Appendix 11: Benchmarking

1.1 Introduction

AusNet has adopted the AER's preferred base-step-trend approach to forecasting opex for the 2024-28 access arrangement period, whereby the 'revealed' cost of the 'base year' is escalated by trend parameters, to which step changes are added. According to Rule 72(1)(e) of the NGR, we are required to provide to the AER, the basis of which our opex forecast has been derived. As a result, we have developed this report, to demonstrate the efficiency of our base year cost.

The issues explored within this appendix are not new, and we have previously addressed questions on efficiency and its appropriateness as part of other resets by obtaining external advice on benchmarking and productivity. This is the approach we adopted for both the EDPR 2022-26 and TRR 2023-27.

However, the consultant we have typically relied on for benchmarking analysis (Economic Insights) was unavailable due to a conflict of interest.[1] We considered the possibility of using alternative sources for benchmarking but concluded that the pool of consultants to be extremely limited.[2] Another consideration relates to the fact that an updated report from Economic Insights (or another consultant) would likely add one extra observation (CY2020) to the dataset contained in Economic Insight's report for the AGN (SA) 2021-26 access arrangement.

We have, therefore, prepared our own assessment to demonstrate the efficiency of our base year cost. Our assessment draws heavily on publicly available data taken from:

- Economic Insights' benchmarking report for the AGN (SA) 2021-26 access arrangement[3]; and
- Economic Insights' productivity performance report for the same AGN (SA) access arrangement.[4]

These reports are relevant to AusNet because they are the latest reports of their kind for Australian gas distribution businesses and produced estimates approved by the AER. That is, the AER considered AGN South Australia's base year opex to be efficient on the basis of Economic Insight's benchmarking report.[5]

1.1.1 Chapter structure

The following sections provide insights and observations into the operating efficiency of AusNet to demonstrate that our base year opex is efficient, specifically:

- Section 1.2 describes the operating environmental factors in which we operate;
- Section 1.3 provides the results of the partial performance indicators analysis; and
- Section 1.4 provides the productivity performance results.

1.2 Operating environmental indicators

Operating environmental indicators describe the key characteristics of Gas Distribution Businesses (GDBs) and plays an important role in establishing the efficiency of the GDBs.

Economic Insights identified four operating environmental indicators:

- Energy delivered (TJ), number of customers and network kilometres;
- Customer density—customers per kilometre (km) of mains;
- Energy density—terajoules (TJ) per customer; and

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[1] We approached Economic Insights in July 2021, December 2021 and March 2022 and each time, they confirmed their conflict of interest.
[2] By way of example, Economic Insights prepared the benchmarking reports for the current gas access arrangements in Victoria, NSW, South Australia and ACT (AGN 2018-22, Multinet gas 2018-22, AusNet 2018-22, AGN 2018-22, Jemena 2020-25, AGN SA 2021-26 and Evoenergy 2021-26). They also prepared benchmarking reports for recent historical gas access arrangements in Victoria, NSW and South Australia (Envestra (Albury) 2013-17, Envestra (Victoria) 2013-17, Multigas 2013-17, AusNet 2013-17, Jemena 2015-20 and AGN SA 2016-21).
[3] Economic Insights 2020, Benchmarking Operating and Capital Costs of Australian Gas Networks' South Australian Network Using Partial Productivity Indicators, Report prepared for Australian Gas Networks, 15 June.
[4] Economic Insights 2020, The Productivity Performance of Australian Gas Networks' South Australia Gas Distribution System, Report prepared for Australian Gas Networks, 15 June.
[5] AER 2020, Australian Gas Networks (SA) Access Arrangement 2021to 2026, Attachment 6 Operating expenditure, Draft Decision, November, pp. 21-23.

- Network utilisation—TJ per kilometre.

We consider that these four environmental indicators remain appropriate for us when considering the efficiency of the base year to use in the GAAR and we explore each of these below.

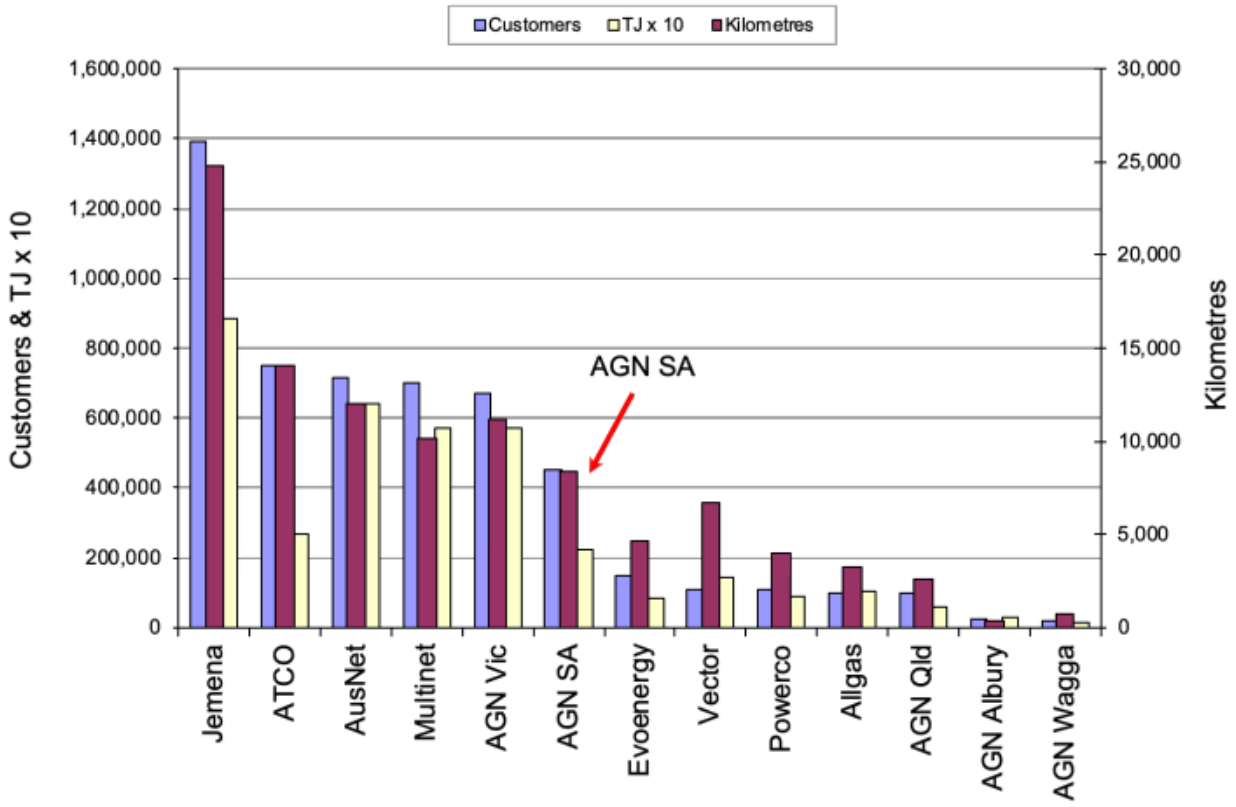
The period and GDBs included in Economic Insights report were:

- 1999 to 2019 for AusNet (Victoria), Evoenergy (ACT) and AGN (South Australia);
- 2000 to 2019 for ATCO Gas Australia (Western Australia);
- 1999 to 2018 for AGN (Victoria), Multinet (Victoria) and Jemena (NSW);
- 1999 to 2017 for AGN Albury (NSW);
- 1999 to 2016 for AGN (Queensland);
- 2000 to 2016 for Allgas Energy (Queensland);
- 1999 to 2015 for AGN Wagga (NSW);
- 2004 to 2018 for Powerco (New Zealand); and
- 2005 to 2019 for Vector (New Zealand).

1.2.1 Energy delivered, number of customers and network kilometres

Figure 1.2.1 below shows that AusNet is the third largest GDB in terms of customer numbers and kilometres, and the second largest GDB in terms of energy delivered. While larger, we are also similar in size to the other two Victorian networks (Multinet and AGN Victoria). We are also similar in size to ATCO from a customer numbers and kilometres perspective.

Figure 1.2.1: Key features of the operating environment, 2019



Source: Economic Insights 2020, Benchmarking Operating and Capital Costs of Australian Gas Networks' South Australian Network Using Partial Productivity Indicators, Report prepared for Australian Gas Networks, 15 June, Figure 2.1.

