



Draft decision
Jemena Gas Networks (NSW) Ltd
Access arrangement 2015-2020

Attachment 13 - Demand

November 2014

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Note

This attachment forms part of the AER's draft decision on Jemena Gas Networks' 2015–20 access arrangement. It should be read with 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 – value of imputation credits

Attachment 5 – regulatory depreciation

Attachment 6 – capital expenditure

Attachment 7 – operating expenditure

Attachment 8 – corporate income tax

Attachment 9 – efficiency carryover mechanism

Attachment 10 – reference tariff setting

Attachment 11 – reference tariff variation mechanism

Attachment 12 – non-tariff components

Attachment 13 – demand

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Shortened forms

| Shortened form | Extended form |
|-----------------------------------|--|
| 2010–15 access arrangement | Access arrangement for JGN effective from 1 July 2010 to 30 June 2015 inclusive |
| 2010–15 access arrangement period | 1 July 2010 to 30 June 2015 inclusive |
| 2015–20 access arrangement | Access arrangement for JGN effective from 1 July 2015 to 30 June 2020 inclusive |
| 2015–20 access arrangement period | 1 July 2015 to 30 June 2020 inclusive |
| Access arrangement information | Jemena Gas Networks (NSW) Ltd, <i>Access Arrangement Information 2015–20</i> , 30 June 2014 |
| Access arrangement proposal | Jemena Gas Networks (NSW) Ltd, <i>Access arrangement, JGN's NSW gas distribution networks, 1 July 2015 – 30 June 2020</i> , 30 June 2014 |
| AER | Australian Energy Regulator |
| capex | capital expenditure |
| CAPM | capital asset pricing model |
| CCP | Consumer Challenge Panel |
| Code | National Third Party Access Code for Natural Gas Pipeline Systems |
| CPI | consumer price index |
| DRP | debt risk premium |
| ERP | equity risk premium |
| JGN | Jemena Gas Networks (NSW) Ltd (CAN 003 004 322) |
| MRP | market risk premium |
| NGL | national gas law |
| NGO | national gas objective |
| NGR | national gas rules |

| | |
|--------------------------------------|---|
| opex | operating expenditure |
| PPI | partial performance indicators |
| PTRM | post-tax revenue model |
| RAB | regulatory asset base |
| RBA | Reserve Bank of Australia |
| Reference service agreement proposal | Jemena Gas Networks (NSW) Ltd, <i>Reference Service Agreement, JGN's NSW gas distribution networks</i> , 30 June 2014 |
| RFM | roll forward model |
| RIN | regulatory information notice |
| RPP | revenue and pricing principles |
| SLCAPM | Sharpe-Lintner capital asset pricing model |
| WACC | weighted average cost of capital |

13 Demand forecasts

This attachment sets out the AER's assessment of the demand forecasts proposed by JGN for its NSW gas distribution network for the 2015–20 access arrangement period. Demand is an important input into the derivation of JGN's reference tariffs. It also affects opex and capex linked to network growth.

13.1 Draft decision

The AER does not approve the proposed demand forecasts as we are not satisfied that they comply with r. 74(2) of the NGR. JGN relied upon forecasts prepared by Core Energy. We consider that some aspects of Core Energy's forecast method and some assumptions applied produces forecasts of connections and consumption which are not the best estimates possible in the circumstances.

For forecast consumption, addressing the issues that we have found with the forecasting approach used by Core Energy results in increases to annual per customer consumption of:

- up to 8 per cent for residential customers
- up to 6 per cent for small business customers
- up to 17 per cent for tariff V industrial and commercial customers.

There is no change for tariff D industrial and commercial customers.

In relation to forecast connection volumes, our changes result in 5,841 connections being reallocated from new estates to medium/high density and a 1,207 reduction in small business connections.

The reasons for our decision are discussed below.

13.2 Jemena Gas Network's proposal

JGN engaged Core Energy Group Pty Ltd (Core) to prepare its demand forecasts.

