Attachment 7.13

Response to Draft Decision:
Opex Productivity in the Gas Distribution Industry

A report by Huegin

2016/17 to 2020/21 Access Arrangement Information
Response to Draft Decision

Australian Gas Networks

The use of economic benchmarking in the gas distribution industry

Review on the application of an opex productivity factor for Australian Gas Networks

huegin

www.huegin.com.au

Executive summary

Observations from the electricity industry

The economic benchmarking techniques used in AGN's Access Arrangement are similar to those used in the electricity distributions Determinations. These techniques have been shown to be sensitive to model specification and modeling technique. In addition, the use of economic benchmarking in the electricity industry has followed extensive consultation with industry and numerous adjustments to the AER's models. The lack of consultation with the gas industry amplifies the risks of regulatory error when relying on economic benchmarking to inform Access Arrangements.

Compliance with the regulatory framework

The Expenditure Forecast Assessment Guidelines and National Gas Rules provide a useful framework from which to assess the benchmarking conducted by the AER. We believe the application of an annual productivity adjustment for AGN contravenes this framework.

The justification for a productivity adjustment is overstated

Much of the evidence presented by the Australian Energy Regulator in AGN's Access Arrangement to justify an annual productivity adjustment is overstated. More accurate estimates of industry productivity are likely to be much lower than those presented.

Productivity growth is firm-specific

Changes in productivity growth should incorporate the individual circumstances of the business being analysed. The AER have used the circumstances of a different gas distributor to arrive at an annual productivity adjustment for AGN. This contradicts the principles set out in its Expenditure Forecast Assessment Guideline and also clause (2) (b) of Rule 74 of the National Gas Rules

Contents

Economic Benchmarking - Observations from the electricity industry

The productivity factor used by the AER has been derived using techniques similar to those undertaken in recent electricity industry benchmarking and determination efforts. The main difference is the level of consultation and analytical rigour evident in those efforts compared to that which the AGN decision relies upon.

1

Economic benchmarking - observations from the electricity supply industry

The Australian Energy Regulator (AER) has used economic benchmarking techniques to estimate a productivity adjustment for Australian Gas Networks (AGN) over the forthcoming Access Arrangement. These benchmarking techniques are similar to those adopted in the AER's recent Determinations for the electricity supply industry[1].

A brief summary is provided below of the AER's application of benchmarking techniques in the electricity supply industry followed by discussion of the difficulties with the application of these techniques in the gas industry.

The AER's approach in the electricity supply industry

The AER used three economic benchmarking techniques in its recent electricity distribution determinations[2]. These were;

1) Stochastic Frontier Analysis (SFA) - an econometric technique that uses maximum likelihood estimators to split the residual from an econometric model into a random error component and an inefficiency component. This inefficiency component is then used to estimate the efficient level of opex a business should operate within given its network characteristics,

2) Multilateral Total Factor Productivity (MTFP) - a technique different to SFA because it doesn't estimate a relationship between opex and different cost drivers but uses the ratio of an aggregated index of outputs and and an aggregated index of inputs to provide a productivity comparison between businesses. These different levels of productivity are then used to infer relative efficiency differences between businesses, and

3) Multilateral Partial Factor Productivity (MPFP) - an indexing technique that uses the same aggregated output index as in MTFP but using capital or opex as the sole input. For example, an opex productivity score would be calculated using the the aggregated set of outputs as in the MTFP model but with operating expenditure as the only input.

The SFA analysis, with customer numbers, ratcheted peak demand, circuit length, share of network underground and a time variable as model variables, was used to provide an estimate of both the efficient opex in a business's base year[3] and an estimate of a future productivity adjustment value. The MTFP and MPFP techniques were mainly used as a cross-check on the results of the SFA analysis and not used to directly estimate an alternative opex value for each of the distribution businesses (DNSPs'). The outcomes for each of the DNSP's along with the current stage of the determination process are detailed below.

Business	Adjustment to base opex	Ongoing productivity adjustment	Stage in process
ActewAGL	36% reduction	0%	Under appeal
Ausgrid	35% reduction	0%	Under appeal
Endeavour Energy	No reduction	0%	Under appeal
Essential Energy	26% reduction	0%	Under appeal

1 The term industry supply is used to describe both the electricity distribution and transmission businesses

2 Ordinary Least Squares was also used as a cross check of the results obtained from the Stochastic Frontier Analysis model

3 A business's base year is the starting point from which the AER adds additional opex over time associated with growth in outputs and changes in regulatory conditions. For example if a business nominated 2014 as its base year and received no reduction this means that its opex in 2014 has been judged to be an appropriate starting point from which to forecast changes in future opex.

