20 December 2018

Mr Sebastian Roberts
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Australian Energy Regulator
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Dear Mr Roberts,

AER draft decision paper on forecasting productivity growth for electricity distributors

AusNet Electricity Services Pty Ltd (**AusNet Services**) welcomes the opportunity to make a submission in response to the Australian Energy Regulator's (**AER**) draft decision paper on forecasting productivity growth for electricity DNSPs. AusNet Services supports the AER in reviewing its approach to applying a productivity adjustment.

The AER's approach to forecasting opex allows for a forecast of the shift in the productive frontier. However, there is currently no reasonable expectation of a positive shift in the productive frontier over the medium term. Given this, a forecast of zero frontier shift remains appropriate.[1] We do agree with stakeholders that undergrounding the distribution network minimises opex and so the growth in undergrounding of the network should be taken into account in forecasting opex.[2]

We consider the best approach available to address the issues raised in the AER's draft decision is to use the AER's econometric models for electricity DNSPs and apply them in the entirety.[3] While we suggest that the AER use its econometric models, we also consider the AER should do a comprehensive review of these models. In particular, the AER should examine whether their approach to adjusting for the proportion of undergrounding is producing a robust forecast of the change in costs driven by an increasing proportion of undergrounding. Further, the AER should examine econometric techniques to separate frontier shift and catch-up using econometric models.

Our suggested approach would allow for adjustments to be made to the opex forecasts for the proportion of undergrounding and the time trend (productivity) in addition to the adjustments already made for:

- Circuit length;
- Ratcheted maximum demand;
- Customer numbers; and
- Energy throughput.

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[1] It is important to distinguish this from catch-up, which is treated separately in the regulatory regime

[2] This should be treated as an adjustment to the output growth forecasts, rather than as a shift in the productive frontier

[3] The AER's econometric models currently forecast a positive time trend (negative productivity movements).

This ensures that the output growth, undergrounding and productivity estimates are derived from the same models, underlying data and provides an internally consistent and repeatable approach to forecasting productivity improvements in electricity DNSPs. In any econometric model there are some interdependencies between parameter estimates and even if any individual parameter estimate is either too high or too low, the model in its entirety should remain reasonable. For this reason, we have significant concerns with the AER using models from the gas distribution industry to set a productivity adjustment for electricity DNSPs. Choosing parameter estimates from unrelated econometric models means there is no consistency with the other adjustments made by the AER.

Regardless, the future productivity trends in the electricity industry would not be similar to the historical productivity trends in the gas industry for a number of reasons:

- The expected significant additional penetration of DER will add additional costs, whilst putting downward pressure on energy delivered. This results in downward pressure on productivity. The transformation of the role of the network is not occurring in gas DNSPs.

- Significant legislative change has driven increases in safety and vegetation management expenditure in electricity distribution. These programs are not yet complete and will continue to impact on productivity in the forthcoming regulatory period

As such, the productivity estimates from the gas industry should not be materially relied upon in the AER's decision.

We note there are tight timeframes for the AER in making the upcoming NSW decisions. However, in Victoria there is sufficient time available to address in detail the areas raised for further consideration in this review, including undertaking additional econometric modelling to improve the robustness of the results.

Please contact Michael Larkin, Senior Regulatory Economist on 03 9695 6346 with any questions in relation to this submission.

Sincerely,

Tom Hallam
General Manager, Regulation and Network Strategy
AusNet Services

Attachment – AusNet Services' submission to the AER draft decision paper on forecasting productivity growth for electricity distributors

This Attachment outlines issues relevant to the appropriate manner to adjust forecast opex for changes in productivity.

