satisfied that the overall demand forecasting methodology applied by JGN's consultant, CORE Energy & Resources (CORE), is consistent with rule 74(2) of the National Gas Rules (NGR).

However, our draft decision not to accept JGN's volume boundary meter strategy has a flow-on impact on demand forecasts, in particular forecast residential connection numbers.[2] Our alternative forecast of 117,068 net connections over the 2020–25 period is 9.5 per cent higher than JGN's forecast of 106,883 net connections.[3]

With respect to Tariff D, we are satisfied that forecast demand for Maximum Daily Quantity (MDQ) and Annual Contract Quantity (ACQ) for this tariff class is consistent with rule 74(2) of the NGR.

Based on the best information available at the time of our assessment, we accept JGN's demand and customer forecast in this draft decision. However, we consider the information provided to date is insufficient to justify our accepting the forecast in our final decision, and will not accept it in our final decision unless JGN provides further information as requested, for the following reasons:

- the 2018–19 actual data was not available for review at the time of the assessment
- the latest available Housing Industry Association of Australia (HIA) data has not yet been taken into account in JGN's forecast [4]
- it is not clear to us in the proposal what process and assumptions JGN undertook to derive the billing data for the purpose of determining the historical penetration rates
- although it appears to be a standard practice from previous forecasts, it is not clear to us in the proposal that a simple one year lag between HIA data and JGN connection remains appropriate in determining penetration rates during periods of significant upward or downward trend in construction activities.

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1 Our draft decisions on JGN's capex and opex are respectively at Attachments 5 and 6.

2 Our reasoning on volume boundary meters is at Attachment 1.

3 JGN, *Attachment 8.2 Demand Forecasting report*, June 2019, table 4.2, p. 38.

4 IR032: Core Energy relied on HIA housing forecasts from February 2019.

- JGN's concept of zero consuming meters requires clarification in several respects, including:
    - a description and definition of zero consuming meters
    - the difference between zero consuming meters as distinct from what we understand are disconnections
    - the source of this data, as well as the assumptions and adjustments JGN might have made in determining the proposed volume
    - potential overlap with other areas of the proposal, including the Reference Service Agreement (RSA) and meters with access difficulties
    - the overall appropriateness in making this adjustment in the demand and customer forecasts, and what alternatives were considered.

12.1.1 Additional information sought

We would like JGN in its revised proposal to:

- incorporate updated demand and customer forecast based on 2018–19 actual data, and the latest HIA data
- provide clarifications on the basis in which the billing data is derived including the source data and associated workings in a separate worksheet
- provide further clarifications on the accuracy of using a one year lag between HIA data and JGN connection, including the likely error margins to the penetration rates
- describe the concept of zero consuming meters, its application to the demand and customer forecast, how it differs from disconnections, its relationship with other areas in JGN's proposal, and the reasons it complies with the National Gas Objective (NGO)
- confirm the impact to the demand and customer forecast with and without JGN's volume boundary meter strategy in which individual hot water meters remain on offer for buildings with centralised hot water systems.

We recommend that JGN seek independent assurance on any updates to the demand and customer forecast as well as validating that the key inputs used in the demand and customer forecast are fit for purpose.

The reasons for our draft decision are discussed in Section 12.3.

12.2 JGN's proposal

12.2.1 Summary

JGN engaged CORE to prepare its demand forecasts for its NSW network for the 2020–25 access arrangement period. A summary of the key aspects of JGN's demand forecasts are set out in Table 12.1 (Tariff V – residential and commercial) and Table 12.2 (Tariff D – industrial)[5].

CORE made an adjustment to its forecasts in response to JGN's significant program to remove 'zero-consuming meters'. CORE's report describes 'zero-consuming meters' as meters with no associated demand arising from situations such as property vacancy and non-payment.[6] This adjustment is in addition to conventionally observed and understood disconnections.

Table 12.1 JGN demand forecasts for Tariff V for the 2020–25 access arrangement period

	2020–21	2021–22	2022–23	2023–24	2024–25
Residential connections [a]	22,681	20,944	20,353	20,813	22,092
Residential Demand (TJ)	26,586	26,886	27,113	27,333	27,551
Commercial connections	526	522	518	513	509
Commercial Demand (TJ)	13,092	13,176	13,235	13,256	13,289

Source: JGN Access Arrangement Information.[7]

Notes: a. these values include the impact of zero consuming meters.