Core applied the following approach to produce JGN's proposed Tariff V demand forecasts. It:¹

- Normalised historic consumption data for the effects of weather
- Identified material drivers of consumption volumes (referred to in Core's report as demand) for each tariff category that are not captured in the historical trend but will impact future gas usage. This includes residential (sub-category residential forecasts were also produced for existing, new estates, medium density/high rise and electricity to gas customer groups), small business, industrial and commercial.
- Identified material drivers of net connections for each tariff category (as described above) that are not captured in the historical trend but will impact future gas consumption
- Selected a preferred methodology for quantifying the material drivers of consumption volumes and net connections based on statistical significance and supportability

¹ JGN, *2015-20 Access Arrangement Information*, 30 June 2014, Attachment 5.1: Core Energy Group, *Gas Demand and Customer Forecasts - Jemena Gas Networks - NSW Gas Access Arrangement 2015- 2020*, April 2014, p12.

- Derived forecasts for consumption volumes and net connections for each tariff category and provided an explanation of any variance from the normalised historical trend
- Reviewed and validated results through discussions with JGN and independent analysis.

To forecast Tariff D demand, Core:²

- Compiled individual customer historical consumption volume and net connections
- Identified material drivers of consumption volume for the top 50 customers (collected by survey) and by industry sector for the remaining customers that are not captured in the historical trend but will impact future gas consumption
- Made adjustments for reallocation of consumption between Tariff D and Tariff V, based on advice from JGN
- Selected a preferred methodology for quantifying the material drivers of changes in chargeable demand (CD)³ based on statistical significance and supportability
- Derived forecasts of chargeable demand.
- Reviewed and validated results through discussions with JGN and independent analysis.

13.3 Assessment approach

The NGR require a full access arrangement proposal for a distribution pipeline to include usage of the pipeline over the earlier access arrangement period showing:

- minimum, maximum and average demand; and customer numbers in total and by tariff class⁴
- to the extent that it is practicable to forecast pipeline capacity and utilisation of pipeline capacity over the access arrangement period, a forecast of pipeline capacity and utilisation of pipeline capacity over that period and the basis on which the forecast has been derived.⁵

The NGR also require that forecasts and estimates.⁶

- are arrived at on a reasonable basis
- represent the best forecast or estimate possible in the circumstances.

We consider that there are two important considerations in assessing whether demand forecasts are arrived at on a reasonable basis and whether they represent the best forecasts possible in the circumstances.⁷ These are:

- the appropriateness of the forecast methodology – this involves consideration of how the demand forecast has been developed and whether or not relevant factors have been taken into account.

² JGN, *2015-20 Access Arrangement Information*, 30 June 2014, Attachment 5.1: Core Energy Group, *Gas Demand and Customer Forecasts - Jemena Gas Networks - NSW Gas Access Arrangement 2015- 2020*, April 2014, p12.

³ Chargeable demand is the quantity of gas used to determine the Demand Charge under Jemena's Reference Tariff Schedule.

⁴ NGR, r. 72(1)(a)(iii).

⁵ NGR, r. 72(1)(d).

⁶ NGR, r. 74(2).

⁷ NGR, r. 74(2).

- the application of the forecasting methodology – this involves consideration of the accuracy of data and assumptions on each of the input parameters.

To determine whether JGN's proposed demand forecasts are arrived at on a reasonable basis and are the best possible forecasts in the circumstances, we reviewed the data used to implement the forecasting methodology.

We engaged Deloitte Access Economics to advise on JGN's demand forecasts and to assist us develop alternative demand forecasts where we were not satisfied that forecasts comply with the requirements of the NGR.

In making its draft decision, we relied on:

- information provided by JGN as part of its proposed access arrangement; specifically, JGN's consultant report on demand forecasts, demand forecast spreadsheets, access arrangement information and responses to the regulatory information notice (RIN)
- additional information provided by JGN in response to our information requests
- two reports provided by Deloitte Access Economics⁸
- Core Energy's response to the Deloitte Access Economics report⁹.

13.3.1 Interrelationships

In order to estimate the connections capex, the gross connections forecast developed in the demand forecasts is set equal to the volume of new connections. We have a different view to JGN on gross connections. This results from differences regarding the method and assumptions used in arriving at forecast gross connections. Consequently, we have used our estimate of gross connections for arriving at our alternative capex allowance for connections (see attachment 6, section 6.4.2).