Introduction

The AER's approach to forecasting opex allows for a forecast of the shift in the productive frontier. However, there is currently no reasonable expectation of a positive shift in the productive frontier over the medium term. Given this, a forecast of zero frontier shift remains appropriate. We agree with stakeholders that undergrounding minimises opex and so the increase in undergrounding of the network should be taken into account when forecasting opex,

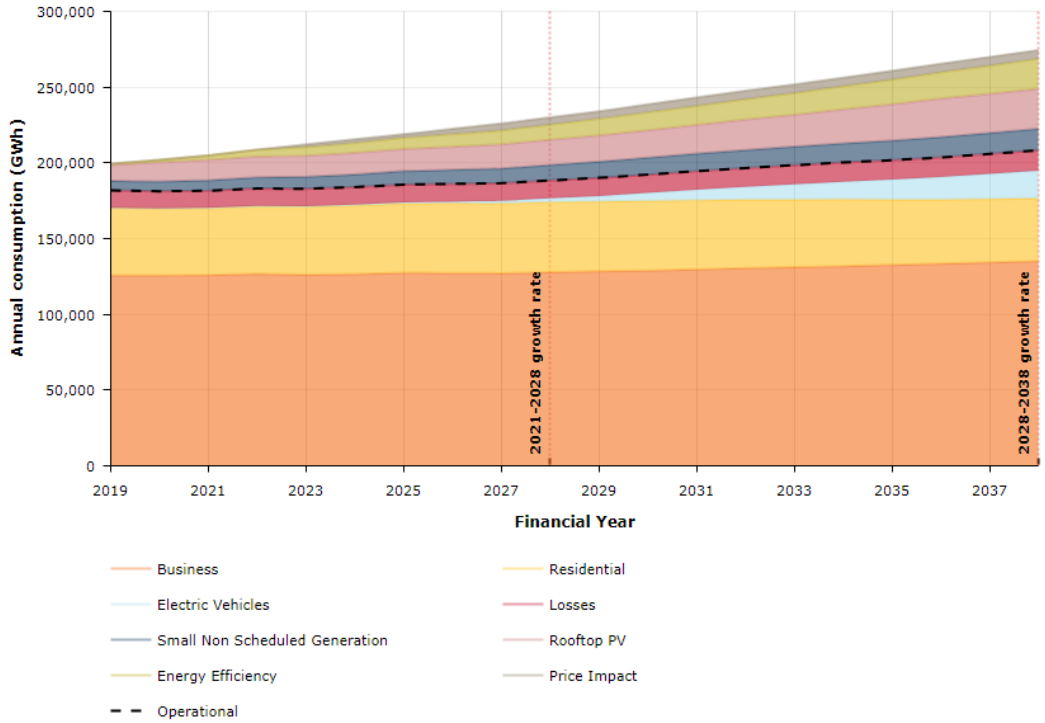
It is important to highlight that the AER's draft decision only concerns a productivity adjustment for 'frontier shifts' and that other, firm-specific productivity gains (catch-up) is treated separately in the regulatory regime. AusNet Services has enacted significant cost reduction programs in the 2016-2020 regulatory period, which has lowered opex and resulted in a significant improvement in productivity in 2017. We expect this trend to continue up to at least 2019. These productivity improvements are specific to AusNet Services and are an example of 'catch-up' rather than a shift in the productive frontier. Due to the operation of the Efficiency Benefit Sharing Scheme (EBSS) our customers capture 70% of the benefits of this catch-up and AusNet Services retains 30%. This provides a strong incentive for DNSPs to pursue operational efficiencies, while ensuring customers share the benefits. However, when looking at the broader operating environment for DNSPs, there is no reasonable expectation of a shift in the productive frontier over the medium term. Industry factors that drive this are:

- The transformation of the role of the network, particularly the expected significant additional penetration of DER. This will add additional costs, whilst putting downward pressure on energy delivered (an output in the AER's MPFP model) and so put downward pressure on productivity.

- Significant legislative change has driven increases in safety and vegetation management expenditure in electricity distribution. These programs are not yet complete and will continue to impact on productivity in the forthcoming regulatory period

The transformation of the electricity networks will have a particularly significant impact on frontier shift going forward. There has been an increasing proportion of electricity consumption being delivered by local generation and this trend is forecast to increase into the future, which will increasingly drive costs higher, while reducing a key output.

Figure 1 Energy consumption in the NEM (forecast)



Source: 2018 Electricity Statement of Opportunities (ESOO) – electricity consumption and demand forecasts

Proposed alternative approach to forecasting frontier shift

We consider the best approach available is to use the AER's existing econometric models for electricity DNSPs.[4] The AER already uses these models as the basis for forecasting the opex impact of growth in:

- Circuit length;
- Ratcheted maximum demand;
- Customer numbers; and
- Energy throughput.