Table 12.2 JGN demand forecasts for Tariff D for the 2020–25 access arrangement period

	2020–21	2021–22	2022–23	2023–24	2024–25
MDQ (GJ)	232	227	222	217	212
ACQ (GJ)	45,845	45,898	43,955	43,018	42,086

Source: JGN Access Arrangement Information.[8]

5 Tariff D is gas consumers who consume more than 10,000 gigajoule (GJ) per annum.

6 JGN, *Attachment 8.2 Demand Forecasting report*, June 2019, p.24.

7 JGN, *Attachment 8.2 Demand Forecasting report*, June 2019, table 4.1, table 4.2, table 5.1 and table 5.2.

Demand for Industrial customers (Tariff D) uses different approaches to forecast MDQ and ACQ for different industrial customers. MDQ is forecast based on forecast ACQ, accounting for additional underlying movements in MDQ relative to ACQ.

JGN forecast total residential demand to increase by around 0.90 per cent per year over the 2020–25 access arrangement period. This compares to an increase of 1.34 per cent per year growth in the current 2015–20 period.[9]

JGN forecast total commercial demand to increase by 0.38 per cent per year over the 2020–25 access arrangement period. This compares to a decrease of 1.12 per cent per year in the current 2015–20 period.

JGN forecast residential consumption per connection to decrease by 0.55 per cent per year over the 2020–25 access arrangement period. Similarly, commercial consumption per connection is expected to decrease by 0.96 per cent per year over the 2020–25 period. This compares to a decrease of 1.25 per cent per year and 2.59 per cent per year, respectively, in the current 2015–20 period.

JGN forecasts residential connections to increase by 1.45 per cent per year over the 2020–25 access arrangement period. Similarly, commercial connections are also forecast to increase by 1.34 per cent per year over the 2020–25 period. This compares to an increase of 2.64 per cent per year and 1.51 per cent per year, respectively, in the current 2015–20 period.

JGN forecasts industrial demand (MDQ and ACQ) to decrease by 2.18 per cent per year and 2.12 per cent per year, respectively, over the 2020–25 access arrangement period. This compares to a decrease of 3.54 per cent per year and 2.08 per cent per year, respectively, in the current 2015–20 period.

12.2.2 Forecast methodology

The forecasts for Tariff V gas demand were derived by multiplying the forecast of net customer numbers by the forecast consumption per connection.[10] This methodology was applied for both residential and commercial customer groups, albeit with different drivers.

As part of its forecast methodology, CORE has taken into account the impact of weather and price elasticities, and has adjusted connection number due to historical disconnections, electricity to gas conversion, volume boundary meters and zero consuming meters.[11]

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8 JGN, *Attachment 8.2 Demand Forecasting report*, June 2019, table 6.1 and table 6.2.

9 Noting that any comparison between the 2020–25 access arrangement period and the current period is a comparison between two forecasts, as 2018–19 and 2019–20 are estimates.

10 JGN, *Attachment 8.2 Demand Forecasting report*, June 2019, p. 23 and p. 24.

11 Ibid.

CORE's current methodology and model feature the following enhancements compared to its previous forecast:[12]

- increased data granularity and structure
- increased time series incorporate a substantial, recent macroeconomic event
- price elasticity that honours established econometric theory.

Forecasting of Tariff V connections numbers

CORE undertook a number of steps to forecast residential customer numbers in the 2020–25 access arrangement period:

- CORE used historical and forecast series from an independent third party for dwelling forecasts as the base (HIA)[13]
- CORE also undertook validation of the base data and trends using Australian Bureau of Statistics (ABS) data for dwelling approvals and dwelling commencements, as well as growth projections from NSW Treasury
- CORE then undertook a five year and 10 year average analysis of the historical billing data supplied by JGN to derive the forecast penetration rate[14]
- CORE then apportioned the network connected dwellings into single, medium density and high-rise dwellings using HIA dwelling type projections
- CORE also adjusted the connection numbers to take into account JGN's volume boundary strategy, on the assumption that the majority of new high-rise dwellings are expected to be supplied by a single boundary meter. This results in a reduction in the total residential connections, while the total number of connected dwellings remains the same
- CORE included new connections from electricity to gas conversions on existing dwellings based on historical billing data supplied by JGN.[15]

In addition to new residential connections, CORE also included changes to existing connections to forecast residential customer numbers in the 2020–25 period:

- CORE has forecast disconnections based on the historical average of disconnections as a percentage of the total connections at the commencement of each year [16]
- CORE has included a significant removal program and a new network policy to remove existing and future zero consuming meters from total residential connections.