Business	Adjustment to base opex	Ongoing productivity adjustment	Stage in process
Ergon Energy	No reduction	0%	Final Determination
Energex	No reduction	0%	Final Determination
Jemena	No reduction	0%	Draft Determination
CitiPower	No reduction	0%	Draft Determination
Powercor	No reduction	0%	Draft Determination
United Energy	No reduction	0%	Draft Determination
AusNet Services	No reduction	0%	Draft Determination
SA Power Networks	No reduction	0%	Final Determination

The table above shows that for most of the businesses, the opex proposed as the starting point from which to apply the base, step, trend approach was accepted by the AER. Also, for the industry as a whole, declining productivity between 2006 and 2013 meant that an annual productivity adjustment of 0% was applied for all electricity distributors.

Whilst industry consultation on the AER's approach to benchmarking began in 2012, there remains significant debate and controversy surrounding the AER's application of economic benchmarking results in recent Determinations. As of January 4, 2016 the AER's use of economic benchmarking to inform expenditure forecasts was under review by the Australian Competition Tribunal.

Some of the limitations of using the economic benchmarking models to determine the future opex of electricity distributors are outlined below.

Limitations of the economic benchmarking techniques in the electricity industry

Some of the key issues encountered in the use of benchmarking in the electricity industry have been:

1) Model specification limitations - Changes in the variables used along with the imposed relationship between these variables and opex can result in different efficiency scores between businesses,

2) Choice of modelling technique - Different modelling techniques can lead to different efficiency scores, in the case of electricity distribution these differences were exacerbated by the use of the 5th placed business as the efficiency comparison point, and

3) Issues with data comparability - Different accounting practices and variable definitions will lead to different efficiency scores between benchmarked businesses.

Each of these issues is discussed below.

1) Model specification limitations

There remains no consensus on the right specification for benchmarking electricity networks. Decades of literature has not arrived at a consistent definition of inputs and outputs. Most glaringly, circuit length is considered as an input by some models and an output by others. The AER's preference for an econometric model required more data than available in Australia. Econometric models measure the relationship between changes in opex and changes in different network characteristics (such as customer numbers, circuit length etc). The difficulty with estimating an econometric model in the electricity industry (and in the gas industry) is the lack of variation in these variables over time. For example, measures of circuit length, customer numbers and the share of network underground are unlikely to exhibit sufficient variation over time to provide an accurate estimate of the

relationship between opex and network characteristics. Put simply, if theres is little change in variables over time then it is difficult to measure how these variables impact opex. This means that there is limited benefit in making a dataset longer (the addition of more years of data) because there is unlikely to be a subsequent increase in the variation of the dataset. What is required is the inclusion of more businesses, making the dataset wider, to increase the variation in the sample. In the case of the AER's electricity distribution benchmarking, the AER decided to include data from New Zealand and Ontario, Canada. Whilst for the electricity transmission industry this meant abandoning an econometric approach and using MTFP and MPFP.

The introduction of data from NZ and Ontario, Canada has limited the consideration of model variables to a very small subset of what is available in Australia. It is unlikely that the variables that exist in the small union of data from the three jurisdictions would happen to coincide with those that best represent a robust model of electricity network opex efficiency.

Despite industry consultation commencing in December 2012 there remains uncertainty over the legitimacy of a single econometric model to adequately reflect the cost function of a heterogeneous set of businesses[4]. The distinctly different operating environment of businesses has meant that small changes in model specification can lead to significantly different results in terms of both industry rank and associated efficiency score.

> *"Australian DNSPs exhibit variation not seen in many other countries or regions. There are only 13 networks, and they range from extremely small, very high density, to extremely large, very low density. They are impacted by all manner of different environmental factors. There is no reason to think that any statistical relationship could be found which holds true for networks of such different character. For this reason, econometric benchmarking may be, at best, of very limited utility.*
>
> Page 46 Networks NSW Submissions, Australian Competition Tribunal

In the context of gas benchmarking, we believe the difficulty of applying a single model to a diverse set of businesses would be just as relevant. Measuring productivity change requires measurement of the relationship between outputs, inputs and environmental variables over time. Invariably, the largest influence over the benchmarking results relates to what the analyst decides are the industry outputs. Whilst this topic was the subject of exhaustive discussion in the benchmarking of electricity distributors it has received relatively little attention in the context of benchmarking in the gas distribution industry. Given how highly correlated variables are within this industry (i.e. businesses that have a large customer base are also likely to have high throughput, line length, system capacity, etc.), small changes in model specification can have a significant impact on the results.