The AER is proposing to also use these models to make an adjustment for the proportion of undergrounding in the network. This would leave only one component of these models that the AER is not applying (which is the time trend parameter). The time trend parameter captures trends in productivity that are not adequately captured by the combination of the other inputs and outputs. The AER should apply all elements of these models and we consider that this approach appropriate because it:

- Ensures that the output growth, undergrounding and productivity estimates are derived from the same models and underlying data. This minimises the risk of inconsistencies arising and if any individual parameter estimate is either too high or too low, the model in its entirety should remain reasonable.

[4] We note that we would support the AER undertaking a detailed process to re-examine these models in their entirety.

- Provides an internally consistent and repeatable approach for forecasting the shift in the productive frontier. In doing so this provides some certainty to the AER and DNSPs going forward and ensures that subjective decisions do not have a material impact on the forecast productivity.

- Ensures that there is no selective adoption of results from different models. This would allow the AER to choose a forecast from a menu of parameter estimates rather than applying robust econometric model in the entirety.

The time trend for the electricity DNSPs (in the AER's econometric models for 2012-17) indicates productivity decreases and so we consider the AER's previous approach of applying no productivity adjustment remains appropriate.[5]

Estimating Frontier Shift

AusNet Services does not consider that the AER's proposed adjustment to opex to account for a shift in the productive frontier is well justified. We have attached an independent expert report from Houston Kemp, which makes several key points:

- The productivity adjustment should reflect the net productivity change. Consideration should be given to the capex necessary to drive the productivity improvements. The AER does not specifically approve capex or opex to drive productivity improvements, so any necessary expenditure to improve productivity should be factored into the productivity adjustment.

- When evaluating the productivity parameter, the longest time period practical should be used, to ensure abnormal periods do not unduly impact the forecast.

- The AER needs to be careful not to conflate catch-up with frontier shift. The regulatory regime has other mechanisms to target catch-up efficiency and the AER should be diligent in separating the impacts.

The AER's draft decision is at odds with the above in the ways explained below. As a result, the MPFP analysis, the ABS labour productivity statistics and the econometric models from the gas industry all overestimate the frontier shift productivity improvements that can be achieved by electricity DNSPs.

Capital Expenditure

The AER has not considered any capital expenditure necessary to achieve productivity improvements and so the AER's proposed adjustment would overestimate of the net improvements in opex productivity. Of particular importance (because it directly impacts the estimate in the AER's draft decision) is that the impact of capital expenditure on the econometric models of the gas DNSPs has not been considered. This means that this element of the estimate would over forecast achievable net opex productivity improvements. Therefore, the estimates relied upon by the AER can, at best, be viewed as upper bounds.

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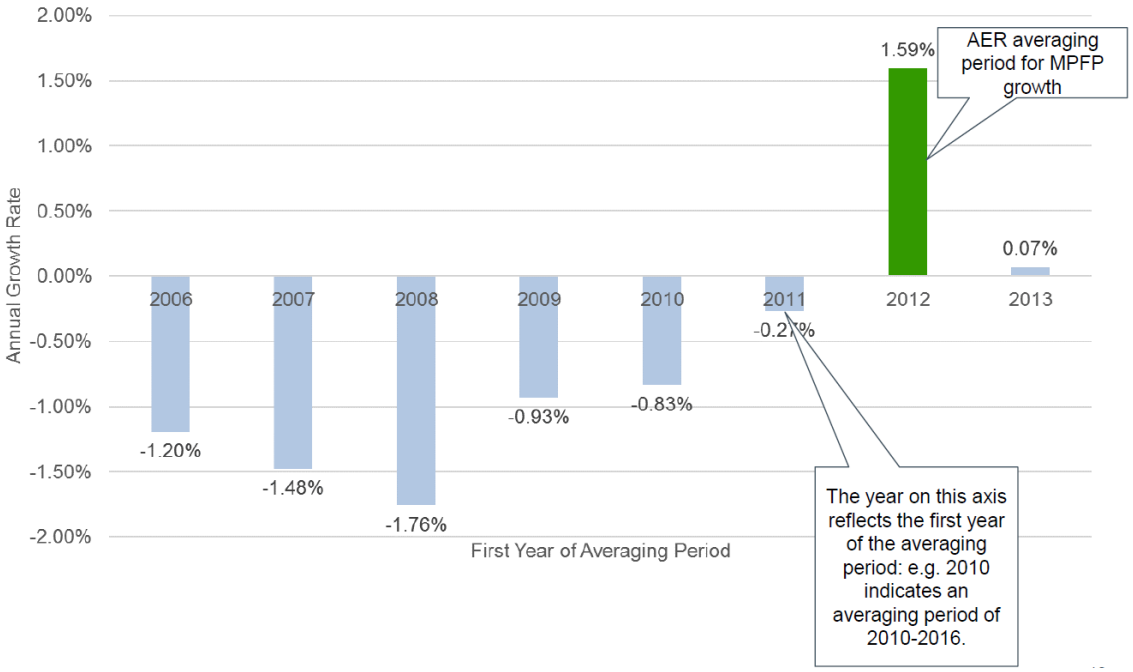
[5] We note that this time trend will include both catch-up and frontier shift. The AER should examine econometric techniques to separate these elements in this time trend to ensure it can be robustly applied in the future.