The estimate of unaccounted for gas (UAG) expenditure, included in opex, is calculated as consumption multiplied by the UAG rate multiplied by the gas price. As UAG expenditure is dependent on the consumption forecasts, it will scale in accordance with adjustments to consumption.

The number of connections and the gas demand (throughput) are variables used to determine the change in outputs. This is an element of the rate of change which is applied to the base opex.

Tariff prices depend on estimates of per customer consumption and the number of connections. Changes in these forecasts will translate into changed tariff prices. In simple terms, tariff prices are determined by cost divided by quantity, such that an increase in forecast quantity has the effect of reducing the tariff price.

13.4 Reasons for draft decision

We do not approve the proposed demand forecasts. We are not satisfied that elements of JGN's forecasting methodology, some of the assumptions applied, and some of the data used, are arrived at

⁸ Deloitte Access Economics, *AER Review of Core Energy Group gas demand forecast for Jemena's NSW network*, 11 August 2014; Deloitte Access Economics, Australian Energy Regulator, *Gas Demand forecast for Jemena's NSW network*, 30 October 2014.

⁹ Core Energy Group, *Response to Deloitte Report: Australian Energy Regulator, Review of Core Energy Group Gas demand forecast for Jemena's NSW network*, August 2014.

on a reasonable basis and represent the best estimate possible in the circumstances.¹⁰ We consider that that the modelling results are consequently not the best estimates in the circumstances. A summary of our reasons is below.

In particular, in forecasting demand Core Energy:

- Did not include a variable to capture future economic activity, for example, GSP or SFD in its forecasts. As discussed below, economic activity is expected to increase over the next access arrangement compared with the current access arrangement. As a result, the absence of such a variable in Core Energy's forecasts means they are likely to under estimate per customer consumption. On the basis of Deloitte's advice, we have included GSP or SFD in our per customer consumption forecasts for tariff V residential and I&C customers. Deloitte estimated "own price elasticity" within the model.¹¹ This resulted in different own price elasticities (the sensitivity of gas consumption per customer to changes in the gas price) being applied to tariff V residential and I&C per customer consumption forecasts compared to those applied by Core Energy.
- Calculated a trend in per customer consumption over 2002 to 2013, which was then applied to forecast tariff V small business per customer consumption. As we consider there has been a structural change since 2008 in small business per customer consumption use, we have estimated the trend using 2008 to 2013 data.
- Applied a cross price elasticity (the sensitivity of gas consumption per customer to changes in electricity prices) of 0.1. On the basis of advice from Deloitte, we have reduced this to 0.05.¹²
- Included the carbon price in its forecasts. We have removed the carbon price given the repeal of the carbon tax.

In forecasting connections:

- we were not satisfied that Core Energy's assumption that 48 per cent of new dwellings are new estate connections and 52 per cent are medium/high density connections was arrived at on a reasonable basis. Based on historical HIA data, we consider that a 44 and 56 per cent allocation respectively for new estate and medium/high density connections produces a better estimate in the circumstances.
- we consider that Core Energy's forecast of business connections results in an overstated number of connections. This is due to the inclusion of data from 2003 to 2007 in estimating the historical trend which is projected forward. As discussed in greater detail below, we consider that this data should be excluded due to a structural break in the series in 2008, where there was a significant step change in the number of connections. We consider that a trend calculated using 2008 to 2013 data produces the best estimate in the circumstances.
- we consider that Core Energy's forecast of the number of residential disconnections are overstated. This is due to the inclusion of 2002 to 2010 data in estimating the historical trend in the disconnection rate. In contrast to the 2002 to 2010 period, for the three years, 2011 to 2013, the number of disconnections has been stable. Therefore, we are not satisfied that using an

¹⁰ NGR, r.74(2).

¹¹ Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, pp. 24-27.

¹² Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, p. 27.

increasing trend over this period is appropriate. Rather, we consider that 2011-13 data provides a more reasonable basis for forecasting disconnections than the trend over the 2002-13 period.

As a result, we consider that JGN's proposed demand forecasts are not arrived at on a reasonable basis and do not represent the best forecasts possible in the circumstances. The reasons for our decision are discussed in greater detail below.

