FINAL DECISION
Ausgrid distribution determination 2015−16 to 2018−19

Attachment 7 – Operating expenditure

April 2015

AUSTRALIAN ENERGY REGULATOR

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Note

This attachment forms part of the AER's final decision on Ausgrid's revenue proposal 2015–19. It should be read with other parts of the final decision.

The final decision includes the following documents:

Overview

Attachment 1 - Annual revenue requirement

Attachment 2 - Regulatory asset base

Attachment 3 - Rate of return

Attachment 4 - Value of imputation credits

Attachment 5 - Regulatory depreciation

Attachment 6 - Capital expenditure

Attachment 7 - Operating expenditure

Attachment 8 - Corporate income tax

Attachment 9 - Efficiency benefit sharing scheme

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Attachment 11 - Service target performance incentive scheme

Attachment 12 - Demand management incentive scheme

Attachment 13 - Classification of services

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Attachment 17 - Negotiated services framework and criteria

Attachment 18 - Connection methodology

Attachment 19 - Pricing methodology

Attachment 20 - Analysis of financial viability

Contents

Shortened forms

Shortened form	Extended form
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
augex	augmentation expenditure
capex	capital expenditure
CCP	Consumer Challenge Panel
CESS	capital expenditure sharing scheme
CPI	consumer price index
DRP	debt risk premium
DMIA	demand management innovation allowance
DMIS	demand management incentive scheme
distributor	distribution network service provider
DUoS	distribution use of system
EBSS	efficiency benefit sharing scheme
ERP	equity risk premium
Expenditure Assessment Guideline	expenditure forecast assessment Guideline for electricity distribution
F&A	framework and approach
MRP	market risk premium
NEL	national electricity law
NEM	national electricity market
NEO	national electricity objective
NER	national electricity rules
NSP	network service provider
opex	operating expenditure
PPI	partial performance indicators
PTRM	post-tax revenue model
RAB	regulatory asset base
RBA	Reserve Bank of Australia
repex	replacement expenditure
RFM	roll forward model

Shortened form	Extended form
RIN	regulatory information notice
RPP	revenue and pricing principles
SAIDI	system average interruption duration index
SAIFI	system average interruption frequency index
SLCAPM	Sharpe-Lintner capital asset pricing model
STPIS	service target performance incentive scheme
WACC	weighted average cost of capital

7 Operating expenditure

Operating expenditure (opex) refers to the operating, maintenance and other non-capital expenses, incurred in the provision of network services. Forecast opex for standard control services is one of the building blocks we use to determine a service provider's total revenue requirement.

This attachment provides an overview of our assessment of opex. Detailed analysis of our assessment of opex are in the following appendices:

- Appendix A - Base opex
- Appendix B - Rate of change
- Appendix C - Step changes
- Appendix D - Forecasting methodology.

7.1 Final decision

We are not satisfied that Ausgrid's forecast opex reasonably reflects the opex criteria.[1] We therefore do not accept the forecast opex Ausgrid included in its building block proposal.[2] We compare our alternative estimate of Ausgrid's opex for the 2014–19 period, with Ausgrid's initial proposal, our draft decision and its revised proposal in Table 7.1.[3]

Table 7.1 Our draft and final decision on total opex ($ million, 2013–14)

	2014–15	2015–16	2016–17	2017–18	2018–19	Total
Ausgrid's initial proposal	565.1	566.2	574.2	568.9	568.4	2842.9
AER draft decision	337.5	342.2	349.8	343.2	349.2	1721.9
Ausgrid's revised proposal	528.4	553.2	536.1	531.7	529.9	2679.3
AER final decision	390.8	396.6	404.3	397.5	403.6	1992.9

Source: AER analysis.

Note: Excludes debt raising costs.

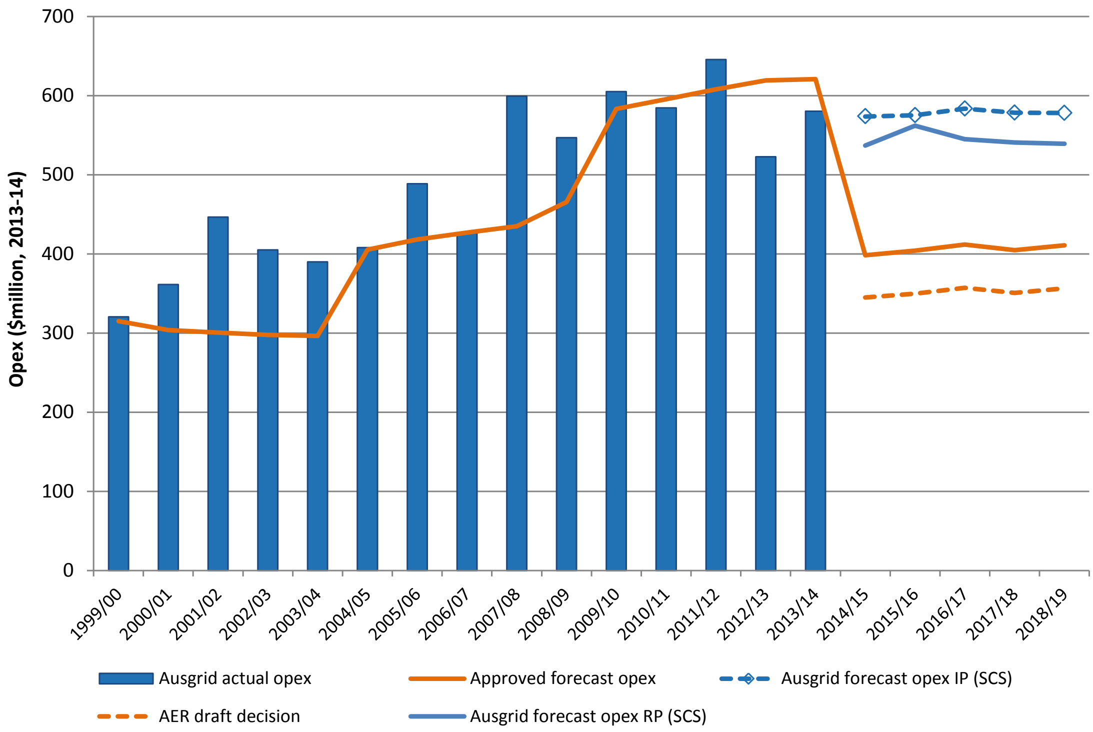
Figure 7.1 shows our final and draft decision compared to Ausgrid's past actual opex, previous regulatory decisions and its initial and revised proposals.

1 NER, clause 6.5.6(c).

2 NER, clause 6.5.6(d).

3 NER, clause 6.12.1(4)(ii).

Figure 7.1 AER final decision compared to draft decision and Ausgrid's



Source: Ausgrid, Regulatory accounts 2004–05; Ausgrid, Economic benchmarking - Regulatory Information Notice response 2005–06 to 2013–14; Standard control services (SCS).

The primary reason for the difference between our forecast opex amount and Ausgrid's proposal reflects our views about the efficiency of Ausgrid's recent historical performance and whether it should be used as the basis for forecasting Ausgrid's opex in the 2014–19 period. This affects how we develop the starting point for the forecast of opex over the 2014–19 period.

Ausgrid's proposal is based on the opex it incurred in 2012–13 (base year) in delivering standard control services. We assessed whether this is a reasonable starting point for forecasting Ausgrid's opex over the 2014–19 period.

We examined Ausgrid's proposal using a number of different techniques including:

- detailed reviews of Ausgrid's labour and workforce practices
- top down benchmarking at both a total opex and category level.

This information provided convincing evidence that Ausgrid's opex in its proposed base year was materially inefficient. The evidence we received in response to our draft decision, or in relation to Ausgrid's revised proposal, did not cause us to depart from this conclusion.

We arrived at our alternative opex estimate by taking into account a wide range of cost drivers faced by Ausgrid. This includes (but is not limited to):

- the size of Ausgrid's network

- the number of customers Ausgrid delivers to
- the regulatory obligations Ausgrid faces
- the characteristics of Ausgrid's network such as asset age, percentage of assets underground and percentage of assets for subtransmission
- the expected growth in labour prices over the 2014–19 period
- Ausgrid's capitalisation practices
- safety and reliability outcomes.

To the extent that the operating environment faced by Ausgrid is not accounted for in our benchmarking model, where appropriate, we have adjusted our benchmark for the estimated cost of these operating environment factors.

Benchmarking is a well developed tool which has already been used extensively by overseas regulators. There are a number of different ways in which service providers can be benchmarked. We received a number of submissions from Ausgrid, other distributors as well as other stakeholders which provided us with various expert reports critiquing our approach. We have considered this material in detail. Our view is that the benchmarking we have relied upon in this final decision is more robust than the alternatives proposed by Ausgrid, other service providers and their consultants in terms of model specification, data and estimation methods. However, in response to submissions, we have modified our approach in this final decision. This modification has led to an increase in the total forecast we are satisfied reasonably reflects the opex criteria.

In total we have increased our opex forecast by $271.0 million (real 2013–14) since our draft decision.

The difference between our draft decision and final decision amounts largely reflects a lower point of comparison in assessing Ausgrid's relative efficiency to other service providers in the NEM in its benchmarking performance.

We note that Ausgrid considered that our draft decision, if implemented, would adversely impact its ability to provide a safe, reliable and secure supply at an efficient price.[4] We do not agree. We consider the amount we have allowed Ausgrid to recover from consumers will enable it continue to provide safe and reliable network service but will reflect the efficient costs of a prudent operator, given a realistic expectation of the demand forecast and cost inputs.

[4] Ausgrid, *Revised Regulatory proposal,* January 2015, p. 7.

7.2 Ausgrid's revised proposal

In its initial proposal, Ausgrid forecast opex of $2842.9 million (real 2013–14) for the 2014–19 period. Ausgrid adopted a category specific forecasting approach to arrive at a base amount of opex. Approaches it adopted included:

- 'Base year': forecast opex was based on actual expenditure in a single year (2012–13), which was adjusted for what it termed 'change factors'. Ausgrid used this approach to forecast the majority of its cost categories.
- 'Base year variation by volume': forecast opex was based on actual unit rates in a single year (2012–13) which was adjusted for forecast price changes and then multiplied by forecast volumes. Ausgrid used this approach to forecast inspection costs (not including vegetation management inspections).
- 'Base year historical averaging': this is similar to the 'base year approach' except that rather than using a single year of actual expenditure, Ausgrid used the average expenditure between 2009–10 and 2012–13. Ausgrid used this approach to forecast nature induced breakdown maintenance expenditure.
- 'Bottom up': opex was derived from a forecast of all the relevant inputs including the number of tasks, the cost types required to perform each task (such as labour and materials) and the price of these cost inputs. Ausgrid used this approach to forecast insurance premiums and vegetation management contracts.

Change factors forecast by Ausgrid included:

- real cost escalation
- loss of synergies associated with the cessation of its Transitional Services Agreement
- restructuring costs
- productivity savings.

In its revised proposal Ausgrid forecast opex of $2679.3 million (real 2013–14) for the 2014–19 period, excluding debt raising costs. This is a $163.5 million or 5.8 per cent reduction on the $2842.9 million (real 2013–14) it proposed in its original proposal.[5] Ausgrid reduced its opex forecast to incorporate improved forecast labour productivity, reduced material cost escalation and reduced labour cost escalation.[6]

Ausgrid did not agree with our approach to forecasting total opex. It had three key issues with our assessment approach. It considered:

- our assessment was based on deriving our alternative estimate rather than reviewing its proposal

5 Ausgrid, *Revised Regulatory proposal,* January 2015, p. 120.

6 Ausgrid, *Revised Regulatory proposal,* January 2015, p. 63.

- we had placed unreasonable weight on benchmarking analysis in rejecting and substituting Ausgrid's proposed opex forecast. It considered that the benchmarking was subject to errors and limitations
- we had not considered safety and reliability risks in forming our substitute of base opex.[7]

Ausgrid did not accept our position and comments in respect to its labour practices, loss of synergy costs and redundancy costs. As a result it did not revise its position on those matters in its revised proposal.

7.3 Assessment approach

Our assessment approach, outlined below, is, for the most part[8], consistent with the Expenditure forecast assessment guideline (the Guideline).[9] We decide whether or not to accept the service provider's total forecast opex. We accept the service provider's forecast if we are satisfied that it reasonably reflects the opex criteria.[10] If we are not satisfied, we replace it with a total forecast of opex that we are satisfied does reasonably reflect the opex criteria.[11]

It is important to note that we make our assessment about the total forecast opex and not about particular categories or projects in the opex forecast. The Australian Energy Market Commission (AEMC) has expressed our role in these terms:[12]

> It should be noted here that what the AER approves in this context is expenditure allowances, not projects.

The service provider’s forecast is intended to cover the expenditure that will be needed to achieve the operating expenditure objectives. These objectives are:[13]

1. meeting or managing the expected demand for standard control services over the regulatory control period
2. complying with all applicable regulatory obligations or requirements associated with providing standard control services

7 Ausgrid, *Revised Regulatory proposal,* January 2015, p. 129.

8 We did not apply the DEA benchmarking technique. We outline the reasons why we did not apply this technique in section A.4 of our base opex appendix. We also have not applied the equation for estimating final year opex. We outline why we have not made this assumption in Appendix B.

9 AER, *Expenditure forecast assessment guideline*, November 2013. We did not apply the DEA benchmarking technique. We outline the reasons why we did not apply this technique in section A.4 of our base opex appendix. We also have not applied the equation for estimating final year opex. We outline why we have not made this assumption in Appendix B.

10 NER, clause 6.5.6(c).

11 NER, clause 6.5.6(d).

12 AEMC, *Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012*, 29 November 2012, p. vii.

13 NER, clause 6.5.6(a).

3. where there is no regulatory obligation or requirement, maintaining the quality, reliability and security of supply of standard control services and maintaining the reliability and security of the distribution system
4. maintaining the safety of the distribution system through the supply of standard control services.

We assess the proposed total forecast opex against the opex criteria set out in the NER. The opex criteria provide that the total forecast must reasonably reflect:[14]

1. the efficient costs of achieving the operating expenditure objectives
2. the costs that a prudent operator would require to achieve the operating expenditure objectives
3. a realistic expectation of the demand forecast and cost inputs required to achieve the operating expenditure objectives.

The AEMC noted that '[t]hese criteria broadly reflect the NEO [National Electricity Objective]'.[15]

In deciding whether or not we are satisfied the service provider's forecast reasonably reflects the opex criteria we have regard to the opex factors.[16] We attach different weight to different factors when making our decision to best achieve the NEO. This approach has been summarised by the AEMC as follows:[17]

> As mandatory considerations, the AER has an obligation to take the capex and opex factors into account, but this does not mean that every factor will be relevant to every aspect of every regulatory determination the AER makes. The AER may decide that certain factors are not relevant in certain cases once it has considered them.

The opex factors we have regard to are:

- the most recent annual benchmarking report that has been published under clause 6.27 and the benchmark operating expenditure that would be incurred by an efficient distribution network service provider over the relevant regulatory control period
- the actual and expected operating expenditure of the distribution network service provider during any preceding regulatory control periods

[14] NER, clause 6.5.6(c).

[15] AEMC, *Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012*, 29 November 2012, p. 113.

[16] NER, clause 6.5.6(e).

[17] AEMC, *Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012*, 29 November 2012, p. 115.

- the extent to which the operating expenditure forecast includes expenditure to address the concerns of electricity consumers as identified by the distribution network service provider in the course of its engagement with electricity consumers
- the relative prices of operating and capital inputs
- the substitution possibilities between operating and capital expenditure
- whether the operating expenditure forecast is consistent with any incentive scheme or schemes that apply to the distribution network service provider under clauses 6.5.8 or 6.6.2 to 6.6.4
- the extent the operating expenditure forecast is referable to arrangements with a person other than the distribution network service provider that, in our opinion, do not reflect arm's length terms
- whether the operating expenditure forecast includes an amount relating to a project that should more appropriately be included as a contingent project under clause 6.6A.1(b)
- the extent to which the distribution network service provider has considered and made provision for efficient and prudent non-network alternatives
- any relevant final project assessment conclusions report published under 5.17.4(o),(p) or (s)
- any other factor we consider relevant and which we have notified the distribution network service provider in writing, prior to the submission of its revised regulatory proposal under clause 6.10.3, is an operating expenditure factor.

For this determination, there are two additional operating expenditure factors that we will take into account under the last opex factor above:

- our benchmarking data sets including, but not necessarily limited to:
    (a) data contained in any economic benchmarking RIN, category analysis RIN, reset RIN or annual reporting RIN
    (b) any relevant data from international sources
    (c) data sets that support econometric modelling and other assessment techniques consistent with the approach set out in the Guideline

  as updated from time to time.
- economic benchmarking techniques for assessing benchmark efficient expenditure including stochastic frontier analysis and regressions utilising functional forms such as Cobb Douglas and Translog.[18]

[18] This is consistent with the approach we outlined in the explanatory statement to our Expenditure Forecast Assessment Guideline. See, for example, p. 131.

For transparency and ease of reference, we have included a summary of how we have had regard to each of the opex factors in our assessment at the end of this attachment.

More broadly, we also note in exercising our discretion, we take into account the revenue and pricing principles which are set out in the National Electricity Law.[19]

This attachment sets out our general approach to assessment. Our approach to assessment of particular aspects of the opex forecast is also set out in more detail in the relevant appendices.

Expenditure forecast assessment guideline

After conducting an extensive consultation process with service providers, users, consumers and other interested stakeholders we issued the Guideline in November 2013 together with an explanatory statement.[20] The Guideline sets out our intended approach to assessing operating expenditure in accordance with the NER.[21]

We may depart from the approach set out in the Guideline but if we do so we give reasons for doing so. In this determination for the most part we have not departed from the approach set out in the Guideline.[22] In our Framework and Approach paper for each service provider, we set out our intention to apply the guideline approach in making this determination.[23]

Our approach is to compare the service provider's total forecast opex with an alternative estimate that we develop ourselves.[24] By doing this we form a view on whether we are satisfied that the service provider's proposed total forecast opex reasonably reflects the opex criteria. If we conclude the proposal does not reasonably reflect the opex criteria, we use our estimate as a substitute forecast. This approach was expressly endorsed by the AEMC in its decision on the major rule changes that were introduced in November 2012. The AEMC stated:[25]

> While the AER must form a view as to whether a NSP's proposal is reasonable, this is not a separate exercise from determining an appropriate substitute in the event the AER decides the proposal is not reasonable. For example, benchmarking the NSP against others will provide an indication of both whether the proposal is reasonable and what a substitute should be. Both the

19 NEL, s. 16(2); s. 7A.

20 AER, *Expenditure forecast assessment guideline - explanatory statement*, November 2013.

21 NER, clause 6.5.6.

22 We did not apply the DEA benchmarking technique. We outline the reasons why we did not apply this technique in section A.4 of our base opex appendix. We also have not applied the equation for estimating final year opex. We outline why we have not made this assumption in Appendix B.

23 AER, *Stage 2 Framework and approach - NSW electricity distribution network service providers*, January 2014, p. 50.

24 AER, *Expenditure forecast assessment guideline*, November 2013, p. 7.

25 AEMC, *Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012*, 29 November 2012, p. 112.

consideration of "reasonable" and the determination of the substitute must be in respect of the total for capex and opex.

Our estimate is unlikely to exactly match the service provider's forecast because the service provider may not adopt the same forecasting method. However, if the service provider's inputs and assumptions are reasonable, its method should produce a forecast consistent with our estimate.

If a service provider's total forecast opex is materially different to our estimate and we find there is no satisfactory explanation for this difference, we may form the view that the service provider's forecast does not reasonably reflect the opex criteria. Conversely, if our estimate demonstrates that the service provider's forecast reasonably reflects the expenditure criteria, we will accept the forecast.[26] Whether or not we accept a service provider's forecast, we will provide the reasons for our decision.[27]

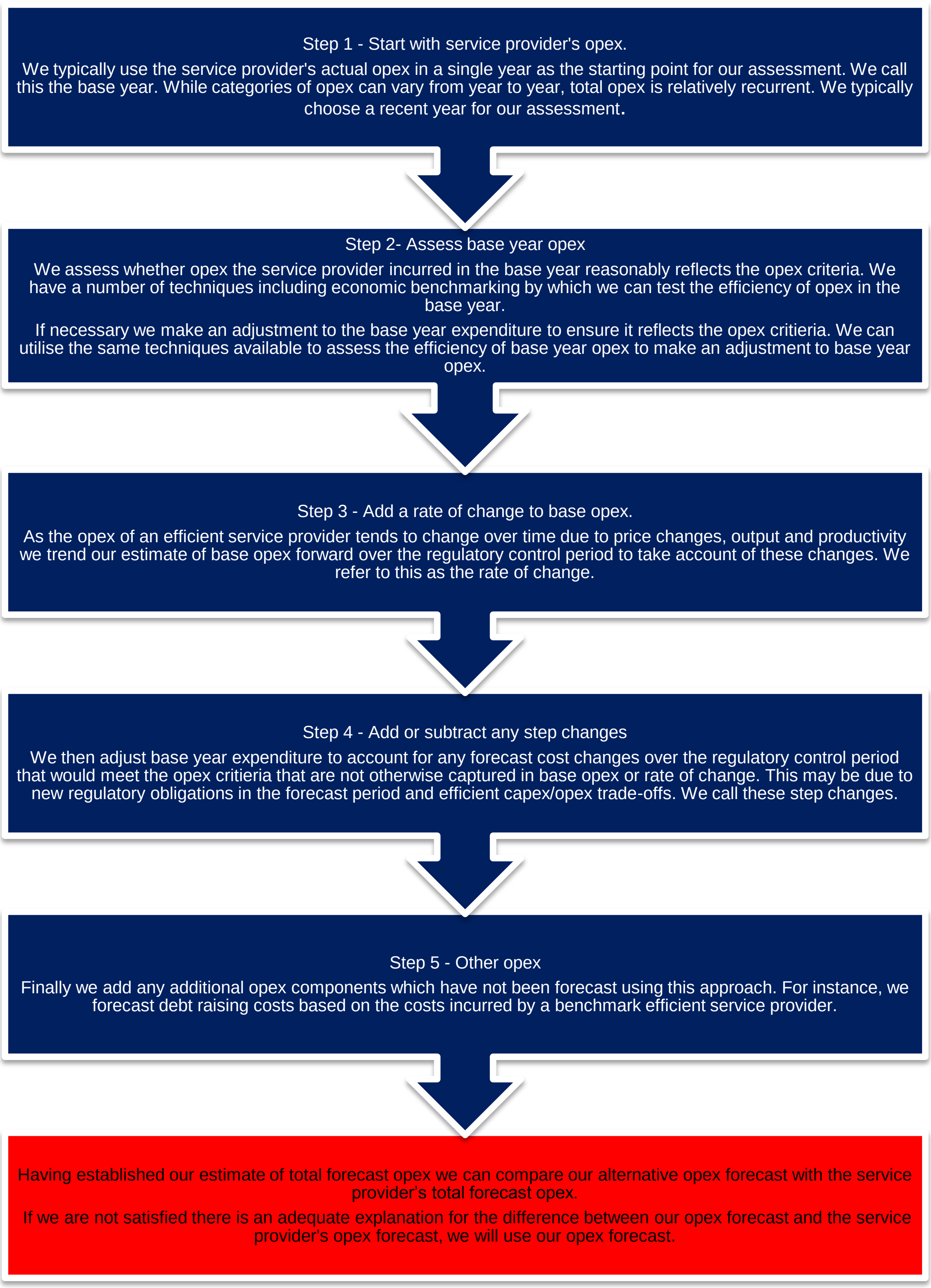
Building an alternative estimate of total forecast opex

Our approach to forming an alternative estimate of opex involves five key steps which we outline below in Figure 7.2.

[26] NER, clause 6.5.6(c).

[27] NER, clause 6.12.1(3)(ii).

Figure 7.2 Our assessment approach



Underlying our approach are two general assumptions:

1. the efficiency criterion and the prudency criterion in the NER are complementary
2. actual expenditure was sufficient to achieve the opex objectives in the past.

We have used this general approach in our past decisions. It is a well-regarded top-down forecasting model that has been employed by a number of Australian regulators over the last fifteen years. We refer to it as a 'revealed cost method' in the Guideline (and we have sometimes referred to it as the base-step-trend method in our past regulatory decisions).[28]

While these general steps are consistent with our past determinations, we have adopted a significant change in how we give effect to this approach, following the major changes to the NER made in November 2012. Those changes placed significant new emphasis on the use of benchmarking in our opex analysis. We will now issue benchmarking reports annually and have regard to those reports. These benchmarking reports provide us with one of a number of inputs for determining forecast opex.

We have set out more detail about each of the steps we follow in constructing our forecast below.

Step 1 – Starting point - base year expenditure

We prefer to use a recent year for which audited figures are available as the starting point for our analysis. We call this the base year. This is for a number of reasons:

- As total opex tends to be relatively recurrent, total opex in a recent year typically best reflects a service provider's current circumstances.
- During the past regulatory control period, we have incentives in place to reward the service provider for making efficiency improvements by allowing it to retain a portion of the efficiency savings it makes. Similarly, we penalise the service provider when it is relatively less efficient. This gives us confidence that the service provider did not spend more in the proposed base year to try to inflate its opex forecast for the next regulatory control period.
- Service providers also face many regulatory obligations in delivering services to consumers. These regulatory obligations ensure that the financial incentives a service provider faces to reduce its costs are balanced by obligations to deliver services safely and reliably. In general, this gives us confidence that recent historical opex will be at least enough to achieve the opex objectives.

In choosing a base year, we need to make a decision as to whether any categories of opex incurred in the base year should be removed. For instance:

[28] AER, *Expenditure forecast assessment guideline*, November 2013, p. 22.

- If a material cost was incurred in the base year that is unrepresentative of a service provider's future opex we may remove it from the base year in undertaking our assessment.
- Rather than use all opex in the base year, service providers also often forecast specific categories of opex using different methods. We must also assess these methods in deciding what the starting point should be. If we agree that these categories of opex should be assessed differently, we will also remove them from the base year.

As part of this step we also need to consider any interactions with the incentive scheme for opex, the Efficiency Benefit Sharing Scheme (EBSS). The EBSS is designed to achieve a fair sharing of efficiency gains and losses between a service provider and its consumers. Under the EBSS, service providers receive a financial reward for reducing their costs in the regulatory control period and a financial penalty for increasing their costs. The benefits of a reduction in opex flow through to consumers as long as base year opex is no higher than the opex incurred in that year. Similarly, the costs of an increase in opex flow through to consumers if base year opex is no lower than the opex incurred in that year. If the starting point is not consistent with the EBSS, service providers could be excessively rewarded for efficiency gains or excessively penalised for efficiency losses in the prior regulatory control period.

Step 2 - Assessing base year expenditure

Regardless of the base year we choose, the service provider's actual expenditure may not reflect the opex criteria. For example, it may not be efficient or management may not have acted prudently in its governance and decision-making processes. We must test whether actual expenditure in that year should be used to forecast efficient opex in the next regulatory control period.

As we set out in the Guideline, to assess the efficiency of a service provider's actual expenditure, we use a number of different techniques.[29]

For instance, we may undertake a detailed review of a service provider's actual opex. For this final decision, we have reviewed Ausgrid's labour and workforce practices.

Benchmarking is particularly important in comparing the relative efficiency of different service providers. The AEMC highlighted the importance of benchmarking in its changes to the NER in November 2012:[30]

> The Commission views benchmarking as an important exercise in assessing the efficiency of a NSP and informing the determination of the appropriate capex or opex allowance.

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29 AER, *Expenditure forecast assessment guideline*, November 2013, p. 22.

30 AEMC, *Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012*, 29 November 2012, p. 97.

By benchmarking a service provider's expenditure we can compare its productivity over time, and to other service providers. For this decision we have used Multilateral Total Factor Productivity, Partial Factor Productivity and several opex cost function models to assess Ausgrid's efficiency.[31]

We also have regard to trends in total opex and category specific data to construct category benchmarks. We have also used this information to inform our assessment of the efficiency of base year expenditure. In particular, we can use this category analysis data to identify sources of spending that are unlikely to reflect the opex criteria over the forecast period. It may also lend support to, or identify potential inconsistencies with, our broader benchmark modelling.

If we determine that a service provider's base year expenditure does not reasonably reflect the opex criteria, we will not use it as our starting point for our estimate of total forecast opex. Rather, we will adjust it so it reflects an efficient, recurrent level of opex that does reflect the opex criteria. To arrive at an adjustment, we use the same techniques we used to assess the service provider's efficiency.

Step 3 - Rate of change

Once we have chosen a starting point that reflects the opex criteria, we apply an annual escalator to take account of the likely ongoing changes to opex over the forecast regulatory control period. Opex that reflects the opex criteria in the forecast regulatory control period could reasonably differ from the starting point due to changes in:

- price growth
- outputs growth
- productivity growth.

We estimate the change by adding expected changes in prices (such as the price of labour and materials) and outputs (such as changes in customer numbers and demand for electricity). We then incorporate reasonable estimates of changes in productivity.

Step 4 - Step changes

Next we consider if any other opex is required to achieve the opex objectives in the forecast period. We refer to these as ‘step changes’. Step changes may be for cost drivers such as new, changed or removed regulatory obligations, or efficient capex/opex trade-offs. As the Guideline explains, we will typically include a step change only if efficient base year opex and the rate of change in opex of an efficient service provider do not already include the proposed cost.[32]

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[31] The benchmarking models are discussed in detail in appendix A, which details our assessment of base opex.