Time period

The AER's draft decision presented no detailed analysis of the decision to choose 2012 to 2017 as the appropriate time period to measure Opex MPFP. The observed growth in productivity is materially impacted by both the start and end year of the measurement period, which is shown in the Figure below.

Figure 2 Comparison of MPFP results with different time periods



Source: NERA economic consulting – Presentation to the AER productivity stakeholder workshop.

The selection of years prior to 2012 as the starting point all show a negative productivity trend and indeed choosing 2013 would only have a very small positive productivity trend. As per Houston Kemp's advice, we consider that it is preferable to use the longest data set available, to minimise the impact of short term changes in productivity. Where a short time period is used, there is a much greater chance that short term factors unduly impact the forecast and these may not be repeatable in future. These short term factors may impact in either a positive or negative manner at different times and so a short term average will always need considerable analysis to determine whether it is reflect of expected future productivity growth. We consider the period from 2012 onwards represents abnormally large productivity gains and so is not representative of a normal operating environment for DNSPs going forward:

- The privatisation of the NSW DNSPs has driven considerable productivity gains (noting that the AER has excluded Ausgrid and Essential Energy from its opex MPFP analysis).
- Changes in capitalisation approaches by DNSPs can have a very large impact on the observed productivity changes.
- TasNetworks merged the distribution and transmission networks in 2014 achieving considerable synergies.

In addition, we anticipate that increased uptake of DER will be a drag on DNSPs productivity going forward and is not fully reflected in the 2012-17 results. As such, we do not consider this short term approach reflects actual expected productivity growth in the 2021-25 regulatory period.

Separating Frontier Shift

The AER made an adjustment to separate frontier shift from catch-up in its opex MPFP analysis. Importantly, no adjustment for any catch-up was made when the AER examined the productivity of the Gas DNSPs or the labour productivity statistics from the ABS. As such, both of these estimates conflate catch-up and frontier shift and so are over estimates of the productivity adjustment.

In regards to the adjustment made to the opex MPFP, we consider that this adjustment was not sufficient to avoid conflating catch-up with a shift in the productive frontier. The AER excluded data from four firms that it considered materially inefficient. However, DNSPs are not either 'materially inefficient' or on the efficient frontier. Indeed, even the most efficient DNSP in the NEM is probably not operating at the efficient frontier.[6]

All other DNSPs will fall between these two extreme ends of the spectrum and would have experienced some degree of catch-up. It is preferable to use robust statistical techniques to separate frontier shift from catch-up to ensure this forecast only captures the frontier shift. This is a complex undertaking, however we consider the AER should commence progressing this work as soon as practicable. In the short term, focusing on a smaller subset of frontier firms may be appropriate. Unfortunately, even focusing on a smaller subset of firms does not account for catch-up experienced by those firms and introduces more subjectivity in selecting which firms to focus on.