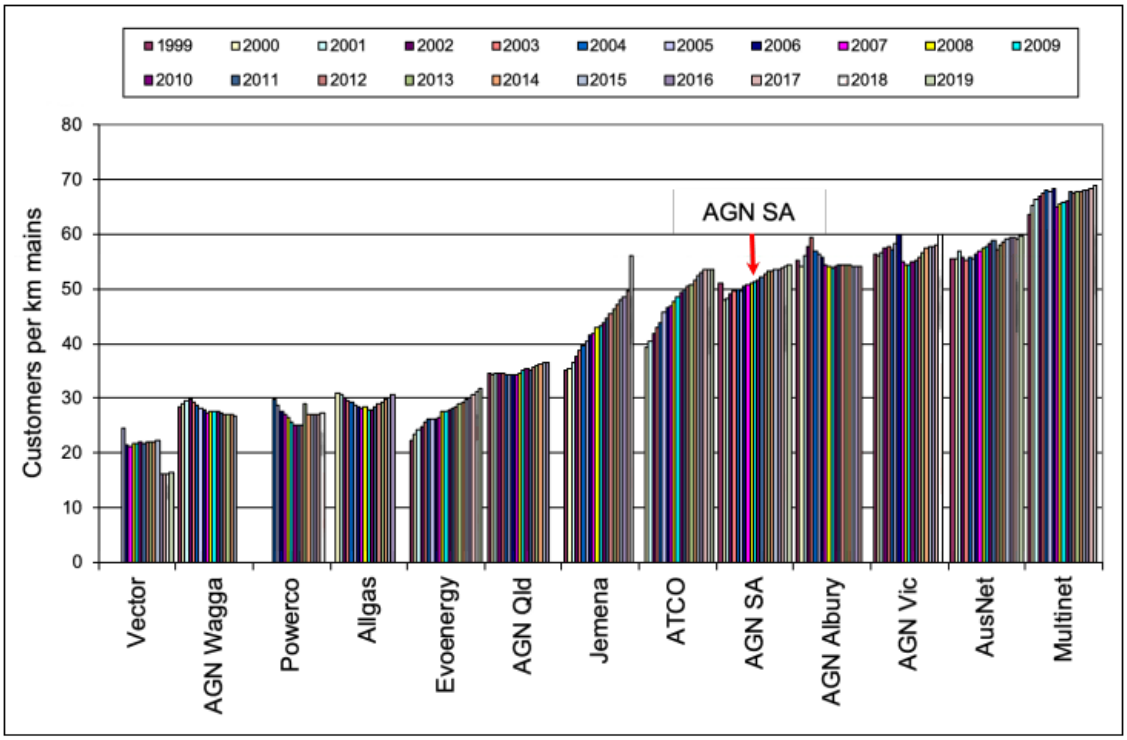
Note: 2019 or latest year.

1.2.2 Customer density

Customer density is measured by the number of customers per km of mains. Figure 1.2.2 shows that with the exception of some one-off results, AusNet has ranked second in terms of customer density for the past 13 years (2007 to 2019 inclusive). Our density at 59 customers per km of mains (latest five-year period from 2015-2019) is above the

average for all GDBs in the sample (43). AusNet's density is similar to AGN Victoria (58), AGN South Australia (54), and AGN Albury (54). The three Victorian networks have the highest customer densities.

Figure 1.2.2: Customer density, 1999-2019



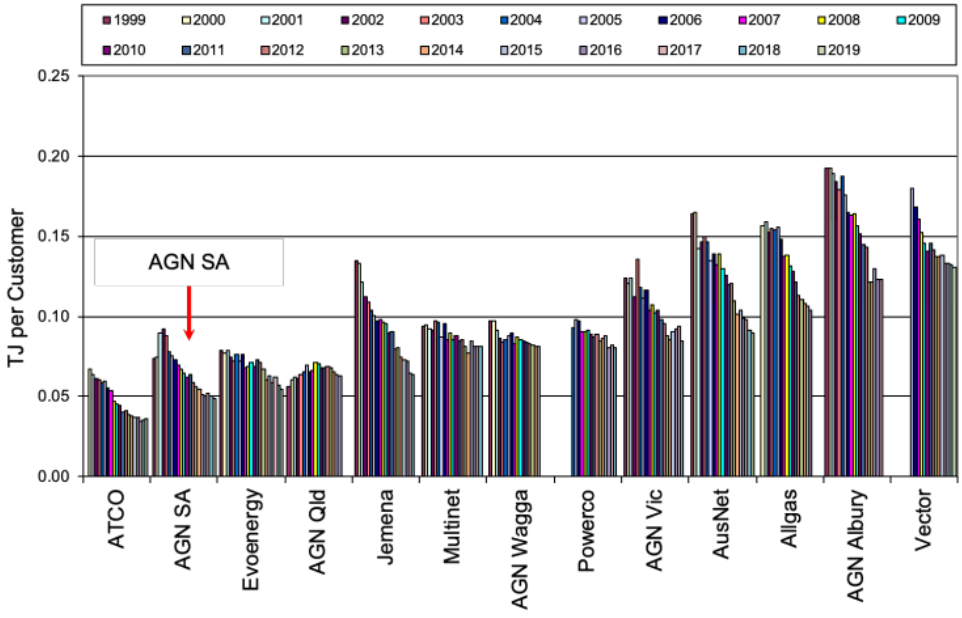
Source: Economic Insights 2020, Benchmarking Operating and Capital Costs of Australian Gas Networks' South Australian Network Using Partial Productivity Indicators, Report prepared for Australian Gas Networks, 15 June, Figure 2.2.

1.2.3 Energy density

Energy density is measured by the energy throughput (TJ) per customer. Figure 1.2.3 below shows that AusNet is currently ranked fourth among all the GDBs in the sample. Our average energy density (96 GJ per customer) is above the average across all sampled GDBs (83 GJ per customer).

Energy use per customer has generally declined over the period from 1999 to 2019. For AusNet, our energy density decreased from 164 GJ per customer in 1999 to 89 GJ per customer in 2019, or a 55 per cent decrease.

Figure 1.2.3: Energy density, 1999-2019

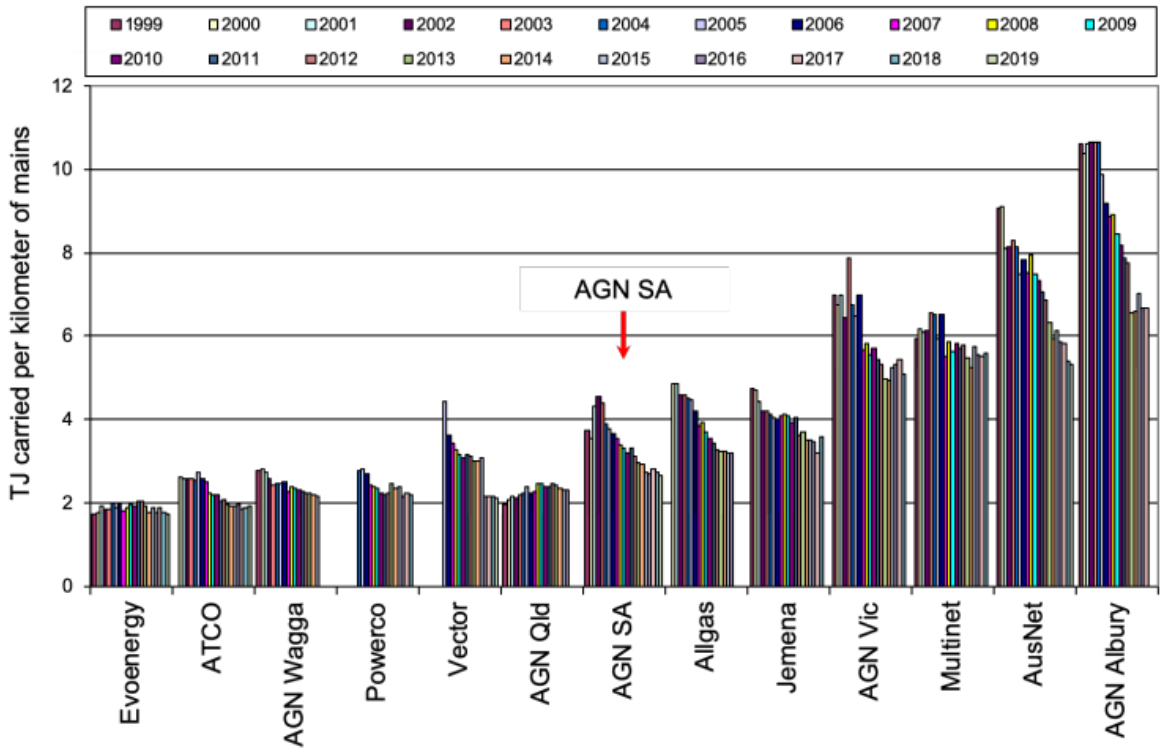


Source: Economic Insights 2020, Benchmarking Operating and Capital Costs of Australian Gas Networks' South Australian Network Using Partial Productivity Indicators, Report prepared for Australian Gas Networks, 15 June, Figure 2.3.