[32] AER, *Expenditure forecast assessment guideline*, November 2013, p. 24.

Step 5 - Other costs that are not included in the base year

In our final step, we make any further adjustments we need for our opex forecast to achieve the opex objectives. For instance, our approach is to forecast debt raising costs based on a benchmarking approach rather than a service provider's actual costs. This is to be consistent with the forecast of the cost of debt in the rate of return building block.

After applying these five steps, we arrive at our total opex forecast.

Comparing the service provider's proposal with our estimate

Having established our estimate of total forecast opex we can test the service provider's proposed total forecast opex. This includes comparing our alternative total with the service provider's total forecast opex. However, we also assess whether the service provider's forecasting method, assumptions, inputs and models are reasonable, and assess the service provider's explanation of how that method results in a prudent and efficient forecast.

The service provider may be able to adequately explain any differences between its forecast and our estimate. We can only determine this on a case by case basis using our judgment.

This approach is supported by the AEMC's decision when implementing the changes to the NER in November 2012. The Commission stated:[33]

> the AER could be expected to approach the assessment of a NSP's expenditure (capex or opex) forecast by determining its own forecast of expenditure based on the material before it. Presumably this will never match exactly the amount proposed by the NSP. However there will be a certain margin of difference between the AER's forecast and that of the NSP within which the AER could say that the NSP's forecast is reasonable. What the margin is in a particular case, and therefore what the AER will accept as reasonable, is a matter for the AER exercising its regulatory judgment.

If we are not satisfied there is an adequate explanation for the difference between our opex forecast and the service provider's opex forecast, we will use our opex forecast in determining a service provider's total revenue requirement.

As outlined in the Guideline, if the prudent and efficient opex allowance to achieve the opex objectives is lower than a service provider's current opex, we would expect a prudent operator would take the necessary action to improve its efficiency and prudency. We would expect a service provider (including its shareholders) to bear the cost of any inefficiency or imprudent actions. To do otherwise, would mean electricity

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33 AEMC, *Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012*, 29 November 2012, p. 112.

network consumers would fund some costs of a service provider's inefficiency or imprudent actions.

Accordingly, if our opex forecast is lower than a service provider's current opex we would generally not consider it open to us to provide a transition path to the efficient allowance. This approach is reflected in the NER, which provides that we must be satisfied that the opex forecast reasonably reflects the efficient costs of a prudent operator given reasonable expectations of the demand forecast and cost inputs to achieve the expenditure objectives.[34]

7.4 Summary of our decision

We are not satisfied Ausgrid's total forecast opex reasonably reflects the opex criteria. We compared Ausgrid's opex forecast to an opex forecast we constructed using the method outlined above. Ausgrid's proposal is higher than ours and we are satisfied that it does not reasonably reflect the opex criteria. For this reason, we have substituted Ausgrid's total opex forecast with our total opex forecast.

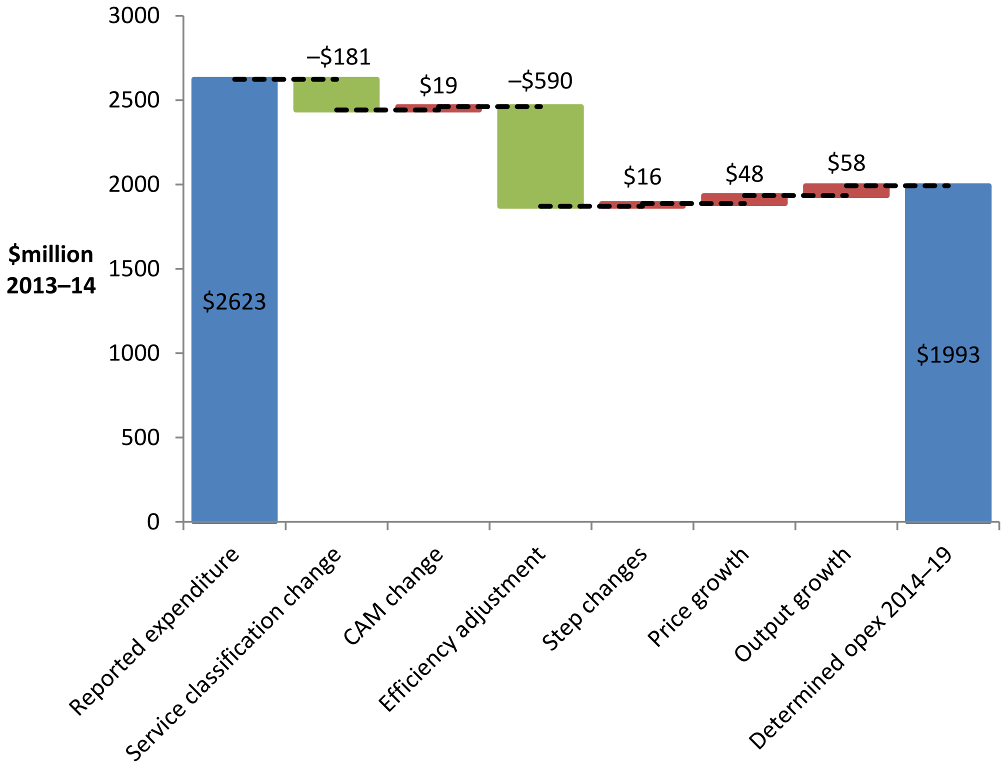
Figure 7.3 illustrates how our forecast for the 2014–19 period has been constructed.

The starting point on the left is what Ausgrid's opex would have been for the 2014–19 period if it was set based on Ausgrid's reported opex in 2012–13. We have set an opex forecast lower than this amount due to our assessment of Ausgrid's opex against the opex criteria (efficiency adjustment) and to reflect changes in Ausgrid's cost allocation methodology (CAM) and service classification.

We have then added our forecast of output growth, price growth and a step change to arrive at our total opex forecast for the 2014–19 period.

34 AER, *Expenditure forecast assessment guideline - Explanatory statement*, November 2013, p. 23.

Figure 7.3 Our final decision opex forecast for the 2014–19 period



Source: AER analysis.

Table 7.2 illustrates our forecast in each year of the 2014–19 period.

Table 7.2 Our final decision opex forecast ($ million, 2013–14)

	2014–15	2015–16	2016–17	2017–18	2018–19	Total
Base opex	374.2	374.2	374.2	374.2	374.2	1870.9
Output growth	5.1	8.1	11.4	15.0	18.5	58.1
Price growth	4.5	6.9	9.4	12.1	14.7	47.7
Step change - HOB leaseback	7.0	7.4	9.3	-3.7	-3.7	16.3
Total opex forecast	**390.8**	**396.6**	**404.3**	**397.5**	**403.6**	**1992.9**

Source: AER analysis.

Note: Excludes debt raising costs; Numbers may not add due to rounding.

A summary of the main steps of our assessment are outlined below.[35]

[35] For each of these areas, our analysis is supported by an appendix. In addition appendix D assesses Ausgrid's forecasting methodology.

7.4.1 Forecasting method assessment

As noted above, our estimate of total opex is unlikely to exactly match Ausgrid's. Broadly, differences between the two forecasts can be explained by differences in the forecasting methods adopted and the inputs and assumptions used to apply the method. We have reviewed Ausgrid's forecast method to identify if and where Ausgrid's forecasting method departed from the method set out in the Guideline. Where Ausgrid's forecasting method did depart from the Guideline we considered whether this departure explained the difference between Ausgrid's forecast of total opex and our own. We also considered whether adopting Ausgrid's approach was required to produce an opex forecast that reasonably reflects the opex criteria, having regard to the opex factors.

We provided reasons in our draft decision why adopting Ausgrid's forecasting method would not produce an opex forecast that better reflects the opex criteria.[36] However, Ausgrid did not agree with our assessment of its forecasting method. It adopted the same forecasting method to derive its opex forecast in its revised regulatory proposal.

We address the concerns raised by Ausgrid in appendix D. Having considered the concerns raised by Ausgrid we remain satisfied that the guideline forecasting method produces an opex forecast that better meets the opex criteria than does Ausgrid's forecasting method. For this reason we have used our guideline forecasting method to derive our alternative estimate of opex.

7.4.2 Base opex

Assessing Ausgrid's base opex

We assessed Ausgrid's proposed base year of 2012–13. We tested Ausgrid's base opex in 2012–13 using overall benchmarking techniques. We then examined the drivers of the results of these benchmarking techniques by examining key components of opex. For Ausgrid, we looked specifically at Ausgrid's labour and workforce practices.

The main techniques we used to test the efficiency of Ausgrid's base opex are outlined in Table 7.3. Our findings from our examination of Ausgrid's labour and workforce practices support our overall benchmarking findings, which conclude that Ausgrid's actual base opex is materially inefficient. This is the same conclusion we reached in our draft decision.

The evidence put forward by Ausgrid in its revised proposal did not cause us to alter most of the findings in our draft decision. Therefore, without an efficiency adjustment, we consider a forecast base opex based on Ausgrid's actual historical opex would not reasonably reflect the opex criteria.

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[36] AER, *Draft decision: Ausgrid distribution determination 2014–19*, Attachment 7, November 2014, pp. 170–173.

Table 7.3 Assessment of Ausgrid's base opex

Technique	Description of technique	Findings
Economic benchmarking	Economic benchmarking measures the efficiency of a service provider in the use of its inputs to produce outputs. The economic benchmarking techniques we used to test Ausgrid's efficiency included Multilateral Total Factor Productivity, Multilateral Partial Factor Productivity and opex cost function modelling. We compared Ausgrid's efficiency to other service providers in the NEM.	Despite differences in the techniques we used, all benchmarking techniques show Ausgrid does not perform as efficiently as most other service providers in the NEM. We consider that differences in Ausgrid's operating environment not captured in the benchmarking models do not adequately explain the different benchmarking results between Ausgrid and other service providers.
Review of labour and workforce practices	Labour costs represent a large proportion of all NSW service providers' opex. We engaged Deloitte Access Economics (Deloitte) to review the NSW service providers' labour and workforce practices.	Deloitte found that because of labour and workforce management issues, Ausgrid's base year would not likely represent efficient costs. Deloitte concludes that:[37] • the NSW service providers have high labour costs because they have too many employees. They all engaged permanent staff in preference to contractors over the 2009–14 period for transitory capex work. Now, due to EBA restrictions on redundancies, they have stranded labour • because the NSW service providers employ a high proportion of their employees through EBAs (more than 75 per cent) restrictive EBA clauses have a significant impact on workforce flexibility • the optimum level of outsourcing is likely to be higher than the level the NSW service providers outsourced at over the 2009–14 period; this is a key distinguishing factor from the Victorian service providers • while the NSW service provider have been implementing efficiency improvements, many efficiencies have not been realised until after the 2012–13 base year.

Source: AER analysis.

Arriving at an alternative estimate of base opex

We are unable to use Ausgrid's historical opex to prepare our alternative forecast of opex because basing our forecast on Ausgrid's historical opex would not result in a forecast opex that would reasonably reflect the opex criteria.

37 Deloitte Access Economics, NSW distribution network service providers labour analysis: addendum to 2014 report, April 2015, pp. ii–vii; Deloitte, NSW Distribution Network Service Providers Labour Analysis, November 2014, pp. i-v.

We therefore need to determine a starting point that would lead to a forecast opex that would reasonably reflect the opex criteria.

We have used the results from our preferred benchmarking model (Cobb Douglas SFA) to adjust Ausgrid's base opex to determine a starting point for our forecast of overall opex that would reasonably reflect the criteria.[38] Our preferred benchmarking model measures the opex efficiency of all service providers in the NEM over the 2006 to 2013 period relative to a frontier service provider. The outputs in the model are customer numbers, line length and ratcheted maximum demand.

In doing this, we have not adjusted Ausgrid's base opex relative to the efficiency of the frontier service provider. This is consistent with the preference in the Guideline to rely on revealed costs and only adjust base opex where it is materially inefficient.

Instead, we have used a benchmark comparison point that is the lowest of the efficiency scores in the top quartile of possible scores. This is equivalent to the efficiency score for the business at the bottom of the upper third (top 33 per cent) of companies in the benchmark sample (represented by AusNet Services). We have done this because:

- this recognises that more than a third of the service providers in the NEM, operating in varied environments, are able to perform at or above our benchmark comparison point. We are confident that a firm that performs below this level is therefore spending in a manner that does not reasonably reflect the opex criteria. An adjustment back to this appropriately conservative point is sufficient to remove material inefficiency while still incorporating an appropriately wide margin for potential modelling and data errors for the purposes of forecasting
- given it is our first application of benchmarking, it is appropriate to adopt a cautious approach
- we consider this approach achieves the NEO and RPP because it is sufficiently conservative to avoid the risks associated with undercompensating the service provider but also promotes efficiency incentives.

Our estimate of base opex is $374.2 million (real 2013–14). Table 7.4 illustrates the steps we have undertaken to derive our estimate. Table 7.4 shows that we start Ausgrid's average opex in the 2006 to 2013 period. This is because our preferred benchmarking model compares average efficiency over the sample period.

A key reason we use average period efficiency scores is because it reduces the impact of year–specific fluctuations not under the control of the service provider (such as weather conditions). Average efficiency results also provide us with an estimate of

[38] Stochastic frontier analysis (SFA) can directly estimate efficiency scores and has superior statistical properties. Economic Insights, Economic Benchmarking Assessment of Operating Expenditure for NSW and ACT Electricity DNSPs, November 2014, p. v.

underlying recurrent expenditure not influenced by other year on year changes, which we require for the Guideline approach to estimating total forecast opex.[39]

Our detailed assessment of base opex is outlined in appendix A to this attachment.

Table 7.4 Arriving at our alternative estimate of base opex

	Description	Output	Calculation
Step 1 – Start with Ausgrid's average opex over the 2006 to 2013 period	Ausgrid's network services opex was, on average, $509.3 million ($2013) over the 2006 to 2013 period.	$509.3 million ($2013)	
Step 2 —Calculate the raw efficiency scores using our preferred economic benchmarking model	Our preferred economic benchmarking model is Economic Insights' Cobb Douglas SFA model. We use it to determine all service providers' raw efficiency scores. Based on Ausgrid's customer numbers, line length, and ratcheted maximum demand over the 2006 to 2013 period, Ausgrid's raw efficiency score is 44.7 per cent.	44.7 per cent[40]	
Step 3—Choose the comparison point	For the purposes of determining our alternative estimate of base opex, we did not base our estimate on the efficient opex estimated by the model. The comparison point we used was the lowest performing service provider in the top quartile of possible scores, AusNet Services. According to this model AusNet Services' opex is 76.8 per cent efficient based on its performance over the 2006 to 2013 period. Therefore to determine our substitute base we have assumed a prudent and efficient Ausgrid would be operating at an equivalent level of efficiency to AusNet Services.	76.8 per cent[41]	
Step 3— Adjust Ausgrid's raw efficiency score for operating environment factors	The economic benchmarking model does not capture all operating environment factors likely to affect opex incurred by a prudent and efficient Ausgrid. We have estimated the effect of these factors and made a further reduction to our estimate where required. We have determined an 11.7 per cent reduction to Ausgrid's comparison point based on our assessment of these factors. A material operating environment factor we considered was not accounted for in the model is the different subtransmission configurations in NSW.	68.7 per cent	= 0.768 / (1 + 0.117)
Step 4—Calculate the	We then calculate the opex reduction by comparing	35.0 per cent	= 1 – (0.447 /

39 Economic Insights, Response to Consultants' Reports on Economic Benchmarking of Electricity DNSPs, April 2015, section 4.1.

40 Economic Insights, *Economic Benchmarking Assessment of Operating Expenditure for NSW and ACT Electricity DNSPs*, November 2014, p. 37.

41 Economic Insights, *Economic Benchmarking Assessment of Operating Expenditure for NSW and ACT Electricity DNSPs*, November 2014, p. 37.

	Description	Output	Calculation
percentage reduction in opex	Ausgrid's efficiency score with the adjusted comparison point score.		0.687)
Step 5—Calculate the midpoint efficient opex	We estimate efficient opex at the midpoint of the 2006 to 2013 period by applying the percentage reduction in opex to Ausgrid's average opex over the period. This represents our estimate of efficient opex at the midpoint of the 2006 to 2013 period.	330.9 million ($2013)	= (1 – 0.350)* 509.3 million
Step 6— Trend midpoint efficient opex forward to 2012–13	Our forecasting approach is to use a 2012–13 base year. We have trended the midpoint efficient opex forward to a 2012–13 base year based on Economic Insights' opex partial factor productivity growth model. It estimates the growth in efficient opex based on growth in customer numbers, line length, ratcheted maximum demand and share of undergrounding. It estimated the growth in efficient opex based on Ausgrid's growth in these inputs in this period to be 8.48 per cent.	359.0 million ($2013)	= 330.9 × (1+ 0.0848)
Step 7—Adjust our estimate of 2012–13 base year opex for CPI	The output in step 6 is in real 2013 dollars. We need to convert it to real 2013–14 dollars for the purposes of forming our substitute estimate of base opex. This reflects one and a half years of inflation. This is our estimate of base opex.	374.2 million ($2013–14)	= 359.0 × (1 + 0.042)

Source: AER analysis.

7.4.3 Rate of change

Our forecast rate of change in opex captures the forecast year on year change in our estimate of base opex. Specifically, it accounts for forecast growth in outputs, prices and productivity (such as economies of scale). Output growth and productivity growth captures the forecast change in the quantity of inputs required. Price growth captures the forecast change in the real prices of those inputs. These three opex drivers should account for the main sources of opex changes over time.

We have maintained our draft decision method to forecasting the rate of change. We have updated our labour forecasts to reflect the most recent forecast from Deloitte Access Economics (DAE) and Independent Economics.

Ausgrid maintained its initial proposal approach to forecasting output growth and productivity growth in its revised proposal. However, Ausgrid adopted our price growth forecasting method.

We consider our draft decision approach to forecasting output growth based on our economic benchmarking analysis produces a robust estimate. As outlined in our draft decision, we consider our output growth measure captures the key outputs of service providers, as valued by customers. Our use of economic benchmarking techniques is detailed in appendix A.

We have forecast zero productivity growth. Our productivity growth forecast is based on our expectations of productivity for a benchmark service provider over the 2014–19 period. In estimating productivity growth we have had regard to a number of sources of evidence. This includes the results of our economic benchmarking analysis, the drivers of recent productivity trends for the distribution businesses and the productivity forecasts for the gas distribution and electricity transmission sectors.

We have amended our alternative opex forecast to apply the rate of change to 2013–14 because we will not subject any expenditure to the EBSS in the 2014–19 period. In our draft decision we used the equation in the Guideline to estimate expenditure in the final year and applied the rate of change from 2014–15. In percentage terms, our forecast rate of change is higher than Ausgrid's. This mainly reflects Ausgrid's higher proposed productivity improvements.

Table 7.5 compares the rate of change for Ausgrid's initial proposal, our draft decision and our final decision.[42]

Table 7.5 Rate of change in opex (per cent)

	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19
Ausgrid initial proposal		2.61	0.39	1.12	1.34	–0.12
AER draft decision		1.22	1.31	1.71	1.88	1.74
AER final decision	1.05	1.51	1.40	1.50	1.57	1.53

Source: AER analysis.

Our detailed assessment of the rate of change is outlined in appendix B to this attachment.

7.4.4 Step changes

We have included a step change above an efficient base level of opex for the leaseback of Ausgrid's head office building. We are not satisfied that there should be other reasons for a change to our estimate. A summary of the proposals we considered as step changes are outlined below in Table 7.6.

[42] We used the reset RIN data to calculate the annual percentage change in Ausgrid's initial proposal. Ausgrid was not required to provide an update to its reset RIN in its revised proposal.

Table 7.6 AER assessment of step changes ($ million, 2013–14)

	Initial proposal	Draft decision	Revised proposal	Final decision
TSA disynergy costs[1]	64.1	-	63.5	-
Leaseback cost of head office building	16.3	16.3	16.3	16.3
Compliance with obligations	25.0	-	n/a[2]	-
Impact of transitioning to new cost allocation method[1]	20.8	-	20.6	-
Cost base restructure	39.8	-	n/a[2]	-
Broad based demand management	22.1	-	22.1	-

Note (1) For these proposals, Ausgrid forecast to partially offset cost increases with productivity savings

(2) For these proposals, Ausgrid did not specify a forecast amount in its revised proposal

Source: AER analysis; Ausgrid, *Regulatory proposal*, pp. 56-60; Ausgrid, *Revised regulatory proposal*, p. 174; Ausgrid, Attachment 5.14 - Demand management - opex and capex overview, p. i.

For the most part, we consider our estimate of opex already reasonably reflects the opex a prudent and efficient service provider, with realistic estimates of demand forecasts and cost inputs (including operating and environmental factors), would require to achieve the opex objectives.

However, we considered a step change was necessary for the leaseback of Ausgrid's head office building for up to three years. Ausgrid's head office building was sold by the NSW Government. While for the period of the leaseback Ausgrid's forecast opex is higher, its RAB is permanently lower as a result of the sale. We consider this to be an efficient trade-off.

Our detailed assessment of all step changes is outlined in appendix C to this attachment.

7.4.5 Inflation

For our draft decision, we lagged the inflation index we used to convert nominal opex amounts to real 2013–14 dollar terms. The lag used was consistent with the treatment of inflation in the roll forward model. Based on submissions received on our draft decision, we have conducted further analysis and agree there is no need to lag the inflation index for opex forecasting purposes for all our decisions.[43] Consequently we amended our opex model to apply the inflation index without any lag.

43 TransGrid, *Revised revenue proposal*, January 2015, p. 107.

7.4.6 Debt raising costs

Debt raising costs are transaction costs incurred each time debt is raised or refinanced. We forecast them using our standard forecasting approach for this category which sets the forecast equal to the costs incurred by a benchmark firm. Our assessment approach and the reasons for those forecasts are set out in appendix H to attachment 3.

7.5 The impact of our decision

In response to our draft decision, the service providers submitted that our approach will increase the safety, reliability and security risk of their networks because they will need to immediately restructure, reduce staff and stop certain expenditure programs. They also consider the associated revenue reductions will adversely affect their financial viability and pose a risk to investment.[44]

The distributors also submit that if we were to implement the opex reductions from the draft decision, the NEL and NER require that we provide a realistic forecast of their actual costs while incentivising efficiency reductions over time in a realistic manner.[45] This includes:

- redundancy costs, which the service providers submit are legitimate and prudent in a time of transformation[46]
- a transition to mitigate the consequences of requiring service providers to immediately review, and substantially reduce, expenditure.[47]

This section clarifies our approach in light of these submissions.

7.5.1 Safety and reliability

The service providers have submitted that the reductions we are making to revenue based on our assessments of opex and capex will lead to safety and reliability risks. In making this submission, they are assuming that they would continue to run their businesses the way they are currently, but with less funds. Therefore, the service providers submit, they would need to scale back activities and reduce staff.[48] This

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[44] Ausgrid, *Revised Regulatory Proposal*, January 2015, pp. 28-36; Networks NSW, *NSW DNSPs' submission on the AER's draft determinations*, 13 February 2015, pp. 6-9.

[45] Ausgrid, *Revised Regulatory Proposal*, January 2015, pp. 153, 163-164; Essential Energy, Revised regulatory proposal, pp. 213–214; Endeavour Energy, Revised regulatory proposal, p. 195.

[46] Ausgrid, *Revised Regulatory Proposal*, January 2015, p. 162; Essential Energy, revised regulatory proposal, pp. 207–208; Endeavour Energy, Revised regulatory proposal, p. 190.

[47] This issue was raised more substantially by Ergon Energy in submissions to the NSW and ACT draft decisions, and by ActewAGL. This issue is, however, relevant to all service providers. ActewAGL, Revised Regulatory Proposal, pp. 257-267; Ergon Energy, Submissions on the draft decisions: NSW and ACT distribution determinations 2014-15 to 2018-19, 13 February 2015, pp. 23-27.

[48] Ausgrid, Revised Regulatory Proposal, January 2015, pp. 151–153; Essential Energy, Revised regulatory proposal, pp. 192–193; Endeavour Energy, Revised regulatory proposal, pp. 179–180.

reflects their view that their proposed total opex forecast reasonably reflects the opex criteria so they cannot provide standard control services for any lower amount.[49]

We recognise that service providers must meet their safety and reliability obligations. However, we must consider how much consumers should pay for a service provider to do so. The NER require that we determine a total forecast opex that includes the *efficient* costs that a *prudent operator* would require to achieve the opex objectives (which include safety and reliability obligations).

As we explain below, benchmarking enables us to determine the efficient costs that a prudent operator would require to achieve the opex objectives because we are comparing the NSW service providers to all other service providers in the NEM. As we explain in section A.6, all the NEM service providers are operating safe and reliable networks. Further, many are doing so for less cost than the NSW service providers.

To the extent that differences between service providers may exist, we 'normalise' for these differences when we assess operating environment factors. Based on this assessment, we reduce the performance gap between the NSW service providers and the benchmark comparison point.

Importantly, service providers have the flexibility (and indeed the responsibility) to reallocate funds and resources during the regulatory period in response to changing circumstances, events and risks. Service providers are not constrained to current plans and processes or by the assumptions and forecasts in either their proposals or the determinations we make. This may require a departure from a business as usual approach.

We recognise that the NSW service providers may continue to incur costs above efficient levels due to, for example, their EBAs or other practices they have in place that prevents them from easily reducing costs. However, their shareholders, not consumers, must bear these costs.

We are not satisfied that the service providers have provided sufficient evidence to support these claims such that we would change our approach to safety and reliability from the approach set out in our draft decision. We consider that our approach, including our use of benchmarking, appropriately accounts for safety and reliability obligations because:

- service providers at and above our benchmark comparison point are meeting their safety and reliability obligations at lower cost
- our decisions set the revenue service providers can recover from consumers, but do not direct or constrain the quantum or allocation of a service provider's spending
- the enforcement of safety regulations is not determined by the quantum of regulatory revenue.

49 For example, Ausgrid, Revised Regulatory Proposal, January 2015, pp. 123-126.

We also address some specific safety submissions the service providers have raised in relation to bushfire risk and insurance.

The effect of using benchmarking on safety and reliability

As we explain above, we use several assessment techniques—including benchmarking—to assess the efficiency of revealed opex and determine whether we need to adjust them before building up our alternative estimate.

In section A.4, we explain that we do not apply any benchmarking techniques 'deterministically' or 'mechanically'. As foreshadowed in the Guideline, improved data and the development of benchmarking has improved our ability, over simply using revealed costs, to determine a total opex forecast that reasonably reflects the opex criteria. In section A.7 we explain how we use benchmarking to set a 'comparison point', to which we compare the service provider's opex efficiency.

In doing this, we are appropriately determining an estimate of total forecast opex that is sufficient for a prudent and efficient service provider (facing the same exogenous circumstances as the service provider we are assessing) to meet its safety and reliability obligations, in light of realistic expectations of demand and cost inputs for such a service provider. This is because benchmarking enables us to compare the service provider we are assessing to the 'comparison' service providers that have efficiently achieved their legislated safety and reliability obligations over the benchmark period.

However, to the extent differences may exist, we consider whether they will have an impact on benchmarking performance as part of our assessment of operating environment factors. As we explain in section A.6, we take into account all factors which we reasonably consider are exogenous and non-duplicative. These factors can result in substantial adjustments, providing additional opex to reflect the particular exogenous circumstances of each service provider. Several of these factors are directly relevant to safety and reliability, such as an allowance for different OH&S regulations and licence conditions. We have adopted a conservative approach to factors which are individually immaterial but may have a collective impact.

Otherwise, however, our examination in section A.6 of safety metrics for all service providers (including those who form part of our benchmark comparison point[50]) demonstrates that the comparator providers have managed to safely meet the requirements to provide standard control services in the relevant period. The comparator firms also operate reliable networks. Therefore, the service providers under assessment can operate safe and reliable networks but for a lower cost.

[50] While we have lowered the comparison point to AusNet Services in this decision, the comparison point for the operating environment factors is the customer weight average of the service providers that score equal to or above the benchmark comparison point.

Further, reliability is also included in our MTFP and opex MPFP benchmarking, which we use to cross-check our preferred benchmarking technique. Given the consistency in results across our benchmarking techniques, we can consider that the benchmark opex amounts will not undercompensate for reliability.

In addition, in our final decision on total forecast capex, our alternative estimate of capex is greater than what we approved in our draft decision. In particular we have:

- accepted a large portion of Ausgrid's proposed augex; and
- taken into account recent replacement practices in conjunction with an engineering review of forecast repex requirements.

While capex is the subject of a separate forecast, many service providers have made broad statements about the combined effect of opex and capex reductions on safety.[51] In arriving at our substitute estimate of total forecast capex, we specifically took into account Ausgrid's ability to meet safety and reliability requirements and obligations. The higher total forecast capex in this final decision is sufficient to meets these requirements and obligations. We consider this addresses the submissions raised about the implications for safety both in relation to the capex required to address safety and the impact of any overall reduction in capex and opex combined.