Finally, we note that DNSPs treat capitalised overheads differently and that there is a wide diversity in the proportion of overheads capitalised. Some DNSPs have changed their approach to allocating overheads during the 2012-17 period, reducing the amount of overheads that are capitalised (treating more expenditure as opex) but the AER is excluding this change from their analysis. Our analysis indicates that the capitalisation approaches can drive material differences in the productivity results and counting all opex overheads lowers the apparent productivity growth after 2012. The AER should consider further the way in which they deal with overheads in their benchmarking dataset.

Figure 3 Comparison of opex MPFP results with different capitalisation approaches

	2012-16
AER benchmarking report	1.6%
Overheads adjusted to reflect opex as it impacts revenue	0.0%
Overheads adjusted to reflect average capitalisation rate of all DNSPs	1.1%

Source: AusNet Services analysis of AER data (various data sources).

The AER has used the opex MPFP analysis to identify a high end estimate of productivity improvements. However, for the reasons set-out above we consider this is overstating the shift in the productive frontier and should not be materially relied upon.

[6] The SFA CD model provides an estimate of the efficient frontier and indicates that Powercor is not operating at the efficient frontier.

Response to AER's questions

Our responses to the AER's questions are set out below.

Question 1: Are there any other sources of information, for example, any economy wide measures of productivity growth that we should take into account when we forecast opex productivity growth?

No

The AER has had regard to historical productivity trends in the gas distribution industry. This has no relevance to expected future trends for electricity DNSPs and should be discarded in the analysis. However, if the AER does consider the gas distribution industry, then it should give similar weight to the productivity trends in the electricity transmission industry, which is a better proxy for electricity DNSPs because:

- There is some substitutability between the workforce for electricity DNSPs and electricity transmission businesses, so drivers of labour productivity factors are closely related.
- Output measures used by the AER (particularly customers/end users, demand and energy throughput) are consistent between electricity distribution and electricity transmission when aggregated to the industry level. This ensures these factors are consistent in the measurement used.
- Speed of technological change is comparable, as advancements often have applications in both electricity DNSPs and Electricity TNSPs.
- Electricity transmission industry has had a faster pace of legislative change than gas distribution, which is more reflective of 'steady-state' electricity distribution legislative change.

The AER does not produce econometric models for the transmission industry. The available opex MPFP results could be used, but overall we consider it inadvisable to use either the gas or transmission industries in a material manner. As stated above opex MPFP is likely to overestimate the expected frontier shift so could only be used as an upper bound.

Question 2: Should all information sources be given equal weight or should we give greater or lesser weight to specific sources? If we should give greater or lesser weight to a specific information source, which source and why?

We consider the AER's econometric models from the electricity DNSPs should be used to determine the productivity adjustment, to provide internal consistency in the way in which opex is forecast. The other sources of information used by the AER should not be given substantive weight in its assessment. In particular, the gas DNSPs productivity trends should be given no weight.

Question 3: Do you agree that the time trend achieved by gas distributors is reasonably reflective of the time trend that electricity distributors can achieve? If not, do you think the gas results overstate or understate what can be achieved by electricity distributors? Why?

No.

The future productivity trends in the electricity industry would not be similar to the historical productivity trends in the gas industry for a number of reasons:

- The expected significant additional penetration of DER will add additional costs, whilst putting downward pressure on energy delivered (downward pressure on productivity). The transformation of the role of the network is not occurring in gas DNSPs.

- Significant legislative change has driven vast safety and vegetation management expenditure in electricity distribution. This continues to impact on productivity.

The time trend from the gas businesses is a product of the model specifications used and the data underlying these models. As such the time trend is specific to both those businesses and the modelling approach used and we can see no conceptual basis for directly using a modelled outcome from another industry. The time trend from the electricity distributors is more appropriate because:

- It is consistent with the model used to set other elements of a DNSPs opex forecast.

- If the AER considers the time trend from the electricity models is incorrect, then we question on what basis the rest of the model can be considered credible.

- As examined in the AER's OEF review, it is not possible to account for all drivers of efficiency change in the econometric models. The time trend in the econometric model would capture some of these other changes in the operating environment of the electricity DNSPs that are not sufficiently captured by the other inputs and outputs.