1.2.4 Network utilisation

Figure 1.2.4 below shows network utilisation, which is the product of customer density and energy density. The chart shows that AusNet is ranked second of the sampled GDBs. In the most part, network utilisation has declined over the sample period, reflecting the fact that declines in energy density per customer have typically outpaced increases in customer density per km. AusNet's network utilisation declined 41 per cent, which is significantly higher than the other Victorian network's declines; AGN Victoria and Multinet experienced declines of 15 and 10 per cent respectively.

Figure 1.2.4: Network utilisation (energy per kilometre), 1999-2019



Source: Economic Insights 2020, Benchmarking Operating and Capital Costs of Australian Gas Networks' South Australian Network Using Partial Productivity Indicators, Report prepared for Australian Gas Networks, 15 June, Figure 2.4.

1.3. Partial Productivity Indicators

Partial productivity indicators present information on the inputs per customer of GDBs and inputs per mains km compared to their network customer densities. This is useful because by expressing inputs in per customer or per km values and plotting them against customer density, there is a form of control for differences in the size and customer densities of the GDBs. As such, partial productivity indicators play an important role in establishing the efficiency of the GDBs.

In Economic Insights' benchmarking report for the AGN (SA) 2022-26 access arrangement, the efficiency performance of AGN (SA) within a group of 11 Australian and two New Zealand gas distribution businesses (GDBs) is explored and AusNet is one of the Australian GBDs. While the report focussed on AGN (SA), it also presented our results and outcomes relative to the other GDBs, which makes it relevant and appropriate for our purpose.

The period and GDBs included in Economic Insights report are the same as that listed in Section 1.2.

In presenting its results, Economic Insights noted:

- That while its partial performance indicators have the advantage of being relatively easy to construct and understand, care needs to be exercised in interpreting the results, as individual partial performance indicator results may give a misleading impression of overall efficiency. To gain an indication of overall relative performance, the partial indicators need to be considered together and jointly with key operating environment indicators.
- If a GDB is ranked poorly for most indicators, then this may warrant further investigation as to whether that GDB was operating inefficiently. Conversely, if a GDB is ranked highly for most indicators then this may be taken to suggest that it is performing at levels consistent with industry best practice. If a GDB performs well on some

indicators but poorly on others then the GDB's performance is harder to assess as it may be making trade–offs between different types of inputs (e.g., opex and capital) and more detailed analysis may be required.

- It is also desirable to have regard to more holistic measures of efficiency, such as total factor productivity (TFP) analysis, and methods of measuring efficiency, which can control for differences in scale and other operating environment differences.

The specific partial performance indicators used by Economic Insights in its analysis included:

- Opex per customer relative to customer density;
- Opex per mains km relative to customer density;
- Asset cost per customer relative to customer density;
- Asset cost per mains km relative to customers density;
- Total cost per customer relative to customer density; and
- Total cost per mains km relative to customers density.

And, as noted by Economic Insights:

> *[These partial] performance indicators establishes the relative performance of the GDBs across major facets of their businesses while identifying key operating environment differences. They provide an opportunity to examine the priorities and trade–offs of the various GDBs – for example, comparing operating expenditure (opex) and capital input indicators together allows trade–offs between opex and capital use to be recognised.*[6]

1.3.1 Key outcomes

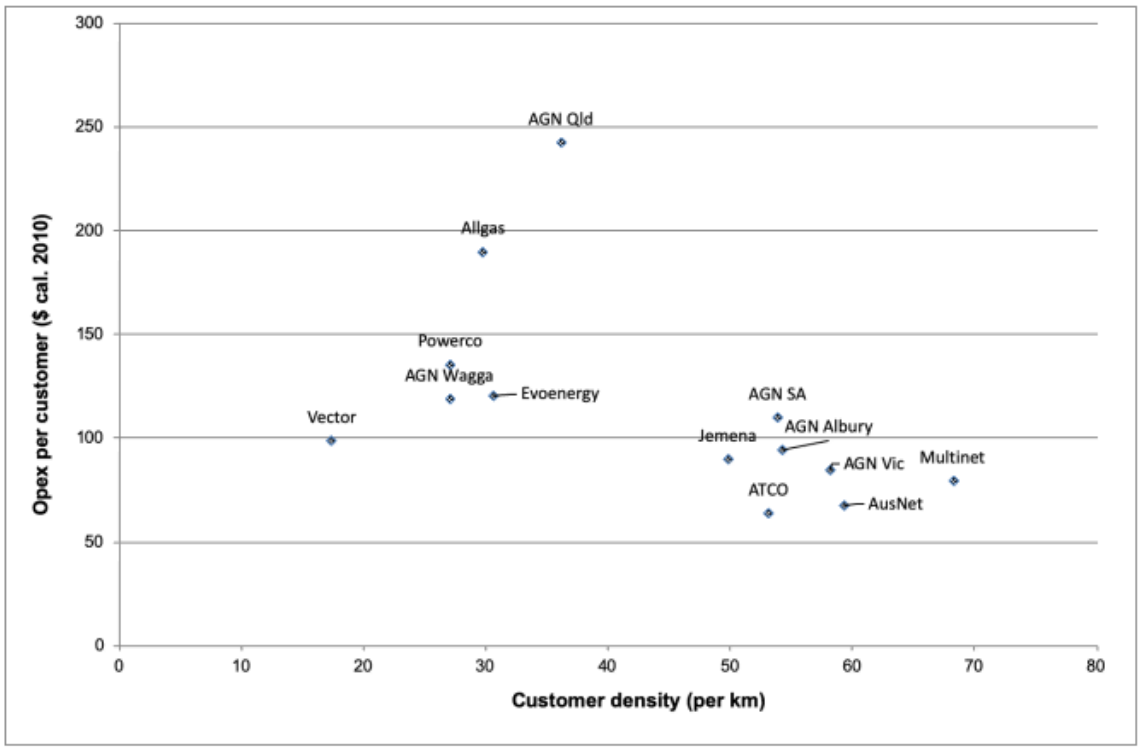
Economic Insights' partial performance indicators showed:

- AusNet's average opex per customer (in $2010) over the latest five-year period (2015 to 2019) was $68, which is well below the average among the seven GDBs with similar and higher customer densities ($84) – Figure 1.3.1.
- AusNet's opex per km of mains was $4,020 over the latest five-year period, which is below the average of all GDBs in the sample ($4,614), and below the average of GDBs with similar and higher customer densities ($4,756) – Figure 1.3.2.
- AusNet's capital asset cost per customer averaged $180 in the latest five-year period. This is far below the sample average of $280, and below the average of $204 for the group of GDBs with higher customer density – Figure 1.3.3.
- AusNet's average asset cost per km was approximately $10,700 over the latest five-year period, which is similar to the average for all GDBs ($10,965) – Figure 1.3.4.
- The average total cost per customer of AusNet in the latest five-year period was $248. This is below the average total cost per customer for the seven GDBs with comparatively high customer density ($288) – Figure 1.3.5.
- AusNet's average total cost per km ($14,691 in the latest five-year period) was below the average total cost per km for all GDBs in the sample ($15,579 in the latest five-year period) – Figure 1.3.6.
- AusNet's normalised real opex per customer is below the sample average under both methods used by Economic Insights. The sample averages are $116.4 and $115.9 for methods 1 and 2 respectively – Figure 1.3.7 and Figure 1.3.8.[7]

Based on the results presented above – whereby we are ranked above average or higher across all indicators – it appears that AusNet is performing above the average efficiency level among the group of larger GDBs.

[6] Economic Insights 2020, Benchmarking Operating and Capital Costs of Australian Gas Networks' South Australian Network Using Partial Productivity Indicators, Report prepared for Australian Gas Networks, 15 June, p. 2.
[7] See the following source for more information about the normalisation methods: Economic Insights 2020, Benchmarking Operating and Capital Costs of Australian Gas Networks' South Australian Network Using Partial Productivity Indicators, Report prepared for Australian Gas Networks, 15 June, pp. 22-4.