13.4.1 Minimum, maximum and average demand

Under the NGR, JGN's access arrangement information must include minimum, maximum and average demand for the earlier access arrangement.¹³ We consider that the information contained within the AAI satisfies the requirement of r. 72(1)(a)(iii)(A) of the NGR.¹⁴ We also consider that the total customer numbers as shown in the access arrangement information and the breakdown by tariff class as shown in the RIN pro forma satisfy the requirement of r. 72(1)(a)(iii)(B) of the NGR.¹⁵

13.4.2 Forecast pipeline capacity and utilisation

Rule 72(1)(d) of the NGR requires that, to the extent practicable, the access arrangement information should include forecast pipeline capacity and utilisation of pipeline capacity over the access arrangement period. JGN did not provide information on pipeline capacity and utilisation. JGN submitted that:¹⁶

Capacity information for a distribution network is not available or meaningful for a distribution pipeline. The JGN 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 is not practicable.

We accept that there are a number of practical considerations governing why the calculation of utilisation is not straight forward.

13.4.3 Forecast of consumption per customer

In producing consumption per customer forecasts Core Energy undertook weather normalisation of historical data, used the historical trend to forecast consumption per customer and then applied post-model adjustments for changes in electricity and gas prices. A discussion of these steps follows below.

Weather normalisation of historical data

There is a strong relationship between gas demand and climate. Lower than normal temperatures increase gas demand for residential heating. Therefore, we recognise the need to adjust actual gas consumption to ensure that one-off events do not unduly bias demand forecasts.

Core Energy's forecasts account for the impact that weather has on gas demand through a process of weather normalisation. Core Energy applies the Effective Degree Day method for determining actual and forecast weather. It estimates the linear trend using data from 1979 to 2013.¹⁷

¹³ NGR, r. 72(1)(a)(iii)(A).

¹⁴ JGN, *2015-20 Access Arrangement Information*, June 2014, p. 22.

¹⁵ JGN, *2015-20 Access Arrangement Information*, June 2014, p. 22; JGN, *2015-20 Access Arrangement Information*, June 2014, Appendix A to the AA RIN response - Regulatory templates (CONFIDENTIAL) [UPDATE].XLSM.

¹⁶ JGN, *2015-20 Access Arrangement Information*, June 2014, p. 39.

¹⁷ JGN, *2015-20 Access Arrangement Information*, 30 June 2014, Appendix 5.1: Demand forecasting report, p. 27.

Deloitte questioned whether the 1979 data point should be included as it appears to be an outlier.¹⁸ However, on the basis that it did not result in a material impact on total residential demand it did not suggest excluding it.¹⁹

On this basis, we accept Deloitte's advice that Core Energy's weather normalisation of the historical data.

Structural approach vs time series approach

Core Energy used a time series approach as the starting point for estimating consumption per person.

We consider that this approach includes problems, including a lack of information about future economic activity to alter the path from the historical trend. This approach is reasonable where there is no expectation of a change in economic outlook. However, as discussed below, that is not the case when we compare the outlook for the next access arrangement period compared with the current.

Economic activity in NSW has been depressed over the current access arrangement period. The NSW Treasury and Deloitte Access Economics are forecasting increased economic activity during the next access arrangement period. In the 2014-15 Budget, the NSW Treasury included projections of 3.25 per cent growth in real state final demand and 3.0 per cent growth in real gross state product over the 2013-14 to 2015-16 period.²⁰ This is off a base of 1.7 and 1.8 per cent growth respectively in 2012-13. Deloitte Access Economics has forecast average annual GSP growth of 2.5 per cent over the 2014-20 period, compared with 1.9 per cent growth over the 2009-13 period.²¹

Core stated that it believes that 'the approximate 2 per cent NSW GSP growth observed in recent history to be within an acceptable range of potential outcomes'.²² It states that notwithstanding other's forecasts, 'on balance history would appear to provide a reasonable guide to future demand (adjusted for price impact)'.²³ This seems inconsistent with Core Energy's forecasting approach for Envestra's Victorian gas distribution network. In that report, Core Energy included GSP in the forecast.²⁴ Deloitte considers that, by not including an indicator to capture the impact of the expected improvement in economic activity on gas demand, Core Energy is likely to have under-forecast consumption over the 2015-20 access arrangement period.²⁵

Conversely, Deloitte applied a structural approach to estimate per customer consumption. This involved identifying drivers of gas consumption per customer and forecasting the relative influence of those drivers. Deloitte included indicators of future economic activity (GSP or SFD growth forecasts) and the sensitivity of gas consumption per customer to changes in the gas price (own price elasticity). Including the own price elasticity within the model estimates the relationship between the drivers. This is in contrast to Core Energy's approach, which uses assumptions outside the model to estimate price elasticity impacts. As a result, it does not estimate any relationship or relative weighting between the variables.