The AER does not direct or constrain service provider spending

The service provider's submissions also suggested that, in determining total forecast opex, we were setting a "constraint"[52] or requiring service providers to make "immediate job reductions."[53] Some submissions criticised us for failing to conduct "bottom up" reviews of expenditure.[54] Essential Energy also submits that our assessment of its labour practices as inefficient means that we are attempting to unilaterally and retrospectively void its EBA obligations.[55]

The assumption inherent in these statements is that we determine, dictate and limit what service providers can spend. This assumption also appears in the consultant reports relied on by the service providers. For example:

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51 For example, Endeavour Energy, Attachment 1.08 Statement of Chief Operating Officer; Attachment 1.09 R2A Asset System Failure Safety Risk Assessment; Ausgrid, Attachment 1.02 Statement of Chief Operating Officer; Attachment 1.13 R2A Asset System Failure Safety Risk Assessment.

52 Ausgrid, Revised regulatory proposal, p. 152; Endeavour Energy, Revised Regulatory Proposal, p. 109 (citing Endeavour - Attachment 1.09, R2A Asset System Failure Safety Risk Assessment at p 4); Essential Energy, Revised regulatory proposal, p. 192.

53 Ausgrid, Revised Regulatory Proposal, January 2015, p 31; Endeavour Energy, Revised regulatory proposal, p. 34; Essential Energy, Revised regulatory proposal, p. 38.

54 Endeavour Energy, Revised Regulatory Proposal, January 2015, p. 9; Ausgrid, Revised Regulatory Proposal, p. 31;

55 Essential Energy, Revised Regulatory Proposal, January 2015, p. 194.

- CEPA assesses our adjustment as "an immediate and full change in the [price level]."[56]
- R2A cites an "indication" from its client, Endeavour Energy, that our draft decision would result in "immediate job reductions" and have an "immediate and major impact" on inspections[57] (though the report also notes that the consequences of the latter would not really show up until the fifth year of the regulatory period).[58]
- AON, in advising on increased insurance premiums and potential withdrawal of insurer support, proceeds from the assumption that service providers will maintain the same percentage of opex forecast allocation to vegetation management. AON therefore assumes the service providers have no flexibility to reallocate spending within the opex forecast and no capacity for a service provider to choose to fund its own additional spending.[59]

This assumption is incorrect. We do not determine, dictate or limit what service providers can spend. As the AEMC notes, we determine the revenue required by a prudent and efficient service provider in a workably competitive market.[60] We allow service providers to recover this revenue from consumers. It is for a service provider to take this revenue and direct it as it sees fit, including by changing its behaviour to meet new or changing circumstances.[61]

Accordingly if a service provider, for whatever reason, wishes to spend above what we have determined to be prudent, efficient and realistic costs to achieve the opex objectives (for example because it has entered into a particular contract or it has decided to maintain activities at a level which require resourcing above an efficient cost level), it could do so. Alternatively, if the service provider considered its opex forecast should be spent differently to our alternative estimate or to its own proposal, including to achieve longer term efficiencies, it is entitled to do so.

To the extent that service provider incurs costs above efficient levels, the service provider—not consumers—must bear these costs.

In assessing the proposals put to us by service providers our task is to assess efficient costs that can be recovered by the service provider from its customers. We acknowledge and accept that a service provider may choose to spend in excess of the revenue that we have determined would be required of a prudent and efficient service

56 Ausgrid, Attachment 1.07, Expert Report of David Newbery, p. 14.

57 Endeavour - Attachment 1.09, R2A Asset System Failure Safety Risk Assessment, p. 15.

58 Endeavour - Attachment 1.09, R2A Asset System Failure Safety Risk Assessment, p. 27.

59 Ausgrid, Attachment 1.14 AON Insurance Advice Report, p. 4.

60 AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, p 182

61 AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, p 182 - 183

provider (facing the relevant NSW service provider's exogenous circumstances). However, as noted by the AEMC in the 2012 Rule Determination:[62]

> If a service provider is run inefficiently then its shareholders, and not its customers, should bear the financial consequences of inefficient financing practices.

For example, Essential Energy has already committed to maintaining its current spending on vegetation management, regardless of our decision.[63] It is for Essential Energy to determine how to achieve this—whether funds can be reallocated, or whether its dividends should be reduced.

Jacobs' report for the NSW service providers notes:[64]

> There are many strategies open to the distributor management teams to attempt to prepare the organisations for the reduced opex expenditures... (and) Corporate responses such as workplace reforms, restructures, renegotiation of contracts etc. will take time to implement.

How a service provider will respond in light of funded opex being reduced is a matter of corporate governance and for shareholders. Our role is to determine the revenue allowance that should be funded by consumers, which we base on an assessment of efficient costs.

Safety regulation and enforcement is unaffected by regulatory forecasts

Some service providers have suggested that we should have sought the advice of jurisdictional safety regulators in deciding on the appropriateness of our draft decision opex forecasts. Further, they submit that we would be in breach of our primary duty of care under the *Work Health and Safety Act 2011* (Cth) if, being aware of the safety impacts of the proposed opex forecast in the draft determination, we make the final determination allowing for the same level irrespective of the safety impacts.[65]

We disagree with these submissions. Just as we do not constrain service providers' decisions about safety, safety regulators do not take account of regulatory forecasts when regulating or taking enforcement action. These activities are, quite properly, carried out independently. For example in NSW the Operations and Programs Branch of the Department of Trade & Investment, Resources and Energy administers safety and technical regulations, including the conduct of annual safety audits. Importantly, this Department does not undertake this work by reference to the financial outcomes of

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[62] AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, p 73

[63] Essential Energy Revised Regulatory Proposal, January 2015, p 15

[64] Ausgrid Attachment 1.01 - Jacobs - Reliability Impact Assessment p 12

[65] For example, ActewAGL, Submission on the AER's Draft decision ActewAGL distribution determination 2015-16 to 2018-19, 13 February 2015, pp. 11-12; Ausgrid, Revised Regulatory Proposal, pp. 31-33.

service providers or their shareholders. Nor does it consider the ability of a service provider to pay particular dividends.[66]

The legal advice by Norton Rose Fulbright (solicitors for ActewAGL) that we will be in breach of the WHS Act if we are warned about safety impacts and nevertheless reduce regulatory forecasts proceeds on the basis that it was instructed by ActewAGL to identify: [67]

> whether the AER has any obligation under the WHS Act which would preclude it from making a determination which would (sic) impeded ActewAGL's ability to operate safely.

We find that Norton Rose Fulbright's advice proceeds on two incorrect assumptions:

- that our forecasts dictate spending; and, accordingly
- that the reduction in opex forecasts will, inevitably, mean that service providers are unable to protect their workers.

As we explain above, we do not dictate how much a service provider can or will actually spend during the regulatory control period. Our assessment of the opex forecast required for a service provider to carry out its statutory obligations is based on our benchmarking work and factors specific to the service provider. We determine an amount that the service provider acting prudently and incurring only efficient costs would require to provide a safe and reliable service and to meet its regulatory obligations, including its responsibilities in relation to the health and safety of its workers. It is the responsibility of the service provider to decide what it will spend its to meet these obligations.

To the extent that the regulated forecast is less than that which the service provider proposed, it will need to consider factors such as reprioritising its spending programs or re-appraising the need for the level of activity it is considering. If the service provider incurs costs above the opex forecast we determine, it must seek alternative sources of funding as it will not be able to recover these additional expenditures from its customers.

As set out above, health and safety obligations are not enforced by reference to regulatory revenue. Regardless of regulatory revenue, service providers are obligated to protect their workers and other persons involved in their operations. Accordingly, we are not persuaded by Norton Rose Fulbright's interpretation of the WHS Act.

66 Letter from Ms Claudia Huertas, Director of Operations and Programs, Department of Trade & Investment, Resources and Energy to AER dated 20 March 2015.

67 Letter from M Tooma of Norton Rose Fulbright to Mr Peter Holden of ActewAGL, 6 January 2015.

Specific safety concerns

The service providers' proposals, submissions and consultant reports present some common issues with respect to the impact of our draft decision opex forecast regarding:

- increased bushfire risk, particularly due to reduced vegetation management activities
- the impact reduced vegetation management will have on insurance premiums.

Bushfire risk

Networks NSW engaged R2A to conduct a safety risk assessment arising from "'implementing" our draft determination opex forecast. R2A considers safety risks to employees and the public would increase and the likelihood of catastrophic bushfires would more than double.[68] Likewise, statutory declarations by the service providers' Chief Operating Officers (COOs) identify the impact of opex reductions vis-à-vis the necessary opex requirement.[69] However, R2A and the service providers' COOs assume that each NSW service provider will face increased inspection cycles, shorter asset lives and increased fire risk on the basis that it:[70]

- will spend the same proportion of its total opex on inspections as in its revised proposal, proportionally reduced to our draft decision (that is, will not reallocate or find additional efficiencies to enable it to spend more on inspections)
- will not spend beyond its opex forecast under any circumstances
- undertakes an identical program to what it would have undertaken, with reduced resources.

We do not agree that any of the above assumptions are a required result of our decision. We consider that this analysis is overly prescriptive of a service provider's expected behaviour. As stated above, we determine an amount that the service provider acting prudently and incurring only efficient costs would require to provide a safe and reliable service and to meet its regulatory obligations. It is the responsibility of the service provider to decide how it will spend the approved forecast including considering factors such as reprioritising its spending programs or re-appraising the need for the level of activity it is considering.

The service providers also rely on correspondence from the Commissioners of Fire and Rescue NSW and the NSW Rural Fire Service. The Commissioners indicate their concern regarding any reduction in vegetation management. While we acknowledge that this concern is relevant to the task of the Commissioners, we do not consider that

68 Ausgrid,Revised Regulatory Proposal, January 2015, p. 32, citing R2A report.

69 Ausgrid, Revised Regulatory Proposal, January 2015, attachment 1.02.

70 Endeavour, Revised Regulatory Proposal, January 2015, Attachment 1.09 - R2A Endeavour Energy Asset/System Failure Safety Risk Assessment January 2015, page 22-24

this view, of itself, provides any evidence of a difference in the risk faced by the NSW distributors and the benchmark service providers.

Insurance costs

The NSW service providers submitted that if they implemented our draft decision, their insurance costs would increase.[71] They rely on a partially confidential report prepared for Networks NSW by AON.[72] AON provide services to Ausgrid, Essential Energy and Endeavour Energy (amongst others). AON's report is therefore an informed, but not independent, perspective on the impact of our draft decision. AON's report proceeds on the following basis:[73]

> Aon's advice is supplied to assist NNSW assess the impact on insurance costs and coverage if the overall proposed AER operational expenditure percentage Opex and/or Capex cuts were applied in the same proportion to vegetation management expenditure (i.e. Ausgrid (39%), Endeavour (23%), Essential (38%)) for the 2014–2019 regulatory period.

That is, AON assumes that each of its clients:

- have only the amount we forecast an efficient and prudent provider would spend on vegetation management to spend on this activity
- will make no adjustments or changes other than reducing their overall spending on vegetation management.

AON's findings are inconsistent with, for example, Essential Energy's announced commitment to maintaining its current spending on vegetation management, regardless of our decision.[74] AON also, quite unfairly, assumes that the management of service providers are mere conduits feeding regulatory forecasts into activities in the exact proportion we estimate. We regard the directors and executives of service providers as sophisticated, intelligent and capable. We expect them to take necessary steps to change their practices to take account of changing conditions, including regulatory forecasts.

Jacobs suggests what some of these steps may be,[75] but we are confident in the ability of service providers to determine appropriate responses to our decision—including ensuring that they maintain adequate external and self-insurance coverage.

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71 Ausgrid Revised Regulatory Proposal pp 33-34; Endeavour Energy, Revised regulatory proposal, January 2015, pp. 37–38; Essential Energy, Revised regulatory proposal, January 2015, p. 41.

72 AON Insurance costs and coverage impacts arising from cuts in vegetation management expenditure for the 2014-2019 regulatory period, 13 January 2015.

73 AON Insurance costs and coverage impacts arising from cuts in vegetation management expenditure for the 2014-2019 regulatory period, 13 January 2015, p 4.

74 Essential Energy Revised Regulatory Proposal, January 2015, p 15

75 Ausgrid Attachment 1.01 - Jacobs - Reliability Impact Assessment, p 12

7.5.2 Realistic outcomes

The NSW service providers submit that if they are to implement the opex reductions from the draft decision, the NEL and NER require that we provide a realistic forecast of their actual costs while incentivising efficiency reductions over time in a realistic manner.[76] This includes, they submit:

- redundancy costs, which the service providers submit are legitimate and prudent in a time of transformation[77]
- a transition to mitigate the consequences of requiring service providers to immediately review, and substantially reduce, expenditure.[78]

The service providers point to the third opex criterion—"a realistic expectation of the demand forecast and cost inputs required to achieve the operating expenditure objectives"[79]—as the driver of this apparent requirement.

We disagree with these submissions for two reasons. Firstly, our view is the service providers' interpretation of the 'realistic' criterion is incorrect. In our view, this criterion is concerned with ensuring that there is a proper basis for estimating the demand and cost inputs that a prudent and efficient service provider would incur over the forecast period.[80] The demand forecast and cost inputs are for those of a prudent and efficient service provider operating the relevant service provider's network. They are not the cost inputs which result from previous inefficient decision making. Such an approach would undermine the incentive based aims of the regulatory scheme when read as a whole, because a service provider that bound itself by less than efficient decisions would be rewarded with a forecast that includes increased cost inputs.

We consider, therefore, that the opex criteria do not impose a requirement for the AER to be satisfied as to how the service provider in question will actually operate its business with the efficient total forecast opex. Such an interpretation runs counter to the notion of a prudent and efficient service provider—albeit facing the same exogenous circumstances as the service provider in question—implied by the opex criteria. Consumers should not be required to fund the consequences of long-term inefficient contracts. This notion was affirmed by the AEMC's removal of "individual circumstances" from the 'prudent' criterion. We are not persuaded by submissions to the effect that we must consider a service provider's actual cost inputs because the

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76 Ausgrid, Revised Regulatory Proposal, January 2015, pp. 153, 163-164; Essential Energy, Revised regulatory proposal, pp. 213–214; Endeavour Energy, Revised regulatory proposal, January 2015, p. 195.

77 Ausgrid, Revised Regulatory Proposal, p. 162; Essential Energy, revised regulatory proposal, January 2015, pp. 207–208; Endeavour Energy, Revised regulatory proposal, January 2015, p. 190.

78 This issue was raised more substantially by Ergon Energy in submissions to the NSW and ACT draft decisions, and by ActewAGL. This issue is, however, relevant to all service providers. ActewAGL, Revised Regulatory Proposal, pp. 257-267; Ergon Energy, Submissions on the draft decisions: NSW and ACT distribution determinations 2014-15 to 2018-19, 13 February 2015, pp. 23-27.

79 NER, clause 6.5.6(c)(3).

80 To this end, our approach is to apply a 'rate of change' to base opex that incorporates such factors including the demand for electricity, input prices and output growth.

AEMC did not remove "individual circumstances" from the 'realistic' criterion.[81] The phrase "individual circumstances" does not form part of the criterion.

Secondly, the service providers' views are based upon the incorrect assumption that it is the AER's role to dictate how they must run their businesses. As we explained in our draft decision, we do not approve specific projects or dictate the legal obligations a service provider enters into. Our task is to determine an efficient level of *total* opex for a prudent service provider to meet the opex objectives over a five year regulatory control period. As the AEMC notes, this underpins the incentive properties of the regulatory regime:[82]

> The level, rather than the specific contents, of the approved expenditure allowances underpin the incentive properties of the regulatory regime in the NEM. That is, once a level of expenditure is set, it is locked in for a period of time, and it is up to the NSP to carry out its functions as it sees fit, subject to any service standards.

Therefore, as we stated in our draft decision and above, we are providing the service providers with a forecast that we are satisfied reasonably reflects the opex criteria. It is the responsibility of the service provider to decide how it will spend the revenue it recovers from consumers. If the service provider decides to spend more than it recovers from consumers it must seek alternative sources of funding to do so.

Redundancy costs

The service providers submit that they are entitled to recover redundancy costs from consumers. They consider hiring staff is a legitimate cost so removing staff should be too.[83] The service providers also submit that incurring redundancy costs is no different to any other business undergoing necessary transformation to respond to changing circumstances and drivers. Such an approach, they contend, is prudent so to deny the transformation and costs will hinder the incentives to drive efficiencies when it is effective to do so.[84] They also reiterate their view that obligations under the *Fair Work Act 2009* fall within the definition of 'regulatory obligation or requirements' in the NEL.[85]

Consistent with our approach in our draft decision, we do not agree with these submissions. We are not denying the service providers the ability to transform their businesses and pay staff their entitlements. Recruitment and removal of staff are both

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81 Ergon Energy, *Submission on the Queensland Electricity Distribution Regulatory Proposals 2015–16 to 2019–20 Issues Paper*, 30 January 2015, pp. 10-14.

82 AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, p. 93.

83 Ausgrid, Revised Regulatory Proposal, January 2015, p. 162; Essential Energy, Revised regulatory proposal, p. 208; Endeavour Energy, Revised regulatory proposal, January 2015, p. 190.

84 Ausgrid, Revised Regulatory Proposal, January 2015, p. 162; Essential Energy, Revised regulatory proposal, January 2015, p. 208; Endeavour Energy, Revised regulatory proposal, January 2015, p. 190.

85 Ausgrid, Revised regulatory proposal, p. 5; Essential Energy, Revised Regulatory Proposal, January 2015, pp. 207-208; Endeavour Energy, Revised regulatory proposal, January 2015, p. 190.

'legitimate costs' that the service providers would need to incur. However, we do not 'fund' the service providers for these (or any specific) activities. We assess a service provider's revealed opex in order to form a view on whether it reasonably reflects the opex a prudent and efficient (objective) service provider would require in the future to comply with its obligations. Service providers have broad discretion about all contractual arrangements and the manner in which they carry out those obligations.

Further, we reiterate our draft decision view that obligations under the *Fair Work Act 2009* fall outside the definition of 'regulatory obligations or requirements' in section 2D of the NEL. The service providers have not provided evidence supporting their view that enterprise agreement obligations fall within this NEL definition. Rather, they have simply stated that our draft decision opex forecasts were insufficient to cover their labour commitments arising from their enterprise agreements.[86]

While a contractual arrangement may have been entered it in the previous period, this does not mean the associated costs should form the basis for the opex forecast (and, hence, the overall revenue allowance) in the next period. The service providers received their revenue allowances for the previous period and we are not taking any of the allowances away. However, we are determining the appropriate starting point for the forecast period. New information and better assessment techniques reveal that Ausgrid's and Essential Energy's revealed opex is not the appropriate starting point.

If we estimated a forecast by reference to a provider in all the same circumstances as the service provider in question we would potentially need to make a decision that incorporated matters as specific as the service provider's staffing levels or car leasing arrangements, and other matters that are completely within the discretionary control of management. If a service provider entered into a long term inefficient contract, we would be required to include the associated costs in our forecast. These decisions are not part of our role. Such an approach would be contrary to the incentive basis for the regulatory regime. Rather our role is to determine a forecast that we are satisfied reasonably reflects the opex criteria.

Deloitte's independent review of labour and workforce practices found that the service providers relied predominantly on hiring permanent staff employed under EBAs rather than contractors.[87] Many of these staff were hired on a full time basis to complete the service providers' large, but temporary, capex programs in the 2009–14 period.[88] This is due to EBA restrictions which make it difficult for the service providers to change their resourcing arrangements quickly and flexibly. Now, due to EBA restrictions that do not allow for forced redundancies, the service providers have stranded resources.

86 Ausgrid, Revised regulatory proposal, p. 12; Essential Energy, Revised Regulatory Proposal, January 2015, p. 15; Endeavour Energy, Revised regulatory proposal, January 2015, p. 11.

87 Deloitte Access Economics, NSW Distribution Network Service Providers Labour Analysis–Addendum, April 2015, p. 31.

88 Deloitte Access Economics, NSW Distribution Network Service Providers Labour Analysis–Addendum, April 2015, p. 31.

Our view is that this would not have been an efficient practice for a prudent service provider.

In line with the incentive regime, it is for the service providers to determine the appropriate response to excess labour needs and to bear the costs associated with those earlier decisions. The service providers could do this either within their regulated forecast by prioritising expenditure programs or with alternative sources of funding not recovered from customers.

Transition path

Some service providers have submitted that the NEL and NER enable (and require) us to provide a transition to efficient expenditure in the event we make large reductions in opex.[89] Their opinion is the NER provide us with sufficient discretion to apply a transition or, in the alternative, the control mechanism provides a means of doing so. To not provide a transition would be unachievable and not 'realistic' because they would need to immediately review and substantially reduce their opex, jeopardising the safety of the network.[90]

The NSW service providers' position on transition path is unclear. In their revised proposals they submit that a transition path is unnecessary when the AER's "allowance" is sufficient to achieve the opex objectives.[91] However, they also submit that adjustments in opex must reflect the time it would realistically take to implement them and propose a control mechanism adjustment.[92]

We agree that a transition path is unnecessary when our forecast is sufficient to achieve the opex objectives. We have not been persuaded by any submissions that suggest it is more appropriate for the consumers, rather than service providers, to bear the cost of becoming more efficient. We have also received several submissions from stakeholders that argue the opposite. That is, the type of approach advocated by service providers would be inconsistent with the NEL and NER.[93]

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89 For example, Ergon Energy, Submission on the Queensland Electricity Distribution Regulatory Proposals 2015–16 to 2019–20 Issues Paper, 30 January 2015, pp. 10-14; ActewAGL, Revised Regulatory Proposal, pp. 257-267; Ergon Energy, Submissions on the draft decisions: NSW and ACT distribution determinations 2014-15 to 2018-19, 13 February 2015, pp. 23-27.

90 Ergon Energy, Submission on the Queensland Electricity Distribution Regulatory Proposals 2015–16 to 2019–20 Issues Paper, 30 January 2015, pp. 10-14; ActewAGL, Revised Regulatory Proposal, pp. 257-267.

91 Ausgrid, Revised Regulatory Proposal, January 2015, p. 12; Essential Energy, Revised regulatory proposal, p. 16; Endeavour Energy, Revised regulatory proposal, January 2015, p. 12.

92 Ausgrid, Revised Regulatory Proposal, January 2015, p. 164; Networks NSW, NSW DNSPs' submission on the AER's draft determinations, 13 February 2015, pp. 6-9.

93 Origin Energy, Submission to AER draft determination for NSW electricity service providers, 13 February 2015, pp. 7-8; EnergyAustralia, Submission to Australian Energy Regulator - Determination of allowable revenue for NSW electricity distribution networks, 13 February 2015, p. 6; CCP, Response to AER Draft Determination Re: ActewAGL Regulatory Proposal, 2014-19; p. 10, 35-36; CCP, Submission on NSW DNSPs regulatory proposals 2014-19,15 August 2014, p. 3; CCP, Submission to AER– Responding to NSW draft determinations and revised proposals from electricity distribution networks, February 2015, p. 55; EUAA, Submission to Energex Revenue Proposal (2015/16 to 2019/20), 30 January 2015, pp, 22-29; EUAA, Submission to Ergon Energy (Ergon) Revenue

If a transition is a "premium" above the efficient costs that a prudent operator would require, we cannot include that premium in our estimate of total forecast opex that we are satisfied reasonably reflects these opex criteria. Conversely, if a transition is included as part of a forecast that does reasonably reflect the opex criteria, no further premium is required or possible.

We also note that legal advice provided to ActewAGL contradicts the service providers' view. That advice states that if we applied a transition path pursuant to clause 6.12.1(11) of the NER we would likely be in error:[94]

> Although we think that the establishment of a “glide path” is open to the AER, having regard to the analysis above, there is a tension in this conclusion, in that it proceeds on the assumption that the NEO requires ActewAGL to be allowed forecast opex at a level which exceeds that which the AER has legitimately allowed to ActewAGL pursuant to clause 6.12.1(4)(ii) of the NER. In our view, it is difficult to imagine a circumstance in which that consequence might arise, without the AER’s decision under clause 6.12.1(4)(ii) involving errors of the kind specified in section 71C of the NEL.

This legal advice suggests, in the alternative, that clause 6.12.1(4)(ii) allows the AER to use its discretion to take endogenous circumstances (such as the actual business structure vis-á-vis the prudent service provider's structure) into account because it would be inconsistent with the NEO for us to "presume, from the outset, that [our] discretion is circumscribed so that [we] must *only* consider the efficient costs that an objectively prudent distributor might incur. In particular, [it is asserted that] we have an obligation to consider the manner in which a service provider has structured its business in reliance on previous determinations made by [us], and its ability to transition to much lower levels of opex immediately."[95]

We have carefully considered this view and we are not convinced it is a sound interpretation of the NEO and the NER. It assumes that:

- service providers should expect that opex forecasts for future regulatory periods will be of the same order as opex forecasts for previous regulatory periods
- service providers are entitled to structure their business on that assumption.
- Neither of these assumptions is correct. We determine the opex forecast (which forms part of the revenue which a service provider may recover from consumers)

Proposal (2015/16 to 2019/20), 30 January 2015, pp, 22-29; QCOSS, Understanding the long term interests of electricity consumers – Submission to the AER’s Queensland electricity distribution determination 2015-2020, pp. 57-69; Far North Queensland Regional Organisation of Councils, AER Issues Paper - Queensland Electricity Distribution Regulatory Proposals 2015-16 to 2019-20, 30 January 2015, pp. 3-4; Australian PV Institute, APVI Submission to the AER on the Issues Paper on Ergon’s and Energex’s Network’s Regulatory Proposals, December 2014, pp. 5-6.

94 Young and McClelland, ActewAGL Distribution - AER draft decision on operating expenditure for 2015 to 2019 regulatory control period - memorandum of advice, 13 February 2015, paras 95-105.

95 Young and McClelland, ActewAGL Distribution - AER draft decision on operating expenditure for 2015 to 2019 regulatory control period - memorandum of advice, 13 February 2015, paras 68-94.

on the basis of the best information available to us at the time. If new benchmarking data shows that efficient costs are lower than previously thought, this information will be reflected in our determination.

The legal advice submitted by ActewAGL also assumes that we are requiring service providers to immediately change their circumstances. As set out above, this is not the case.

We consider that requiring service providers to bear their own transition costs is in both the short and long term interests of consumers. It will encourage service providers to make decisions that are prudent, reasonable and efficient in the long term. It will ensure consumers are not required to pay for inefficient expenditure or the consequences of inefficient expenditure. We consider that such incentives and consumer protections are likely to contribute substantially to the NEO.

This does not constrain service providers from taking time to transition to efficient levels or spend their opex forecasts on transition costs. As we explained in our draft decision, we do not prevent service providers from carrying out inefficient spending—including because of previous agreements, practices or arrangements. A service provider may have bound itself, contractually, to inefficient practices. However, the funds for inefficient spending should not be provided from a forecast which is assessed at the level of prudent and efficient spending. Accordingly, a service provider would need to fund any desired or required transition spending by:

- achieving greater efficiencies elsewhere in its practices; or
- paying lower dividends to shareholders.

These are the choices a competitive business must make, where efficiencies are revealed by a market.[96] These are the choices a regulated business, funded by consumers, should also make, where efficiencies are revealed by robust analysis. We consider that if this results in a disparity in profits between more and less efficient service providers, it indicates our approach is creating appropriate incentives and a better approximation of a workably competitive market.

7.5.3 Financeability

With their revised regulatory proposals, the NSW service providers submitted reports by CEPA.[97] CEPA considered our draft decision alternative opex forecasts and the 'speed to reduce the efficiency gap' would put at risk the achievement of the NEO because it could impact on the service providers' financial viability.[98]

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96 Second reading speech, National Electricity (South Australia) (National Electricity Law—Miscellaneous Amendments) Amendment Bill 2007, p 6.

97 Ausgrid, Revised Regulatory Proposal, January 2015, Attachment 1.07; Endeavour Energy, Revised Regulatory Proposal, Attachment 1.06; Essential Energy, Revised Regulatory Proposal, January 2015, Attachment 1.6.

98 CEPA, Benchmarking and setting efficiency targets for the Australian DNSPs, (ActewAGL), 19 January 2015, p. 55; Ashurst, Networks NSW–AER draft determination–Ashurst Australia, 16 January 2015, pp. 14-15.

The financeability implications of our decisions do not form part of our obligations under the NER. CEPA acknowledges this, but suggests that such an obligation may implied into the NEO.[99] Financeability is an underlying theme of the service providers' revised regulatory proposals. In particular, they raise the magnitude of our draft decision opex and capex adjustments as a driver of financeability concerns.[100] As a result, we have examined CEPA's submissions in the overview to this final decision and in Attachment 20.

We do not dispute CEPA's findings that the service providers may face financeability concerns under the restrictive assumptions that are used by CEPA in their analysis. CEPA undertook its analysis under the assumptions that the service providers will not make any changes to its level of opex or capex in response to our decision. The analysis also assumes that inefficient costs should be funded by consumers and not by shareholders through reduced returns. We do not find this to be appropriate.

In order to arrive at a more realistic conclusion on financeability we conducted our own analysis and tested various assumptions of the NSW service providers achieving efficiencies over the regulatory period. In summary, our analysis demonstrates that, for each service provider, our estimate of the total forecast opex that reasonably reflects the opex criteria will not adversely affect its financial viability.

7.6 Interrelationships

In assessing Ausgrid's total forecast opex we took into account other components of its regulatory proposal:

- The impact of cost drivers that affect both forecast opex and forecast capex. For instance forecast maximum demand affects forecast augmentation capex and forecast output growth used in estimating the rate of change in opex.
- The approach to assessing rate of return, to ensure there is consistency between our determination of debt raising costs and the rate of return building block.
- Changes to the classification of services from standard control services to alternative control services.
- Consistency with the application of incentive schemes - in particular our decision not to subject any expenditure to the EBSS during the 2015–19 regulatory control period.
- Concerns of electricity consumers identified in the course of its engagement with consumers.