Using two examples the AER made reference to in AGN's Draft Decision highlights this point. These examples are from productivity studies conducted by Economic Insights (on behalf of Jemena Gas Networks) and ACIL Allen Consulting (on behalf of ActewAGL). The differences between the estimates produced by the two models are highlighted on the following page.

4 A number of businesses have appealed the AER's application of economic benchmarking, as of 4 January 2016 this appeal remained in front of the Australian Competition Tribunal

Estimated coefficients using Stochastic Frontier Analysis

Two models, two different outcomes

Economic Insights and ACIL Allen have both conducted Stochastic Frontier Analysis studies of gas network productivity in Australia.

Whilst both studies use the same econometric technique - stochastic frontier analysis - they yield vastly different estimates of the relationship between energy throughput and customer numbers on operating expenditure. The coefficients from each model are compared below. These coefficients form the basis for opex productivity estimates, consequently the decision of which model is selected will influence the size of the opex productivity adjustment applied. The coefficients below represent the respective cost elasticities of the different variables. For example in the second row (Customers) the estimated coefficients are 0.127 and 0.501. This means that a 1% increase in customer numbers will result in a 0.127% (Economic Insights) or 0.501% (ACIL Allen) increase in opex [5].

The results highlight the sensitivity of econometric models to model specification. An econometric model uses the variation of the chosen variables to explain the changes in operating expenditure. In the example below, the inclusion of variables for the proportion of network that is made up of non cast iron mains and network fragmentation result in significant changes in the estimated cost elasticity for customers and energy throughput.

Variable	Economic Insights Coefficients	ACIL Allen Coefficients
Energy	0.238	-0.0634
Customers	0.127	0.501
Customer density	-0.9977	-0.531
RAB	0.6349	0.685
Technology	-0.0071	-0.00466
Non cast iron mains	-0.3556	
Network fragmentation	0.0946	

5 Page 31 Productivity study ActewAGL Distribution Gas Network, ACIL Allen and page 50 JGN Opex efficiency and future productivity growth, Economic insights

2) Sensitivity to the chosen technique

Techniques used in the AER's economic benchmarking in the electricity industry included econometric analysis (SFA), multilateral partial factor productivity (MPFP) and multilateral total factor productivity (MTFP).

The decision on which approach to use will have a large impact on the recommended productivity adjustment. This is because the two techniques often included different variables and will therefore show different changes in the relationship between opex and the chosen outputs over time. Partial factor productivity shows the historic change in the ratio of an aggregated set of outputs to opex making no consideration of explanatory variables such as asset age or asset dispersion. This historic change in the ratio is then used as the appropriate productivity adjustment in the future - this approach was used in the recent electricity transmission Determinations.

Econometric analysis is different in that it measures the relationship between opex and a number of different explanatory variables. This allows for forecast data to be used to estimate the impact of changes in these variables to opex and therefore arrive at an opex productivity forecast that is unique to each business's circumstances. Using this approach means a number of explanatory variables (to the extent that data is available) that impact opex can be included in the analysis.

In the recent electricity distribution determinations the technique that was adopted (opex partial productivity or stochastic frontier analysis) resulted in significantly different estimates of efficiency when compared to the frontier firm[6]. In the context of benchmarking in the gas industry, it is likely that benchmarking results would also be sensitive to changes in the modelling technique selected.

3) Issues with data comparability

In addition to the sensitivity of the benchmarking results to model specification and technique selection, there remains uncertainty around the comparability of data between businesses. One example in the context of the recent benchmarking of the electricity distribution industry was the different Cost Allocation Methodologies (CAMs) between businesses. Given that any productivity assessment measures the amount of opex used to produce a set outputs, differences between what constitutes opex between the businesses benchmarked will impact on efficiency results. Businesses that have higher capitalisation policies will benefit using the AER's opex benchmarking as more expenditure is classified as capex relative to other businesses.

In addition to differences in CAMs, differences in opex between businesses may be a consequence of different network strategies in the operation and maintenance of a network. For example, a business may choose to prolong the use of assets, delaying or deferring its replacement. This has the effect of increasing the maintenance opex required and delaying or deferring subsequent capital expenditure. Whilst both strategies may be appropriate given the circumstances of a businesses, opex benchmarking will favour businesses that choose to replace assets earlier and avoid the maintenance expenditure associated with ageing assets.