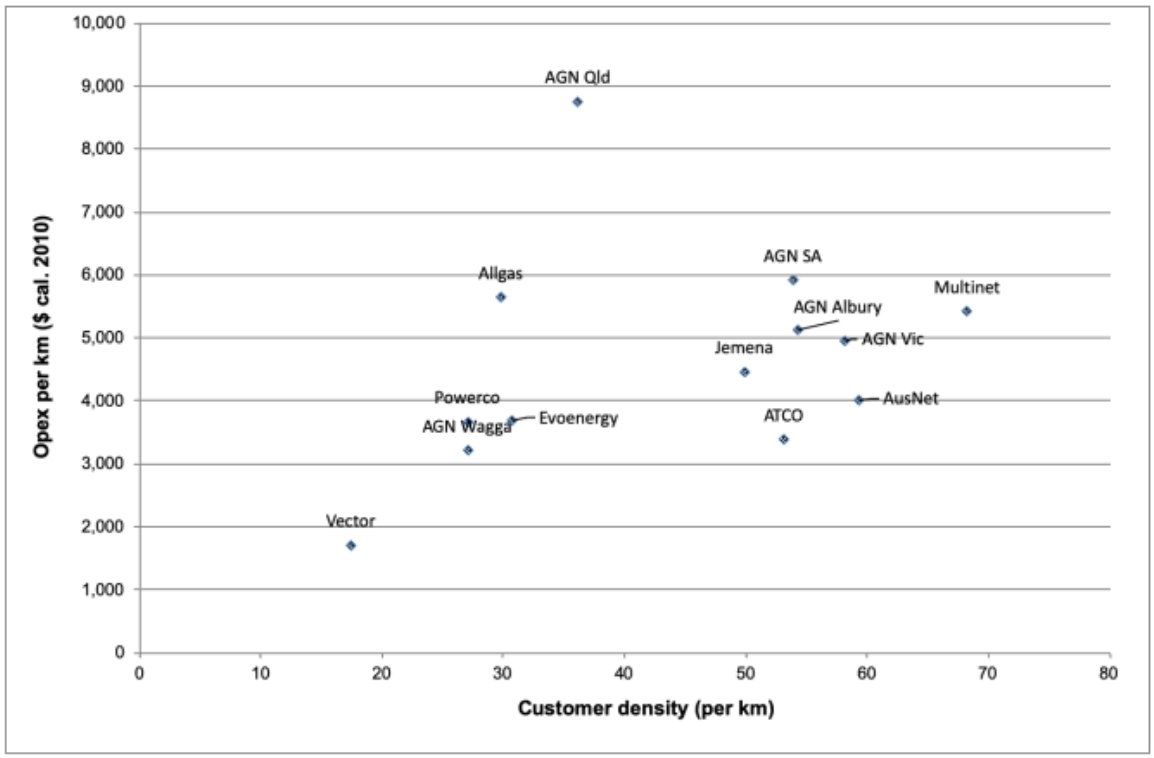
Figure 1.3.1: Opex per customer relative to customer density (avg. 2015-2019)



Source: Economic Insights 2020, Benchmarking Operating and Capital Costs of Australian Gas Networks' South Australian Network Using Partial Productivity Indicators, Report prepared for Australian Gas Networks, 15 June, Figure 3.1.

Note: 2015-2019 average, or the latest five-year period.

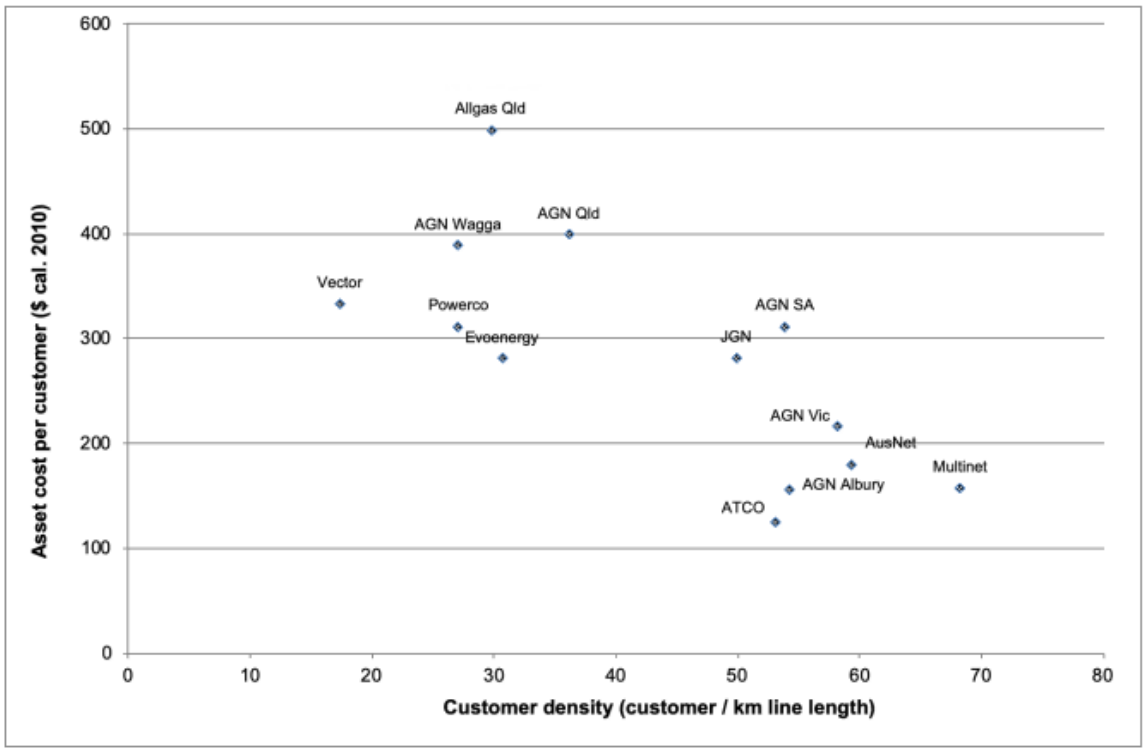
Figure 1.3.2: Opex per mains km relative to customer density (avg. 2015-2019)



Source: Economic Insights 2020, Benchmarking Operating and Capital Costs of Australian Gas Networks' South Australian Network Using Partial Productivity Indicators, Report prepared for Australian Gas Networks, 15 June, Figure 3.2.

Note: 2015-2019 average, or the latest five-year period.

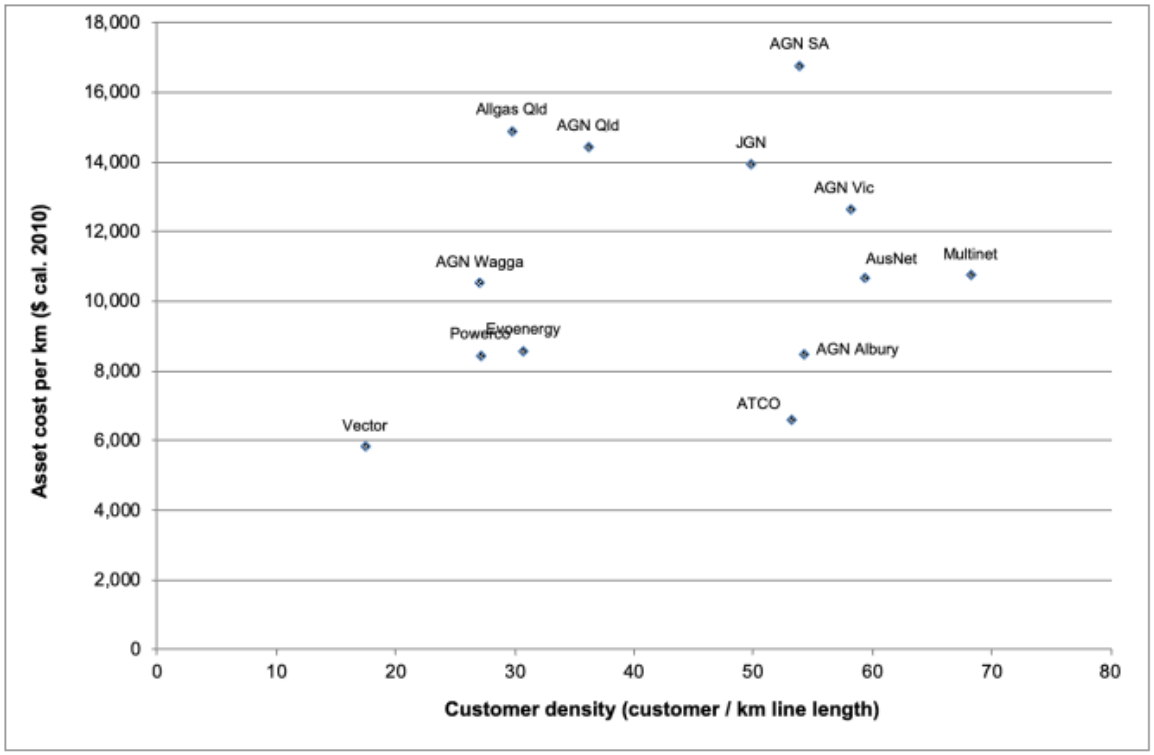
Figure 1.3.3: Asset cost per customer relative to customer density (avg. 2015-2019)



Source: Economic Insights 2020, Benchmarking Operating and Capital Costs of Australian Gas Networks' South Australian Network Using Partial Productivity Indicators, Report prepared for Australian Gas Networks, 15 June, Figure 3.4.