¹⁸ Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, p. 21.

¹⁹ Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, p. 24.

²⁰ NSW Treasury, Budget Paper 2 - 2014-15 Budget Statement, Chapter 2, Table 2.1, p.2-2.

²¹ Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, p. 10.

²² Core Energy Group, Response to Deloitte Report, August 2014, p. 8.

²³ Core Energy Group, Response to Deloitte Report, August 2014, p. 8.

²⁴

²⁵ Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, p. 9.

For developing the forecast relationship for tariff V residential per customer consumption, Deloitte included the change in the previous year's SFD, the gas bills (proxying for gas price) in the current year and the gas bills in the previous year.²⁶

For developing the forecast relationship for tariff V I&C per customer consumption, Deloitte included the change in the previous year's GSP, the gas bills in the previous year.²⁷

For two customer types, tariff V small business and tariff D, Deloitte did not apply a structural approach to estimating per customer consumption.

For tariff V small business per customer consumption Deloitte advised that 'the strength of the downward trend over the historical period was larger than the effect of any potential explanatory variables (including price and economic conditions)'.²⁸ For this reason it did not modify Core Energy's trend based forecast method. Core Energy forecast tariff V small business consumption per customer on the basis of the historical trend between 2002 and 2013. Deloitte advised that this would not result in the best estimate of per customer consumption possible in the circumstances. This is because data before 2008 exhibited a strong decline in per customer consumption, relative to the stable demand post-2008. Deloitte consider that this reflects a moderation and most likely structural change in per customer consumption post-2008. For this reason Deloitte has estimated the historical trend over the 2008 to 2013 period for forecast application.²⁹ This results in a change from Core Energy's forecast annual average decline in per customer consumption of 3.2 per cent to Deloitte's forecast of 2.5 per cent.

For tariff D per customer consumption, Core Energy's forecast was based on 2013 chargeable demand, with adjustments for known changes in load and forecast shifts in loads attributable to customers moving between tariff D and tariff V. These were advised by JGN and included survey results from the top 20 customers. Deloitte accepted that this methodology provided a reasonable basis for forecasting the tariff D per customer consumption.³⁰

Cross price elasticities

As discussed above, the own price elasticity (or the sensitivity of gas consumption per customer to changes in the gas price) was included within the Deloitte model.

Core Energy adjusted per customer consumption for the sensitivity of gas consumption per customer to changes in electricity prices (cross price elasticity). It assumed a value of 0.1, which implies that a one per cent increase in electricity prices leads to a 0.1 per cent decrease in per customer consumption of gas.³¹ It included this on the basis that there is an expected significant widening in the price differential between gas and electricity over the forecast access arrangement period. Core Energy's 0.1 assumption for cross price elasticity is drawn from US studies.³²

²⁶ Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, p. 24.

²⁷ Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, p. 25.

²⁸ Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, p. 25.

²⁹ Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, p. 25.

³⁰ JGN, 2015-20 Access Arrangement Information, 30 June 2014, Appendix 5.1: Demand forecasting report, pp. 41-48.

³¹ JGN, 2015-20 Access Arrangement Information, 30 June 2014, Appendix 5.1: Demand forecasting report, p. 87.

³² JGN, 2015-20 Access Arrangement Information, 30 June 2014, Appendix 5.1: Demand forecasting report, p. 88.

Deloitte considers that, on balance, it may be reasonable to include an estimate of cross price elasticity in the per customer consumption forecasts. However, it considered that a value of 0.1 was too high and instead applied 0.05.³³ Deloitte based this decision on the following factors:³⁴

- Core Energy's within model estimates of cross price elasticity were not statistically significant.
- ACIL Allen in its gas forecasting work for AEMO had not found any modelling which produced a statistically significant estimate for cross price elasticity and did not include it as a variable in its current modelling.
- Deloitte's own price elasticity estimates are higher than those applied by Core Energy. To avoid double counting, Deloitte considers it is appropriate to have a lower cross price elasticity.
- There are likely to be mitigating effects offsetting gas price increases relative to electricity prices. These include the likely increase in price of alternative energy products including solar, as subsidies are removed.