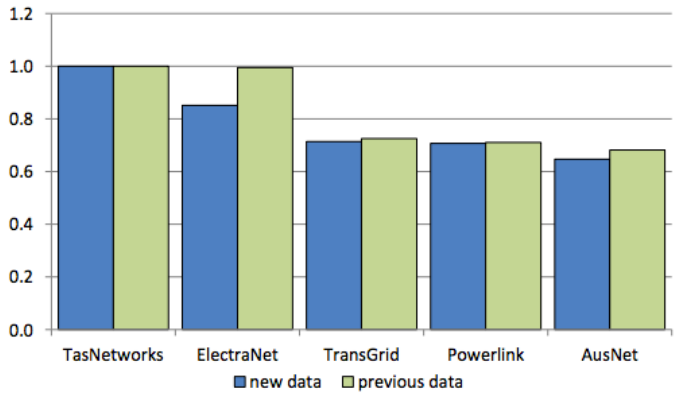
The interchangeability of opex and capex mean that focusing only on opex can result in inaccurate efficiency estimates between businesses. It should be noted that the Ontario Energy Board and Office of Gas and Electricity Markets (Ofgem, the United Kingdom energy regulator) both use a measure of total costs when conducting economic benchmarking.

Whilst different accounting differences will impact opex comparisons, theres are also differences in how businesses measure physical variables that will have a significant impact on the results. The benchmarking used by the AER in the electricity transmission industry provides a good example of how differences in the measurement of physical variables can impact the results. The graph on the following page is taken from the AER's 2015 Annual Benchmarking Report and shows the changes in benchmarking scores for businesses between 2006-13 based on a change to the measurement of voltage-weighted entry and exit connections (used as an output). The change in efficiency is significant for ElectraNet and highlights how a change in the measurement of variables leads to significant differences in productivity results. Updating how the AER defines exit and entry connection points means that ElectraNet's average productivity score between 2006-13 has fallen by almost 20%.

6 Although the rankings were similar.

The green bars represent the productivity score of the transmission businesses in the 2014 Annual Benchmarking Report whilst the blue bars are the scores when using a different output definition in the 2015 Annual Benchmarking Report.

Figure 5 Average MTFP index scores for 2006–13[7]



Benchmarking uncertainties are amplified in the gas industry

With the application of the AER's economic benchmarking under review by the Australian Competition Tribunal it is difficult to say whether the benchmarking approach used will endure beyond the current regulatory period. In the context of using benchmarking in the gas industry, the uncertainty is amplified by the lack of publicly available and audited data, fewer comparison firms and no industry consultation.

The first step in the measurement of productivity change (the change in outputs relative to the change in inputs) is to define what the industry outputs are. This process of defining industry outputs and inputs began in electricity distribution in December 2012 with the AER's Issues Paper[7] followed by industry workshops, Draft Guidelines[8], Final Guidelines[9] a Draft Benchmarking report and then a Final Benchmarking report [10]. At each step stakeholders were able to submit feedback and independent analysis and in many cases this resulted in changes to the approach used by the AER.

If economic benchmarking is going to be used to inform decisions in the gas industry then we believe a similar consultation process needs to be followed to define which variables should be measured and which approaches are feasible in the gas industry. AGN's Access Arrangement provides an example of why a consistent measurement of outputs is required. Whilst the AER uses energy throughput and customer numbers to measure output, the reports used to inform AGN's productivity adjustment uses only customer numbers. Without a consistent definition of a gas distribution businesses outputs there will continue to be varying estimates of productivity and productivity change between businesses. In addition, industry participation and consultation was assisted by the collection of a consistent and audited dataset that businesses could use to test different model assumptions, this is currently not the case for the gas industry.

The timeline below highlights the process followed by the AER in arriving at its 2014 Annual Benchmarking Report which outlined the productivity differences between both electricity distribution and transmission businesses from