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12 Ibid, p. 90.

13 JGN, *Attachment 8.1 Overview of JGN's Demand Forecast*, June 2019, p. 7.

14 JGN, *Demand Forecast Model*, June 2019, worksheet 'Res Conn Analysis', line 114.

15 Ibid, line 141.

16 JGN, *Attachment 8.2 Demand Forecasting report*, June 2019, p. 24.

Table 12.3 JGN residential connection forecasts for Tariff D

	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25
Opening Connections	1,353,889	1,366,847	1,396,854	1,419,534	1,440,478	1,460,831	1,481,644
New Estate Connections	24,201	22,464	18,935	17,742	17,360	17,805	18,945
Medium Density Connections	3,432	3,293	2,838	2,551	2,530	2,584	2,682
High Rise Individual Meters	11,178	7,924	4,352	3,818	3,779	3,881	4,063
High Rise Volume Boundary Meters	142	167	166	145	144	148	155
Electricity to Gas Conversion	4,000	4,000	4,000	4,000	4,000	4,000	4,000
Conventional Disconnections	-3,134	-2,814	-2,457	-2,058	-2,112	-2,164	-2,218
Zero Consuming Meter Disconnections	-26,861	-5,027	-5,153	-5,253	-5,348	-5,440	-5,535
Net Connections	**12,958**	**30,007**	**22,681**	**20,944**	**20,353**	**20,813**	**22,092**
Closing Connections	1,366,847	1,396,854	1,419,534	1,440,478	1,460,831	1,481,644	1,503,736

Source: JGN Access Arrangement Information.[17]

CORE has forecast small business customer numbers based on historical average new connections and disconnections in the 2020–25 period.[18]

[17] JGN, *Attachment 8.2 Demand Forecasting report*, June 2019, table 4.2.

[18] Ibid, p. 43.

Table 12.4 JGN small business connection forecasts for Tariff D

	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25
Opening Connections	36,022	36,534	37,043	37,569	38,090	38,608	39,121
New Connections	828	828	828	828	828	828	828
Disconnections	-315	-319	-302	-306	-310	--314	-318
Net Connections	**512**	**508**	**526**	**522**	**518**	**513**	**509**
Closing Connections	36,534	37,043	37,569	38,090	38,608	39,121	39,630

Source: JGN Access Arrangement Information[19]

Forecasting of Tariff V consumption per connection

CORE undertook a number of steps to forecast residential consumption per connection for the 2020–25 access arrangement period. CORE has:

- modelled and removed the impact of weather from the forecast[20]
- adjusted for the continued gains in energy efficiency and appliance substitution through the observation of historical trend[21]
- adjusted for gas price and electricity price related elasticities based on extensive third party analysis and review of previous price elasticity factors accepted by us [22]
- adjusted for zero consuming meters by reducing the total residential connections without any corresponding change in demand[23]
- considered macroeconomic variables and found the relationship between economic variables and residential demand is unreliable and not statistically significant. As such, the forecast exclude any additional economic variables.[24]

19 Ibid, table 5.2.
20 Ibid, p.20.
21 Ibid, p.39.
22 Ibid, p.40.
23 Ibid, p.38.
24 Ibid, p.40.

Table 12.5 JGN residential consumption per connection (GJ) forecasts for Tariff D

	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25
Existing 2017–18	19.6	19.3	19.2	19.2	19.1	19.1	19.0
New Connections Weighted Average [a]	4.8	10.0	12.6	13.7	14.2	14.4	14.5
Weighted Average Demand	**19.1**	**18.8**	**18.7**	**18.7**	**18.6**	**18.4**	**18.3**

Source: JGN Access Arrangement Information[25]

Notes: [a.] First year customers consume 29.3 per cent of their mature demand and second year customers consume 90.3 per cent based on historical average.

For commercial consumption per connection, CORE used statistical analysis similar to that which it used to forecast residential consumption per connection. The only difference is the absence of zero consuming meters and dwelling type variable because it is not applicable to commercial customers.