Carbon price

At the time of producing Core Energy's forecasts a carbon price was still applied. Hence Core Energy's forecasts include the impact of carbon price. As the carbon price has now been removed, Deloitte has modified the forecasting method to remove the inclusion of the carbon price.³⁵

We agree that this is appropriate and have adopted Deloitte's method of forecasting per customer consumption for tariff V residential, small business and I&C customers.

This results in our per customer consumption forecast over the access arrangement period being, on average:

- 5.8 per cent higher over the access arrangement period than Core Energy's forecast for tariff V residential customers
- 4.8 per cent higher over the access arrangement period for tariff V small business customers
- 12.5 per cent higher over the access arrangement period for tariff V I&C customers
- no different for tariff D customers.

³³ Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, p. 27.

³⁴ Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, p. 27.

³⁵ Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, p. 28.

13.1.1 Forecast of number of connections

Tariff V connections

Forecasts of the number of connections are produced for each type of tariff V customer: electricity to gas, new estate, medium/high density, small business and industrial and commercial.

Core Energy forecast the number of Tariff V connections by adding to the 2012-13 number of connections (the latest available year of actual data) the forecast number of new connections and subtracting the number of disconnections.

Core Energy has applied different forecast methods to estimate the number of new connections for each type of Tariff V customer. These are set out below.

Electricity to gas new connections

Core Energy forecasts electricity to gas connections using the 2012-13 number of connections and applies a negative growth factor. The negative growth factor reflects JGN and Core's view that its existing marketing expenditure will be less effective. JGN and Core attribute the decline in marketing effectiveness to the forecast increase in gas prices relative to the electricity price. Core identifies the gas/electricity price relativity as the most significant driver of electricity to gas connections. The number of connections is forecast to fall strongly – 2.0 per cent per annum on average over the forecast period.

This forecasting method appears to produce results which are at odds with the historical trend. Historical connections have been increasing at an average of 8.1 per cent per year between 2009 and 2013. When questioned regarding this, Core indicated that JGN data for 2013-14 show an 18 per cent decrease in connections compared to 2012-13.³⁶ This decline, together with the decline in electricity to gas connections in 2012-13, a 4.2 per cent fall, may indicate a change in the long term trend.

On this basis, Deloitte Access Economics considered that Core Energy's forecast method was reasonable and did not include any changes in its alternative estimate of electricity to gas connections. Based on Deloitte's advice, we have adopted the forecast number of electricity to gas connections.

New estate and medium/high density new connections

Core Energy forecast new dwelling connections (that is, both new estate and medium/high density connections) as follows. First, it multiplied JGN's penetration rate by Core Energy's forecast of new dwellings. Second, it adjusted for a catch-up on the dwelling supply shortfall in meeting housing demand. Core Energy applies an 80 per cent penetration rate. That is, of all new dwellings, 80 per cent are assumed to connect to JGN's network. Core Energy determined JGN's penetration rate on the basis of advice from JGN and on historical JGN data. Core Energy developed the new dwellings forecast by:³⁷

- identifying the NSW Government projections of population in the local government areas serviced by JGN
- multiplying the identified population by the NSW Government projection of the average NSW household density (household/person)

³⁶ Core Energy Group, Response to Deloitte Report, August 2014, p. 10.

³⁷ JGN, 2015-20 Access Arrangement Information, 30 June 2014, Appendix 5.1: Demand forecasting report, pp. 57-58.

- using the BIS Shrapnel estimate of dwelling stock deficiency as at June 2013³⁸, multiplying this by Core Energy's assumption of how much the shortfall will be reduced (80 per cent), the ratio of JGN household share of total NSW households (80 per cent) and the JGN penetration rate (80 per cent).

Core Energy allocates total new dwelling connections between new estate and medium/high density connections on the assumption that 52 per cent of new dwellings are medium/high density and 48 per cent are in new estates. It submits that this assumption is based on a range of third party analysis. Core did not provide the details of this third party analysis.³⁹

Core Energy forecast of new estate and medium/high density connections follows the strongly increasing historical trend to 2017, after which they decline and then stabilise at 2015-16 levels. However, over the access arrangement period new estate and medium/high density connections are not forecast to grow, in average annual terms.