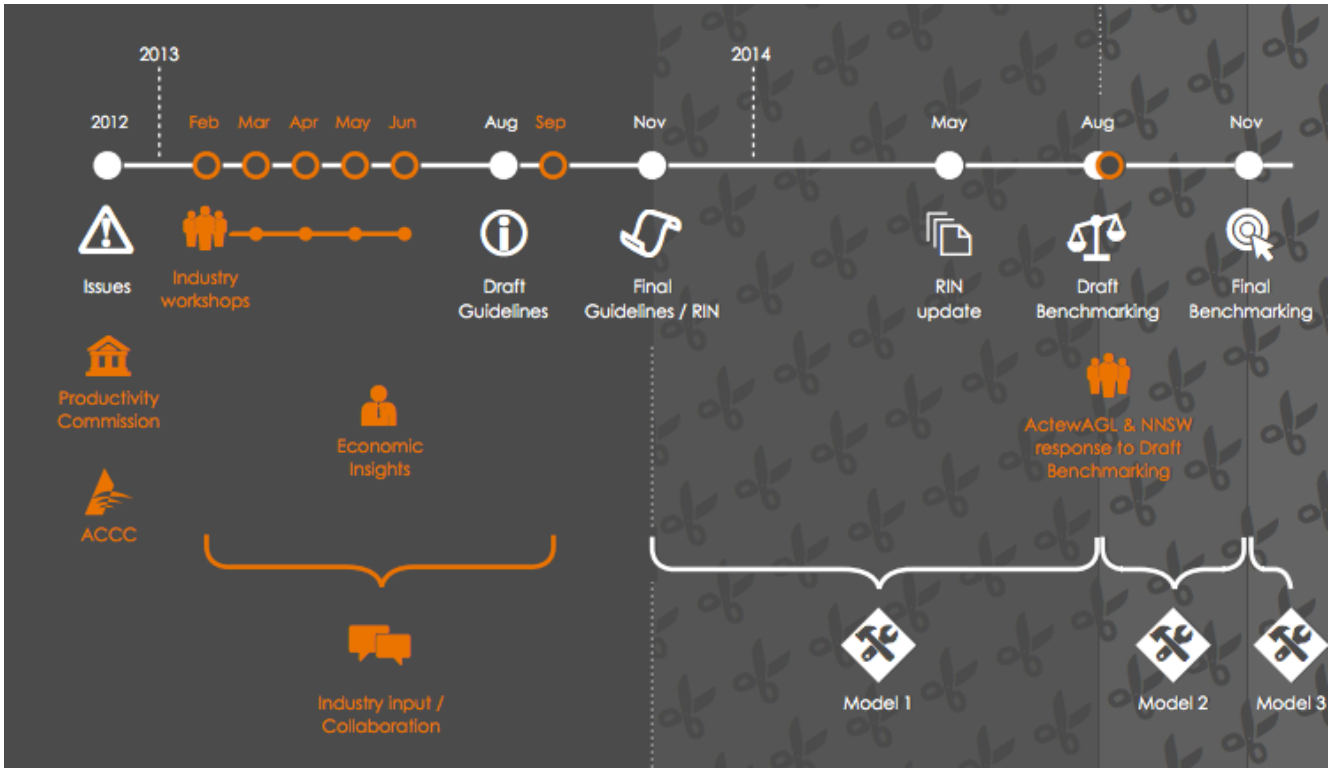
7 AER Issues paper - Expenditure forecast assessment guidelines for electricity distribution and transmission, 20 December 2012

8 AER Explanatory statement - draft expenditure forecast assessment guideline - August 2013

9 AER Explanatory statement - expenditure forecast assessment guideline - November 2013

10 Annual distribution benchmarking report - November 2014

2006-13. This process continues to evolve in response to industry feedback with subsequent alterations to its approach in the recently published 2015 Annual Benchmarking Report.



Compliance with the regulatory framework

The Expenditure Forecast Assessment Guidelines and National Gas Rules provide a framework for the use of economic benchmarking by the AER. We believe the AER's approach in setting an annual productivity adjustment does not comply with this framework.

2

There is a lack of compliance with the Expenditure Forecast Assessment Guidelines and the Rules

The decision to apply a 0.5% productivity adjustment factor to AGN's forecast opex is not based on a process that could be considered to accord with the principles of the Expenditure Forecast Assessment Guideline, nor comply with the National Gas Rules (NGR).

The Expenditure Forecast Assessment Guideline

The AER has adopted a practice similar to that used in the electricity supply industry in AGN's Draft Decision, yet with none of the associated requirements for robustness and transparency of the model specification and application process. Whilst adherence to the Expenditure Forecast Assessment Guideline (EFAG) principles during the application of the benchmarking process is still subject to consideration by the Australian Competition Tribunal through the current NSW and ACT appeals[11], the principles themselves provide a useful framework for evaluating the current approach used by the AER in AGN's Draft Decision. These guiding principles outlined in the EFAG[12] are:

1. Validity
2. Accuracy and reliability
3. Robustness
4. Transparency
5. Parsimony
6. Fitness for purpose

We believe that compliance with these principles has not been demonstrated in AGN's Draft Decision. The exhibit on the following page represents an assessment of the attributes of the model and process that has led to the AER decision for AGN against the principles of the Expenditure Forecast Assessment Guideline.