Table 12.6 JGN small business consumption per connection (GJ) forecasts for Tariff D

	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25
Existing 2017–18	370.6	361.4	359.1	357.6	355.3	352.0	348.9
New Connections Weighted Average [a]	68.1	152.2	198.9	223.5	238.7	248.6	256.1
Weighted Average Demand	**363.8**	**352.0**	**348.5**	**345.9**	**342.8**	**338.9**	**335.3**

Source: JGN Access Arrangement Information.[26]

Notes: [a.] First year customers consume 23.7 per cent of their mature demand and second year customers consume 81.6 per cent based on historical average.

Forecasting of Tariff D

CORE undertook a number of steps to forecast industrial customer demand in the 2020–25 access arrangement period: [27]

[25] Ibid, table 4.4.

[26] Ibid, table 5.3.

[27] JGN, *Attachment 8.1 Overview of JGN's Demand Forecast*, June 2019, p. 9 and p. 10.

- CORE used historical trends to forecast new connections and disconnections, taking into account known closures and customers expected to switch between Tariff D and Tariff V
- for the largest customers, CORE has forecast each customer individually based on publically available information, and JGN's ongoing correspondence with the customer
- for customers belonging to industrial sectors that demonstrate a statistical relationship with Gross Value Add (GVA), demand is forecast using a regression model of gas demand with GVA as a variable[28]
- for industrial sectors that exhibits a clear weather induced demand pattern, remove the impact of weather from the forecast
- for other customers that do not fall into the above groupings, an observed historical trend is used.

MDQ is forecast based on forecast ACQ, accounting for additional underlying movements in MDQ relative to ACQ. Chargeable demand (CD) is forecast based on the historical relationship between MDQ and demand on the ninth highest demand day.

Table 12.7 JGN industrial demand (GJ) and closing connections forecasts for Tariff D

	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25
MDQ	241,541	236,695	232,101	227,472	222,298	217,452	212,498
MDQ (9th Highest)	194,408	189,983	186,826	183,053	179,069	175,229	171,355
ACQ	47,896,975	46,563,806	45,845,197	44,898,001	43,955,208	43,018,111	42,086,222
Closing Connections	400	414	428	420	412	404	396

Source: JGN Access Arrangement Information.[29]

12.3 Assessment approach

Rule 74(2) of the NGR requires forecasts in access arrangement proposals to be arrived at on a reasonable basis, and to represent the best forecast possible in the circumstances. Based on all the information before us, we are satisfied that JGN's forecasts for Tariff V demand are consistent with rule 74(2) of the NGR for the purpose

[28] Gross Value Add refer to the economic output of an economic sector measured and published by the ABS.

[29] JGN, *Attachment 8.2 Demand Forecasting report*, June 2019, table 6.1, table 6.2 and table 6.3.

of the draft decision. This is because we accept CORE's overall methodology to forecast demand.

However, we would not accept the same forecast demand for Tariff V in our final decision based on the same inputs. This is because we expect JGN to update their demand forecast based on 2018–19 actual data, and the latest HIA forecast.

In addition, there are areas in the demand and customer forecasts which require further clarifications from JGN prior to our final decision, specifically:

- the process and assumptions JGN undertook to derive the billing data for the purpose of determining the historical penetration rates
- details and the flow-on impacts surrounding the significant program and JGN's new policy to introduce zero consuming meters in the demand and customer forecast calculation
- the impact on demand and customer forecasts if JGN's volume boundary meter strategy is not mandatory for new customers with centralised hot water systems, or is no longer a viable strategy due to changes in embedded network requirements.

With respect to Tariff D, we are satisfied that the demand forecasts for these tariff classes are consistent with rule 74(2) of the NGR.

The reasons for our decision are discussed further below.

12.3.1 Minimum, maximum and average demand

Under the NGR, JGN's access arrangement must include minimum, maximum and average demand for the earlier access arrangement period.[30] JGN's access arrangement information and its response to our Regulatory Information Notice (RIN) satisfy these requirements.[31]

12.3.2 Forecast pipeline capacity and utilisation

The NGR require that to the extent practicable, the access arrangement information should include forecast pipeline capacity and utilisation of pipeline capacity over the access arrangement period.[32]

JGN did not provide this information in its access arrangement information. However, JGN's distribution network is a meshed network made up of interconnected pipes, and there are a number of practical considerations that mean that calculating forecast capacity and utilisation is not practicable.

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30 NGR, r. 72(1)(a)(iii)(A).