In reviewing Core Energy's forecast method, Deloitte noted that 'combining both supply side and demand side factors to arrive at estimates of new dwellings is somewhat novel...' and that '[a] more orthodox approach would simply be to use forecasts of new dwellings to determine the forecast'.⁴⁰ Deloitte, however, assessed Core Energy's forecast against the latest available HIA data to determine the reasonableness of the forecast.

Deloitte noted that the number of new connections appeared to be low in the early part of the access arrangement and high in the later part. But, in aggregate Deloitte considered they appeared reasonable. Deloitte indicated that Core Energy's new dwelling percentage of all dwelling starts is lower, at 60 per cent, than the HIA forecast of 62 per cent. However Deloitte considered that, given the forecast decline in competitiveness of gas, the lower percentage assumption is reasonable.⁴¹

Deloitte assessed Core Energy's allocation assumption (that 52 per cent of new dwellings are medium/high density) against the historical proportions using HIA data for 2009 to 2013. HIA data indicated an average of 56 per cent of new dwellings are in new estates. The JGN and HIA total new dwellings data is reasonably similar over the access arrangement period. For consistency reasons, Deloitte submitted that the HIA data historical average of 56 per cent should be applied.⁴² Based on Deloitte's advice we have adopted a 56 and 44 per cent allocation respectively for medium/high density and new estate connections.

Making this change to Core Energy forecasts results in an 8.2 per cent reduction in new estate connections and a 7.6 per cent increase in medium/high density connections over the access arrangement period.

Small business and industrial and commercial new connections

Core Energy forecast the number of small business and industrial and commercial connections by estimating the respective historical growth between 2003 and 2013 and extrapolating that growth

³⁸ The AER requested that JGN update its forecasts for the latest BIS and HIA data (AER information request 16a). The HIA data is publically available. JGN did not provide updated forecasts, stating that they would need to purchase the updated BIS data and that this may result in material expense incurred for no benefit (JGN, Response to information request 16a, received 17 October 2014).

³⁹ JGN, 2015-20 Access Arrangement Information, 30 June 2014, Appendix 5.1: Demand forecasting report, p. 58.

⁴⁰ Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, p.13.

⁴¹ Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, p.14.

⁴² Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, p.14.

forwards. It also adjusted I&C connections for expected customer movement between Tariff D and Tariff V. This results in an average annual 7.7 per cent increase in small business and I&C connections.

Deloitte Access Economics considers that there is a structural break in 2008. This is because new connections data before 2008 was relatively stable around 300 new connections per year. In 2008 there was a significant step increase to around 500 new connections. The number of new connections has been relatively stable at this level post-2008. Deloitte considers that by including the data from 2003 to 2007, the average growth rate calculated by Core Energy results in overstated business connections. Core Energy's forecast would see a doubling of business connections in 2019-20 compared with 2012-13.⁴³

Based on Deloitte's advice we have estimated the historical trend for forecast application using data from 2008 to 13. This results in an average annual 3.0 per cent increase in small business and I&C connections.

Residential disconnections

Core Energy forecast residential disconnections using the 2002 to 2013 historical average.⁴⁴ This results in a 50 per cent increase in the disconnections in 2014 over the annual average of the disconnections between 2011 to 2013.

Deloitte questioned the basis for Core Energy's forecast step up in residential connections. Core Energy submitted that recent disconnections were not a guide to future disconnections as gas prices have remained low while electricity prices have increased.⁴⁵

Notwithstanding Core's response, Deloitte considers that the step up in disconnections is unreasonably high.⁴⁶ On the basis of Deloitte's advice we have forecast residential disconnections using 2011 to 2013 data. This results in annual average disconnection rate of 0.36 per cent compared with Core Energy's forecast of 0.51 per cent.

Tariff V business disconnections

Core Energy forecast Tariff V business disconnections using the 2010 to 2013 historical average. It submitted that data prior to 2010 was unreliable due to a large number of dormant supply points.⁴⁷

Deloitte assessed that given the lack of robust data prior to 2010 this approach is reasonable. On this basis we accept the forecast of Tariff V business disconnections.