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99 CEPA, Benchmarking and setting efficiency targets for the Australian DNSPs, (ActewAGL), 19 January 2015, pp. ix-x.

100 For example, Ausgrid, Revised Regulatory Proposal, pp. 37-38; Endeavour Energy, Revised Regulatory Proposal, January 2015, pp. 41-43, 195; Essential Energy, Revised Regulatory Proposal, January 2015, pp. 44-46, 213-214.

While capex is the subject of a separate forecast, many service providers have made broad statements about the combined effect of opex and capex reductions on safety.[101] In addition, the extent to which costs are expensed or capitalised by a service provider, or the extent to which there may be appropriate substitution between capex and opex when developing forecasts, are important interrelationships that we take into account when making our decision.

7.7 Assessment of opex factors

In deciding whether or not we are satisfied the service provider's forecast reasonably reflects the opex criteria we have regard to the opex factors.[102] Table 7.7 summarises how we have taken the opex factors into account in making our final decision.

Table 7.7 Our consideration of opex factors

Opex factor	Consideration
The most recent annual benchmarking report that has been published under rule 6.27 and the benchmark operating expenditure that would be incurred by an efficient Distribution Network Service Provider over the relevant regulatory control period.	There are two elements to this factor. First, we must have regard to the most recent annual benchmarking report. Second, we must have regard to the benchmark operating expenditure that would be incurred by an efficient distribution network service provider over the period. The annual benchmarking report is intended to provide an annual snapshot of the relative efficiency of each service provider. The second element, that is, the benchmark operating expenditure that would be incurred an efficient provider during the forecast period, necessarily provides a different focus. This is because this second element requires us to construct the benchmark opex that would be incurred by a hypothetically efficient provider for that particular network over the relevant period. We have used several assessment techniques that enable us to estimate the benchmark opex that an efficient service provider would require over the forecast period. These techniques include economic benchmarking, opex cost function modelling, category analysis and a detailed review of Ausgrid's labour and workforce practices. We have used our judgment based on the results from all of these techniques to holistically form a view on the efficiency of Ausgrid's proposed total forecast opex compared to the benchmark efficient opex that would be incurred over the relevant regulatory control period.
The actual and expected operating expenditure of the distribution network service provider during any proceeding regulatory control periods.	Our forecasting approach uses the service provider's actual opex as the starting point. We have compared several years of Ausgrid's actual past opex with that of other service providers to form a view about whether or not its revealed expenditure is sufficiently efficient to rely on it as the basis for forecasting required opex in the forthcoming period.
The extent to which the operating expenditure	We understand the intention of this particular factor is to require

[101] For example, Essential, *Revised Regulatory Proposal*, Attachment 1.1 [CONFIDENTIAL] Statement of Gary Humphreys Chief Operating Officer Essential Energy; Attachment 1.2 Asset System Failure Safety Risk Assessment; Attachment 1.9 Potential AER Impacts.

[102] NER, clause 6.5.6(e).

Opex factor	Consideration
forecast includes expenditure to address the concerns of electricity consumers as identified by the distribution network service provider in the course of its engagement with electricity consumers.	us to have regard to the extent to which service providers have engaged with consumers in preparing their regulatory proposals, such that they factor in the needs of consumers.[103] We have considered the concerns of electricity consumers as identified by Ausgrid in assessing its proposal – particularly those expressed in the consumer-focussed overview provided as an attachment to its regulatory proposal. For example, a clear theme present in this document is that customers consider electricity prices are too high.[104]
The relative prices of capital and operating inputs	We have considered capex/opex trade-offs in considering step changes for Ausgrid's head office building and for demand management expenditure. We considered the relative expense of capex and opex solutions in considering these step changes. We have had regard to multilateral total factor productivity benchmarking when deciding whether or not forecast opex reflects the opex criteria. Our multilateral total factor productivity analysis considers the overall efficiency of networks in the use of both capital and operating inputs with respect to the prices of capital and operating inputs.
The substitution possibilities between operating and capital expenditure.	As noted above we considered capex/opex trade-offs in considering step changes for Ausgrid's head office building and for demand management expenditure. We considered the substitution possibilities in considering these step changes. Some of our assessment techniques examine opex in isolation – either at the total level or by category. Other techniques consider service providers' overall efficiency, including their capital efficiency. We have relied on several metrics when assessing efficiency to ensure we appropriately capture capex and opex substitutability. In developing our benchmarking models we have had regard to the relationship between capital, opex and outputs. We also had regard to multilateral total factor productivity benchmarking when deciding whether or not forecast opex reflects the opex criteria. Our multilateral total factor productivity analysis considers the overall efficiency of networks with in the use of both capital and operating inputs. Further, we considered the different capitalisation policies of the service providers and how this may affect opex performance under benchmarking.
Whether the operating expenditure forecast is consistent with any incentive scheme or schemes that apply to the distribution network service provider under clauses 6.5.8 or 6.6.2 to 6.6.4.	The incentive scheme that applied to Ausgrid's opex in the 2009–14 regulatory control period, the EBSS, was intended to work in conjunction with a revealed cost forecasting approach. In this instance, we have forecast efficient opex based on benchmark efficient service provider. We have considered this in deciding how the EBSS should apply to Ausgrid in the 2009–14 regulatory control period and the 2014–19 period.
The extent the operating expenditure forecast is	Some of our techniques assess the total expenditure efficiency of

[103] AEMC, *Rule Determination*, 29 November 2012, pp. 101, 115.

[104] Ausgrid, *Keeping your electricity supply affordable, safe and reliable: An overview of our plans 2014-19*, Attachment to Regulatory Proposal, p. 5.

Opex factor	Consideration
referable to arrangements with a person other than the distribution network service provider that, in our opinion, do not reflect arm's length terms.	service providers and some assess the total opex efficiency. Given this, we are not necessarily concerned whether arrangements do or do not reflect arm's length terms. A service provider which uses related party providers could be efficient or it could be inefficient. Likewise, for a service provider who does not use related party providers. If a service provider is inefficient, we adjust their total forecast opex proposal, regardless of their arrangements with related providers.
Whether the operating expenditure forecast includes an amount relating to a project that should more appropriately be included as a contingent project under clause 6.6A.1(b).	This factor is only relevant in the context of assessing proposed step changes (which may be explicit projects or programs). We did not identify any contingent projects in reaching our final decision.
The extent the distribution network service provider has considered, and made provision for, efficient and prudent non-network alternatives.	We have not found this factor to be significant in reaching our final decision.

Source: AER analysis.

The NER require that we notify the service provider in writing of any other factor we identify as relevant to our assessment, prior to the service provider submitting its revised regulatory proposal.[105] Table 7.8 identifies these factors.

Table 7.8 Other factors we have had regard to

Opex factor	Consideration
Our benchmarking data sets, including, but not necessarily limited to: 1. data contained in any economic benchmarking RIN, category analysis RIN, reset RIN or annual reporting RIN 2. any relevant data from international sources 3. data sets that support econometric modelling and other assessment techniques consistent with the approach set out in the Guideline as updated from time to time.	This information may potentially fall within opex factor (4). However, for absolute clarity, we are using data we gather from NEM service providers, and data from service providers in other countries to provide insight into the benchmark operating expenditure that would be incurred by an efficient and prudent distribution network service provider over the relevant regulatory period.
Economic benchmarking techniques for assessing benchmark efficient expenditure including stochastic frontier analysis and regressions utilising functional forms such as Cobb Douglas and Translog.	This information may potentially fall within opex factor (4). For clarity, and consistent with our approach to assessment set out in the Guideline, we are have regard to a range of assessment techniques to provide insight into the benchmark operating expenditure that an efficient and prudent service provider would incur over the relevant regulatory control period.

Source: AER analysis.

105 NER, clause 6.5.6(e)(12).

A Base year opex

In this appendix, we present our detailed analysis of the NSW service providers' base year opex. Base year opex is the starting point for our approach to developing an estimate of the total forecast opex we consider meets the requirements of the NER.[106] We use this approach to assess each of the service providers' total forecast opex proposals. If we are not satisfied the service providers' opex proposals reasonably reflect the opex criteria, our estimates form the basis of any adjustments we will make.[107] This approach is set out in the Guideline and is in accordance with principles that have been endorsed by the AEMC.[108]

To ensure our estimates of total forecast opex reasonably reflect the opex criteria, we must be satisfied the starting point is an appropriate reflection of the ongoing efficient costs a prudent operator would require in the forecast period. If we use the service provider's revealed expenditure that includes, for example, inherent inefficiencies as the basis for a forecast, the forecast will also contain these inefficiencies. Therefore, if we find that the base year expenditure is inefficient or in some other way unrepresentative of the expenditure needed to achieve the opex objectives in the forecast period, we adjust it.

When presenting our detailed analysis of base opex in this appendix, we explain how we have taken account of the issues raised in the revised proposals and the submissions made by various stakeholders on our draft decision and the revised proposals. To the extent this involves additional analysis, we present it. The structure of this appendix is:

- Section A.1 sets out a summary of our findings and base year adjustments and the extent to which they have changed since our draft decision
- Section A.2 provides an exposition of ex ante incentive regulation and the role of benchmarking
- Section A.3 outlines our approach to assessing base opex
- Section A.4 presents the results of our benchmarking
- Section A.5 presents the results of our category analysis and qualitative review
- Section A.6 contains our assessment of operating environment factors

[106] As we explain in the opex attachment, this is the efficient total forecast opex we consider a prudent service provider would require to achieve the opex objectives in the forthcoming period.

[107] NER, clauses 6.5.6(c) and (d) and 6.12.1(4).

[108] AER, Expenditure forecast assessment guideline, November 2013, p 7; AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, p. 112.

- Section A.7 explains our conclusions on base opex and whether we propose to make any adjustments to base year opex for the purposes of constructing an alternative total opex forecast.

A.1 Summary

In this section we provide a summary of our findings and our view of the base year opex that we are satisfied represents a starting point for total forecast opex that reasonably reflects the opex criteria. We have carefully considered all material before us, including our own analysis, the service providers' revised regulatory proposals and submissions in forming our view on base year opex for each service provider.

A.1.1 Final decision adjustments

Table A.1 contains our final determination estimates of base year opex.

Table A.1 Final determination estimates of efficient base year opex ($million 2013–14)

	Ausgrid	Endeavour	Essential
Revealed base opex (adjusted)[a]	492.2	225.7	418.0
AER base opex	374.2	233.3	308.2
Difference	118.0	-7.6[b]	109.8
Percentage base opex reduction	24.0%	N/A	26.3%

Note: (a) This number is the revealed 2012–13 opex, so it differs from the starting number in Table 7.4, which is average opex over 2006–13. We have adjusted the service providers' revealed opex for debt raising costs, new CAM (if applicable) and new service classifications.
(b) Our estimate of base opex for Endeavour is slightly higher than Endeavour's because the reduced benchmark comparison point means its revealed costs are lower than the efficiency target.

Source: AER analysis.

We are not satisfied that Ausgrid's and Essential Energy's revealed expenditure in 2012–13 are appropriate starting points for determining our estimates of total forecast opex. However, we are satisfied that Endeavour Energy's revealed expenditure in 2012–13 is an appropriate starting point for determining our estimate of total forecast opex. We take this view based on quantitative and qualitative analysis using several assessment techniques, which included:

- review of the service providers' regulatory proposals
- four economic benchmarking techniques—three econometric and one index-based—including consideration of operating environment factors
- partial performance indicators
- category analysis

- targeted detailed review of certain types of expenditure.

All of these techniques suggested that material inefficiency existed in the service providers' revealed expenditure. Therefore, and in accordance with the process we outlined in the Guideline, we reduced the service providers' revealed expenditure to estimate base year opex amounts that we were satisfied reasonably reflected the opex criteria and would therefore represent an appropriate starting point for developing a total opex forecast.

Our reduction to Endeavour Energy's revealed opex was lower than that for Essential Energy and Ausgrid. Our analysis showed that Endeavour Energy had implemented efficiency programs earlier and to a greater extent than its two peers. However, we considered that as at 2012–13 (the base year), Endeavour Energy had further efficiency improvements to realise.

In this final decision, we have made two changes to our approach since our draft decision, which impact on the base year reductions we have made in developing our alternative forecasts.

First, we have adjusted the benchmark comparison point for determining whether a service provider's revealed opex is materially inefficient. We explain our reasons for this change below and in detail in section A.7.

Second, we have modified our approach to determining the operating environment factor adjustments. This increases the allowance for exogenous differences between service providers and the benchmark comparison point for Endeavour Energy from 10 per cent to 13 per cent. Ausgrid's allowance has increased from 10 per cent to 12 per cent. Essential Energy's allowance has increased from 10 per cent to 11 per cent. We explain our reasons for this change in section A.6.

These changes result in smaller reductions to revealed opex than those from the draft decisions. For Endeavour Energy the lower benchmark comparison point results in a slightly lower efficiency target than its revealed costs. Therefore, an adjustment to Endeavour Energy's base year opex is unnecessary and we can rely on its revealed expenditure in 2012–13 as the starting point for determining our estimate of total forecast opex.

While Endeavour Energy's revealed opex still includes inefficiencies, the change in our approach means we have determined it is not *materially* inefficient for the purposes of developing an alternative forecast that we are satisfied reasonably reflects the opex criteria.

A.1.2 Why Ausgrid's and Essential Energy's revealed opex are not appropriate starting points for estimating total forecast opex

Our analysis shows that it would not be appropriate to rely on Ausgrid's or Essential Energy's revealed opex as starting points for estimating total forecast opex that reasonably reflects the opex criteria. Our benchmarking demonstrates that the service providers' revealed opex is inefficient. Other quantitative techniques as well as the qualitative review of labour costs by Deloitte Access Economics (Deloitte) support the benchmarking findings.

Our review

As set out in the Guideline, our preference is to rely on revealed expenditure as the basis for determining our estimate of total forecast opex that reasonably reflects the opex criteria. However, we cannot simply assume that revealed expenditure for 2012-13 is reflective of the opex criteria for the 2014-19 regulatory control period. We use benchmarking to test the service providers' revealed expenditure against that of their peers.[109] We then use category analysis and detailed review of significant cost categories to see if they are consistent with our benchmarking findings. This approach is set out in the Guideline and in section A.3 (which details our assessment approach for base opex).

Benchmarking

In the draft decision, we assessed the service providers' revealed expenditure using economic benchmarking and partial performance indicators (PPIs). We have not changed our approach to using benchmarking since the draft decisions so the benchmarking techniques we rely on in this final decision are the same.

Economic benchmarking

For this final decision, we continue to rely on the economic benchmarking techniques developed by Economic Insights for assessing the relative efficiency of service providers compared to their peers. Economic Insights developed four benchmarking techniques that specifically compare opex performance, using data submitted by all service providers, over the period 2006 to 2013.

Figure A.1 presents the results of each of Economic Insights' opex models (stochastic frontier analysis (SFA), econometric regressions and opex MPFP) for each service provider in the NEM.

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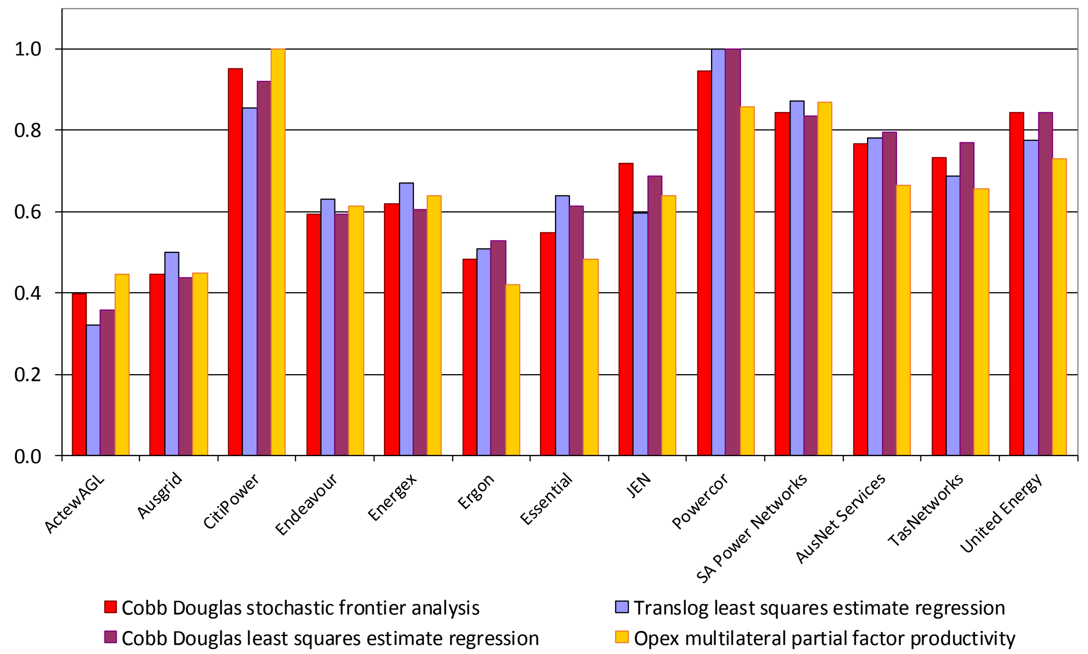
[109] AER, *Expenditure Forecast Assessment Guideline*, November 2013, pp. 7-8.

Figure A.1 Econometric modelling and opex MPFP results (average efficiency scores for 2006 to 2013)



Source: Economic Insights, 2014.

Each model differs in terms of estimation method or model specification and accounts for key operating environment factors (such as differences in customer density and degree of network undergrounding that may differentiate service providers) to differing degrees. Accordingly, the results will never be identical. However, Figure A.1 demonstrates that the results of the four models are consistent. All models show that the efficiency of the NSW service providers' revealed expenditure does not compare favourably with that of many of their peers. Ausgrid performs more poorly than Endeavour Energy and Essential Energy on each measure. Essential Energy performs more poorly than Endeavour Energy on two of the four measures.

Our preferred model is SFA (in red on the chart above) because it can directly estimate efficiency scores and has superior statistical properties.[110] The best performing business under this model is Citipower, with a score of 0.95. We refer to CitiPower as the 'frontier' firm throughout this appendix.

Section A.4 discusses economic benchmarking in more detail. Our benchmarking techniques and benchmarking results were the subject of many submissions filed in response to our draft decisions. In considering the various points raised in submissions, we have been able to further test the robustness of our approach. The

110 Economic Insights, Economic Benchmarking Assessment of Operating Expenditure for NSW and ACT Electricity DNSPs, November 2014, p. v.

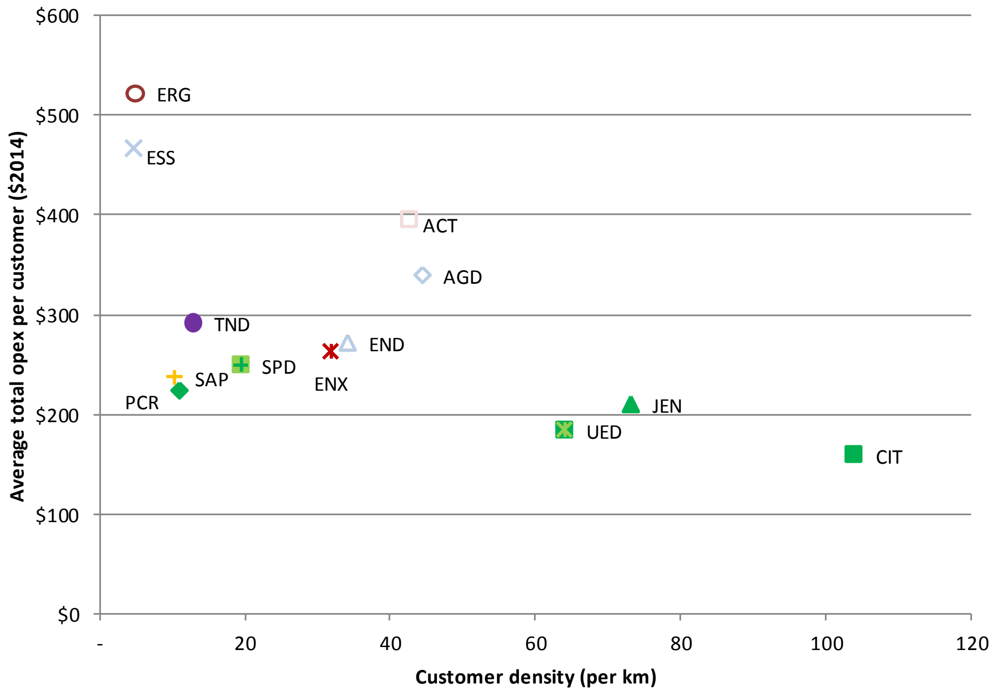
submissions we received on benchmarking and the manner in which we have taken those submissions into account in our final decisions are also discussed in section A.4. Economic Insights' final decision report provides further detail, including analysis of the positions and alternative models advanced by the service providers' consultants.[111]

Partial performance indicators

PPIs are a simplistic form of benchmarking. They measure the ratio of total output and one input factor. They are often used as they are easy to calculate and understand. However when used in isolation their results should be interpreted with caution because they are not as robust as our economic benchmarking techniques that relate inputs to multiple outputs using a cost function.

When examined in conjunction with other indicators they can provide supporting evidence of efficiency. We consider the PPI results do provide further evidence to support the results of our economic benchmarking techniques. Figure A.2, a key metric, compares average annual opex per customer for each service provider.

Figure A.2   Average annual opex per customer for 2009 to 2013 against customer density ($2013-14)



Source: Economic benchmarking RIN data.

Note: ACT = ActewAGL, AGD = Ausgrid, CIT = CItiPower, END = Endeavour, ENX = Energex, ERG = Ergon, ESS = Essential, JEN = Jemena, PCR = Powercor, SAP = SA PowerNetworks, SPD = AusNet, TND = TasNetworks, UED = United Energy.

111 Economic Insights, Response to Consultants' Reports on Economic Benchmarking of Electricity DNSPs, April 2015.

Figure A.2 demonstrates a clear demarcation between Ausgrid, Essential Energy and the majority of their peers (predominantly the Victorian and South Australian service providers but also TasNetworks and Energex. Based on this measure, Endeavour Energy performs somewhat more favourably than Ausgrid and Essential Energy because it appears comparatively lower (which is better) and is almost comparable to AusNet Services. This is consistent with the economic benchmarking results which generally indicate that Endeavour Energy performs better than the two other NSW service providers.

'Per customer' PPIs tend to be less favourable towards rural service providers who typically operate more assets per customer. We must bear this in mind when we consider the results in Figure A.2. In particular, Essential Energy has a low density network so it will appear to perform worse on PPIs than it does on the economic benchmarking models – particularly when compared to frontier performers CitiPower and Powercor. We would expect Ausgrid and Endeavour Energy to compare more favourably to Powercor due to their higher customer densities, but less favourably to CitiPower because CitiPower is very dense.

PPIs do not explicitly account for operating environment differences and examine only one output. However, bearing these limitations in mind, our PPI metrics (opex per customer and total user cost per customer) support the economic benchmarking results. We consider these PPIs remain useful tools of comparison if their limitations are understood. Further, our first annual benchmarking report contains additional PPIs that examine different outputs. These PPIs similarly show the NSW service providers generally perform poorly compared to their peers.[112] PPIs were the subject of some submissions from stakeholders. We consider PPIs in more detail in section A.4.

Incorporating differences between service providers

While Economic Insights' benchmarking models account for key differences between service providers—customer density, network line length and degree of network undergrounding, for example—they do not account for all differences. This is because accounting for too many differences in the model can lead to unstable results. The available data on operating environment differences is also a limiting factor.

Accordingly, in our draft decision, we conducted a detailed examination of the operating environment factors (OEFs) that might impact the benchmark performance of service providers. In the draft decision, we concluded that we needed to increase the NSW service providers' efficiency scores by 10 per cent to account for exogenous differences particular to their networks. The most significant exogenous difference between the best performing service providers and the NSW service providers is the proportion of subtransmission network over 66kV. We considered these differences would adversely impact on the NSW service providers' efficiency scores and should not be interpreted as inefficiency.

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[112] AER, Electricity distribution network service providers–annual benchmarking report, November 2014, Appendix A.

Following further analysis, in this final decision, we have reviewed which factors we will adjust for and as a result of this analysis have increased the adjustment from 10 per cent to 12 per cent for Ausgrid, 13 per cent for Endeavour Energy and 11 per cent for Essential Energy. Our assessment of operating environment factors and how it contributes to the adjustments is set out in detail in section A.5.

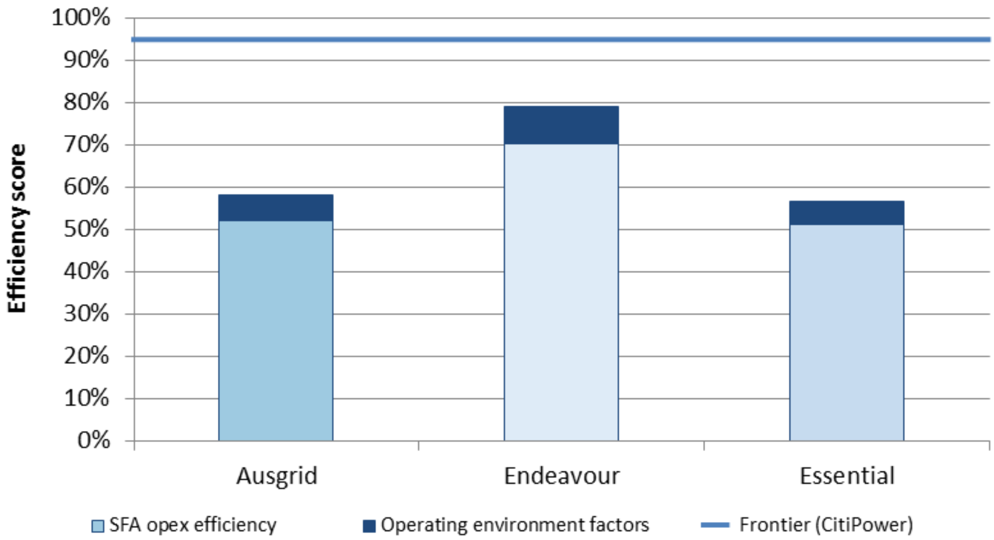
Our operating environment factor adjustments are percentage adjustments relative to the frontier. Therefore, the operating environment factor adjustments in Figure A.3 will not reflect the absolute percentages reported above. That is, the dark blue proportion represents 12 per cent for Ausgrid, 13 per cent for Endeavour Energy and 11 per cent for Essential Energy of the frontier efficiency score rather than an addition of 11, 12 or 13 percentage points on top of the SFA opex efficiency score.

Figure A.3 shows the efficiency scores for the NSW service providers compared to the frontier service provider (CitiPower):

- using the Cobb Douglas SFA model (Economic Insights' recommended model for quantifying an adjustment to revealed opex) and
- incorporating the allowance for exogenous differences in operating environments.

Our operating environment factor adjustments are percentage adjustments relative to the frontier. Therefore, the operating environment factor adjustments in Figure A.3 will not reflect the absolute percentages reported above. That is, the dark blue proportion represents 12 per cent for Ausgrid, 13 per cent for Endeavour Energy and 11 per cent for Essential Energy of the frontier efficiency score rather than an addition of 11, 12 or 13 percentage points on top of the SFA opex efficiency score.

Figure A.3 Comparison of raw SFA efficiency scores to the frontier, adjusted for operating environment factors



Source: AER analysis.

Note: The raw SFA efficiency scores displayed are 'rolled forward' from a period-average basis (for 2006-2013) to the 2012–13 base year. We explain this in section A.7 in our discussion of the adjustment process.

Figure A.3 demonstrates that, even allowing for operating environment factors, Ausgrid and Essential Energy have efficiency scores well below the frontier efficiency score of 95 per cent using our SFA benchmark model. Endeavour Energy, even with its comparatively higher score of 78 per cent, remains almost 20 percentage points below the frontier.

We used additional assessment techniques to see if they supported the benchmarking results and to help us understand what might be driving differences in benchmark performance.

Category analysis and qualitative assessment

In our draft decisions, we used more granular assessment techniques in two stages as a means of understanding what drives the benchmarking results. In the first stage, we examined the service providers' regulatory proposals and conducted category analysis of key opex categories. We have also applied this assessment technique in making our final decision.

All three service providers stated in their proposals that they were facing stranded labour problems due to reductions in capex, resulting in a need to incur voluntary redundancy costs.[113] This suggested labour costs could be one of the drivers of the NSW service providers' benchmarking performance. Essential Energy also submitted a step down in vegetation management expenditure in the forecast period. This suggested vegetation management practices may also be a driver of Essential Energy's benchmarking performance.[114]

Further, category analysis showed the NSW service providers had 'high' or 'very high' costs on labour and overheads metrics compared to most of their peers. Essential Energy also showed 'very high' costs on the vegetation management metrics, and a significant increase in vegetation costs over the 2009–13 period.

Accordingly (and because these categories account for a significant proportion of the NSW service providers' opex—labour is approximately 70 per cent[115]) for the second stage, we engaged Deloitte to conduct an independent detailed review of each of the NSW service providers' labour practices. We also conducted a review of Essential Energy's vegetation management opex. Through the detailed reviews, we found significant issues in these categories of the NSW service providers' opex, which we

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113 Ausgrid, Regulatory Proposal, p. 59; Essential, Regulatory Proposal, p. 78; Networks NSW, Submission on AER issues paper, pp. 12-16; Networks NSW, Submission on AER issues paper, pp. 12-16.