31 JGN, *Attachment 8.1 Overview of JGN's Demand Forecast,* June 2019, p.20 and JGN, *Attachment 6 Workbook-2*, June 2019.

32 NGR, r. 72(1)(d).

12.3.3 Demand forecast of Tariff V

We are satisfied with CORE's methodology for estimating residential and commercial customer numbers. However, there remain some outstanding requirements and clarifications prior to accepting the resulting forecasts in our final decision for the 2020–25 access arrangement period.

2018–19 actual demand and customer data

Given that JGN submitted its 2020–25 access arrangement proposal at 30 June 2019, it is understandable that 2018–19 actual data is not reflected in its proposal.

However, as noted in JGN's response to our information request, 2018–19 actual data will be available as part of the RIN process by 31 October 2019 or four months after the end of a regulatory year.[33]

As such, it is good industry practice to use the latest data when it is available and our expectation is that JGN will update all inputs using 2018–19 actual data including any that was used to develop its demand and customer forecasts.

Latest HIA dataset

As noted in JGN's response to our information request, CORE relied on HIA housing forecasts from February 2019, where 2018–19 is an estimate.[34]

As part of JGN's response to our information request, JGN also noted that they will not make the decision on whether to engage CORE to update the demand forecasts until after our draft decision is published.[35]

Similar to 2018–19 actual data, our expectation is that JGN will use the latest HIA dataset in its revised proposal and seek assurance that CORE's methodology and model integrity remains intact in its revised demand and customer forecast as a result of any changes to the inputs.

Volume boundary meter strategy

As a result of not accepting JGN's volume boundary meter strategy, where JGN is proposing to only offer a single meter at the boundary of any new residential building with a centralised hot water system from 2020–21 onwards, there are flow-on impacts to the connection numbers forecast given the changes in conversion rate between dwellings and connections in the 2020–25 access arrangement period.

Our reasoning for not accepting JGN's volume boundary meter strategy are discussed in Attachment 1 – Services covered by the access arrangement.

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33 JGN, *Response to information request IR032*, 13 September 2019.

34 Ibid.

35 Ibid.

For this draft decision (as well as Attachment 5 – Capital expenditure), we have accepted JGN's forecast uptake for volume boundary metering in the 2015–20 period, but hold the annual uptake rate constant at 65 per cent for high-rise buildings for the 2020–25 period, instead of the 77 per cent proposed by JGN.

We have also updated CORE's demand and customer forecast model to reflect this change in our draft decision.

Table 12.8 Impacts from volume boundary meter changes

	2020–21	2021–22	2022–23	2023–24	2024–25
JGN's proposal residential connections	22,681	20,944	20,353	20,813	22,092
AER's draft decision residential connections	24,925	22,905	22,287	22,793	24,158
JGN's proposal residential demand (TJ)	26,586	26,886	27,113	27,333	27,551
AER's draft decision residential demand (TJ)	26,590	26,905	27,145	27,378	27,610

Source: AER analysis using CORE's demand and customer forecast model.

As expected, the forecast connections are higher when the percentage uptake of volume boundary meters is reduced. However, we did not anticipate this change to impact total residential demand. We will be seeking confirmation from JGN that we have adjusted its model appropriately.

We will also be seeking further clarification from JGN on the impact on both connection numbers and demand of JGN's volume boundary meter strategy, including its alternative forecast results.

Forecast of consumption per connection

We are satisfied with CORE's methodology for estimating residential and commercial consumption per connection, but the resulting forecasts for the 2020–25 access arrangement period will be subject to JGN updating to the latest data and providing further clarifications on zero consuming meters.

Weather normalisation

Consistent with our previous decisions, we accept that CORE's weather normalisation methodology leads to a reasonable estimate of future 'normal' weather.

Assessment of the factors influencing the forecasts

We accept CORE's methodology that uses historical average annual growth removing the impact of gas and electricity prices, and weather, by adjusting historical demand per connection by the estimated impact of each of these factors.[36]

We also accept CORE's assumption that the impact of appliance trends, energy efficiency trends, and government policy have been mostly captured by the normalised historical rate.

In terms of price elasticities, CORE have conducted extensive studies with reference to international literature and is also consistent with our previous decisions on own price elasticity and cross price elasticity.[37] As such, we accept the methodology leads to a reasonable estimate of the impact on demand from future gas and electricity prices.

Forecast of new connections numbers

We accept CORE's methodology to use population growth data from NSW Treasury and NSW dwelling completions from HIA as the basis for residential connections forecast.