Note: 2015-2019 average, or the latest five-year period.

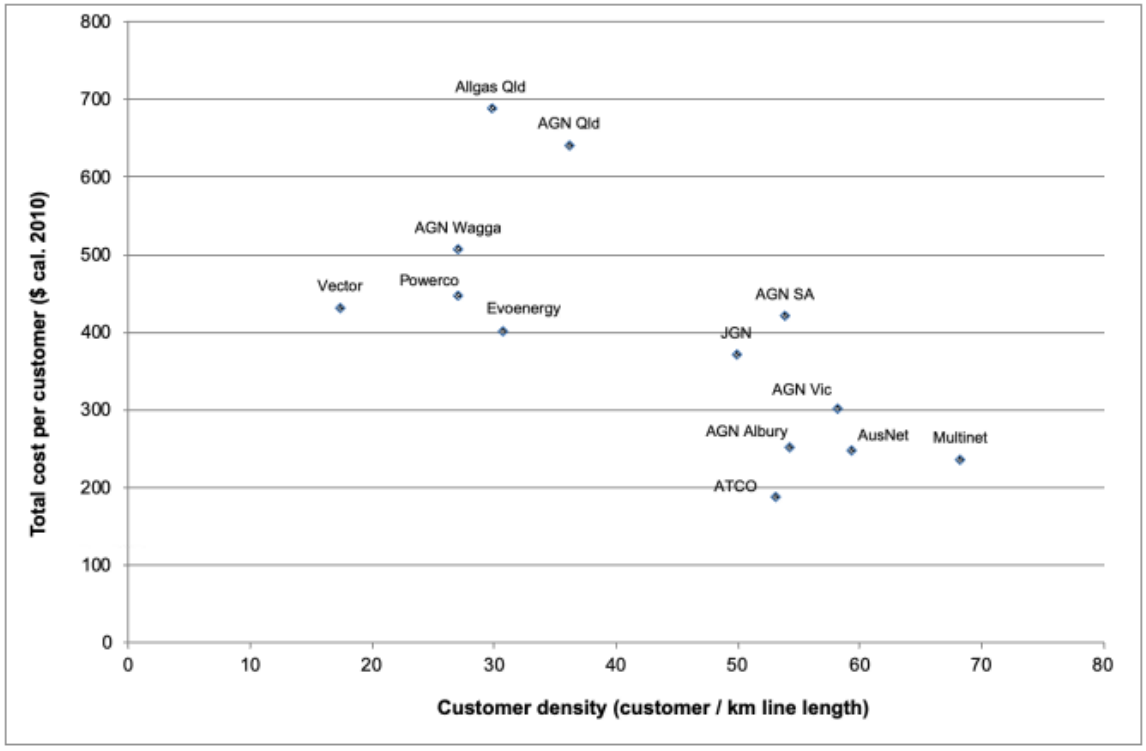
Figure 1.3.4: Asset cost per mains km relative to customer density (avg. 2015-2019)



Source: Economic Insights 2020, Benchmarking Operating and Capital Costs of Australian Gas Networks' South Australian Network Using Partial Productivity Indicators, Report prepared for Australian Gas Networks, 15 June, Figure 3.5.

Note: 2015-2019 average, or the latest five-year period.

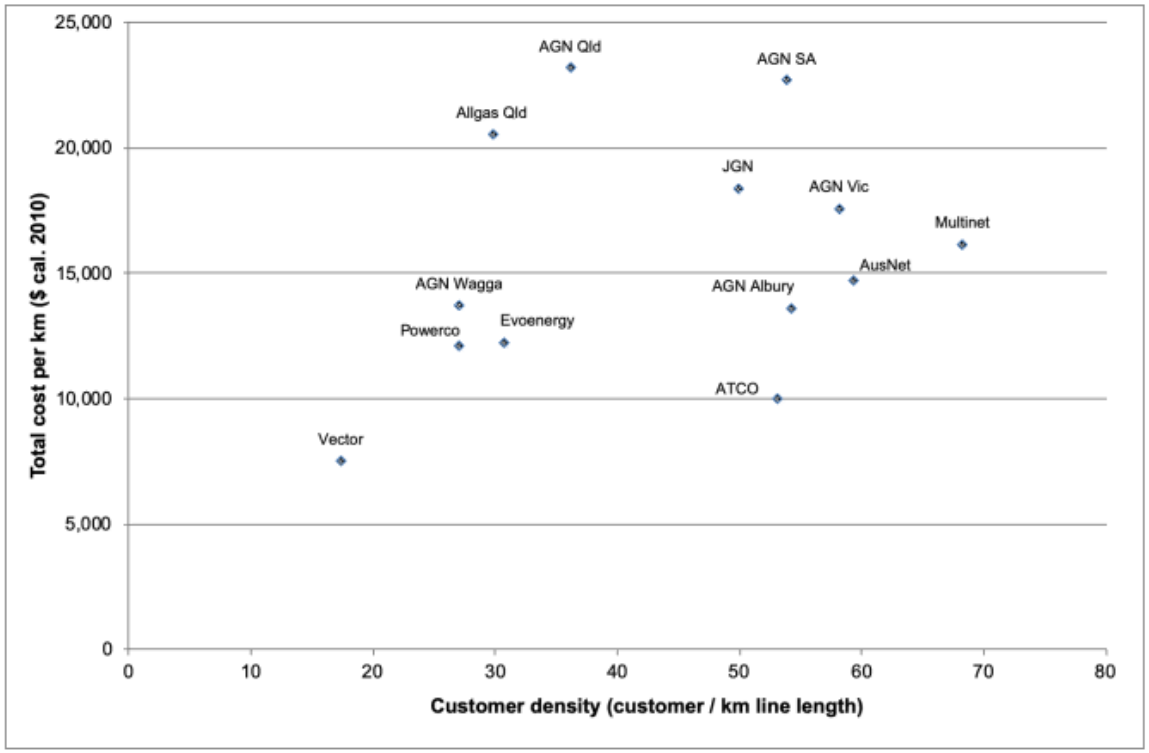
Figure 1.3.5: Total cost per customer relative to customer density (avg. 2015-2019)



Source: Economic Insights 2020, Benchmarking Operating and Capital Costs of Australian Gas Networks' South Australian Network Using Partial Productivity Indicators, Report prepared for Australian Gas Networks, 15 June, Figure 3.6.

Note: 2015-2019 average, or the latest five-year period.

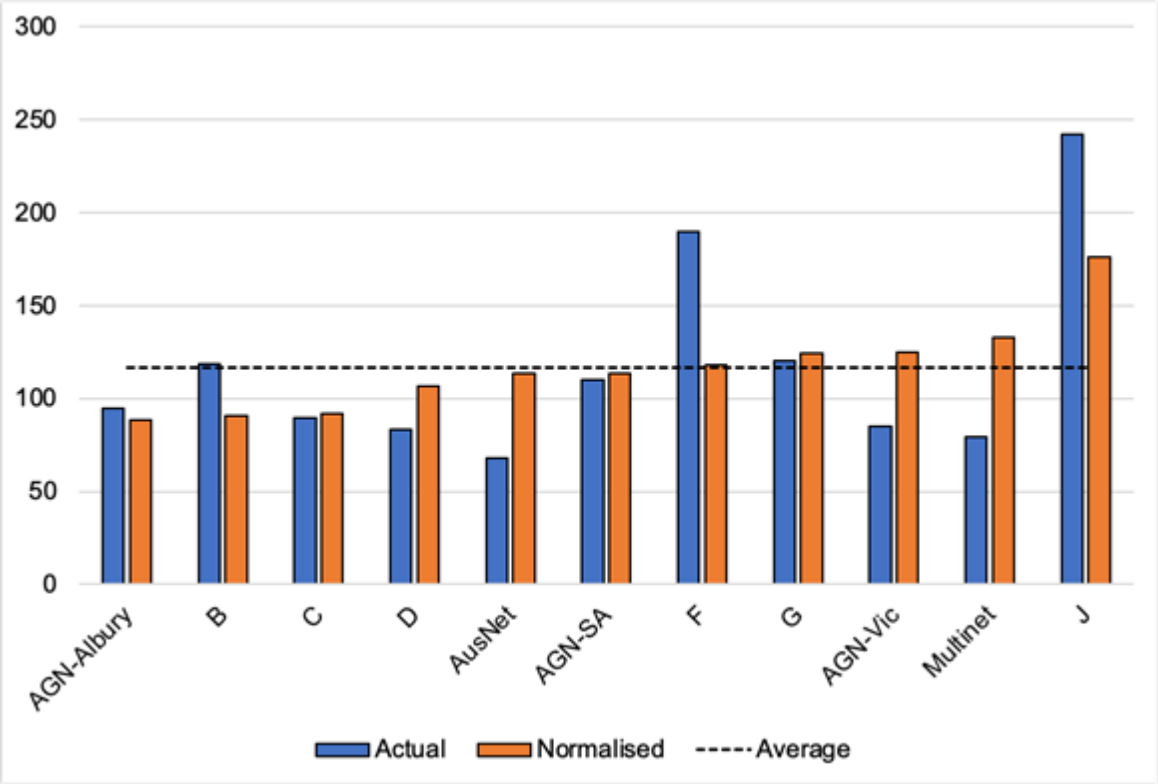
Figure 1.3.6: Total cost per mains km to customer density (avg. 2015-2019)