114 Essential Energy, *Regulatory Proposal,* p. 73; Essential Energy, Regulatory proposal appendix item 6.2 – Vegetation management review findings, p. 13.

115 See, for example, NSW service provider responses to annual RINs for 2012-13.

considered was evidence of base year inefficiency, supporting our benchmarking results.

Deloitte's detailed review findings

For our final decisions, we engaged Deloitte to provide an addendum to its draft decision findings, which includes a response to the service providers' revised proposals and related consultants' reports. After taking into account the new information, Deloitte's overall findings remain the same as those in its earlier report.[116]

Deloitte's overall findings for labour costs are:[117]

- the NSW service providers have high labour costs because they have too many employees. They all engaged permanent staff in preference to contractors over the 2009–14 period for transitory capex work. Now, due to EBA restrictions on redundancies, they have stranded labour
- because the NSW service providers employ a high proportion of their employees through EBAs (more than 75 per cent) restrictive EBA clauses have a significant impact on workforce flexibility
- the optimum level of outsourcing is likely to be higher than the level the NSW service providers outsourced at over the 2009–14 period; this is a key distinguishing factor from the Victorian service providers
- while the NSW service provider have been implementing efficiency improvements, many efficiencies have not been realised until after the 2012–13 base year.

Deloitte considered that Endeavour Energy's base year opex was likely more efficient than Ausgrid's and Essential Energy's because it had commenced implementing efficiency improvements earlier. However, all NSW service providers (including Endeavour Energy) had efficiencies they were yet to realise because the reforms they had implemented to date did not consider potential opportunities to improve efficiency outside of the three NSW businesses. That is, they compared efficiency among themselves, but not to businesses in other jurisdictions.[118]

Deloitte's findings align with statements reportedly made by Networks NSW CEO and chairman.[119]

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116 Deloitte Access Economics, NSW distribution network service providers labour analysis: addendum to 2014 report, April 2015, pp. ii-vii.

117 Deloitte Access Economics, NSW distribution network service providers labour analysis: addendum to 2014 report, April 2015, pp. ii–vii; Deloitte Access Economics, NSW Distribution Network Service Providers Labour Analysis, November 2014, pp. i-v.

118 Deloitte, NSW Distribution Network Service Providers Labour Analysis, November 2014, pp. i-v.

119 See, for example, Vince Graham, Selling off electricity networks will give NSW cheaper power bills, The Australian, 20 August 2014, p. 12; Angela Macdonald-Smith, Networks CEO attacks unions, makes threat on outsourcing, Sydney Morning Herald, 20 October 2014, p. 25; Australian Financial Review, NSW power network boss backs sale, 11 February 2015, p. 11; The Daily Telegraph, Power perks driving prices, 9 March 2015, p. 3; The Daily Telegraph, Privatising poles and wires network will end the union-negotiated rorts, 9 March 2015, p. 78.

We discuss our labour review findings in more detail in section A.5.

Essential Energy's vegetation management detailed review findings[120]

Our overall findings for vegetation management remain the same as those from our draft decision. That is, Essential Energy's own documentation, including a report it commissioned from Select Solutions, provide evidence that its vegetation management practices in the base year (2012–13) were inefficient.[121] Select Solutions' review found that Essential Energy must move to a "significantly more efficient" vegetation management model to reduce the impact of its expenditure on customer prices.[122] Select Solutions found several causes of inefficiency, including:

- attributing too much vegetation management effort to reactive spot clearing rather than proactive cyclic maintenance
- primarily engaging contractors for cutting on a demonstrably less efficient hourly rate basis
- less than optimal outsourcing.

We discuss our vegetation management findings in more detail in section A.5.

Adjustments to revealed opex

For each of the NSW providers, the evidence shows that there is a gap between the revealed costs in the base year and the benchmark opex that an efficient provider would incur. This gap is larger for Ausgrid and Essential Energy than it is for Eneavour Energy. In these circumstances we may need to make an adjustment to the revealed base opex. Making an adjustment involves consideration of the appropriate technique, the appropriate benchmark comparison point and the appropriate manner in which to make the adjustment. Our approach of using benchmarking as a basis for making adjustments to opex is consistent with Ofgem's approach.[123]

The best technique for the adjustment

Consistent with our draft decision approach, we continue to adopt Economic Insights' recommendation to rely on the Cobb Douglas SFA model as the preferred technique

[120] Our review of Essential Energy's vegetation management does not apply to Endeavour Energy or Ausgrid in any way.

[121] Essential, *Regulatory Proposal*, 2014, p. 73; Essential Energy, *Vegetation Management Strategy and Implementation Plan for Additional Expenditure – FY 2013 to 14*, February 2013; Select Solutions, Review of Essential Energy Vegetation Management Strategy–Final Report, 22 March 2013.

[122] Essential Energy, *Vegetation Management Strategy and Implementation Plan for Additional Expenditure – FY 2013 to 14*, February 2013, p. 13.

[123] Noting that Ofgem now assesses total expenditure rather than capex and opex separately. See, for example, Ofgem, RIIO-ED1–Final determinations for the slow-track electricity distribution companies-Overview, 28 November 2014, Chapter 4.

upon which we base an adjustment to revealed opex. This technique directly estimates efficiency scores and has superior statistical properties.[124]

The benchmark comparison point

In our draft decisions, we adopted a benchmark comparison point based on the weighted average efficiency scores of all service providers with efficiency scores greater than 0.75 to account for potential data and modelling issues. This weighted average reduced the efficiency target from 0.95 (the frontier firm) to 0.86.

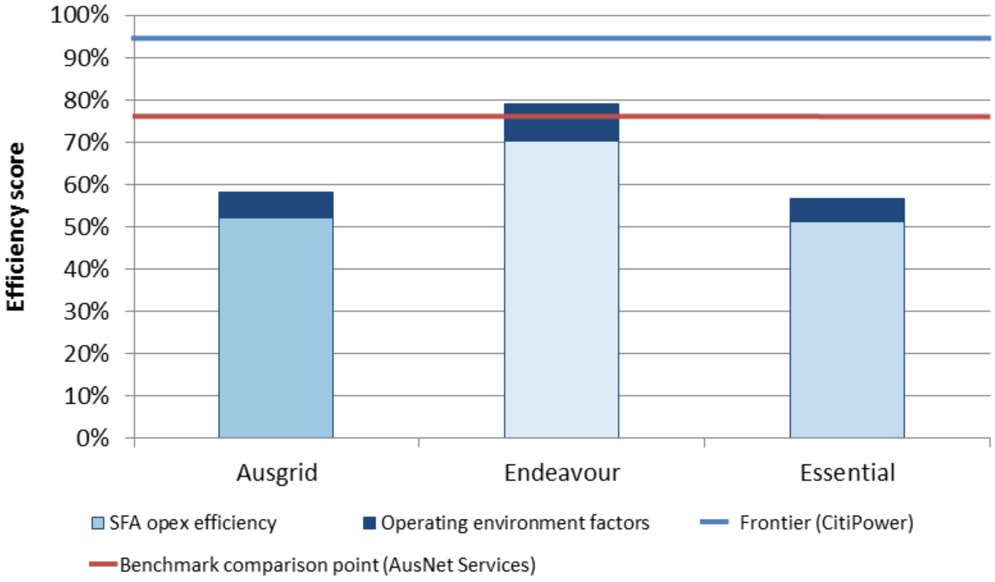
For the reasons we outline in detail in section A.7, we have reconsidered the benchmark comparison point in our final decisions. We have decided that, on balance, a more appropriate benchmark comparison point is the efficiency score for the business at the upper third (top 33 per cent) of companies in the benchmark sample (represented by AusNet Services). It reduces the benchmark comparison point from 0.86 (used in the draft decisions) to 0.77. We have done this because:

- this recognises that more than a third of the service providers in the NEM, operating in varied environments, are able to perform at or above our benchmark comparison point. We are confident that a firm that performs below this level is therefore spending in a manner that does not reasonably reflect the opex criteria. An adjustment back to this appropriately conservative point is sufficient to remove the material over-expenditure in the revealed costs while still incorporating an appropriately wide margin for potential modelling and data errors for the purposes of forecasting
- given it is our first application of benchmarking, it is appropriate to adopt a cautious approach
- our draft decision averaging approach produced an unusual result for service providers ranked in the top quartile of efficiency scores, but below the average of that top quartile. These service providers would require an efficiency adjustment to reach the average benchmark comparison point (because their scores are below the average) despite being efficient enough to be ranked in the top quartile and, hence, included in the average
- we consider this approach better achieves the NEO and RPP because it is sufficiently conservative to avoid the risks associated with undercompensating the service provider but also promotes efficiency incentives.

Figure A.4 shows the efficiency scores using our SFA model for the NSW service providers compared to the modified benchmark comparison point, represented by the red line (AusNet Services). The blue line represents the frontier firm (CitiPower).

[124] Economic Insights, Economic Benchmarking Assessment of Operating Expenditure for NSW and ACT Electricity DNSPs, November 2014, p. v.

Figure A.4 Comparison of raw SFA efficiency scores to the revised benchmark comparison point, adjusted for operating environment factors



Source: AER analysis.

Note: (1) The raw SFA efficiency scores displayed are 'rolled forward' from a period-average basis (for 2006-2013) to the 2012–13 base year. We explain this in section A.7 in our discussion of the adjustment process.

(2) As explained above, our operating environment factor adjustments are percentage adjustments relative to the frontier. Therefore, the operating environment factor adjustments in Figure A.4 (in dark blue) will not reflect the absolute percentages (12% for Ausgrid and Endeavour Energy, 11% for Essential Energy).

Figure A.4 demonstrates the difference between the frontier firm and our modified benchmark comparison point. Due to the lower benchmark comparison point, Endeavour Energy's result is now above it. This means we are able to rely on Endeavour Energy's revealed opex because it is not materially inefficient. However, Figure A.4 also shows that Endeavour Energy is still inefficient when compared to the frontier.

In addition, a substantial gap remains between Ausgrid's and Essential Energy's efficiency scores, adjusted for operating environment factors, and the benchmark comparison point. This is explained in more detail in section A.7.

The adjustment process

The adjustment process involves using the SFA model (our most robust benchmarking technique) to estimate average efficiency over the 2006–13 period. We then adjust the SFA results to take into account the reduced benchmark comparison point and operating environment factor allowances that we discussed above. Because we compare average efficiency, we must 'roll forward' the average efficient opex to the 2012–13 base year, because that is the relevant starting point for estimating total forecast opex that reasonably reflects the opex criteria. We do this by applying the measured rate of change, which accounts for the difference between output, price and productivity in the 2012–13 base year and at the period average (2006 to 2013).[125]

A key reason we use average period efficiency scores is because they reduce the impact of year–specific fluctuations not under the control of the service provider (such as weather conditions). Given the sample period is only eight years, Economic Insights considers the average is sufficiently recent to avoid potential loss of current relevance.[126]

Average efficiency results also provide us with an estimate of underlying recurrent expenditure not influenced by year on year changes, which we require for the Guideline approach to estimating total forecast opex.

We discuss our adjustment in detail in section A.7.

A.1.3 Summary responses to the service providers' submissions

In their revised regulatory proposals, the service providers submitted a large amount of material commenting on our draft decision approach to assessing opex. Key submissions made by the service providers that are relevant to base year opex include:

- our approach "placed unreasonable weight on…benchmarking results" and, therefore, is inconsistent with the NEL and the NER
- our benchmarking is "fundamentally flawed" and not supported by our other assessment techniques
- we did not adequately consider the service providers' regulatory proposals or their individual circumstances.

Throughout this appendix, we respond to the submissions put forward by the service providers and other stakeholders in the course of explaining our approach and findings. This section provides an overview of our response to the above three key submissions.

Reasonable weight placed on benchmarking

The service providers submit that our decisions on forecast opex rely exclusively on benchmarking to both reject the companies' proposed forecast opex and as the basis for substituted opex. In so doing, the NSW service providers submit that our draft

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125 This differs slightly from the rate of change we apply in Appendix B. While the approach is the same, to trend base opex forward over the forecast period, we apply forecast growth. When rolling forward average efficient opex, we apply measured growth because we can observe what has actually changed between the period average and the base year.

126 Economic Insights, Response to Consultants' Reports on Economic Benchmarking of Electricity DNSPs, April 2015, section 4.

decisions have not properly addressed the requirements of the opex criteria, having regard to the 11 opex factors under the NER. Additionally, they consider the NER "seek the AER to undertake a broader examination of a distributor's proposal", but that we have not done this. This, they submit, amounts to effectively disregarding our 2009–14 distribution determination of efficient forecast opex.[127]

We do not agree. As outlined in the Guideline, in our draft decisions and in this final decision, we have relied on several assessment techniques, both quantitative and qualitative to assess the service providers' proposed forecast opex. In doing so, we have used the same techniques as the basis for determining substitute opex. We have used our discretion to give benchmarking prominent, but appropriate weight based on its robustness and utility.

We have assessed the service providers' proposals using the techniques outlined in the Guideline. We have engaged with the details of the service providers' proposals to the extent they are relevant to our assessment of base opex. They were the starting point for our assessment. Ultimately, however, we must form a view on the amount of a service provider's forecast, not the specific contents of the proposal.[128]

Further, since our 2009–14 determination, we have developed new techniques that give us better insight into assessing expenditure and have new information that we are able to take into account. All stakeholders should expect us to use new techniques and information when they become available.[129] This new information demonstrates that the service providers' revealed costs are inefficient. However, we have not moved away from revealed costs—we use them when it is appropriate to do so. Rather, we have used new techniques to ensure that we are better able to make a decision that reasonably reflects the opex criteria for the future. Our approach represents a refinement of our longstanding approach to assessing opex.

We discuss these issues in detail in section A.3.

Benchmarking is robust, reliable and reasonable

The service providers have all submitted (and used consultants to support their view) that our benchmarking is fundamentally flawed due to, for example:[130]

- conceptual limitations

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[127] Ausgrid, Revised Regulatory Proposal, pp. 23-24, 129-138; Endeavour Energy, Revised Regulatory Proposal, pp. 25-26, 157-163; Essential Energy, Revised Regulatory Proposal, pp.29-30, 168-175.

[128] AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, p. 93.

[129] We have indicated in previous decisions and in defending those decisions our preference to use up to date information where possible. The Tribunal has endorsed this approach and indicated a similar preference: see for example Application by Ergon Energy Corporation Limited (Labour Cost Escalators) (No 3) [2010] ACompT 11 at [61] to [62].

[130] Ausgrid, Revised Regulatory Proposal, pp. 129-153; Endeavour Energy, Revised Regulatory Proposal, pp. 157-179; Essential Energy, Revised Regulatory Proposal, pp. 168-192.

- variable selection
- data comparability and reliability
- lack of a reasonableness check.

Our view is that Economic Insights' benchmarking is robust and reliable. The model specification and estimation methods are superior to the alternatives proposed by the service providers and their consultants. In addition, the Australian data we are using are robust because we have gathered, tested and validated it over three years of consultation with service providers and other interested stakeholders. The international data Economic Insights has used (to improve the precision of the models) has been used by the electricity regulators in the respective jurisdictions in recent regulatory decisions.[131]

Economic Insights responds to the service providers' submissions in detail in its final decision report.[132] We also discuss this further in section A.4.

Regulatory proposals and individual circumstances are considered

Broadly, the service providers submit that by relying on benchmarking as part of our assessment approach, we have: [133]

- not started our assessment with their regulatory proposals or examined which aspects of their proposals involve inefficient expenditure in any level of detail
- failed to comply with the NER requirements to have regard to their individual circumstances.

Benchmarking is a tool we use to assess regulatory proposals. We also use it in setting a substitute forecast if we are not satisfied that a service provider's proposed forecast reasonably reflects the opex criteria. We have considered the service providers' proposals in significant detail in conducting our assessments. We have conducted detailed reviews and analysed the service providers' forecasting approaches. We also have had regard to the service providers' individual circumstances through our review of operating environment factors (see section A.6) to the extent required by the NER and in accordance with the intent of the AEMC.

We disagree with the service providers' view that the NER require us to consider their endogenous circumstances. The AEMC is clear that while exogenous circumstances

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[131] Economic Insights, Response to Consultants' Reports on Economic Benchmarking of Electricity DNSPs, April 2015, section 3.2.

[132] Economic Insights, Response to Consultants' Reports on Economic Benchmarking of Electricity DNSPs, April 2015, section 3.10.

[133] Ausgrid, Revised Regulatory Proposal, pp. 134-139; Endeavour Energy, Revised Regulatory Proposal, pp. 159-163; Essential Energy, Revised Regulatory Proposal, pp.170-175; Networks NSW, NSW DNSPs' submission on the AER's draft determinations, 13 February 2015, pp. 6-9.

are relevant and should be accounted for, endogenous circumstances should not be considered.[134]

We discuss these issues in detail in section A.3.

[134] AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, p. 113. See also pp. viii, 25, 98, 107-108.

A.2 Ex ante incentive regulation and the role of benchmarking

In their revised proposals, the network businesses have questioned our approach and our interpretation of our role under the NEL and NER. This section explains ex ante regulation, and how our approach to benchmarking fits appropriately within the legal and regulatory framework.

A.2.1 Ex ante incentive regulation

Network services are 'natural' monopolies with little scope in any given location for a competitor to duplicate the network efficiently.[135] Monopoly businesses do not have an incentive to set prices at an efficient level because there is no competitive discipline on their decisions. They do not need to consider how and whether or not rivals will respond to their prices. Monopolies' profits depend only on the behaviour of consumers, their cost functions, and their prices or the amount supplied.[136]

Without regulation, the resulting market power would lead to high prices and probably insufficient investment. Accordingly, we must regulate the prices and other aspects of these services to ensure reliable and affordable electricity.[137]

Information asymmetries make it difficult for the AER to accurately assess the efficiency of the network businesses' proposals. We need to make judgements about 'efficient' costs.[138]

Incentive regulation is used to partially overcome information asymmetries. We apply incentive-based regulation across all energy networks we regulate—consistent with the NER.[139] This is a fundamental aspect of the regime. As stated by the AEMC:

> Set out in Chapter 6 of the NER, the incentive regulation framework is designed to encourage distribution businesses to spend efficiently and to share the benefits of efficiency gains with consumers. Specifically, it is designed to encourage distribution businesses to make efficient decisions on when and what type of expenditure to incur in order to meet their network reliability, safety, security and quality requirements.[140]

135 Productivity Commission, Electricity Network Regulatory Frameworks, inquiry report no. 62, 2013, p. 65.

136 ACCC, Submission to the Productivity Commission's inquiry into the economic regulation of airport services, March 2011, p. 8.

137 Productivity Commission, Electricity Network Regulatory Frameworks, inquiry report no. 62, 2013, p. 65.

138 Productivity Commission, Electricity Network Regulatory Frameworks, inquiry report no. 62, 2013, p. 190.

139 Clause 6.2.6(a) of the NER states that for standard control services, the control mechanism must be of the prospective CPI minus X form, or some incentive-based variant of the prospective CPI minus X form, in accordance with Part C (Building Block Determinations for standard control services). Further, the RPPs state a regulated network service provider should be provided with effective incentives in order to promote economic efficiency with respect to direct control network services the operator provides.

140 AEMC, Consultation paper: National Electricity Amendment (Demand Management Incentive Scheme) Rule 2015, February 2015, p. 3.

Broadly speaking, incentive regulation is designed to align the commercial goals of the business to the goals of society or, in the case of energy regulation, the NEO.[141] It relies on the principle that the network businesses' objective is to maximise profits.[142] Businesses that are able to improve their efficiency are rewarded with higher profits.[143] Businesses that allow their efficiency to deteriorate earn lower-than-expected profits. The actual revenue allowance set by the regulator should not influence the basic incentive of network businesses to minimise costs and, thereby, maximise profits.

To elaborate, the regime requires the AER to forecast and lock-in opex at the start of each five-year regulatory period that an efficient and prudent business would require.[144] The business is then given financial rewards when it improves its efficiency and spends less than the forecast during the regulatory period—while maintaining or improving its service standards. If the business spends less than the forecast it will still earn revenue to cover the total forecast amount. Hence it can 'keep the difference' between the forecast and its actual expenditure until the end of the regulatory control period. Conversely, if its spending exceeds the forecast, it must carry the difference itself until the end of the period.

Over time, incentive regulation should in theory allow the regulator to use the information revealed by businesses to develop better forecasts of efficient expenditure—consistent with the opex criteria. This will reduce the scope for the businesses to earn excessive rents and allow the regulator to apply stronger incentives for further cost reduction.[145]

However, using a network business' past information to set future targets can reduce the incentives of the business to lower costs since the business knows that any cut in its expenditure will decrease its revenue allowance in the future. Although the current regulatory approach allows the business to retain the benefit of any reductions in expenditure for a period of time, setting the appropriate level of incentive is difficult as it involves judgments about businesses' reactions to the incentive regime.[146] Moreover, the achievement of best-practice can be costly from the standpoint of managerial effort.[147]

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141 Productivity Commission, Electricity Network Regulatory Frameworks, inquiry report no. 62, 2013, p. 188.

142 Put simply, it is assumed that shareholders want the business to maximise profits because the greater the profits, the greater their income.

143 As stated by the AER in its Expenditure Forecast Assessment Guideline explanatory statement, 'the ex-ante incentive regime provides an incentive to improve efficiency (that is, by spending less than the AER's forecast) because network businesses can retain a portion of cost savings made during the regulatory control period.' (p. 42)

144 This takes into account the realistic expectations of demand forecasts and cost inputs, to meet and manage the demand for network businesses' services, comply with their regulatory obligations and maintain the safety of the system.

145 Productivity Commission, Electricity Network Regulatory Frameworks, inquiry report no. 62, 2013, p. 192.

146 Productivity Commission, Electricity Network Regulatory Frameworks, inquiry report no. 62, 2013, p. 190.

147 ACCC & Public Utility Research Centre University of Florida, Infrastructure regulation and market reform: Principles and practice, May 1998, p. 39.

Therefore, the incentives created by the regime can be somewhat mixed.[148] But, as a first principle, energy regulation in Australia is intended to be incentive-based where possible.[149] This can be contrasted with a pure cost of service model.

A.2.2 Contrast with a cost of service regime

Cost of service regulation, as its name implies, compensates businesses for the costs incurred to provide services. If a business reduces its costs, the benefits of cost efficiency accrue to consumers in the form of lower prices, not to the business as profits. On the other hand if costs increase then so do prices.

Cost of service regulation creates an environment that provides greater assurance to businesses that investments in sunk assets will be recovered. However, a pure cost of service approach provides low-powered incentives for cost reductions because actual costs are fully passed through to consumers. Joskow states:

> Since the regulator compensates the firm for all of its costs, there is no "rent" left to the firm as excess profits. This solves the adverse selection problem. However, this kind of cost of service recovery mechanism does not provide any incentives for the management to exert optimal (any) effort. If the firm's profitability is not sensitive to managerial effort, the managers will exert the minimum effort that they can get away with. While there are no "excess profits" left on the table since revenues are equal to the actual costs the firm incurs, consumers are now paying higher prices than they would have to pay if the firm were better managed and some rent were left with the firm and its managers.[150]

Such low-powered incentives created by a pure cost of service model are typically not observed in competitive markets. This is an important distinction between incentive and cost of service regulation.

In our view, the NEO and the supporting incentive-based regime seek to emulate workably competitive market outcomes. Incentive regulation is designed to impose the pressures of competition on natural monopolies. The AEMC states:

> The role of incentives in regulation can be traced to the fundamental objective of regulation. That is, to reproduce, to the extent possible, the production and

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148 Joskow finds incentive-based regulation applies elements of cost of service regulation in practice: 'This basic price-cap regulatory mechanism used to regulate electricity, gas and water distribution and transmission companies in the UK, is often contrasted with characterizations of cost-of-service or "cost plus" regulation that developed in the U.S. during the 20th century. However, I believe that there is less difference than may first meet the eye. The UK's implementation of a price cap based regulatory framework is best characterized as a combination of cost-of-service regulation, the application of a high powered incentive scheme for operating costs for a fixed period of time, followed by a cost-contingent price ratchet to establish a new starting value for prices. (Joskow, Incentive regulation in theory and practice: electricity distribution and transmission networks, 2005, pp. 70–71.)

149 AER, Overview of the Better Regulation reform package, April 2014, p. 4.

150 Joskow, Incentive regulation in theory and practice: electricity distribution and transmission networks, 2005, pp. 10–11.

> pricing outcomes that would occur in a workably competitive market in circumstances where the development of a competitive market is not economically feasible.[151]

Competition generally places downward pressure on prices and can act as an impetus for cost reductions and quality improvements. In a competitive market, businesses have a continuous incentive to respond to consumer needs at the lowest cost to increase demand for their services and, thereby, maximise shareholder returns.[152] Businesses that are less efficient are unable to pass their full costs onto consumers and ultimately pay lower returns to their shareholders.

Consistent with competitive market outcomes, the AEMC considers shareholders, by seeking a commercial return on investment, create incentives within the business to encourage efficient outcomes.[153] Moreover, the AEMC finds that shareholders should ultimately bear the risk of business inefficiencies:

> … the return on debt estimate should reflect the efficient financing costs of a benchmark efficient service provider. It should try to create an incentive for service providers to adopt efficient financing practices and minimise the risk of creating distortions in the service provider's investment decisions. If a service provider is run inefficiently then its shareholders, and not its customers, should bear the financial consequences of inefficient financing practices.[154]

Although the AEMC is referring to return on debt in the above quote, the same principle applies to opex. Risk should generally be borne by the party that is best able to manage it. Consumers of network energy services are not in a position to influence the network businesses strategy to manage opex, such as staffing decisions. And they do not have the choice of changing energy suppliers. Shifting the risk of business inefficiencies away from the managers and shareholders of the networks would create negative incentives:

> It is also in present and future consumers' interests that the regulatory framework does not provide excess returns, reward inefficiency or effectively 'bail out' a network company that has encountered financial difficulty as a result of its own actions (or inaction); for example because of an inappropriate financial structure or poor management. To do so would weaken or even remove the disciplines that capital markets place on all companies, reducing or removing the effectiveness of the incentives we place on network companies under the regulatory regime to the detriment of consumers. The primary

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[151] AEMC, Rule Determination: National Electricity Amendment (Economic Regulation of Transmission Services) Rule 2006 no. 18, November 2006, p. 93.

[152] ACCC, Submission to the Productivity Commission's inquiry into the economic regulation of airport services, March 2011, pp. 8–9.

[153] AEMC, Rule Determination: Economic Regulation of Network Service Providers, November 2012, p. 34.

[154] AEMC, Rule Determination: Economic Regulation of Network Service Providers, November 2012, p. 73.

responsibility for the financial integrity of a network company lies firmly with that company's management and owners.[155]

A.2.3 How benchmarking helps manage incomplete information about efficient costs

Incentive regulation relies on effective assessment tools to overcome information asymmetries. The 'revealed cost approach' and benchmarking are our two main tools.

As outlined in the Guideline, the AER typically uses the 'base-step-trend' forecasting approach to assess most opex categories. That is, we:

- assess whether base opex reasonably reflects the opex criteria
- assess the prudency and efficiency of forecast cost increases or decreases associated with new regulatory obligations and capex/opex trade-offs (step changes)
- apply trend analysis to forecast future expenditure levels.[156]

The revealed cost approach is a way to determine an efficient base. It relies on the principle that the primary objective of a business is to maximise its profits. The regulatory framework allows network businesses to keep the benefit of any cost reductions for a period of time (as discussed above). The AER may apply various incentive schemes, such as the EBSS in conjunction with the STPIS, to provide the business with a continuous incentive to improve its efficiency in supplying electricity services—while maintaining or improving service standards.

The drive to maximise shareholder returns should in theory push the businesses to become more efficient and productive over time. Actual past expenditure should therefore be a good indicator of the efficient expenditure the business requires in the future.

So, where incentive regulation is effective, the revealed cost approach can at least partially overcome information asymmetries that exist between the business and relevant stakeholders about the efficient opex base. We prefer to use revealed (past actual) costs as the starting point for assessing and determining efficient forecasts.[157] It allows us to leave the minutiae of input and output decision-making to the businesses.[158]

155 Ofgem, Regulating Energy Networks for the Future: RPI-X@20: Emerging Thinking – Embedding financeability in a new regulatory framework, Parallel consultation paper, 20 January 2010, p. 4.

156 AER, Expenditure Forecast Assessment Guideline for Electricity Distribution, 2013, pp. 22–24.

157 AER, Expenditure Forecast Assessment Guideline explanatory statement, 2013, p. 42.

158 Productivity Commission, Electricity Network Regulatory Frameworks, inquiry report no. 62, 2013, pp. 27–28.

However, we cannot automatically assume the network businesses will respond to the efficiency incentives.[159] The businesses' objectives may not align with the incentives of the regime.[160] We undertake an assessment of whether the base year opex reasonably reflects the opex criteria to determine if it is appropriate for us to rely on a business' revealed costs to forecast future expenditure needs.