We also accept that the historical penetration rate is a function of JGN's historical connections against actual dwelling completions and that the historical trend has a close relationship to the likely future penetration rate.

However, we are seeking further information and clarification on some of the key inputs and assumptions supplied by JGN to CORE that underpins the connection numbers forecast.

Billing data and penetration rate calculation

When JGN introduced volume boundary meter in 2015–16, it allowed one metering point at the boundary of the residential building supplying multiple dwellings.

This supply arrangement adds another level of complexity when assessing penetration rates due to its non-compatibility with HIA data, because one counts connections while the other counts dwellings. As such, CORE has had to rely on JGN supplied billing data in order to align it to the HIA data for its penetration rate analysis.

It is not clear to us in the proposal the process and assumptions JGN undertook to derive this data, or the assurance process that CORE might have undertaken to ensure that this data is fit for purpose relative to the HIA data.

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[36] Own price elasticity refers to the change in gas consumption as a result of a change in gas prices, while cross price elasticity refers to the change in gas consumption as a result of a change in electricity prices.

[37] JGN, *Attachment 8.2 Demand Forecasting report*, June 2019, p. 39.

We would also like some assurance that the one year lag between HIA data and JGN connections remains appropriate in determining penetration rates during periods of significant upward or downward trend in construction activities and there are no overlaps in with the way JGN derived the billing data.

Given the information before us, our acceptance of the penetration rate in our final decision is subject to the accuracy of the billing data and how well it fits with the HIA data. This is because we have observed a downward trend in the penetration rate for each of years between 2012–13 to 2017–18. Although the correlation is not as strong in some years compared to others, the downward trend is consistent enough in recent years to warrant a more in-depth review of the key input data, which includes the 2018–19 actual which is not yet available.

Zero consuming meters

It appears that JGN has introduced a significant program and a new network policy to remove 'zero-consuming meters' in the 2020–25 access arrangement period.

CORE's report describes 'zero-consuming meters' as meters with no associated demand which arise from situations such as property vacancy and non-payment.[38] This removal program is in addition to conventional disconnections through historical observations.

Based on the data presented in CORE's model, the inclusion of this removal program will reduce connections by 26,861 in 2018–19 (2 per cent of the total residential connections at the start of the 2018–19 year) and a further 31,756 by the end of the 2024–25 (a further 2.2 per cent of the total residential connections).

In addition to changes in total connection numbers, CORE have also adjusted the demand forecast calculation so that the stock of existing residential customers will experience an increase in demand per connection so that the removal of zero consuming meters will have no impact in total demand volume except for the resulting price elasticity adjustment.[39]

If the total demand remains the same and total connections are reduced by 4.2 per cent, ordinarily the network price for that customer group should increase by a similar amount. However, we have insufficient information to understand the adjustments JGN has made.

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[38] Ibid, p. 24.

[39] Ibid, p. 38.

Table 12.9 Impact from the zero consuming meter removal program

	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25
Total residential connections	42,952	37,848	30,290	28,256	27,812	28,418	29,845
Conventional disconnections	-3,134	-2,814	-2,457	-2,058	-2,112	-2,164	-2,218
Conventional net connections	39,818	35,034	27,834	26,197	25,701	26,254	27,627
Zero consuming meters	-26,861	-5,027	-5,153	-5,253	-5,348	-5,440	-5,535
% of conventional net connections	67.5%	14.3%	18.5%	20.1%	20.8%	20.7%	20.0%
Opening connections	1,353,889	1,366,847	1,396,854	1,419,534	1,440,478	1,460,831	1,481,644
Accumulative % of opening connections	2.0%	2.4%	2.7%	3.1%	3.5%	3.8%	4.2%

Source: JGN Access Arrangement Information[40] and AER analysis

We consider this a significant step change in terms of the data inputs considered in JGN's demand forecast. However, we found little information on this subject in JGN's proposal other than a short description in CORE's report and its inclusion in CORE's demand forecast model.[41] We also found no mention of this change in Attachment 8.1 – Overview of JGN's demand forecast.