We are unsurprised by the positive time trend (negative productivity) seen in the electricity models. Further, the 2017 benchmarking report shows that the time trend remains positive (declining productivity) only using data from 2012-17. This appears to confirm the time trend in the longer time series models and that it reflects the circumstances of the electricity distribution industry.[7]

Question 4: Should we account for changes in the proportion of undergrounding when we forecast opex productivity growth?

We do agree with stakeholders that undergrounding the distribution network minimises opex and so the growth in undergrounding of the network should be taken into account in forecasting opex. However, we consider the AER should re-examine its approach to ensure that it is robust.

[7] At the AER's stakeholder forum the AER verbally indicated that this may be driven by the international data. If this is an important point then we request the AER provide some further analysis to clarify this. If the international trend is also indicates declining productivity in the electricity distribution industry, then the AER should explain why they expect positive future shifts in the frontier when both domestically and internationally there has been declining productivity.

As noted above, any adjustment for the growth in the proportion of undergrounding is more correctly characterised as an adjustment to the output growth forecasts, rather than as a shift in the productive frontier. Output growth forecasts already account for opex increases due to increasing circuit length and this forecast should be refined to capture the impacts of both underground and overhead circuit length. It adds unnecessary complexity and confusion to account for two related variables (increase in circuit length and increase in the proportion of underground circuit length) through two different opex trend parameters.

The proportion of undergrounding typically increases due to a growth in customer connections in estates that are required to be undergrounded i.e. new circuits are built underground, rather than replacing overhead with underground circuits. As such, there is not expected to be an overall reduction in opex from this increasing proportion of undergrounding. Instead this would be expected to manifest as a smaller impact from increasing circuit length. However, we note that the 0.5% estimate of the impact of undergrounding is larger than the output growth escalation for AusNet Services from increasing circuit length. Applying our average growth rates in circuit length the AER's models only indicate approximately a 0.1% increase in our opex each year to account for an increase in circuit length. This indicates that the relative size of the adjustments may incorrect as it is nonsensical for this adjustment to be larger than the output growth impact of increasing circuit length. The AER should consider revising its model specification to directly capture this change through the output growth parameters.

We also note that the DNSPs from which this adjustment is calculated have a wide range of underground penetration from 3.6% up to 55.7% with an average of 12.6% (over the period 2006-16). Similarly, the average growth rates seen by DNSPs vary from 1.4% up to 8.1%. We question if the adjustment can be credibly applied to DNSPs with such a wide range of observed penetrations. As an illustration, if Essential was to increasingly underground its network from 4.5% (in 2017) up to an average level of undergrounding of 12.6%, then the AER's modelling suggests that a 29% reduction in total opex could be achieved as a result of increasing the undergrounding. We do not consider this level of opex reduction is credible.

The AER has applied an average growth rate from across the electricity DNSPs, rather than applying a business specific figure or a forward looking forecast of the increase in underground circuits. A business specific forecast would be the preferable approach. This would at least ensure that the forecast of undergrounding is kept consistent with the growth in circuit length measure used as an output growth measure in the opex model. A forecast of the growth in both underground and overground circuit length is already required to be provided in the reset RINs.

Question 5: Should we account for economies of scale when we forecast opex productivity growth? If so, on what basis should we forecast economies of scale?

No. The AER's econometric models found no material economies of scale.

As stated above, we consider that the AER should apply their econometric models in their entirety. This means adjustments should not be made for factors that are not found to be significant using these econometric techniques.

Question 6: What is the best way to use quality adjusted labour productivity growth (both past and forecast) to inform our opex productivity growth forecast?

We consider this information should be informative only as it is an over estimation of the upper bound of labour productivity growth.

In examining the historical data set, no attempt has been made to separate catch-up from shifts in the productive frontier. The Australian utilities data used by the ABS is based on data from the electricity DNSPs (and the other firms the Electricity, Gas, Water and Waste Services industry group). The AER has excluded four firms from its MPFP analysis because there is some catch-up by electricity DNSPs, so this must similarly impact the ABS data. We are not aware of a way to try and separate frontier shift out in the ABS data. Further, there is no consideration of the capex necessary to achieve the observed productivity improvements. As such, consistent with Houston Kemp's advice outlined above, the results overstate the net productivity improvements.