The productivity factor is intrinsically driven by the model specification and the data used in the benchmarking analysis. Setting aside the concerns with reliance of productivity estimates upon industry data and model specification there has been little adherence to the principles listed above. Specifically, there has been limited consideration of operating environment factors and no justification of why the models used to inform the productivity adjustment are appropriate. In addition, the limitations of the econometric modelling (rendering the technique unreliable in the context of determining relative efficiency) also implies they are unreliable for the estimation of productivity adjustments.

Whilst in this case the AER has used the model and technique only for the productivity adjustment and not comparative efficiency analysis, the value of the productivity adjustment cannot be validated due to the lack of compliance with the aforementioned principles.

We are of the opinion that the productivity adjustment outlined in the Draft Decision cannot be considered to represent the best available under the circumstances particularly given the ACIL Allen reported figure of 0.5% doesn't use AGN's forecast data but is specific to ActewAGL's circumstances. As a result we believe that the AER's approach is not consistent with Rule 74 of the National Gas Rules.

---

11 Application under 71B of the National Electricity Law for a review of a distribution determination made by the Australian Energy Regulator in relation to Ausgrid pursuant to clauses 6.11.1 of Chapter 6 of the National Electricity Rules, 21 May, 2015

12 Page 2 Better Regulation: Expenditure forecast assessment guideline fact sheet, Australian Energy Regulator

Observations against the Guideline principles

The following table outlines each of the Guideline principles, the key attributes of that principle (as set out in the Expenditure Forecast Assessment Guideline) and our observations of the AGN decision against these principles and attributes.

Principle	Key Attributes	Observations in AGN Decision
Validity	o Must be appropriate for what is being assessed. o Should adequately account for factors outside the control of network service providers.	o A model of ActewAGL's network with ActewAGL's data is not appropriate for the assessment of AGN's productivity. o There has been no consideration of factors outside the control of AGN, because the model was not designed for that purpose - and therefore should not be used in the manner it has.
Accuracy & Reliability	o Produces unbiased results. o Produces consistent results. o Produce similar results under consistent conditions. o Tested and calibrated to satisfy need for accuracy and reliability.	o A model based on ActewAGL's data and a specification that lacks consideration of environmental variables is most unlikely to produce accurate and reliable results for an entirely different network operating in different conditions. o There is no evidence of testing or calibration of the model relied upon to set AGN's productivity factor.
Robustness	o Remain valid under different assumptions, parameters and initial conditions. o Must be complete. o Must not be lacking in some material respect.	o There has been no testing of the completeness or validity of the model referred to in the decision to use a productivity adjustment of 0.5% for AGN. o A productivity adjustment factor based on a model that has only customers as the output and only ActewAGL's data is unlikely to be a reasonable representation of AGN's productivity expectations.
Transparency	o AER or stakeholders must be able to test. o Results must be able to be assessed in the context of the underlying assumptions, parameters and conditions.	o The AER has accepted a productivity factor for AGN from a model that we can find no evidence of it testing or validating. o We note that in the electricity distribution determinations, the AER rejected every single econometric model put forward other than its own.
Parsimony	o Preference for a simpler technique when faced with choice of multiple techniques if measured equally against other principles.	o We argue that where AGN operates under the EBSS and has not been found to have materially inefficient revealed costs the simplest technique is to set a productivity adjustment factor of 0%.
Fitness for Purpose	o Appropriate technique for the given task. o Must be satisfied that the forecast reasonably reflects expenditure criteria.	o The AER has ignored AGN and their consultants own analysis in favour of analysis that was not designed to measure AGN productivity. o It is difficult to conclude that the application of a 0.5% productivity adjustment reasonably reflects the expenditure criteria when it has been somewhat arbitrarily selected from information not related to AGN's forecast or circumstances.

The National Gas Rules

Rule 74 (Forecasts and Estimates) of the NGR states that:

(1) Information in the nature of a forecast or estimate must be supported by a statement of the basis of the forecast or estimate.

(2) A forecast or estimate:

(a) must be arrived at on a reasonable basis; and

(b) must represent the best forecast or estimate possible in the circumstances.