In recent years, we have expanded our regulatory toolkit to make greater use of benchmarking, which is a way of determining how well a network business is performing against its peers and over time, and provides valuable information on what is 'best practice' (see Box 1). Benchmarking:

- improves the effectiveness of the regulatory process by enhancing the information available to us
- gives us an alternative source of comparative information about the costs of operating a business in the national electricity market to test the businesses' proposals
- allows us to gain some insight into whether or not there are material inefficiencies in a business' base opex and, therefore, represent a good basis for forecasting future opex.

We use benchmarking to investigate whether an adjustment to base opex is required—that is, we look for evidence of 'material inefficiencies' in a network business' base opex. If the business is materially inefficient compared to its peers, the revealed cost approach may not be appropriate.[161] Reliance on historic costs in these circumstances could yield an outcome inconsistent with the opex criteria and, more broadly, the NEO and RPPs which give effect to incentive regulation.

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[159] The NER require us to be satisfied that a business' total opex forecast reasonably reflects the expenditure criteria (NER, cl. 6.5(c)). Further, we must consider the actual and expected expenditure of the service provider during preceding regulatory control periods, and whether expenditure is consistent with our incentive schemes (NER, cl. 6.5.6(e)(5) and (8)).

[160] ACCC & Public Utility Research Centre University of Florida, Infrastructure regulation and market reform: Principles and practice, May 1998, p. 39.

[161] AER, Expenditure Forecast Assessment Guideline explanatory statement, 2013, p. 93.

Box 1 AER benchmarking techniques

Benchmarking is just one way of assessing whether a business' expenditure proposal is efficient.[162] We use multiple benchmarking techniques to inform our assessment of efficient opex. This includes 'economic benchmarking', partial performance indicators and category-based techniques. In addition, we undertake detailed reviews to investigate the drivers of, or potential explanations for, high expenditure indicators.

Specifically, our consultant, Economic Insights used a stochastic frontier analysis (SFA) model to estimate efficient base year opex and calculate the trend in opex going forward. Economic Insights used two other econometric models as well as multilateral total factor productivity (MTFP) and multilateral partial factor productivity (MPFP) indexes to cross-check the findings of the SFA model. Further, Economic Insights used international data to improve the robustness and precision of the models, but not to benchmark Australian networks against those operating overseas.

Stochastic frontier analysis

SFA is an extended econometric method that can be used in cost benchmarking analysis. SFA enables the estimation of a cost frontier, from which actual costs incurred by businesses can be compared. SFA is similar to other econometric cost models in that it specifies a cost function that relates costs to outputs, input prices, and environmental factors.

However, it differs from traditional econometric approaches in two main ways. First, SFA focuses on estimating the cost frontier representing the minimum costs ('best practice') rather than estimating the cost function representing the 'average' business. Second, SFA aims to separate the presence of random statistical noise from the estimation of inefficiency. SFA also has the advantage that it allows for economies and diseconomies of scale and can include environmental factors.

A.2.4 Benchmarking is part of the regulatory framework

The NER has always required us to have regard to benchmark opex that would be incurred by an efficient network business (cl. 6.5.6(e)(4)). The AEMC's November 2012 network regulation rule changes promote the AER's use of benchmarking for assessing and determining opex forecasts. The new rules stipulate that the AER will undertake and publish regular benchmarking reports, and that we must have regard to these reports in assessing whether networks' proposed opex forecasts reasonably reflect the opex criteria. Further, the AEMC removed potential constraints in the NER on the way the AER may use benchmarking.[163]

Benchmarking promotes the revenue and pricing principles (RPPs), which we are required to take into account when making our decisions. The principles include that a service provider should be provided with: (1) a reasonable opportunity to recover at

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[162] Productivity Commission, Electricity Network Regulatory Frameworks, inquiry report no. 62, 2013, p. 27.

[163] AEMC, Rule Determination: Economic Regulation of Network Service Providers, November 2012.

least its efficient costs; and (2) effective incentives to promote economic efficiency in the provision of its direct control services.

First, benchmarking allows us to more accurately assess whether networks' proposed opex forecasts are efficient. It gives us an additional source of evidence about the networks' performance. Indeed, the AEMC considered that benchmarking is a critical exercise in assessing the efficient costs of a network business and approving its opex forecast.[164]

Our use of benchmarking may mean we forecast a business' future opex requirements at a lower level compared to its historical costs to reflect the opex criteria. A prudent operator would not discount the possibility that we could better detect inefficient costs over time. Each network knows that their revenue allowance may be reduced if it is shown that other networks are operating more efficiently.

The revenue allowance determined by the AER does not set a business' actual operating budget. We predict the operating expenditure required for each network business acting as a prudent operator, incurring efficient costs. The business should attempt to outperform it. The business is expected to organise itself efficiently to make the most efficient use of its resources.[165] Management should attempt to minimise costs in an effort to maximise shareholder value.

That is, a prudent operator is expected to respond to the incentives of the regime—consistent with the NEO and competitive market outcomes.[166] The incentive regime is designed to provide the impetus for the business to deliver safe, reliable and secure services to its customers.

Second, energy regulation in Australia is intended to be incentive-based where possible. Benchmarking strengthens incentives for network businesses to minimise costs—it creates effective incentives to promote: efficient investment, the efficient provision of services and the efficient use of the distribution system, consistent with the NEO.

Benchmarking creates a form of competitive pressure on the networks, whereby information about the relative performance of a business can be an important incentive for improvement.[167] Benchmarking is widely used by private sector firms to identify opportunities for operational efficiencies and other improvements.

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164 AEMC, Rule Determination: Economic Regulation of Network Service Providers, November 2012, p. 112.

165 Productivity Commission, Electricity Network Regulatory Frameworks, inquiry report no. 62, 2013, pp. 170–171.

166 In a competitive market environment, various forces keep managers from deviating from profit-maximising objectives behaviour. If a competitive business is run inefficiently and unprofitably, it could be driven out of business or taken over by rivals/new entrants that do maximise profits. Managers who lose their jobs in these circumstances can find it difficult to obtain new jobs. Incentives such as stock ownership and other performance bonuses also motivate managers to maximise profits.

167 AER, Expenditure Forecast Assessment Guideline explanatory statement, 2013, p. 42.

A.2.5 Benchmarking is a common regulatory tool

The use of benchmarking in economic regulation of energy networks is well-established. The AER/ACCC undertook two studies in 2012 on how benchmarking is applied around the world. These studies cover the key methods, relevant literature and regulatory practices, as well as the major technical and implementation issues in benchmarking energy networks.[168][169] The studies carefully list the advantages and disadvantages of each benchmarking method in the context of energy network regulation. We also commissioned a thorough analysis of benchmarking approaches in some European countries.[170]

The Productivity Commission found utility regulators around the world use static (and dynamic) benchmarking to encourage regulated businesses to achieve the long-run efficiency outcomes of decentralised, workably competitive, markets.[171] Benchmarking has been used by:

- Australian regulators, including state based electricity regulators and the AER
- international regulators such as OFGEM (United Kingdom), CER (Ireland), NZCC (New Zealand), and OEB (Ontario Canada)
- various academics in the Australian, European, American and other contexts.[172]

Unlike some industries, electricity network distribution businesses are good candidates for benchmarking opex. All network businesses use a similar set of assets, such as poles, wires, transformers and cables, to provide network services to customers. Indeed, Bain & Company states '… in some ways, utilities are one of the most straightforward industries to benchmark because they perform essentially the same tasks wherever they are.'[173]

This commonality means that economic benchmarking of costs can be used to measure the economic efficiency of a network business by comparing its performance not only to other businesses, but also to its own past performance.[174] Historically, electricity distribution has exhibited low technology change in comparison to, for example, communications where the pace of technology change is more dynamic.[175]

However, it is important to recognise that network businesses do not operate under exactly the same operating environment conditions. Further, distribution businesses

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168 ACCC/AER, Benchmarking Opex and Capex in Energy Networks, ACCC/AER Working Paper no. 6, May 2012.

169 ACCC/AER, Regulatory Practices in Other Countries: Benchmarking Opex and Capex in Energy Networks, May 2012.

170 Schweinsberg, Stronzik, and Wissner, Cost Benchmarking in Energy Regulation in European Countries, Wik Consult, December 2011.

171 Productivity Commission, Electricity Network Regulatory Frameworks, inquiry report no. 62, 2013, p. 148.

172 Productivity Commission, Electricity Network Regulatory Frameworks, inquiry report no. 62, 2013, p. 148.

173 Bain & Company, Sustained cost reduction for utilities, 2013, p. 2.

174 AER, Expenditure Forecast Assessment Guideline explanatory statement, 2013, p. 132.

175 Coelli, Estache, Perelman, Trujillo, A Primer on Efficiency Measurement for Utilities and Transport Regulators, 2003, p. 11.

can vary in the scope of electricity distribution services they provide. Benchmarking needs to properly account for these differences so that when comparisons are made across networks, we are comparing 'like-with-like' to the greatest extent possible.[176] As stated by the AEMC:

> ... when undertaking a benchmarking exercise, circumstances exogenous to a NSP should generally be taken into account, and endogenous circumstances should generally not be considered. In respect of each NSP, the AER must exercise its judgement as to the circumstances which should or should not be included.
>
> …
>
> If there are some exogenous factors that the AER has difficulty taking adequate account of when undertaking benchmarking, then the use to which it puts the results and the weight it attaches the results can reflect the confidence it has in the robustness of its analysis.

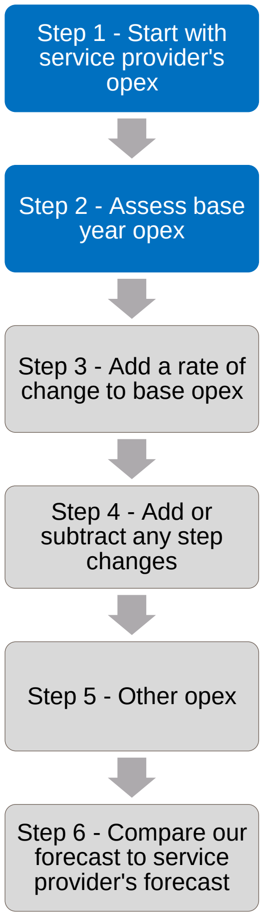
Our benchmarking models account for key differences in operating environment factors (section). This is followed by our review of a large set of operating environment factors to determine whether it is necessary to provide further allowance for operating environment differences.

We undertook an extensive research and consultation process to develop the benchmarking used in the annual benchmarking report and in the determinations. This has been in conjunction with Economic Insights, which is an internationally recognised expert consultant on benchmarking. As discussed in section A.3, we released a significant benchmarking study in 2012 and consulted heavily on both the Guideline (including through an issues paper, draft guideline and workshops) and regulatory information notices. We have further developed our benchmarking models through this determination process.

[176] AER, Expenditure Forecast Assessment Guideline explanatory statement, 2013, p. 132.

A.3 Assessment approach

In section 7.3 we presented a diagram explaining the five steps in our approach to assessing a service provider's total forecast opex.



This section explains our approach to assessing base opex, which covers Step 1 and Step 2 of this overall approach.

Assessing base opex is a crucial part of our overall assessment approach because it is the foundation upon which we build our own estimate of total forecast opex that we consider reasonably reflects the opex criteria. We use our estimate to:

- determine whether to either accept or not accept a service provider's total forecast opex proposal by reference to the opex criteria;[177] and
- in the event we must reject a service provider's proposal[178] (that is, if it does not reasonably reflect the opex criteria) replace that proposed forecast.

The starting point for developing our estimate is the service provider's revealed costs (in this case, opex for the 2012–13 financial year). This is base opex, represented by Step 1, above. Base opex has been audited, and is used by the service providers as an agreed starting point.[179]

As foreshadowed in the Guideline[180], we use the following techniques to assess whether the base opex is suitable as a starting point for determining an estimate of total forecast opex that reasonably reflects the opex criteria (represented by Step 2, above):

- economic benchmarking—more complex techniques that use applies economic theory to measure the efficiency of a distributor's use of inputs to produce a number of different outputs, having regard to operating environment factors
- partial performance indicators—simplistic techniques that relate total opex and total user cost to one cost driver, such as line length or customer density (known as aggregated category benchmarks in the Guideline)

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[177] NER 6.5.6(c), considered in more detail below

[178] NER 6.5.6(d), considered in more detail below

[179] Ausgrid, Regulatory proposal, 2014, p. 53; Endeavour Energy, Regulatory proposal to the Australian Energy Regulator, 2014, p. 83; Essential Energy, Regulatory proposal, 2014, p. 71.

[180] AER, Expenditure forecast assessment guideline, November 2013, p. 22

- category analysis—that compares, across service providers, the cost of delivering a particular category of opex (such as maintenance, vegetation management, etc) to identify areas for detailed review
- detailed review—targeted, qualitative, examination of particular categories of expenditure, such as labour costs and vegetation management, conducted with the assistance of industry experts.

Benchmarking is particularly important in Step 2 of our approach because it enables us to compare the relative efficiency of the total opex of different service providers.[181] The NER give us discretion as to how we use benchmarking in our assessment.[182]

As part of our application of economic benchmarking, we consider differences in service providers' operating environments that could account for some differences in the relative efficiency scores. Based on this review we make appropriate adjustments to efficiency scores.

We have a preferred benchmarking model, which is Cobb Douglas stochastic frontier analysis (SFA).[183] This model creates an efficiency score for all service providers in the NEM. In the event we make an adjustment to base opex, we use this model as the starting point.

If a service provider performs well on our economic benchmarking techniques, we consider it is unnecessary for us to review base opex in further detail. No adjustment is required because we consider the service provider's base opex is not materially inefficient and, therefore, an appropriate starting point for our estimate of total forecast opex that reasonably reflects the opex criteria. Conversely, if our economic benchmarking techniques indicate that a service provider's opex is not efficient, we then review base opex in further detail and consider whether it is necessary to adjust base opex.

Theoretically, all service providers who rank below the service provider with the highest efficiency score on our preferred technique could be considered inefficient. If we decided to apply benchmarking deterministically, we could simply determine the degree of a service provider's inefficiency against the efficiency score of the most efficient service provider and adjust their opex accordingly.

However, we are not applying benchmarking deterministically. As we demonstrate in the diagram below, we have regard to a number of sources of evidence in forming a view on base opex efficiency, consistent with the approach we outlined in the Guideline. If it is clear that base opex is inefficient, we depart from revealed costs. When we do so, we rely on the most robust benchmarking model as the basis for adjustment.

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[181] AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, p. 97.

[182] AEMC, Final Rule Determination, 29 November 2012, pp. 112–113.

[183] Economic Insights, 2014, p. iv

In doing so, however, we rely on the concept of material inefficiency introduced in the Guideline. Because our preference (as stated in the Guideline) is to rely on the revealed cost approach to determine the starting point for our estimate of total forecast opex, we depart from revealed costs only when we consider base opex is *materially* inefficient. [184] The concept of material efficiency recognises that efficiency is a relative term, and one which properly does not adjust a service provider's revealed costs for immaterial inefficiency.

Therefore, in deciding what is materially inefficient, we consider it is appropriate to provide a margin for the effect of potential modelling and data limitations. To give effect to this consideration, we do not compare service providers to the frontier business. We consider the appropriate "benchmark comparison point" is the lowest of the efficiency scores for service providers in the top quartile of possible scores on our preferred SFA model. This is equivalent to the efficiency score for the business at the bottom of the upper third (top 33 per cent) of companies in the benchmark sample (represented by AusNet Services).[185] Our approach of using benchmarking as a basis for making adjustments to opex is consistent with Ofgem's approach.[186]

This means that we will not adjust the base year opex of a service provider unless its efficiency score (taking into account operating environment factors) is below the service provider with the lowest of the efficiency scores in the top quartile of possible scores. We have done this because:

- given it is our first application of benchmarking, it is appropriate to adopt a cautious approach, allowing a margin for potential modelling and data issues and other uncertainties

Step 2
Assess base year opex

Step 2a
Using several sources of evidence, form a view about the efficiency of base opex:
- Economic benchmarking techniques, adjusted for operating environment factors
- Detailed reviews
- Partial performance indicators
- Category analysis

Step 2b
Determine the appropriate adjustment using the most robust benchmarking technique (SFA) and a benchmark comparison point that reflects 'materially inefficient' rather than the efficient frontier

184 AER, Expenditure forecast assessment guideline, November 2013, p. 32–33.

185 This approach is a departure from our draft decision approach to determining the benchmark comparison point. We discuss this further in section A.7.

186 Noting that Ofgem now assesses total expenditure rather than capex and opex separately. See, for example, Ofgem, RIIO-ED1–Final determinations for the slow-track electricity distribution companies-Overview, 28 November 2014, Chapter 4.

- we consider this approach is consistent with the NEO and RPP because it is sufficiently conservative to avoid the risks associated with undercompensating the service provider but also promotes efficiency incentives.

This has the effect of significantly reducing the target against which we compare and (if necessary) adjust service providers' base opex. Our detailed consideration of adjustments to base opex is set out in section A.7.

A.3.1 Our approach to benchmarking since May 2012

We released a working paper on benchmarking in May 2012, and commenced work on the Guideline in December 2012, following the November 2012 Rule change. We finalised the Guideline in November 2013. We subsequently engaged in an extensive process of information gathering that culminated in our first Annual Benchmarking Report in November 2014. Service providers and any other interested parties have had access to the benchmarking RIN data since we published it on our website in May 2014. For the past three years, we have consulted widely with service providers and other stakeholders on our approach and its legal and economic underpinnings. Stakeholders also participated in the rule change process. Table A.2 (further below) sets out this consultation process.

We have, therefore, consulted widely with stakeholders regarding our approach to assessing expenditure forecasts. These consultations have included discussions on how we should use benchmarking in our analysis. During this process, some service providers raised concerns similar to those filed in their responses to our draft decisions. These include submissions that:

- our approach is inconsistent with the NEL and NER
- we have placed excessive weight on benchmarking in our approach[187]
- we must give primacy to service provider's regulatory proposals in assessing or determining an opex forecast
- we are required to (and have not) had regard to the service providers' individual circumstances
- our benchmarking approach is flawed
- our approach ignores the constraints and obligations the distributors face so the result is unrealistic.

Some service providers have also raised additional issues subsequent to the consultation process, the RINs, our annual benchmarking report and the draft decisions.[188] This includes material prepared as early as 2012 which was,

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[187] For example. Huegin Consulting, Submission on the AER Expenditure Guidelines: A Review of the Benchmarking Techniques Proposed, 20 September 2013, p. 10 and p. 13.

[188] For example, in the explanatory statement to our expenditure forecast assessment guideline, we ask no less than 24 questions on economic benchmarking. In their submission on the explanatory statement the NSW distributors

unfortunately, not provided to us by service providers until after we had published our draft decisions.[189] Issues raised in this material include:

- the sensitivity of data envelopment analysis to input and output specifications and sample size
- there is additional benchmarking data and variables that should be considered by us in making our assessments.

We acknowledge that many aspects of our decision making relate to forward looking, technical and difficult matters, on which reasonable minds can differ. However, it is important to distinguish different decisions which we potentially could have made in exercising our discretion from a substantive reason why our decision is or would be unreasonable or incorrect. As the Tribunal has noted:[190]

> It is axiomatic that there will be no one correct or best figure derived from a forecast that in terms of cl 6.5.6(c) 'reasonably reflects' the opex criteria – the very nature of forecasting means that there can be no one absolute or perfect figure. Different forecasting methods are more likely than not to produce different results. Simply because there is a range of forecasts and a distributor's forecast falls within the range does not mean it must be accepted when, as here, the AER has sound reason for rejecting the forecast.

We have had careful regard to the new submissions and concerns raised by service providers. We encourage all stakeholders to actively, transparently and cooperatively participate in our consultation processes as that assists all stakeholders in delivering the best outcomes in accordance with the legislative framework.

A.3.2 How our approach is consistent with NER requirements

We consider that our assessment approach is consistent with the requirements of the NER. That is, we consider that our approach to assessing and, if required, substituting a service provider's proposal is consistent with:

- the opex criteria[191]
- the opex objectives
- the opex factors
- the revenue and pricing principles.

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did not address any of these questions despite having multiple reports that were relevant. AER, Better Regulation, Expenditure forecast assessment guidelines for electricity distribution and transmission, Issues paper, December 2012, pp 88–91.

189 For example: Evans & Peck, Review of factors contributing to variations in operating and capital costs structures of Australia distributors, Final Report, November 2012; Huegin Consulting , Distribution benchmarking study, 2012

190 Application by Ergon Energy Corporation Limited (Labour Cost Escalators) (No 3) [2010] ACompT 11 at [69]

191 The opex criteria broadly reflect the NEO as noted by the AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, p. 113.

Fundamentally, we consider that our decision is likely to contribute to the achievement of the NEO by incentivising and funding efficient, prudent and realistic expenditures. We take this view because our approach:

- ensures that the opex forecast reasonably reflects the efficient costs a prudent service provider requires to safely and reliably provide electricity services; and
- encourages service providers to efficiently invest and operate electricity services, by ensuring that service providers (and not consumers) bear the cost of expenditure in excess of prudent and efficient levels.[192]

Incentives can only be effective if the service providers, rather than consumers, bear the burden of funding spending that does not reasonably reflect the opex criteria.

Opex criteria

The opex criteria in clause 6.5.6(c) of the NER require the AER to assess a service provider's proposal to decide whether it reasonably reflects:

- the efficient costs of achieving the operating expenditure objectives;
- the costs that a prudent operator would require to achieve the operating expenditure objectives; and
- a realistic expectation of the demand forecast and cost inputs required to achieve the operating expenditure objectives.

We consider that the opex criteria work together as a single overall requirement.[193] Prudency and efficiency are complementary.[194] The Australian Competition Tribunal refers to them as a unified concept, and has described them as a single “prudent and efficient requirement".[195]

In turn, "prudent and efficient" costs can only be sensibly given meaning by reference to the demand forecast for the services the service provider provides and the realistic cost inputs that a prudent and efficient provider would require to achieve its opex objectives.When we refer to prudent and efficient costs, we mean costs that a prudent and efficient provider would require, having regard to realistic expectations of cost inputs and the demand forecast to achieve its objectives.

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193 The Tribunal has applied the term in this fashion in at least the following matters: Application by Ergon Energy Corporation Limited (Non-system property capital expenditure) (No 4) [2010] ACompT 12; Application by EnergyAustralia and Others [2009] ACompT 8; Application by Ergon Energy Corporation Limited (Labour Cost Escalators) (No 3) [2010] ACompT 11; Application by DBNGP (WA) Transmission Pty Ltd (No 3) [2012] ACompT 14; Application by United Energy Distribution Pty Limited [2012] ACompT 1; Re: Application by ElectraNet Pty Limited (No 3) [2008] ACompT 3 ; Application by DBNGP (WA) Transmission Pty Ltd [2012] ACompT 6

194 AEMC, Draft rule determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, p 76.

195 Application by ElectraNet Pty Limited (No 3) [2008] ACompT 3 at 199; [195] Application by EnergyAustralia and Others [2009] ACompT 8 at 141, citing reports prepared by service providers and the NER from 2008.

Importantly, the demand forecast and cost inputs are for those of a prudent and efficient service provider operating that network. They are not the cost inputs which result from previous inefficient decision making. This does not mean that we do not take account of circumstances or factors which are beyond the control of a service provider when making our assessment.

It is inherent in the opex criteria, each criterion being concerned with the costs of achieving the opex objectives, that we must have regard to an objective prudent and efficient service provider. However, in doing so, we must also have regard to the differing exogenous circumstances of the service provider we are assessing when making our decisions. This includes costs that arise due to the individual circumstances affecting the manner in which the service provider operates, but over which it does not have control. Such circumstances include geographic factors, customer factors, network factors and jurisdictional factors.[196]

However, the costs that reasonably reflect the opex criteria do not include costs that result from prior inefficient or imprudent spending. These costs may relate to the quality of management or financial decisions. Such factors are within a service provider's control and are inconsistent with costs that a prudent and efficient service provider would incur. This remains the case where a service provider has used revenue recovered by consumers in previous regulatory periods, consistent with our previous decisions, to make such decisions. This view is consistent with the incentive based aims of the regulatory scheme when read as a whole.

It is also consistent with the rationale provided by the AEMC for removing the phrase "individual circumstances" from the opex criteria.[197] Accordingly, we disagree with an interpretation of the opex criteria that a forecast which reflects a "realistic expectation of cost inputs" must take account of past discretionary decisions made by a service provider that bind the service provider, but do not reflect the efficient costs that an objectively prudent operator would incur. This is the case even if, as discussed below, those costs are contractually fixed.

Our approach also satisfies the requirement in the opex criteria that we determine a *total* forecast opex.[198] We are not required to assess individual projects or components of a forecast because such an approach would de-incentivise efficient and prudent discretionary spending and would effectively result in a cost of service regime.[199]

The total forecast opex is forward looking and directed towards the requirements of an objectively efficient and prudent operator in the future, which will then be funded by consumers through the building block revenue model established under the NER.

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196 AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, p. 113. See also pp. viii, 25, 98, 107-108.

197 AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, pp 107, 113.

198 NER 6.5.6(a)

199 AEMC, National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012 No.9 at 93

We must estimate a total forecast which we are satisfied *reasonably reflects* the opex criteria. We use this estimate as a comparator for the service provider's proposal and as a substitute if required. As the AEMC and the Tribunal have identified, the NER gives us broad discretion in how we perform this task.[200]

In this context, we take the view that the opex criteria should be understood as applying an objective test—albeit a test that applies to a particular network and must therefore incorporate certain individual circumstances of that network. The intention behind the regulatory regime is to determine an objective forecast for the operating costs of the network that should be funded by consumers. If a service provider can better this forecast in its actual spending it is rewarded with the cost savings. If it overspends the forecast it bears the costs.

We therefore consider that an appropriate application of the opex criteria involves us making an assessment about what objectively would be:

- the efficient costs of achieving the opex objectives, rather than the actual costs a service provider has spent or intends to spend
- the costs that a prudent service provider for that network would require (rather than the actual costs the actual service provider in question intends or is contractually obliged to provide given all their circumstances and past decision making)
- a realistic expectation of the demand forecast (rather than the service provider's own demand forecast) and
- a realistic expectation of the cost inputs to achieve the objectives (not the actual cost inputs that the provider might incur, or have committed itself to spend money on, to achieve the opex objectives).

It follows, as the Tribunal has noted, there is unlikely ever to be one unique "correct" total forecast. Reasonable minds may differ as to the data and techniques.[201] The AEMC has also recognised this.[202] We expect and observe service providers and their consultants to disagree with aspects of our decision.

Opex objectives

Our assessment approach ascertains the total forecast opex for a prudent and efficient service provider, informed by a realistic expectation of the demand forecast and cost inputs, to achieve the opex objectives. One of these objectives is the applicable 'regulatory obligations or requirements' that the service provider must meet that are associated with the provision of standard control services.[203] Service providers are also

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200 AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, pp 165,

201 Application by Envestra Limited (No 2) [2012] ACompT 3 at [146] , approved of in Application by APA GasNet Australia (Operations) Pty Limited (No 2) [2013] ACompT 8 at [232]

202 AEMC, Economic Regulation of Transmission Services, Rule Determination, 16 November 2006 at 50, 52, 53

203 NER 6.5.6(1)

expected to comply with regulatory obligations under the RPP in the NEL.[204] The other opex objectives relate to safety, demand and, to the extent they are not regulatory obligations, reliability and security levels. We discuss the service providers' concerns with safety and reliability separately in section 7.5.

In acting to fulfil the opex objectives and having regard to the RPP, we therefore have close regard to the definition of ‘regulatory obligation or requirement’ in the NEL.[205] This definition is exhaustive. That is, only matters within the terms of the definition constitute 'regulatory obligations or requirements'.

To fall within the NEL definition, a regulatory obligation or requirement must be attributable to one of the following categories:

- distribution system safety duties
- distribution reliability standards
- distribution service standards
- obligations under the NEL, NER, NERL and NERR
- obligations under legislation in a participating jurisdiction levying tax, regulating the use of land or protecting the environment
- an Act or instrument of a participating jurisdiction that materially affects the provision of electricity network services.

A participating jurisdiction is defined as a jurisdiction which has, in force, a version of the NEL.[206]

Accordingly, it is clear that the definition of 'regulatory obligations or requirements' is limited in application.[207] We have assessed claims by service providers in a manner consistent with this definition and our draft decision. Because this definition in the NEL is limited to the matters set out above, we do not consider that the following constitute 'regulatory obligations or requirements' as defined in the NEL:[208]

- obligations at common law, tort and contract (such as common law duties of care in negligence)
- obligations to comply with legislation that is not from a participating jurisdiction
- obligations to comply with legislation that is from a participating jurisdiction, but which does not fall into the categories identified in the definition in the NEL.

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204 NEL 7A(2)(b)

205 NER chapter 10, definition of 'regulatory obligation or requirement' and NEL, s2D.

206 NEL s 5. This means that only jurisdictions which have passed a version of the NEL are participating jurisdictions.

207 See Second reading speech, National Electricity (South Australia) (NEL -Miscellaneous Amendments) Bill 1996, p 6.

208 Although these obligations may be informed by other requirements that do meet the definition.

For example, all legal persons (including corporations such as service providers) are required to comply with the requirements of the Australian Consumer Law.[209] These requirements are imposed by participating jurisdictions as well as by the Commonwealth. However, they do not fall into the NEL definition outlined above.

We therefore disagree with submissions which assert that a variety of requirements are 'regulatory obligations or requirements' under the NEL. For example, 'laws of general application to corporations and individuals, such as the Competition and Consumer Act, Corporations Act, Privacy Act, intellectual property legislation or motor traffic legislation'[210] are not 'regulatory obligations or requirements'.