Source: Economic Insights 2020, Benchmarking Operating and Capital Costs of Australian Gas Networks' South Australian Network Using Partial Productivity Indicators, Report prepared for Australian Gas Networks, 15 June, Figure 3.7.

Note: 2015-2019 average, or the latest five-year period.

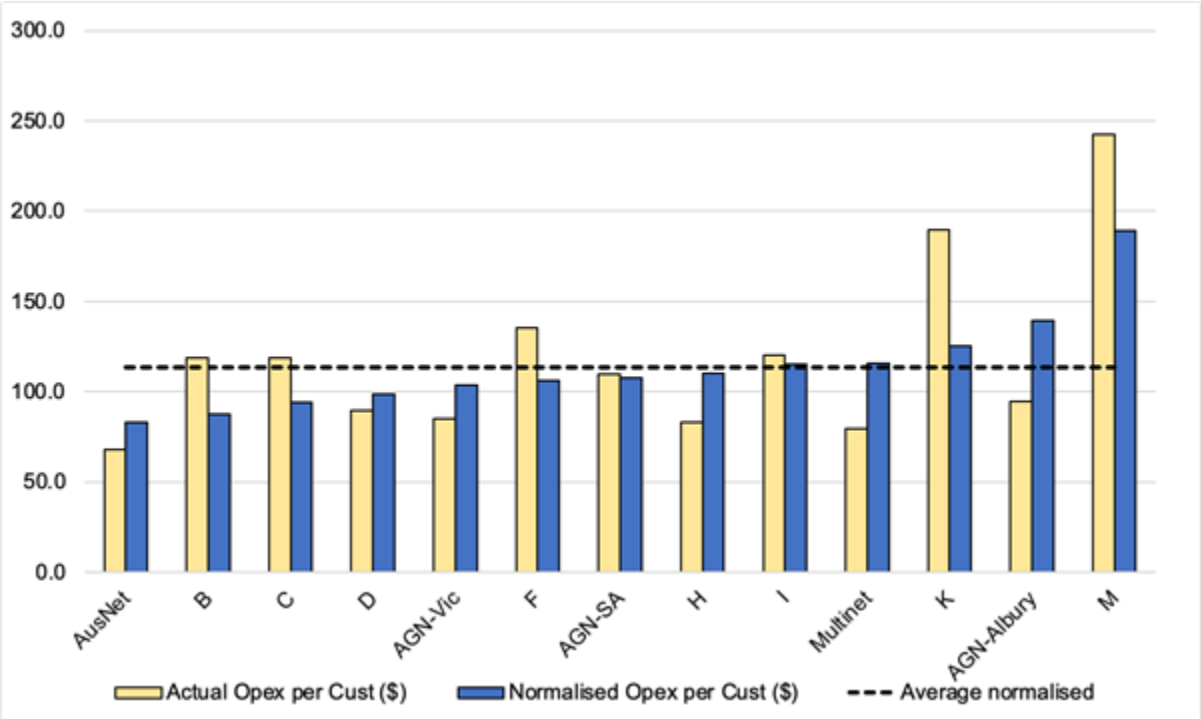
Figure 1.3.7: Normalised Opex per Customer (2015-2019) – 1st method



Source: Email from Economic Insights, 24 May 2022.

Note: We engaged Economic Insights to reproduce Figure 3.8 (from its benchmarking report) albeit with the network businesses owned by AusNet and AGIG identified.

Figure 1.3.8: Normalised Opex per Customer (2015-2019) – 2nd method



Source: Email from Economic Insights, 24 May 2022.

Note: We engaged Economic Insights to reproduce Figure 3.9 (from its benchmarking report) albeit with the network businesses owned by AusNet and AGIG identified.

1.4. Productivity Performance

Productivity performance play an important role in establishing the efficiency of GDBs.

Economic Insights' productivity performance report for the AGN (SA) 2022-26 access arrangement provided an analysis of AGN South Australian's total factor productivity (TFP) and partial factor productivity (PFP) trends compared to other GDBs over time. The report also provided a comparative analysis of AGN SA's productivity levels against other Australian GDBs, including AusNet, using multilateral TFP.[8]

This analysis drew on survey data provided by AGN (SA) and other GBDs, including AusNet, and we note that the data we provided covered the period 1999 to 2019.[9]

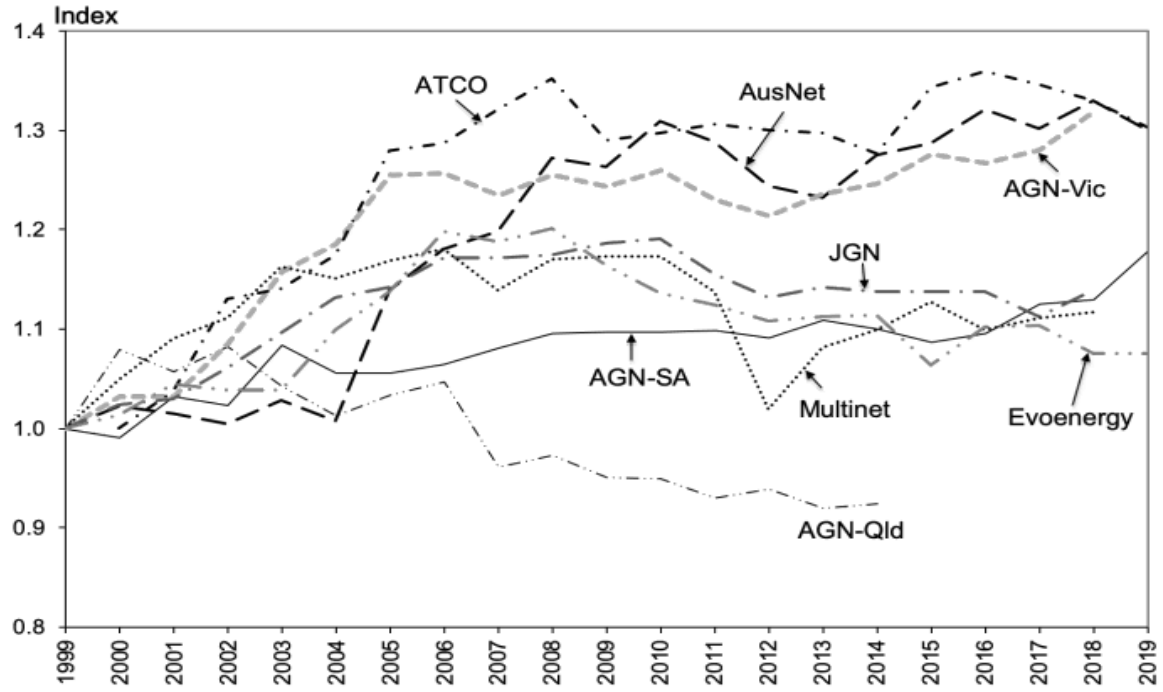
While the report focussed on AGN South Australia, it did provide an overview of AusNet's results and outcomes, which makes it relevant for our purposes.