Tariff D

Core Energy forecast Tariff D connections using information provided by JGN. This included information on Tariff D customer business closures and tariff reclassifications, a customer survey of the top 20 customers and net known movements between Tariff D and Tariff V. The Core Energy forecast results in a decrease of 17 connections in 2014 accounting for shut downs and customers

⁴³ Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, p.16.

⁴⁴ JGN, 2015-20 Access Arrangement Information, 30 June 2014, Appendix 5.1: Demand forecasting report, p. 32.

⁴⁵ Core Energy Group, Response to Deloitte Report, August 2014, p. 19.

⁴⁶ Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, p.19.

⁴⁷ JGN, 2015-20 Access Arrangement Information, 30 June 2014, Appendix 5.1: Demand forecasting report, p. 38.

moving from Tariff D to Tariff V. In 2016, 49 customers are added, representing switches from Tariff V to Tariff D.⁴⁸

Deloitte considered the assumptions underpinning the Tariff D forecast were consistent with the evidence presented.⁴⁹ On this basis, we accept the Tariff D connections forecast.

13.5 Revisions

The AER requires the following revisions to make the access arrangement proposal acceptable:

Revision 3.1: Amend the JGN access arrangement information to replace with the information on connection numbers and consumption included in the following tables:

Table 13.1 AER draft decision on consumption

| | 2016 | 2017 | 2018 | 2019 | 2020 |
|--|------------|------------|------------|------------|------------|
| Tariff V (consumption per connection) | | | | | |
| Existing Residential | 19.66 | 19.44 | 19.29 | 19.19 | 19.29 |
| New E-to-G | 13.06 | 12.91 | 12.81 | 12.75 | 12.81 |
| New Estates | 17.10 | 16.91 | 16.78 | 16.70 | 16.78 |
| New Med Density | 15.02 | 14.85 | 14.73 | 14.66 | 14.73 |
| Small Business | 210.04 | 203.93 | 196.52 | 188.46 | 182.43 |
| I&C (Adjusted for Tariff Switching) | 460.61 | 445.68 | 433.10 | 433.73 | 439.15 |
| Tariff D (total consumption) | | | | | |
| ACQ | 45,951,999 | 45,290,414 | 44,644,746 | 44,014,608 | 43,399,622 |
| MDQ | 262,397 | 259,881 | 256,632 | 254,228 | 254,228 |
| CD | 262,397 | 259,881 | 256,632 | 254,228 | 254,228 |

Source: AER analysis

⁴⁸ JGN, 2015-20 Access Arrangement Information, 30 June 2014, Appendix 5.1: Demand forecasting report, p. 58.

⁴⁹ Deloitte Access Economics, Australian Energy Regulator, Gas demand forecast for Jemena's NSW network, 30 October 2014, p.17.

Table 13.2 AER draft decision on total connection, new connection and disconnection numbers

| | 2016 | 2017 | 2018 | 2019 | 2020 |
|--------------------------|-----------|-----------|-----------|-----------|-----------|
| Total connections | | | | | |
| Residential | 1,227,109 | 1,260,368 | 1,292,376 | 1,323,141 | 1,353,663 |
| Small business | 22,944 | 23,396 | 23,847 | 24,298 | 24,748 |
| Tariff V I&C | 16,820 | 17,151 | 17,494 | 17,851 | 18,222 |
| Tariff D I&C | 427 | 427 | 427 | 427 | 427 |
| New connections | | | | | |
| Electricity to gas | 7,025 | 6,885 | 6,747 | 6,612 | 6,480 |
| New estates | 12,674 | 13,549 | 13,111 | 12,674 | 12,674 |
| Medium/high density | 16,131 | 17,244 | 16,687 | 16,131 | 16,131 |
| Small business | 502 | 500 | 499 | 500 | 500 |
| Tariff V I&C | 303 | 365 | 378 | 393 | 407 |
| Disconnections | | | | | |
| Residential | -4,304 | -4,418 | -4,537 | -4,653 | -4,763 |
| Small business | -46 | -47 | -48 | -49 | -50 |
| Tariff V I&C | -34 | -34 | -35 | -36 | -36 |

Source: AER analysis