It is unclear whether or not these submissions consider obligations to comply with laws of general application fall within the categories defined in the NEL. Regardless, for the reasons set out above, we do not consider that any of these obligations are a 'regulatory obligation or requirement' within the meaning of section 2D (and, by extension, section 5) of the NEL.

We also disagree with the service providers' submissions that compliance with the terms of their own EBAs[211] is a 'regulatory obligation or requirement'. For example, service providers have referred to redundancy costs 'required to be paid as a regulatory obligation'.[212]

First, of the six possible (and exhaustive) categories of obligations or requirements mentioned above, EBAs could conceivably only fall with an Act or instrument made or issued that 'materially affects a service provider's provision of electricity network services'. This is because the terms of an EBA could plausibly materially affect a service provider's provision of standard control services. However, that Act or instrument must be made by a 'participating jurisdiction'. Given a participating jurisdiction must have passed a version of the NEL, an EBA made under the Commonwealth's *Fair Work Act 2009* appears to be imposed by a law other than of a participating jurisdiction.[213] Further, the terms of an EBA itself are not contained in the *Fair Work Act 2009.*

Second, the consequences of breaching the *Fair Work Act 2009* are a separate and narrower subset of the potential consequences of a distributor breaching its EBA.

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209 Schedule 2 to the Competition and Consumer Act 2010 (Cth), various equivalents in state legislation identical terms.

210 For example, ActewAGL Revised proposal at 2, 4.

211 Pursuant to the *Fair Work Act 2009 (Cth)*.

212 Ausgrid, Revised Regulatory Proposal, p. 5; Endeavour Energy, Revised Regulatory Proposal, p. 3; Essential Energy, Revised Regulatory Proposal, p. 7; also implied by ActewAGL, Revised Regulatory Proposal, p . 68.

213 The Commonwealth has not passed a version of the NEL so it is not a participating jurisdiction for the purposes of section 5 (and hence, section 2D) of the NEL. Commonwealth laws are 'regulatory obligations or requirements' if they fall within section 2D(1)(a). These relate to safety duties, reliability and service standards. However, commonwealth laws that fall within section 2D(1)(b), insofar as it refers to a 'participating jurisdiction', do not.

Third, we consider that the interpretation advocated by submissions is contrary to the requirement in clause 6.5.6(a) for a proposal to include the total forecast opex for a regulatory control period. It is important to note that when we determine total forecast opex, we do so within an overall incentive framework that requires the service provider to decide how to spend its allowed revenue requirement. As we mention above, a requirement that we consider the terms of EBAs when forming a view on total forecast opex would be more akin to a cost of service regime than an incentive regime.

Fourth, we note that while contractual or other obligations which do not fall within the definition are not regulatory obligations or requirements so defined, a service provider can still direct the revenue it recovers from customers (or from other sources) to comply with such obligations. The costs of compliance with obligations that are not within the definition of 'regulatory obligation or requirement' are treated like any other costs a service provider incurs.

Service providers have broad discretion about the contractual arrangements they enter into, and often have discretion about the manner in which they carry out their legal obligations. This discretion often includes whether to enter into particular legal obligations, such as employment contracts or arrangements with contractors.

We do not seek to interfere in the discretion a service provider has as to how and when to spend its total opex forecast to run its network. The service provider is free to decide how to manage its activities in light of the revenue recovered from consumers that we approve. Equally, the service provider bears the consequence of imprudent or inefficient decisions, including those relating to cost inputs or its response to demand forecasts. When a service provider enters into an agreement of any kind, it does so in the full knowledge that the forecast will apply for five years, without any guarantee that the same or a similar forecast will be approved for the following five year period.

As the AEMC notes, this underpins the incentive properties of the regulatory regime:[214]

> The level, rather than the specific contents, of the approved expenditure allowances underpin the incentive properties of the regulatory regime in the NEM. That is, once a level of expenditure is set, it is locked in for a period of time, and it is up to the NSP to carry out its functions as it sees fit, subject to any service standards.

Accordingly, where a service provider has entered into an EBA which requires it to incur expenditure that, objectively, would be viewed as inefficient or imprudent or involving cost inputs that an objectively prudent provider would not be realistically expected to incur, it is for the service provider to bear the costs of its decisions.

Once we determine the opex forecast we are satisfied reasonably reflects the opex criteria, it is for a service provider to manage its business as it sees fit. It is for the service provider to decide whether or not to fund particular projects, strategies or

[214] AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, p. 93.

commitments to meet the demand for standard control services, comply with regulatory obligations and maintain safety and reliability. Our role is not to dictate how service providers spend money to comply with their broader obligations. We fund service providers so that if they are efficient and prudent, they will have sufficient opex to achieve the objectives.

Opex factors

We must take the opex factors into account in making our assessment of whether a service provider's proposed forecast reasonably reflects the opex criteria. In this way, they function similarly to the revenue and pricing principles. That is, they require us to have regard to matters, but give us discretion as to the weight we should apply to each.[215]

Our approach has regard to each of the opex factors set out below:

- the most recent annual benchmarking report that has been published under clause 6.27 and the benchmark operating expenditure that would be incurred by an efficient distribution network service provider over the relevant regulatory control period
- the actual and expected operating expenditure of the distribution network service provider during any preceding regulatory control periods
- the extent to which the operating expenditure forecast includes expenditure to address the concerns of electricity consumers as identified by the distribution network service provider in the course of its engagement with electricity consumers
- the relative prices of operating and capital inputs
- the substitution possibilities between operating and capital expenditure
- whether the operating expenditure forecast is consistent with any incentive scheme or schemes that apply to the distribution network service provider under clauses 6.5.8 or 6.6.2 to 6.6.4
- the extent the operating expenditure forecast is referable to arrangements with a person other than the distribution network service provider that, in our opinion, do not reflect arm's length terms
- whether the operating expenditure forecast includes an amount relating to a project that should more appropriately be included as a contingent project under clause 6.6A.1(b)
- the extent to which the distribution network service provider has considered and made provision for efficient and prudent non-network alternatives

215 AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, pp 101.

- any relevant final project assessment conclusions report published under 5.17.4(o),(p) or (s)
- any other factor we consider relevant and which we have notified the distribution network service provider in writing, prior to the submission of its revised regulatory proposal under clause 6.10.3, is an operating expenditure factor.

However, for assessing base opex, we have exercised our discretion to emphasise the following factors specified in clause 6.5.6(e):

- the benchmark opex that would be incurred by an efficient service provider—we have had regard to the analysis and techniques used in our recent annual benchmarking report but we have also used other techniques in addition to those discussed in that document
- recent operating expenditure—we use the operating expenditure of the service provider in previous periods, particularly the most recent as a key input into our approach
- the relative prices of operating and capital inputs—we use input prices to trend base opex such that the total forecast opex allowances reasonably reflect a realistic expectation of demand forecast and cost inputs.

We also have regard to the following opex factors which we consider relevant (and which we notified service providers of in our draft decisions):

- our benchmarking data sets including, but not necessarily limited to:

  (a) data contained in any economic benchmarking RIN, category analysis RIN, reset RIN or annual reporting RIN

  (b) any relevant data from international sources

  (c) data sets that support econometric modelling and other assessment techniques consistent with the approach set out in the Guideline

  as updated from time to time.
- Economic benchmarking techniques for assessing benchmark efficient expenditure including stochastic frontier analysis and regressions utilising functional forms such as Cobb Douglas and Translog.

We identified our preference for using econometric techniques in our explanatory statement to the Guideline.[216]

The NER were specifically amended to allow us to take account of additional factors.[217] Service providers were on notice of our intention to use benchmarking from the 2012 rule change. We consider that these factors are particularly relevant to our approach

[216] AER, Expenditure Forecast Assessment Guideline–Explanatory Statement, November 2013, p. 131.

[217] AEMC , Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, pp 101.

to assessing the service provider's opex forecast and, if necessary, substituting our own opex forecast.

We have used our discretion to give weight to the opex factors which we consider are most relevant to our approach. The AEMC has recognised our discretion in this regard:[218]

> As mandatory considerations, the AER has an obligation to take the capex and opex factors into account, but this does not mean that every factor will be relevant to every aspect of every regulatory determination the AER makes. The AER may decide that certain factors are not relevant in certain cases once it has considered them.

We have received submissions stating that we have placed unreasonable weight on benchmarking and "almost solely" relied on it as a deterministic or mechanistic tool.[219] They consider benchmarking is but one of the opex factors relevant to forming a view on whether total forecast opex proposals reasonably reflect the opex criteria. Additionally, they consider the NER seek we undertake a broader examination of a service provider's proposal, but that we did not do this in the draft decision.[220] Some submissions also state that the purpose of the benchmarking factor is:[221]

> ...for the AER to consider whether available benchmarking information can provide a partial indicator of the efficiency of the forecast expenditure, and if so the investigations and weight that should be ascribed to that data.

We disagree and consider we have had appropriate and reasonable regard to benchmarking, together with other techniques in assessing the revised proposals.

We agree that benchmarking is one of several opex factors that we are required to 'have regard to'. However, as we explain above, we have discretion as to how we have regard to each opex factor, including how much weight we attach to them. Indeed, the AEMC has stated that we may decide certain factors are not relevant.[222] We explained this in our draft decision[223] and the explanatory statement to the Guideline.[224]

We consider it appropriate to give prominent, but not overwhelming weight to benchmarking base opex based on the robustness of the data and techniques and its utility in overcoming information asymmetry and in providing comparisons amongst

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218 AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, pp 115

219 Ausgrid, Revised Regulatory Proposal, pp. 23-24, 129-138; Endeavour Energy, Revised Regulatory Proposal, pp. 25-26, 157-163; Essential Energy, Revised Regulatory Proposal, pp.29-30, 168-175.

220 Ausgrid, Revised Regulatory Proposal, pp. 23-24, 129-138; Endeavour Energy, Revised Regulatory Proposal, pp. 25-26, 157-163; Essential Energy, Revised Regulatory Proposal, pp.29-30, 168-175.

221 Ausgrid, Revised Proposal, January 2015, p. 126; Endeavour Energy, Revised Regulatory Proposal, January 2015, p. 100; Essential Energy, Revised Regulatory Proposal, January 2015, p. 107.

222 AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, p. 115.

223 AER, Draft Decision, Attachment 7,November 2014, pp. 7-10 to 7-11.

224 AER, Expenditure Forecast Assessment Guideline–Explanatory Statement, November 2013, p. 22.

firms in the NEM. Many stakeholders agree with this approach.[225] Our decision to use benchmarking techniques in our assessment of opex is consistent with the recommendations of the Productivity Commission,[226] the Australian Government's response to those recommendations[227] and the AEMC's intent:[228]

> The Commission considers that benchmarking is a critical exercise in assessing the efficiency of a NSP and approving its capital expenditure and operating expenditure allowances.

Neither the NER nor the AEMC's Final Rule Determination requires us to use benchmarking only as a means of identifying issues for further investigation, as some service providers have suggested.[229]

We also consider that our benchmarking approach is well supported by the available evidence. We have had regard to the criticisms of this approach, in their proper context of a proposed model followed by subsequent analysis and critique.

Some submissions consider that our reliance on benchmarking in the draft decision would amount to an error of law which ought to result in the invalidity of our decision should we maintain that approach in the final decision.[230]

We disagree with this view because the NER specifically require that we undertake benchmarking, not just arising from the benchmarking opex factor, but also from the opex criteria themselves. As we mention above, the criteria require that we examine efficient costs that an objectively prudent operator would require to achieve the opex objectives.[231] This invites a comparison of service providers. Additionally, the AEMC highlighted the importance of benchmarking in its changes to the NER in November 2012:[232]

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225 For example, Consumer Challenge Panel, CCP1 Submission to AER Responding to NSW draft determinations and revised proposals from electricity distribution networks, 2 January 2015, pp. 9, 49-53; PIAC, A missed opportunity? Submission to the Australian Energy Regulator’s Draft Determination for Ausgrid, Endeavour Energy and Essential Energy, 13 February 2015, pp. 8-9, 26-32; Origin Energy, Submission to Queensland Electricity Distributors’ Regulatory Proposals, 30 January 2015, pp. 11-15; AGL, Energex Regulatory Proposal: July 2015 to June 2020 - AGL submission to the Australian Energy Regulator, 30 January 2015, pp. 7-9; Consumer Challenge Panel, CCP2 Panel Submission on Energex and Ergon Energy Capex and Opex Proposals, 30 January 2015, pp. 16-26.

226 Productivity Commission, Electricity network regulatory frameworks – inquiry report, Volume 1, 9 April 2013, pp. 2–3, 187.

227 Australian Government, The Australian Government response to the Productivity Commission inquiry report – Electricity Network Regulatory Frameworks, June 2013, pp. i–ii, 3–9.

228 AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, pp. viii, 107, 113.

229 For example, Frontier Economics, Review of the AER’s econometric benchmarking models and their application in the draft determinations for Networks NSW, January 2015, p 10

230 e.g. ActewAGL Revised Regulatory Proposal, 2.3.1, when read with section 2.2.4.

231 NER, clause 6.5.6(c).

232 AEMC, *Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012*, 29 November 2012, p. 97.

> The Commission views benchmarking as an important exercise in assessing the efficiency of a NSP and informing the determination of the appropriate capex or opex allowance.

By benchmarking a service provider's expenditure we can compare its efficiency over time, and relative to the efficiency of other service providers.

In previous regulatory periods, we have applied a revealed cost methodology to forecast opex. We have previously not been in a position to assess the efficiency of base opex when applying the revealed cost methodology because we did not have reliable benchmarking data and techniques to make that assessment.[233]

In this decision, we also use revealed costs. However, we now have reliable and robust data that allow us to assess relative efficiency and, where that assessment demonstrates that revealed costs are materially inefficient, to develop an alternative forecast. In this decision, we have been able to benchmark service providers' opex using various benchmark modelling techniques. We have also applied a range of other quantitative and qualitative techniques to test the validity and consistency of the results. We have:

- used category analysis, which allows us to examine specific key cost drivers between businesses
- conducted detailed reviews of certain historical and proposed opex, such as labour costs.

These approaches are set out in more detail in section A.5.

We have also decided to change the benchmark comparison point, which takes the lowest efficiency score of the service providers in the top quartile of possible efficiency scores rather than the frontier performer (CitiPower). Lowering the benchmark comparison point is an option suggested in response to our draft decision.[234]

We do not agree that adjusting base opex through benchmarking constitutes an unfair post hoc review or disregards our past decisions.[235] Submissions to this effect misunderstand the purpose of our forecasting approach. The purpose of adjusting revealed costs for benchmarking is not to take back funding allocated in a previous regulatory period. It is to properly assess whether the proposed forecast for the upcoming regulatory control period reasonably reflects the opex criteria. That adjustment is based on an assessment of actual historic costs we know have been sufficient to enable service providers to achieve the opex objectives.

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[233] See AER, Explanatory Statement, Expenditure Forecast Assessment Guideline, p 11.

[234] For example, PEG, Statistical Benchmarking for NSW Power Distributors, 19 January 2015, p 64

[235] For example, Essential, Revised Regulatory Proposal p 29; ActewAGL, Revised Regulatory Proposal p 50.

Our economic benchmarking models suggest that there has been a longstanding efficiency gap between the NSW, ACT and QLD service providers and those in other parts of the NEM.[236]

If our benchmarking indicated that the proposed base year opex was relatively efficient, those revealed costs would remain the starting point for assessing future expenditure. Where benchmarking reveals that base opex costs are not a good proxy for future forecasts, we are able to take account of this information and adjust the base opex accordingly.

Some service providers suggested that our decision to adjust base opex means that we have not had regard to our previous decisions, or that a step change had occurred from revealed costs to benchmarking.[237]

We do not consider that taking account of further information, which we have collected in compliance with an express requirement in the NER, constitutes a lack of regard to our past decisions. Nor do we consider it a step change. It is not an unavoidable change in activity due to an external obligation.[238] As set out above, we do not require service providers to spend revenue they recover from consumers on any particular activity, nor do we limit or require their spending to this amount.

All stakeholders should expect us to use new techniques and information when they become available.[239] We have not moved away from revealed costs. Rather, we have used new techniques to ensure that we are better able to make a decision that reasonably reflects the opex criteria for the future. Our approach represents a refinement of our longstanding approach to assessing opex.

As set out above, our intention to use benchmarking has been the subject of an AEMC rule change and extensive consultation. The results of our benchmarking indicate that previous incentive signals and schemes used to motivate service providers were not sufficient.

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236 See, for example, AER, Draft Decision, Attachment 7, section A.3; AER, 2014 Annual Benchmarking Report, November 2014.

237 ActewAGL, Revised Regulatory Proposal p 50; Ergon Energy Submission on Draft Decision p 9.

238 See Application by Ergon Energy Corporation Limited (Labour Cost Escalators) (No 3) [2010] ACompT 11 at [194](d)

239 We have indicated in previous decisions and in defending those decisions our preference to use up to date information where possible. The Tribunal has endorsed this approach and indicated a similar preference: see for example Application by Ergon Energy Corporation Limited (Labour Cost Escalators) (No 3) [2010] ACompT 11 at [61] to [62].

Our approach gives due regard to the service providers' proposals and individual circumstances

Broadly, service providers have submitted that by relying on benchmarking as part of our assessment approach, we have: [240]

- not started our assessment with their regulatory proposals or examined which aspects of their proposals involve inefficient expenditure in any level of detail
- failed to comply with the NER requirements to have regard to their individual circumstances.

The service providers' proposals

We consider that we have had due regard to the service providers' opex proposals. As outlined by the AEMC,[241] in our draft decision and in our assessment approach, we start by looking at the service provider's proposal. Our assessment approach is built around a mechanism to assess the proposal to determine whether it reasonably reflects the opex criteria. Where we find the service provider's proposal does not reasonably reflect the opex criteria, we use that same mechanism to determine an alternative forecast.

As we discussed in the explanatory statement to the Guideline, information asymmetry and the inherent incentive to inflate expected expenditure needs means that we must test the service providers' proposals robustly.[242] Benchmarking is, in our view, an appropriate means of doing this and is consistent with the AEMC's intent:[243]

> Importantly, though, [the NSP's proposal] should be only one of a number of inputs. Other stakeholders may also be able to provide relevant information, as will any consultants engaged by the AER. In addition, the AER can conduct its own analysis, including using objective evidence drawn from history, and the performance and experience of comparable NSPs. The techniques the AER may use to conduct this analysis are not limited, and in particular are not confined to the approach taken by the NSP in its proposal.

Further, as is clear from our draft decision and this final decision, we have engaged closely with the assumptions and submissions in the proposal. For example, we have engaged in a detailed assessment of operating environment factors (see section A.6) We also explicitly examined the service providers' proposals and undertook detailed reviews of labour practices and, for Essential Energy, vegetation management (see

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240 Ausgrid, Revised Regulatory Proposal, pp. 134-139; Endeavour Energy, Revised Regulatory Proposal, pp. 159-163; Essential Energy, Revised Regulatory Proposal, pp.170-175; Networks NSW, NSW DNSPs' submission on the AER's draft determinations, 13 February 2015, pp. 6-9.

241 AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, pp 90, 95, 96, 111, See also: AER, Explanatory Statement, Expenditure Forecast Assessment Guideline, p 7.

242 AER, Expenditure Forecast Assessment Guideline–Explanatory Statement, November 2013, pp. 27-28.

243 AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, pp. 111-112.

section A.5). Finally, a key step in our overall opex assessment approach is to assess the service provider's proposed forecasting approaches (see Appendix D).

Individual circumstances

Our base opex assessment approach gives extensive regard to the service providers' circumstances, as required by the NER and in accordance with the intent of the AEMC. The individual circumstances of a service provider can be exogenous (beyond their control) such as topography and climate, or endogenous (within their control) such as their approach to contracting. The AEMC expressed how it envisaged benchmarking would be applied as follows:[244]

> The final rule gives the AER discretion as to how and when it undertakes benchmarking in its decision-making. However, when undertaking a benchmarking exercise, circumstances exogenous to a NSP should generally be taken into account, and endogenous circumstances should generally not be considered. In respect of each NSP, the AER must exercise its judgement as to the circumstances which should or should not be included.

Individual circumstances are taken into account throughout our approach (including benchmarking):

- First, the benchmarking techniques which we use to compare service providers take into account many of their individual circumstances, most notably their key network characteristics[245] and their actual operating expenditure.
- Second, this process disaggregates those circumstances which we consider reflect inefficiency from those which are exogenous or uncontrollable factors.
- Third, we make appropriate adjustments to the benchmarking results based on findings from other techniques such as detailed review and analysis of operating environment factors. This is consistent with our discretion to make appropriate and transparent decisions on a case by case basis.[246]

We disagree with those service providers who submit that having regard to their circumstances preclude us from giving substantial weight to benchmarking. The clear intention of the AEMC was to remove restrictions on the AER's use of benchmarking:[247]

> The Commission considers that the removal of the "individual circumstances" phrase will clarify the ability of the AER to undertake benchmarking. It assists

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[244] AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, p. 113. See also pp. viii, 25, 98, 107-108.

[245] Depending on the technique, we account for line length, customer density, energy density, demand density, reliability, degree of undergrounding etc.

[246] AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, pp 10.

[247] AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, pp 107, 113.

> the AER to determine if a NSP's proposal reflects the prudent and efficient costs of meeting the objectives.

Our approach gives substantial weight to the individual circumstances of the service provider that are relevant to our task, whilst allowing us to use benchmarking as part of our approach.

A.3.3 Our approach is consistent with the incentive regime

Some service providers have submitted that they developed their current business structure in good faith reliance on our prior determinations on what is efficient opex. They submit, therefore, that if they are required to align expenditure with a reduced level of opex determined by a new and substantially different method, then the reasonable costs incurred in the course of doing so must be considered to be efficient.[248]

In making this statement, these service providers appear to misunderstand the basis of our forecasting approach. We do not determine that past spending against a previous forecast is inefficient if it is below the forecast total opex we previously approved. Rather, we reward this lower actual expenditure through the EBSS.

However, that does not mean that a past level of expenditure is appropriate for making a forecast of costs against the opex criteria for a future regulatory control period. The NER is an incentive framework. The opex forecast we approve, together with the relevant schemes, provide bonuses for improving efficiency while maintaining or improving service standards, beyond the previous period’s revealed costs. This regime encourages businesses to be as efficient as is prudent to beat the total opex forecast and continuously improve their efficiency. In that context, a network business should not be expecting to receive historical costs whenever a new forecast of total opex is assessed.

The AER makes decisions on the basis of the relevant evidence it has before it at the time. In 2009, on the basis of the evidence before us, and also having regard to the circumstances in which we made our decision, we determined what we considered to be an appropriate basis for forecasting total opex for the period 2009–14.

We have additional evidence now, through more detailed benchmarking. As we note above, our benchmarking results indicate that several service providers spend considerably more on a standardised basis than other businesses in the NEM to provide services in a manner that achieves the opex objectives. In assessing future forecasts we need to have regard to this new information.

One of benchmarking's positive attributes is that it increases the incentive to reduce opex. This is something that HoustonKemp acknowledges.[249] We consider that this

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[248] For example, ActewAGL, letter to Paula Conboy, 4 March 2015, p. 2.

[249] HoustonKemp, AER Determination for ActewAGL Distribution - Contribution to NEO and preferable NEO decision, 13 February 2015, pp. 26-27.

increased incentive reflects a decision that is in the long term interests of consumers and reflects the opex objectives.

Despite this, HoustonKemp considers that our approach is inconsistent with the NEO.[250] We disagree. If benchmarking shows a distributor's revealed opex is materially inefficient, it is not possible to set an opex forecast based solely on revealed expenditure that is consistent with the opex criteria. Such an approach would ignore relevant considerations and techniques which we regard as robust and important. The AEMC agrees.[251] In such circumstances, therefore, benchmarking will deliver an alternative forecast that achieves the NEO to a greater degree than revealed expenditure.

A.3.4 The benchmarking we rely on in our approach is robust, reliable and reasonable

Service providers have submitted that our benchmarking is fundamentally flawed because:[252]

- our analysis is not robust
- we have made errors in the application of our models
- we should have regard to conceptual limitations of benchmarking, particularly given the heterogeneity of Australian service providers
- the RIN data used in the benchmarking contains problems
- there has been a lack of testing and peer review.

Economic Insights responds to these submissions in detail in its report, and we explain in section A.2 why benchmarking is appropriate in the context of our ex ante regulatory framework. We also outline why our benchmarking is robust, reliable and reasonable in section A.4. Further, we demonstrate the alternative approaches proposed by the distributors are not robust. For example, some of the alternative approaches proposed by the distributors:[253]

- misunderstand the rationale for using international data and, consequently, the manner in which Economic Insights has used it
- include outputs that reflect secondary cost drivers rather than functional outputs, which can reward inefficient practices

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250 HoustonKemp, AER Determination for ActewAGL Distribution - Contribution to NEO and preferable NEO decision, 13 February 2015, pp. 26-27.

251 AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, pp 107, 113.

252 For example, Ausgrid, Revised Regulatory Proposal, pp. 129-153; Endeavour Energy, Revised Regulatory Proposal, pp. 157-179; Essential Energy, Revised Regulatory Proposal, pp. 168-192.

253 Economic Insights, Response to Consultants' Reports on Economic Benchmarking of Electricity DNSPs, April 2015, section 3.

- exclude key functional outputs—CEPA, for example, presents a function with only one or two outputs, which is not adequate to accurately model distributor cost characteristics
- inappropriately incorporate some operating environment variables without considering their potential effect on the model—depending on the estimation method used, the 'capital intensiveness' (or equivalent) variable, for example, overstates the opex efficiency of the ACT, NSW and QLD distributors simply because they own assets with a capacity of more than 66kV
- suggest the inclusion of many unjustified operating environment variables, which can undermine the ability of a model to explain the relationship between inputs and outputs
- use estimation methods that are not robust because of the underlying assumptions they make about the nature of inefficiency.

In this section, we set out some general principles regarding the nature of benchmarking.

This decision is the first time that we have had sufficient information to conduct rigorous benchmarking analysis. However, we have done so over a long consultation period, using data provided and cross-checked by the service providers themselves. We have used benchmarking analysis in a way that acknowledges benchmarking cannot produce a single "right" answer—but we also rely on benchmarking as an important technique for assessing base opex.

Frontier Economics agree that no single "right" answer exists. It acknowledges both the power of benchmarking and the impressive knowledge the AER's expert (Economic Insights) brings to the subject matter.[254] Huegin makes the same point.[255] Huegin also notes that "the approach that appears to be most common in regulatory jurisdictions around the world is to use a combination of results from different benchmarking techniques to arrive at relative levels of efficiency between businesses."[256]

Accordingly, the level of confidence we require to use benchmarking is that which assists us in being satisfied or dissatisfied that a proposal or comparative estimate reasonably reflects the opex criteria. We are confident that our approach provides us with the necessary comfort to use benchmarking in this way. We therefore disagree with the submission by Frontier Economics that we have placed undue reliance on our

254 Frontier Economics: Review of the AER's econometric benchmarking models and their application in the draft determinations for Networks NSW (January 2015) p vii.

255 Huegin, Huegin's response to Draft Determination on behalf of NNSW and ActewAGL Technical response to the application of benchmarking by the AER, 16 January 2015, pp. 7, 13

256 Huegin, Huegin's response to Draft Determination on behalf of NNSW and ActewAGL Technical response to the application of benchmarking by the AER, 16 January 2015, p 11

benchmarking approach.[257] We do not agree with suggestions by service providers that:[258]

- Australian data is unreliable
- international data is inapplicable, and
- our benchmarking results do not accord with sensibility checks.[259]

The Australian data was supplied by the service providers themselves, in accordance with our compulsory information gathering powers. We required Australian data provided by service providers to be audited and certified by statutory declaration by the CEOs of the service providers. We obtained international data from comparable jurisdictions where similar analysis had previously been conducted.[260]

As we explain in section A.4, we have conducted detailed review of the Australian data, and the international data has been used by the regulators in the respective jurisdictions for determinations. Therefore, we consider that the data we have used for benchmarking is robust for this purpose. Economic Insights also considers that the data is sufficiently robust for benchmarking .The approach taken by Economic Insights produced a functional data set which is both consistent across benchmarking techniques, is dataset insensitive and has undergone significant testing and cross-checking:[261]

It is true that as service provides continue to provide audited information, the dataset will improve still further. However, this does not mean that we are not sufficiently confident at this stage to use benchmarking to assess base operating expenditure. We reject the suggestion that the EI approach is unreliable. The results it has produced are consistent with our other analyses, such as our detailed review of base year opex and our cross checking of our benchmarking results.

We have also considered our modelling in light of the service providers' operating environment factors and the potential for data and modelling issues. We have reviewed the operating environment circumstances that service providers proposed, or which we independently considered, might explain differences in costs compared to other jurisdictions. We have also conducted analysis using other techniques to cross-check the benchmarking results. We disagree, therefore, that we have not conducted 'sensibility checks' of our benchmarking.

[257] Frontier Economics: Review of the AER's econometric benchmarking models and their application in the draft determinations for Networks NSW (January 2015).

[258] Frontier Economics: Review of the AER's econometric benchmarking models and their application in the draft determinations for Networks NSW (January 2015) pp vii, ix.

[259] Endeavour Energy, Revised Regulatory Proposal, p. 179. Ausgrid, Revised Regulatory Proposal, pp. 150–153. Essential Energy, Revised Regulatory Proposal, p. 189.