1.4.1 Productivity growth – key outcomes

As outlined in Economic Insights' report, the comparative TFP indexes in Figure 1.4.1 involved forming indexes of outputs and inputs using the Fisher index method. The analysis includes three outputs (throughput, customer numbers and system capacity) and eight inputs (opex, lengths of transmission pipelines, high pressure pipelines, medium pressure pipelines, low pressure pipelines, and services, numbers of meters and other capital). The time series TFP indexes use the first year of data (typically 1999) as the base-year for each individual GDB, and the analysis provides estimates of TFP growth over the period 1999 to 2019.

Figure 1.4.1 shows the productivity growth across the sampled GDBs, including AusNet's average annual TFP growth from 1999 to 2019 of 1.3%. While our average annual change is relatively high, it is lower than the growth rates for AGN Victoria (1.5%) and ATCO (1.4%). In comparison, AGN South Australia's average growth rate was 0.8% per year.

Figure 1.4.1: Comparative TFP indexes, 1999-2019



Source: Economic Insights 2020, The Productivity Performance of Australian Gas Networks' South Australia Gas Distribution System, Report prepared for Australian Gas Networks, 15 June, Figure 3.4.

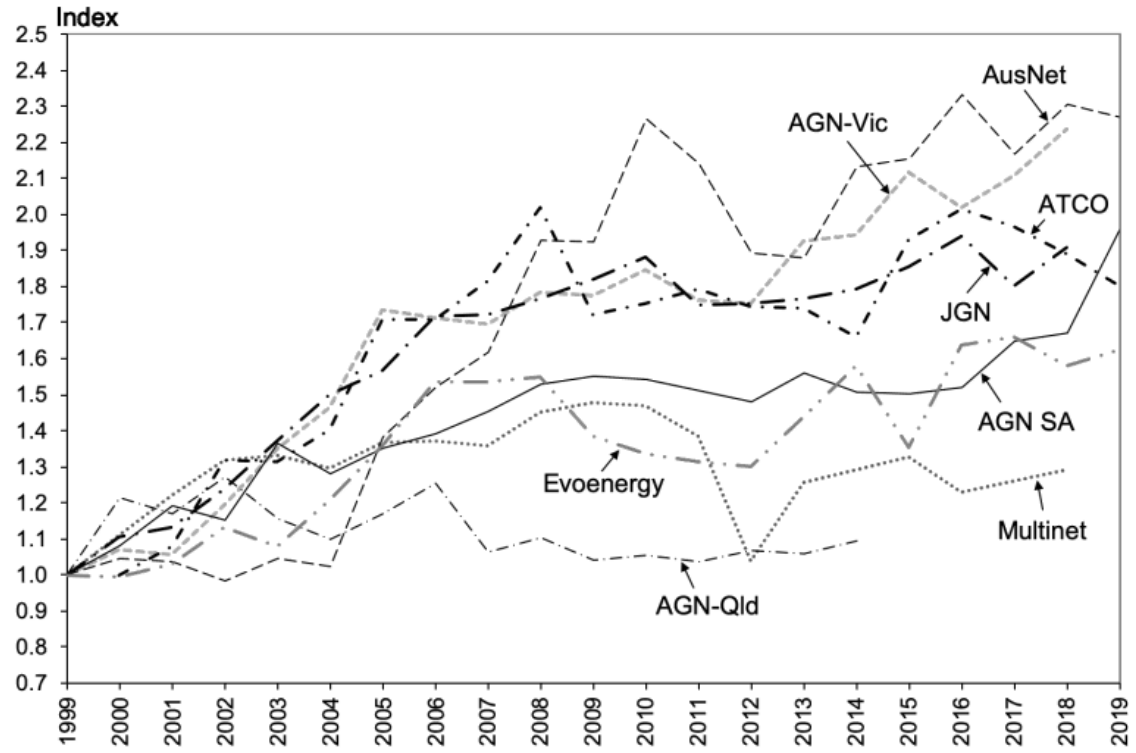
Figure 1.4.2 below compares the opex PFP across the sampled GDBs. AusNet's average opex PFP growth over the period from 1999 to 2019 was 4.2%, which is higher than the average for all GDBs (2.9%). Of the sampled GDBs, only AGN Victoria's growth exceeded our growth rate (4.3%).

[8] Economic Insights 2020, The Productivity Performance of Australian Gas Networks' South Australia Gas Distribution System, Report prepared for Australian Gas Networks, 15 June, p. 2.
[9] Economic Insights' analysis included the following Australian GDBs: AGN (South Australia), AGN (Victoria), AGN (Queensland), Multinet Gas (Victoria), AusNet (Victoria), Jemena Gas Networks (NSW), ATCO Gas Australia (Western Australia) and Evoenergy (ACT).

As Economic Insights' pointed out:

- For most GDBs, Opex PFP growth was particularly strong in the period from 1999 to 2007 (averaging 5.5 per cent per year for all GDBs) but was relatively weak in the following period from 2007 to 2014 (averaging 0.7 per cent per year for all GDBs).
- In the period 2014 to 2019, Opex PFP growth increased (averaging 2.0 per cent per year for all GDBs). In this period AGN SA's Opex PFP growth was particularly high (averaging a 5.4 per cent increase per year).

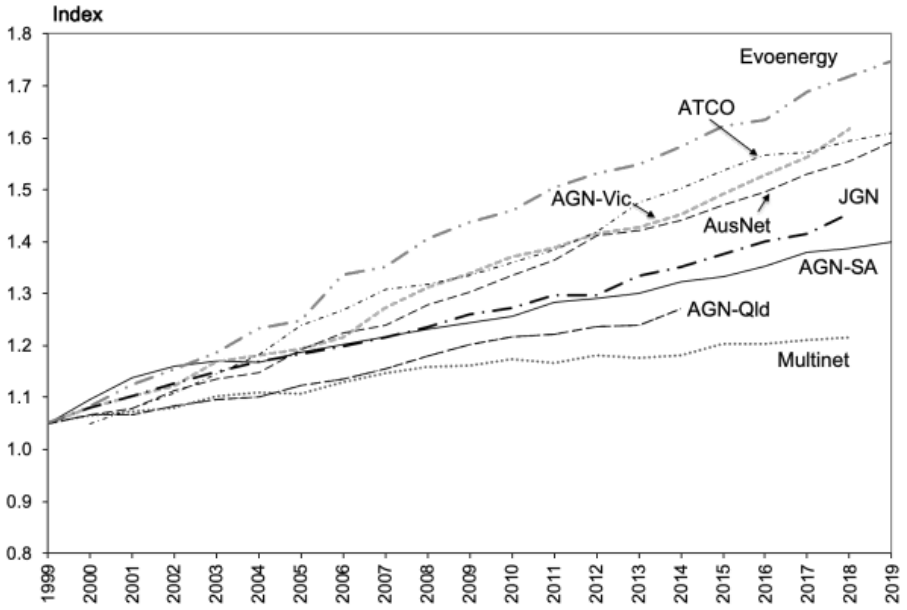
Figure 1.4.2: Comparative opex PFP indexes, 1999-2019



Source: Economic Insights 2020, The Productivity Performance of Australian Gas Networks' South Australia Gas Distribution System, Report prepared for Australian Gas Networks, 15 June, Figure 3.5.

Figure 1.4.3 below shows the comparative output indexes, where the average increase from 1999 to 2019, across all sampled GDBs is 1.9%. In comparison, AusNet's output growth was higher, averaging 2.2% over the same period. While our output growth was relatively high, two other GDBs experienced higher output growth – Evoenergy at 2.7% per year and AGN Victoria at 2.4% per year.