Our preliminary investigation indicates the zero consuming meters program might overlap with the following areas:

- proposed changes to JGN's RSA so that 'Volume Customer delivery points will be automatically deleted from the user's Customer List with effect from 20 Business Days after the days of disconnection'
- a late submission from Energy Networks Australia (ENA) on JGN's 2020–25 proposal specifically comments on challenges associated with network disconnection requests that arises from limited or no access, as well as customers refusing to pay for their energy consumption. ENA describe it as a 'complex' issue and supports broad industry consultation[42]
- JGN's proposed capex programs to mitigate access issues, including customer experience programs, remote meter reading, customer self-read capabilities and incentive based mechanism on meter performance.

40 Ibid, table 7.11.

41 Lines 950 to 957 of CORE's 'Assumptions' worksheet.

42 ENA, *Supplementary Submission*, October 2019.

Given the potential impact on residential network charges and its interactions with other parts of the proposal, we request further detail on zero consuming meters.

Our expectation is that JGN will provide in its revised proposal a detailed definition of zero consuming meters and how its figures are derived, its application in the demand and customer forecast, its application in practice, its relationship with other areas in JGN's proposal, and the reasons it complies with the NGO.

Net new commercial connections

We accept CORE's methodology to forecast small business connections based on the historical average new connections and disconnections, and are satisfied that the resulting forecast is reasonable given the information available.

12.3.4 Demand forecasts for Tariff D

Given that CORE's methodology included both top-down and bottom-up analysis at a sector specific level, we are satisfied that JGN's forecast for industrial customers Tariff D is arrived at on a reasonable basis and represents the best forecast possible in the circumstances.[43]

We have also issued an information request seeking further clarifications on the likely demand impact from the stabilisation of future gas prices and lower exchange rates, and are satisfied that CORE have already considered these factors as part of its demand forecast methodology.[44]

Although CORE did acknowledge some limitations in its forecast methodology, we are satisfied that, based on the information available, the best possible forecast has been adopted.[45]

12.3.5 Validations

We have observed that CORE's previous gas demand forecasts have significantly underestimated actual gas demand over the current (2015–20) access arrangement period, which has resulted in a significant increase in the total revenue collected by JGN in the current period.

While this may be a reasonable cause for concern regarding CORE's proposed demand and customer forecast for the 2020–25 access arrangement period, we have considered the particular circumstances over the past five years and whether CORE's methodology have been systemically biased.

In particular, we note that in the period from the Global Financial Crisis (GFC) through to 2012–13, there was a significant downturn in housing development across Australia,

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43 NGR, r. 74(2).

44 JGN, *Response to information request IR032*, 13 September 2019.

45 JGN, *Attachment 8.2 Demand Forecasting report*, June 2019, p.29.

including Sydney, as well as a downturn in economic activity. As the effects of the GFC subsided, the latent demand for housing combined with the significant growth in Sydney's population from immigration and from movement from regional areas, resulted in a housing boom that was apparent from about 2014–15 through to 2018–19. The economic recovery and housing boom in this period was not captured by any reputable forecasters at the time when we made the final decision for JGN's 2015–20 access arrangement.

As such, although CORE may be criticised for significantly underestimating actual gas demand over the present period, we consider that the failure to forecast the housing boom was ubiquitous across reputable forecasters at the time. It was also understandable in the uncertain circumstances following the GFC. Therefore, we do not consider that this inaccuracy shows any systemic bias or inherent flaws in CORE's forecasting method, assumptions, or practices.

In the 2020–25 demand and customer forecast, CORE acknowledges the considerable uncertainty of housing growth projections at the time of the 2015–20 forecast. The magnitude of which was underestimated in the third party (BIS Shrapnel) forecast series. [46]

In addition, CORE has conducted a back cast and have now revised the model structure to improve the forecast accuracy. CORE now includes a two year ramp up of new customer demand (in-line with observed historical trend) and a more granular structure which forecasts new connections and demand per connection for each connection type. [47]

As noted earlier, CORE's current methodology and model feature the following enhancements compared to its previous forecast:[48]

- increased data granularity and structure
- increased time series incorporate a substantial, recent macroeconomic event
- price elasticity that honours established econometric theory

As such, we are satisfied that as a package, the methodology proposed by CORE represents the best possible method in deriving a demand forecast if reasonably accurate input data is available.

46 Ibid, p. 90.
47 Ibid, p. 91.
48 Ibid, p. 90.

12.4 Revisions

We require the following revisions to make the access arrangement proposal acceptable:

Revision 12.1	Make all necessary revisions arising from using 2018–19 actual and latest HIA data, and areas of clarification set out in 12.1.1.