The AER also provided a forward looking forecast prepared by its consultants Deloitte Access Economics. It is likely that this forecast is prepared on a consistent basis with the Electricity, Gas, Water and Waste Services industry historical dataset and so similarly the forecast includes both catch-up and frontier shift and does not account for any capital expenditure necessary to achieve productivity improvements.

Question 7: Are there any other forecasting approaches we should consider?

We are not aware of any other approaches that would be fit for purpose at this time.

Question 8: Which option do you consider to be the best approach to forecast opex productivity growth for a prudent and efficient distributor? Why?

We consider the best approach available is to use the econometric models for the electricity DNSPs in the entirety.

The AER considers these models are sufficiently robust to use to adjust DNSPs' base year expenditures and set output growth parameters. As explained above, it is not clear why the AER has disregarded a single element of the models it relies upon heavily in its decision making, and instead use an estimate derived from another model. This gives rise to the very real risk that the combination of output growth parameters, undergrounding and the productivity adjustment will not be consistent and not afford DNSPs an opportunity to recover efficient costs. If the AER chooses to disregard the time trend from these models, then we consider it imperative that they provide detailed analysis demonstrating why the unreliability of this parameter does not adversely impact the other parameters in the model. Without such analysis we question whether these models can be confidently applied in other elements of the regulatory framework.

The time trend for the electricity DNSPs (in the AER's econometric models for 2012-17) indicates productivity decreases and so we consider the AER's previous approach of applying no productivity adjustment remains appropriate.[8]

Question 9: How much opex productivity growth do you think an efficient distributor can reasonably achieve? Why? What information are you relying on to inform this view?

In responding to this we consider it very important to separate shifts in the productive frontier from catch-up productivity gains.

We do not consider there is a reasonable expectation of a positive shift in the productive frontier over the medium term. The historical data, particularly the recent improvements in productivity

[8] We note that this time trend will include both catch-up and frontier shift. The AER should examine econometric techniques to separate these elements in this time trend to ensure it can be robustly applied in the future.

are a result of catch-up and so are not a good guide for forecasting future shifts in the productive frontier. On a forward looking basis, the expected significant additional penetration of DER will add additional costs to operating a network, whilst putting downward pressure on energy delivered. This will result in downward pressure on productivity going forward.

AusNet Services has previously been identified as a reasonably efficient business. Despite this AusNet Services has, until recently, had a trend of declining productivity. In 2017 AusNet Services experienced a significant improvement in our productivity. This was driven by a firm wide cost reduction program. This program is continuing and we expect to see improvements in our productivity up to at least 2019. However, we consider this productivity improvement is largely catch-up and does not represent a movement in the productive frontier. Similarly, we consider that much of the productivity change observed in the industry since 2012 also relates to catch-up by other DNSPs.

We consider this a broad trend impacting nearly every DNSP in the NEM. However, in particular the NSW DNSPs have undertaken significant cost cutting exercises since privatisation and TasNetworks achieved efficiencies by merging the distribution and transmission businesses. These two drivers cannot be said to be reflective of shifts in an efficient frontier, which is generally driven by technological changes.

Question 10: Do you agree that we should apply the productivity growth forecast determined by this review process in our next regulatory determination for each electricity distributor? If not, how frequently should we update our forecast? Why?

Consistent with our view that the AER's econometric models should be applied in their entirety, we consider that the forecast of frontier shift should be updated annually as part of the AER's benchmarking report. Further, we consider the AER should make some clear statements about key decisions underpinning these models to provide some certainty going forward. Areas the AER should address include:

- How and when they will review the modelling approaches.

- What time series of data is appropriate for use in the modelling of the econometric models? i.e. the starting year and whether this starting point is fixed or would a rolling average be appropriate?

This would provide transparency going forward and ensure that latest forecast can be applied by the AER in its regulatory determinations. This also removes some subjectivity caused by infrequent or periodic updates to the approach. We note there are tight timeframes for the AER in making the upcoming NSW decisions. However, in Victoria there is sufficient time available to address in detail the areas raised for further consideration in this review, including undertaking additional econometric modelling to improve the robustness of the results. Particularly, the AER should examine econometric techniques to separate catch-up from frontier shift.