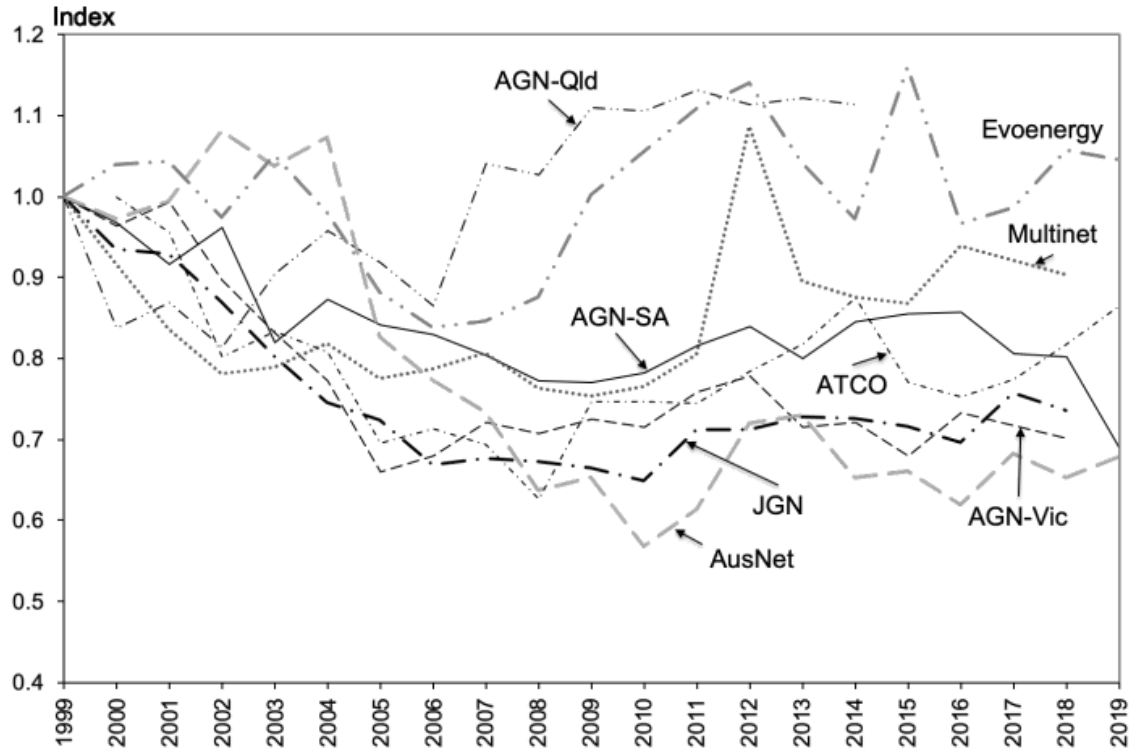
Figure 1.4.3: Comparative output indexes, 1999-2019



Source: Economic Insights 2020, The Productivity Performance of Australian Gas Networks' South Australia Gas Distribution System, Report prepared for Australian Gas Networks, 15 June, Figure 3.7.

Figure 1.4.4 shows the comparative opex input indexes, where AusNet's average rate of change of opex inputs was a reduction of 1.9% per year (1999 to 2019). The average across all sampled GDBs, for the same period, was a reduction of 0.9% per year.

Figure 1.4.4: Comparative opex indexes, 1999-2019

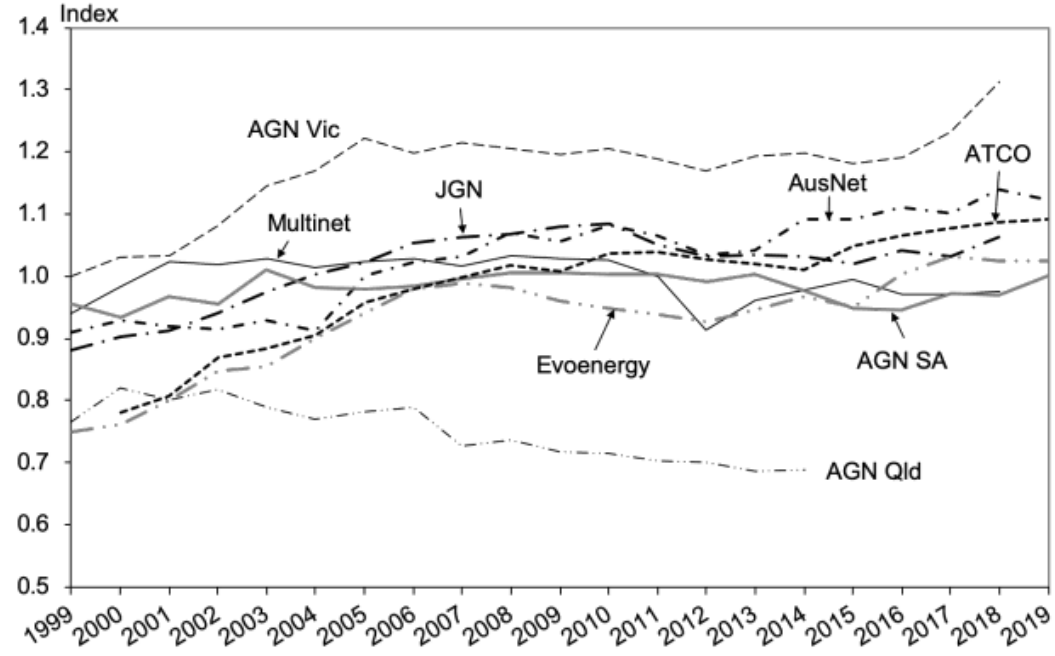


Source: Economic Insights 2020, The Productivity Performance of Australian Gas Networks' South Australia Gas Distribution System, Report prepared for Australian Gas Networks, 15 June, Figure 3.8.

1.4.2 Productivity level – key outcomes

Figure 1.4.5 below shows the MTFP results, where AusNet's MTFP at 1.13 is ranked second of all sampled GDBs. AGN Victoria has the highest MTFP at 1.37. With the exception of AGN Queensland, the other sampled GDBs enjoyed significant gains in productivity over the period.

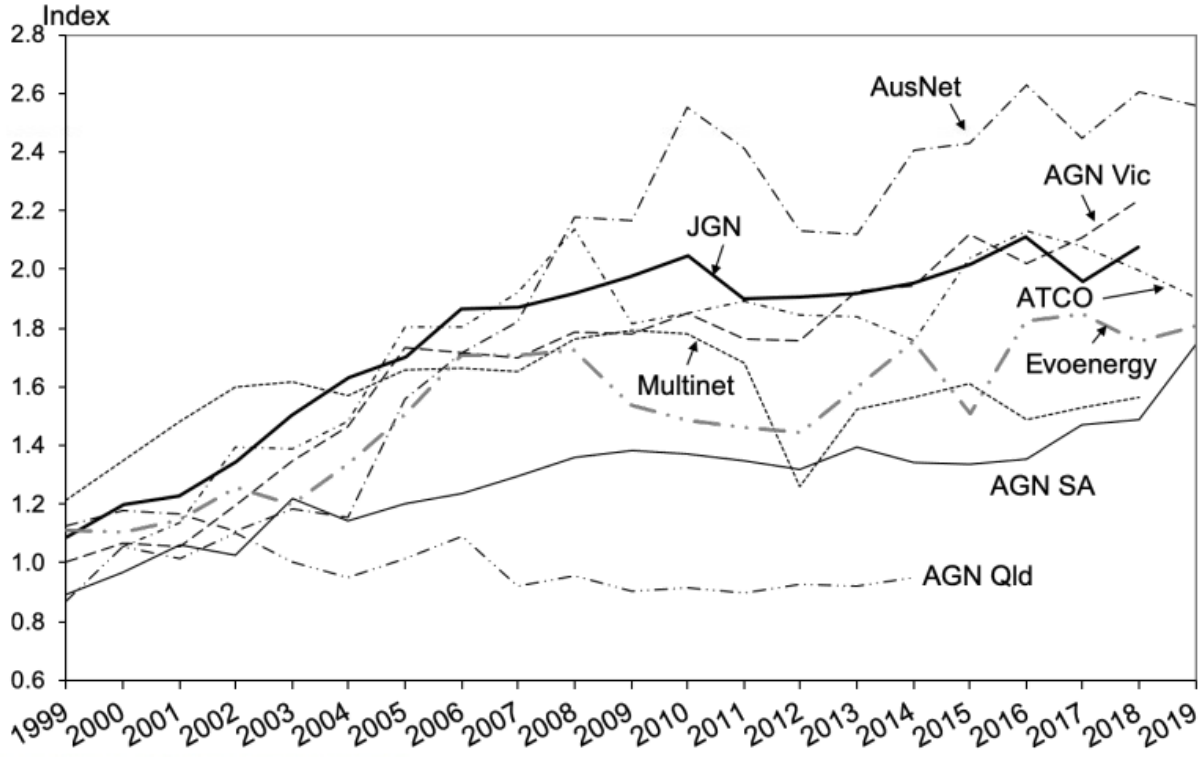
Figure 1.4.5: GDB multilateral TFP indexes, 1999-2019



Source: Economic Insights 2020, The Productivity Performance of Australian Gas Networks' South Australian Gas Distribution System, Report prepared for Australian Gas Networks, 15 June, Figure 4.1.

Figure 1.4.6 below compares the levels of opex PFP, where AusNet's opex PFP level was the highest at 2.56 in 2019. AGN Victoria had the second highest opex PFP level at 2.24 in 2018.

Figure 1.4.6: GDB multilateral opex PFP indexes, 1999-2019



Source: Economic Insights 2020, The Productivity Performance of Australian Gas Networks' South Australian Gas Distribution System, Report prepared for Australian Gas Networks, 15 June, Figure 4.2.