It is our view that the basis of the productivity adjustment calculation as it applies to AGN has not been arrived at on a reasonable basis nor does it provide the best possible estimate in the circumstances. Specifically, we consider that:

1. The estimate of a forecast productivity adjustment has not been arrived at on a reasonable basis because:

    a) The productivity adjustment factor has been derived from a model that has not been rigorously tested or consulted upon;

    b) The data used in the model that has been relied upon for a productivity adjustment factor has not been sufficiently validated.

2. The estimate of a forecast productivity adjustment does not represent the best estimate possible in the circumstances because:

    a) The productivity adjustment has been calculated on the basis of data that is specific to a different gas distribution business.

In summary, the selective application of a productivity adjustment factor taken from a model and data that does not consider AGN's circumstances cannot sufficiently satisfy the criteria of the NGR. Given the existence of the EBSS (and associated argument that a productivity adjustment is not required) and the uncertainty around the method of calculating an appropriate productivity adjustment, Huegin considers that the application of anything other than a 0% productivity factor represents a decision that cannot be demonstrated to comply with principles outlined in the AER's Forecast Assessment Guidelines or the NGR.

The justification for a productivity adjustment is overstated

The comparisons with other productivity forecasts are misleading and overestimate the actual productivity gains that can be expected given AGN's circumstances.

3

The justification for a productivity adjustment is overstated

Even if one were to accept that a productivity adjustment was warranted in the context of the AGN forecast, the evidence presented does not constitute a cogent argument or compelling case for the adoption of a 0.5% productivity adjustment.

Comparisons with other productivity forecasts are misleading

In its justification for a 0.5% opex productivity adjustment, the AER refers to both of the other gas distributors (ActewAGL and JGN) that have "provided recent forecasts of improving gas distribution productivity"[13]. The table and figures used is included below.

Table 7.8 Productivity rates of change – gas distribution

	Productivity average annual change (%)
ActewAGL – forecast opex partial productivity growth 2016–21	0.5
JGN – forecast opex partial productivity growth 2015–20	0.59
AGN – forecast opex productivity growth 2016–21	0.0
Gas industry 2006–13	2.12

Source: ActewAGL, *2016–21 Access arrangement information, Productivity study – ActewAGL Gas distribution Network, Final report to JAM on behalf of ActewAGL*, 29 April 2015, p. 40; Jemena Gas Networks, *2015–20 Access arrangement information*, 30 June 2014, p. 31; and Australian Gas Networks, *Access Arrangement Information for Australian Gas Networks South Australian Natural Gas Distribution Network*, July 2015, Attachment 4.1.

Looking at these numbers we believe the AER has overstated the possible opex productivity adjustment for all three of AGN's comparison points in the table.

ActewAGL proposed a 0% productivity adjustment

For ActewAGL we note that a 0% productivity adjustment was proposed however the AER used a value of 0.5% that was taken from an ACIL Allen Report submitted by ActewAGL.

"

ActewAGL Distribution considers the incentive mechanism for achieving efficient costs to be preferable to an approach that involves both efficiency gains being targeted through the incentive mechanism as well as expected productivity growth being set through the application of a specified productivity growth rate. Having regard to the limitations of benchmarking and the tested incentive mechanism in place that ensures efficient costs are achieved, ***ActewAGL Distribution has not include a specified productivity growth target in the rate of change applied to forecast its efficient opex for the 2016-21 access arrangement period****.*

Page 17, Appendix 5.01 Opex base and trend forecast efficiency, ActewAGL

13 Page 7-36, Attachment 7 - Operating expenditure, draft Decision: Australian Gas Networks Access Arrangements 2016-21

In addition, the 0.5% is driven by the use of customer numbers as the sole output variable in ACIL Allen's model. This means that ActewAGL are expected to achieve returns to scale efficiencies of between 0.99% and 1.56% per annum over the forecast period despite forecasting a negative output growth over the period (due to declining energy throughput). The table below identifies the different components that comprise ActewAGL's opex productivity estimate. The 0.5% used for ActewAGL's determination is the average of the three models.

	Random Effects	FGLS	SFA
1. Economies of scale	0.99%	1.56%	1.08%
2. Technology	-0.03%	0.41%	0.47%
3. Environmental factors	0.68%	1.39%	0.95%
Opex Productivity (1+2-3)	**0.28%**	**0.58%**	**0.59%**

The table shows that it is the anticipated economies of scale (derived by using customers as a sole output) that leads to a positive opex productivity adjustment. We believe that this approach is inconsistent with the rate of change approach as output growth is defined using energy throughput and customer numbers whilst opex productivity is estimated using only customers as the output. Had an adjustment been made for the impact of forecast declining energy throughput (in effect eliminating the economies of scale component), ActewAGL's opex productivity estimate would have been negative.

JGN's six year productivity average is 0.22%

In regards to Jemena Gas Networks' productivity estimate of 0.59% we believe this number is also overstated in terms of productivity adjustments that AGN can reasonably achieve. For example using the productivity results from the final determination show that the average productivity growth rate between 2014/15 (-1.73%) and 2019/20 (0.92%) is 0.22%.

AER						
Price growth	0.43	0.39	0.57	0.78	0.92	0.96
Output growth	–4.20	0.11	0.39	0.27	0.20	0.23
Productivity growth	–1.73	0.14	0.62	0.52	0.83	0.92
Overall	**–2.12**	**0.36**	**0.22**	**0.54**	**0.28**	**0.27**
Difference	**–0.41**	**–0.23**	**–0.29**	**–0.35**	**–0.24**	**–0.24**

In addition, AGN's lower relative output growth and higher forecast RAB growth would both indicate a lower opex productivity growth rate using Economic Insights opex cost model[14]. Jemena's opex productivity growth rate is estimated using forecasts of Jemena's energy throughput, customer numbers, RAB, customer density and service area dispersion over the forecast period.

The gas industry comparison is based on incomplete data

The final piece of information the AER references is the gas industry productivity growth rate from 2006-13. Whilst the AER indicate that partial factor productivity estimates based on historic data may not be appropriate for the 2016-21 period we believe the estimated growth rate of 2.12% is misleadingly high. The 2.12% appears to come from an average of the results of 6 gas businesses, only 1 of which has a productivity score that has been updated to 2013, with 2 business having results from 2006-2010 and 3 businesses having results from 2006-2011.

14 Page 51, JGN Opex Efficiency and Future Productivity Growth., 27 February 2015

Given declining productivity scores throughout the industry, this 2.12% average will be higher than using the results for all businesses updated to 2013 to obtain an industry average.

Productivity growth is firm-specific

The AER has outlined its favoured approach for deriving firm-specific productivity growth forecasts in the Expenditure Forecast Assessment Guidelines. By relying on the 0.5% reported in ACIL Allen's Report, the AER is ignoring this approach.

4

Using ActewAGL's forecast productivity adjustment ignores AGN's circumstances

The AER's preferred approach to forecasting productivity growth was outlined in the Expenditure Forecast Assessment Guideline Explanatory Statement (emphasis added):

> *"*
>
> *If the productivity adjustment is to reflect the potential productivity change the NSP can achieve in the next regulatory control period, it should be:*
>
> 1. ***firm-specific***
> 2. *considered in combination with any base year adjustment. The proposed new approach addresses the first point by enabling us to derive a productivity forecast specific to the NSP by incorporating:*
>   - *forecast output growth*
>   - ***forecast changes in NSP specific business conditions***
>   - *forecast technological change*
>
> Page 36, Draft Expenditure Forecast Assessment Guidelines Explanatory Statement

The use of ActewAGL's productivity forecast uses the techniques endorsed in the AER's Expenditure Forecast Assessment Guidelines but incorporates the wrong data. To show why this is the case it is useful to see how the three different components of productivity change were derived to produce an estimate of 0.5%. Components of the forecast that are unique to each business are in bold.

	Derivation	Firm-specific?
Returns to scale	(1-customer coefficient) x (**forecast change in customers**)	Yes
Technology change	- Time coefficient	No
Operating environment	(RAB coefficient × **forecast change in RAB** + Customer density elasticity × **forecast change in customer density**)	Yes
Productivity estimate	Returns to scale + Technology - Operating environment	Yes

Note: The coefficients represent opex cost elasticity with respect to the different output and environmental variables used and forecasts are in percentages.

The table shows that ActewAGL's productivity forecast of 0.5% is based on its own forecasts for customers, RAB and customer density. If the AER is going to use the same approach to estimate AGN's productivity adjustment the forecasts used should be specific to AGN. By ignoring AGN's forecasts for each of these cost drivers the AER is ignoring the principles set out in its Expenditure Forecast Assessment Guideline and also clause (2) (b) of Rule 74 of the National Gas Rules.

Contact Details

Jamie Blair

Level 10, 2 Elizabeth Plaza, North Sydney, NSW 2060

t: +612 9409 2400
e: jblair@huegin.com.au

huegin