[260] Economic Insights, Economic Benchmarking of NSW and ACT distributor Opex, 17 November 2014 at 29.

[261] Economic Insights, Economic Benchmarking of NSW and ACT distributor Opex, 17 November 2014 at 32.

Indeed, we have ultimately made cautious adjustments to the SFA benchmarking results to ensure that any adjustments to base opex:

- exclude differences caused by factors other than inefficiency
- appropriately account for potential data and modelling issues that could adversely affect the service providers.

The expert reports prepared for the service providers indicate distinct areas where the authors disagree with Economic Insights' draft decision report. However, benchmarking is something that reasonable minds will invariably differ on. As identified above, Frontier Economics and Huegin acknowledge this. Economic Insights' view is that its models are more robust than those produced by the service providers' consultants.

Therefore, for the reasons set out in section A.4 and Economic Insights' final decision report, we do not consider that these criticisms do more than identify alternative possible answers to the benchmarking question. We are not persuaded that Economic Insights' approach is materially affected by the issues raised by the service providers' consultants. We remain satisfied that, despite expected disagreement about outcomes, our use of benchmarking in our assessment approach is consistent with the NER and the NEL.

A.3.5 Procedural fairness matters

In their revised regulatory proposals, the service providers submitted that they had not been afforded procedural fairness. In particular, they submit: [262]

- By publishing our first annual benchmarking report two months late, we have limited their time to make a detailed response to the issues contained within for the purposes of their revised proposals
- The models we used in the draft decision are not consistent with those set out in the Guideline.

As noted above and set out in Table A.2 below, we have been engaged in a lengthy consultation process with the service providers dating back several years. This program of consultation has involved staff interactions with the service providers and their officers and employees. Our consultation process provided service providers with an extension of time and limited the reach of its regulatory information notices under the NEL.

The service providers nevertheless now submit that the AER failed to provide them with procedural fairness. We disagree with these submissions.

[262] Ausgrid, Revised Regulatory Proposal, pp. 9, 143; Endeavour Energy, Revised Regulatory Proposal, pp. 8, 169; Essential Energy, Revised Regulatory Proposal, p. 12, 181.

Table A.2 Full process of the development of benchmarking data set

Milestone	Date
ACCC/AER working paper on benchmarking in electricity networks released. This report provides a comprehensive list of data that had been used in previous energy benchmarking studies.	May-12
AER releases issues paper on expenditure forecast assessment guideline. Issues paper includes: • detailed description of benchmarking techniques • data on the inputs and outputs for benchmarking electricity networks • potential applications of benchmarking techniques	Dec-12
AER workshop – general guideline consultation - Initiation roundtable	Feb-13
Economic benchmarking workshop on outputs	Mar-13
Economic benchmarking workshop on inputs	Mar-13
Economic benchmarking workshop on measurement of outputs and environmental factors	Apr-13
Economic benchmarking techniques workshop on network input measurement	May-13
Preliminary RIN templates circulated for comment	Jun-15
Revised preliminary RIN templates circulated for comment	Jul-13
Draft Economic benchmarking RINs released	Sep-13
Draft expenditure forecast guideline released	Aug-13
Workshop RIN auditing requirements & economic benchmarking data requirements	Oct-13
Final expenditure forecast assessment guideline released	Nov-13
Final RINs for economic benchmarking released	Nov-13
AER answers questions regarding how the economic benchmarking RIN templates are to be completed.	Nov 14
Unaudited RIN responses received AER initiates comprehensive review of RIN data. Review includes: • Comparing RIN information with information previously reported by distributors to ensure consistency such as regulatory proposals, previous RIN responses and distributor annual reports • reviewing time series data to identify any anomalous data points • Reviewing basis of preparation to ensure that data has been prepared in accordance with EBT RIN instructions and	Mar-14

Milestone	Date
definitions • Comparing data across distributors to identify potential anomalies.	
Final audited RIN responses received	Apr-14
Benchmarking data released for public consultation	May-14
Draft benchmarking report and data circulated to NSPs and other stakeholders	Aug-14

Provision of the annual benchmarking report

We prepared an annual benchmarking report (Report) consistent with the requirements of the NER and the NEL.[263] We undertook an extensive process of consultation and data collection and validation as part of this process. Service providers were intricately involved in the design and validation of the Report and the underlying data per Table A.2.

We published the Report in November 2014, rather than September 2014 as contemplated in the NER.[264] However, service providers had access to our methodology and underlying data and (from August 2014) a draft report that was largely reflected in the Report that was published.

We are required to have regard to the annual benchmarking report, in reaching our decision, which we have done.[265] We have built on our annual benchmarking report and used additional techniques and analysis in having regard to the benchmark opex of an efficient provider for the purposes of this decision. We are not required to apply the methodology from the most recent benchmarking report in reaching our final decision.[266] We have, as contemplated by the NER, included other factors in our approach.[267]

Some service providers have made two, somewhat contradictory claims about the above process:[268]

- First, they say that not being served with the final report meant that they were deprived of the opportunity to be heard in relation to the Report before the publication of our draft decision; and

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263 NER 6.27(a)

264 NER 6.27(a) required the chapter to be published by 30 September 2014

265 NER 6.6.5(e)(4)

266 NER 6.27(a)

267 NER 6.5.2(e)(12)

268 Ausgrid, Revised Regulatory Proposal, pp. 9, 143; Endeavour Energy, Revised Regulatory Proposal, pp. 8, 169; Essential Energy, Revised Regulatory Proposal, p. 12, 181; ActewAGL Revised proposal pp 81, 106-107.

- Second, they say that we have departed from the Report in our draft decision by adopting different economic benchmarking techniques.

We acknowledge that the final Report was provided outside the time specified in the NER. The service providers assert that this caused them to suffer a lack of procedural fairness. The requirements of procedural fairness "are essentially practical and depend upon the legislative framework and the circumstances of the particular case."[269] Here, those circumstances included:

- service providers having access to a draft of the Report and all the data used in the Report itself, as well as an extensive period of consultation;
- the AER publishing a further, detailed report which set out our approach to assessing the benchmark opex of an efficient provider for the purposes of the Draft Decision.

The criticisms of our approach to benchmarking in the draft decision are, understandably, focused on our approach in the draft decision rather than the Report.

No service provider has identified any practical difficulties or injustice occasioned by the late publication of the Report. We do not consider the late publication of the Report amounts to a lack of procedural fairness for the purposes of the decision we must make about the service providers' forecast opex proposals.

Consistency of benchmarking models used in draft decision

A number of submissions note that we indicated that we would apply data envelopment analysis (DEA) in the Guideline. At the time of developing the Guideline, we had not received data from service providers so we considered DEA may be another technique we could apply. However, given the data quality and the availability of international data, we have been able to apply SFA (stochastic frontier analysis). This is a superior technique to DEA due to its direct estimate of opex cost efficiency relative to an estimated frontier.[270]

To the extent that this represents a departure from the approach specified in the Guideline, clause 6.2.8(c) of the NER states:

> Except as otherwise provided in this Chapter, a guideline is not mandatory (and so does not bind the AER or anyone else) but, if the AER makes a distribution determination that is not in accordance with the guideline, the AER must state, in its reasons for the distribution determination, the reasons for departing from the guideline.

Accordingly, the above explanation constitutes our reason for departing from the Guideline. We disagree that we have prejudiced the interestes of, of caused an injustice to, the service providers by not consulting more than nine days prior to the

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[269] CPCF v Minister for Immigration and Border Protection [2015] HCA 1 at [306]

[270] Economic Insights, Economic benchmarking assessment of operating expenditure for NSW and ACT Electricity DNSPs, 17 November 2014, p. 28.

draft decision on the benchmarking techniques we have used that are not also included in our benchmarking report.[271]

We consider the distributors have not demonstrated practical unfairness given that they responded in detail to our draft decision. Further, the consultation process we undertook for Better Regulation, the Guideline, and the explanatory statement to the Guideline all foreshadowed our intention to use econometric modelling if possible.

For the above reasons, we consider that our decision is not affected by any lack of procedural fairness or natural justice.

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[271] Ausgrid, Revised Regulatory Proposal, p. 9; Endeavour Energy, Revised Regulatory Proposal, p. 8; Essential Energy, Revised Regulatory Proposal, p. 12.

A.4 Our benchmarking is robust, reliable and reasonable

In this section we set out our analysis of the benchmarking techniques we have used to test whether base year opex of the service providers is efficient. In particular, we reiterate why our approach and results are robust, reliable and reasonable. In doing so, we explain why our approach is preferable to those proposed by the service providers and their consultants.

In this section we set out our benchmarking metrics that examine the efficiency of opex as a whole.[272] Category analysis metrics are considered separately in section A.5.

A.4.1 Position

Our decision is to rely on the same benchmarking analysis that we applied in our draft determination to test the efficiency of the service providers' revealed opex. In coming to this view, we have considered the submissions of the service providers, their consultants and legal advisors, consumer representatives and other stakeholders.

We consider our benchmarking—including the data we have used—is robust, reliable and reasonable. In reviewing the alternatives put forward by the service providers' consultants we have identified shortcomings. Issues identified with the consultant's model's include:[273]

- only using the Australian data set which has inadequate variation to support robust model estimation
- including inappropriate operating environment factors (such as a 132kV line variable) leading to inefficiency gaps being understated
- applying models that make inappropriate assumptions about the nature of inefficiency and hence allocate persistent inefficiency to operating environment differences
- applying models that will misleadingly find service providers to be 'efficient by default'

We summarise the key concerns and provide our responses in Table A.3. Economic Insights provides detailed responses in its report.[274]

[272] These include our partial performance indicators, opex MPFP, and Econometric models.

[273] Economic Insights, Response to Consultants' Reports on Economic Benchmarking of Electricity DNSPs, April 2015, p. 53. (Economic Insights, 2015).

[274] Economic Insights, 2015

Table A.3 Summary of service providers' key benchmarking submissions and our response

Service provider submission	Our response	Reference
'Conceptual limitations' with benchmarking exist including:[275] 1. the inability to differentiate between observed cost differences due to inefficiency or something else 2. the heterogeneity of Australian service providers make it impossible to normalise for differences, leading to bias in the models 3. previous doubts about data quality and the scope to apply benchmarking by the AEMC, the PC, the AER and Economic Insights.	Conceptual limitations do not exist: 1. we have extensively examined the extent to which the efficiency gap could be driven by other factors in our operating environment factor assessment, to identify and quantity the impact of factors that are relevant and not already accounted for in the model 2. Australian service providers are comparable in using opex and capital input in providing electricity distribution services to customers. To the extent that operating environments are different, we have considered this under our ex-post operating environment factor assessment 3. prior comments about data quality and limitations of benchmarking are outdated. Our review and Economic Insights' review of the database indicates that it is sufficiently robust for the application of benchmarking techniques.	We discuss these submissions in section 0 under: 1. Model specification, estimation methods 2. Model specification, estimation methods 3. Data.
Errors exist in the application of benchmarking, including: 1. using an untested and non-peer reviewed model[276] 2. inconsistent results[277] 3. use of a false frontier[278] 4. poor variable selection[279] 5. use of a dummy variable[280] 6. insufficient data preparation[281] 7. post model adjustments[282] 8. no reasonableness check of results.[283]	We have used a robust, reliable and reasonable approach that is not in error: 1. Economic Insights' models are informed by economic theory, engineering knowledge and industry. The draft decision provided for the service providers to engage their own experts to review Economic Insights model, and we have considered these reports. 2. The approaches taken by the service providers' consultants to criticise the model results are not sound 3. We consider Economic Insights' approach is more reasonable than the alternatives	We discuss these submissions in section 0 under: 1. Model specification 2. Efficiency results 3. We discuss this in the adjustments section. 4. Model specification and data 5. Data 6. Data

275 Ausgrid, Revised Regulatory Proposal, pp. 130-142; ActewAGL, Revised Regulatory Proposal, pp. 125-134, attachment C12.

276 Ausgrid, Revised Regulatory Proposal, p. 143; ActewAGL Revised Regulatory Proposal, pp. 150-153.

277 Ausgrid, Revised Regulatory Proposal, p. 143; ActewAGL Revised Regulatory Proposal, pp. 146-149, 175-181.

278 Ausgrid, Revised Regulatory Proposal, pp. 143-144.

279 Ausgrid, Revised Regulatory Proposal, pp. 144-147; Herbert Smith Freehills, AER Draft Decision – Forecast Operating Expenditure (confidential), 13 February 2015, pp. 8-9.

280 Ausgrid, Revised Regulatory Proposal, p. 147.

281 Ausgrid, Revised Regulatory Proposal, pp. 143-150 and Herbert Smith Freehills, AER Draft Decision – Forecast Operating Expenditure (confidential), 13 February 2015, pp. 10-11; ActewAGL, Revised Regulatory Proposal, pp. 140-146.

282 Ausgrid, Revised Regulatory Proposal, p. 150; ActewAGL Revised Regulatory Proposal, pp. 153-166.

Service provider submission	Our response	Reference
	proposed by the service providers. 4. The variables included in the models are appropriate and international data is required for accurately estimating parameter estimates 5. The service providers' consultants have misunderstood the purpose of the international data and the role of country dummy variables. 6. The data is robust and reliable and the concerns raised by the service providers are misplaced. 7. Economic Insights' two stage approach is appropriate and indeed much more reasonable than alternatives proposed by the service providers' consultants. 8. We have conducted several reasonableness checks of the results including PPIs, category analysis and detailed review.	7. Model specification 8. Efficiency results.
Advice from Herbert Smith Freehills specifically comments on Economic Insights' use of international data. Key comments include:[284] • Economic Insights' model is heavily reliant on overseas data • overseas data is not comparable with Australian data • Economic Insights does not adequately account for differences between countries • Economic Insights' data contains errors.	The service providers, their consultants and Herbert Smith Freehills have misunderstood how Economic Insights has used international data. Economic Insights has used the international data only to more accurately estimate parameter estimates, not as comparators for the Australian service providers. Further, Economic Insights considers submissions on the international data quality are misguided given that international regulators have used it for benchmarking and have undertaken similar testing and validation to the AER.[285]	We address these matters as part of our discussion on data in section 0.
Our PPIs do not support the economic benchmarking results because: • we have not acknowledged the inherent limitations.[286] • per-customer metrics are biased against rural service providers and do not show relative efficiency.[287]	Our view remains that PPIs are complementary to economic benchmarking and are an appropriate means crosschecking validity.	We address this submission in our discussion on PPIs in section 0.

283 Ausgrid, Revised Regulatory Proposal, p. 151;Herbert Smith Freehills, AER Draft Decision – Forecast Operating Expenditure (confidential), 13 February 2015, p. 9.

284 Herbert Smith Freehills, AER Draft Decision – Forecast Operating Expenditure (confidential), 13 February 2015, pp. 6-8.

285 Economic Insights, 2015, pp. 20, 26.

286 ActewAGL, Revised Regulatory Proposal, pp. 181-187.

287 Essential revised proposal, pp. 201-202.

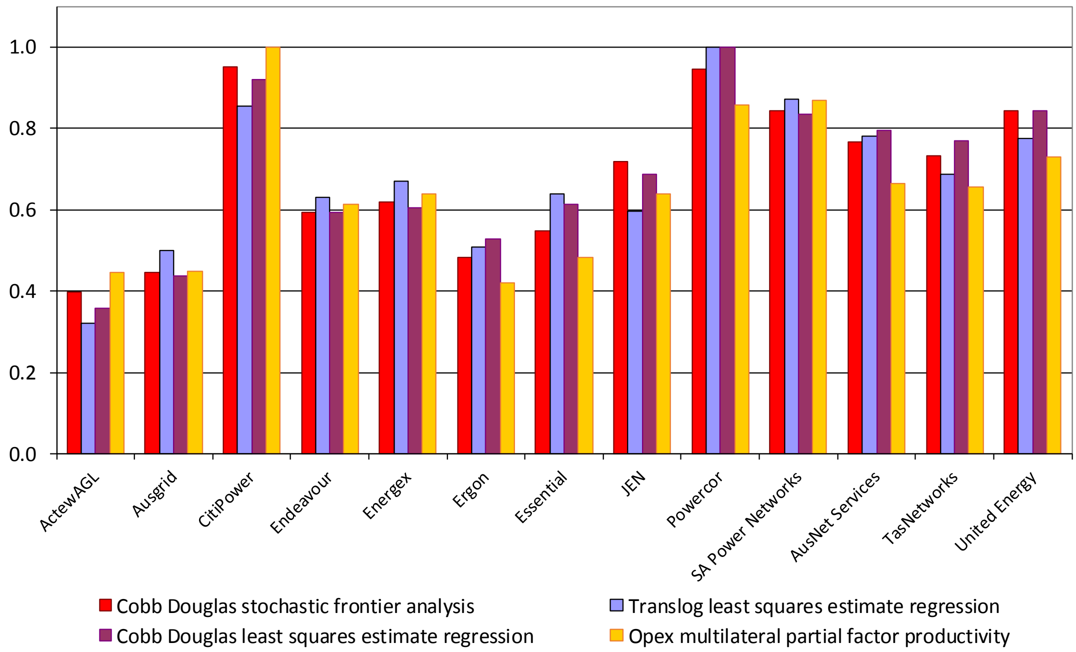
A.4.2 Draft position

In our draft determination we applied six benchmarking techniques to assess the efficiency of the service provider's revealed expenditure. Four of these techniques (which were developed by Economic Insights) enable us to assess relative opex efficiency. On the basis of advice from Economic Insights, we relied on Economic Insights' Cobb Douglas SFA model as the preferred technique for this purpose.

Figure A.1 presents the results of each of Economic Insights' four opex models (stochastic frontier analysis (SFA), econometric regressions and opex MPFP) for each service provider in the NEM. A score of 1 is the best score.

The red bars in Figure A.5 represent the SFA results. The best performing service provider under this model is CitiPower, with a score of 0.95. We refer to CitiPower as the 'frontier' firm.

Figure A.5 Econometric modelling and opex MPFP results (average efficiency scores for 2006 to 2013)



Source: Economic Insights, 2014.

Each model may differ in terms of estimation method or model specification and accounts for operating environment circumstances (factors that may differentiate service providers) to differing degrees. Accordingly, the results will never be identical. However, Figure A.1 demonstrates that the results of the four models are consistent. All models show that the efficiency of the NSW service provider's revealed expenditure does not compare favourably with that of many of their peers.

The Cobb Douglas SFA model, being a statistical technique, directly estimates the efficient opex cost function. In doing so it takes into account economies of scale, density and the relationship between opex and the multiple outputs service providers face. Further the Cobb Douglas SFA model has a random error term that separates the effect of data noises or random errors from inefficiency.[288] It is, therefore, the most sophisticated of Economic Insights' economic benchmarking technique.

We considered the two other econometric models (Cobb Douglas LSE and Translog LSE) provided useful cross checks for the Cobb Douglas SFA model. The Translog LSE model allows for a more flexible opex cost functional form incorporating second order coefficients. The LSE and SFA Cobb Douglas models both estimate efficiency using slightly different techniques. By running both methods we could observe whether the efficiency measurement technique made a material difference to relative efficiency performance.

Economic Insights found that all three econometric techniques produced consistent results:[289]

> The efficiency scores across the three econometric models are relatively close to each other for each DNSP and they are, in turn, relatively close to the corresponding MPFP score. This similarity in results despite the differing methods used and datasets used reinforces our confidence in the results.

Additionally, we used opex MPFP and MTFP (index-based techniques) as a different means of checking the more sophisticated econometric models.

As an opex specific technique, opex MPFP provided a means of using a relatively less data intensive approach—capable of incorporating five outputs and four inputs and some operating environment factors—with an Australian-only service provider dataset.

MTFP played an important role as the overarching indicator of total productive efficiency and, consequently, as a check on the techniques that examine opex efficiency. This is necessary because a service provider could, for example, appear to be inefficient in the use of opex alone, but be efficient overall.

Economic Insights found the MTFP and opex MPFP results supported the econometric models.[290]

Finally, we used PPIs, which are simple, intuitive metrics to provide another perspective on the relative efficiency of service providers. The PPIs only focus on one aspect of a service provider's performance and do not specifically capture operating environment differences. However, bearing these limitations in mind, we considered they were consistent with the other, more sophisticated benchmarking results. The PPI results are set out in section A.5.

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288 Econoimc Insights, 2014, p. 7.

289 Economic Insights, 2014, pp. 46-47.

290 Economic Insights, 2014, p. 46–47.

A.4.3 Revised proposals and submissions

In response to our draft decision for the NSW service providers and ActewAGL, these service providers submitted a large amount of material expressing concerns with our approach to benchmarking and the results. This included reports from the following consultants:

- Frontier Economics[291]
- Huegin[292]
- Cambridge Economic Policy Associates (CEPA)[293]
- Pacific Economics Group Research (PEGR)[294]
- Advisian (formerly Evans and Peck)[295]
- Pricewaterhouse Coopers (PwC).[296]

In addition to submissions from other stakeholders, on 13 February 2015 we received from service providers further legal opinion and consultant reports on benchmarking from:

- Herbert Smith Freehills (submitted by the NSW service providers)
- Young and McClelland (submitted by ActewAGL)
- Huegin (two reports, submitted by Ergon Energy)
- Synergies (two reports, submitted by Ergon Energy)
- Frontier Economics (submitted by Ergon Energy)
- Ernst & Young (EY) (submitted by Ergon Energy).

Economic Insights addresses this material in the report it has prepared for this final decision. In this section, we have grouped the key benchmarking issues raised by the service providers and their consultants into:

- model specification
- data
- estimation methods
- efficiency results.

291 Ausgrid, Revised Regulatory Proposal, Attachment 1.05.
292 Ausgrid, Revised Regulatory Proposal, Attachment 1.06; ActewAGL, Revised Regulatory Proposal, Attachment C4.
293 Ausgrid, Revised Regulatory Proposal, Attachment 1.07; ActewAGL, Revised Regulatory Proposal, Attachment C3.
294 Ausgrid, Revised Regulatory Proposal, Attachment 1.08.
295 Ausgrid, Revised Regulatory Proposal, Attachment 1.09; ActewAGL, Revised Regulatory Proposal, Attachment C2.
296 Ausgrid, Revised Regulatory Proposal, Attachment 1.10.

We discuss each topic below. Consistent with our approach in the draft decision, we have adopted Economic Insights' approach and recommendations on the basis of its expertise in economic benchmarking, including the application of economic benchmarking in the regulatory context. Accordingly, to the extent we refer to 'our approach' or 'our model', this should be interpreted as the approach and models recommended by Economic Insights' and applied in its analysis. Economic Insights' final decision report contains detailed analysis and explanation of its approach and results in light of the information submitted by the service providers and their consultants.

Model specification

Model specification relates to the specification of the outputs, inputs and operating environment variables that Economic Insights has used in its benchmarking model.

In this sub-section, we compare Economic Insights' model specification to the alternatives proposed by the service providers' consultants. First, we reiterate why Economic Insights' modelling approach is robust and reliable. Second, we restate why the inputs, outputs and operating environment factors Economic Insights has chosen are appropriate. Finally, we explain why the alternative models proposed are not robust or reliable.

Our approach is robust and reliable

Economic Insights' model specification has been developed using a logical, structured and consultative approach. We set out this approach below.

The first step we took in developing our benchmarking data base was to consult criteria for selecting input, output and operating environment factors. We set out our initial selection criteria in our issues paper we released for the Guideline.[297] Our final selection criteria are set out in the explanatory statement to the Guideline.[298]

We also developed a broad data set for benchmarking. In developing this data set we considered the model specifications applied in other service provider benchmarking studies.[299]

As part of the Better Regulation reform program we hosted open workshops which were chaperoned by Economic Insights. In these workshops we consulted on engineering, accounting and economic aspects of the model specification with service providers and other interested stakeholders. We published numerous papers on the inputs, outputs and operating environment circumstances of service providers and how these should be measured.

297 AER, Issues paper, expenditure forecast assessment guideline, December 2012, pp. 82–136.

298 AER, Explanatory statement, expenditure forecast assessment guideline, 2013, November 2013, pp. 145–146.

299 AER, Issues paper, expenditure forecast assessment guideline, December 2012, p. 77.

In light of the selection criteria and workshops Economic Insights developed a preliminary model specification which we stated we would test once we collected data.[300] Once we received data Economic Insights ran a number of different model specifications including the preliminary model specification.[301] Economic Insights identified a preferred MPFP model specification on the basis that this specification was not biased towards a particular type of service provider unlike the other model specifications they ran.[302] We circulated the results of the preferred model specification and other specifications that were run by Economic Insights in consultation on our draft annual benchmarking report. Economic Insights modified the MPFP model specification in light of comments received from stakeholders and produced a report based on these considerations which we had regard to in making our draft determination.[303]

We released the benchmarking model and underlying data for consultation with our draft determination. We have considered submissions on the model specification, including alternative models that have been developed, and consider that Economic Insights' model specification is the most appropriate. Their model specification has been developed through extensive consultation, drawing on industry knowledge and expertise, economic theory and their econometric experience. The reasons for not adopting alternative model specifications proposed in submissions below.

Outputs, Inputs and operating environment factors

Model specification comprises the input, outputs and operating environment variables relevant to the networks operated by the service providers. In this section we separately outline why their inputs, outputs and operating environment factors are appropriate. Economic Insights sets out its reasoning for its model specification in section 2 of its report.[304]

Outputs

The outputs that we applied in our Cobb Douglas SFA model are:

- Ratcheted maximum demand
- Customer numbers
- Circuit line length

Economic Insights considers that this output specification captures the key elements of service providers' functional outputs that are valued by customers. Also, the ratcheted maximum demand variable introduces an important demand side element to the

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300 AER, Explanatory statement, expenditure forecast assessment guideline, 2013, November 2013, pp. 141–142.

301 Economic Insights, Memorandum - DNSP MTFP Results, 2014.

302 Economic Insights, Memorandum - DNSP MTFP Results, 2014.

303 AER, Electricity distribution network service providers Annual benchmarking report, November 2014, p. 47.

304 Economic Insights, 2015, pp. 2-19.

measurement of system capacity outputs required.[305] PEGR applied these variables, as well as energy delivered, in its economic benchmarking analysis undertaken for the Ontario Energy Board.[306]

This specification has the advantage of incorporating all of a service provider's main outputs. A service provider needs to provide the capacity necessary to meet demand. This capacity output is better captured by the ratcheted maximum demand variable.[307] Fixed components of distribution output (such as providing access for each customer) are captured by the customer numbers output. The distance over which service providers have to distribute electricity, and the number of assets required to do so, is likely to be captured by the circuit line length variable.

Inputs

Our benchmarking model only includes one input, which is opex. This is appropriate as the purpose of the model is to consider the efficiency of the service providers in using opex to deliver their outputs.

Operating environment factors

Our opex modelling directly accounts for a number of operating environment factor differences. Economic Insights' model specification directly accounts for the main density factors such as customer density and demand density. This is because, as noted by Economic Insights, customer numbers, line length and ratcheted maximum demand are included as outputs.[308]

The model specification also accounts for the effect of underground lines by including an operating environment variable for the proportion of underground lines. Underground lines will require less maintenance and no vegetation management. Further, underground lines are less exposed to exogenous factors that may cause network interruptions.

To capture the effect of cross country operating environment differences Economic Insights also includes dummy variables for Ontario and New Zealand service providers.[309]

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305 Economic Insights, 2015, p. 3.

306 Pacific Economics Group Research, Empirical Research in Support of Incentive Rate Setting in Ontario: Report to the Ontario Energy Board, Report prepared for the Ontario Energy Board, Madison, 2013.

307 An alternative measure to ratcheted maximum demand could be substation capacity. In consultation on the output specification there was some debate as to whether substation capacity or maximum demand should be used. It was noted that, substation capacity would capture the effect of investment in capacity in excess of requirements. We consider that the use of ratcheted peak demand reaches a balance between these two perspectives. Ratcheted maximum demand is the highest level of demand observed over the benchmarking period. As such, it is reflective of the capacity that was required to meet demand over the period.

308 Economic Insights, 2015, pp. 10–11

309 Economic Insights, 2015, p. 14 (section 2.2.4)

We separately estimated the effect of operating environment factors that could not be directly incorporated into Economic Insights' Cobb Douglas SFA model. Our analysis of these adjustments is detailed in section A.6.

Some of service providers' consultants submit that we should have made adjustments to the data prior to undertaking the modelling for operating environment factors.[310] We consider that making ex-post adjustments for operating environment factors, as advised by Economic Insights, is an effective, reasoned and practical approach.

To adjust for operating environment factors prior to modelling we would need to adjust each data point in the sample for the presumed effect of each operating environment factor. This is impractical with the numerous operating environment factors we have considered. To do this would involve considerable judgement regarding the effect of operating environment factors to the 68 service providers in the sample.

Other consultants have argued that we need to directly incorporate more operating environment factors into the model.[311] We consider this approach is inappropriate as:

- only a limited number of variables can be included in economic benchmarking analysis[312]
- Economic Insights has captured a number of important operating environment factors directly in its model[313]
- The availability of data on operating environment factors is a constraint on the number of operating environment factors that can be directly incorporated into the model[314]

Given these points we consider that accounting for operating environment factors not directly incorporated in the modelling through post-model adjustments is a preferable approach. Economic Insights supports this conclusion.[315]

Proposed alternative approaches are not appropriate

We prefer our benchmarking model specification to alternatives proposed by the service providers. The model specification that Economic Insights has applied is an appropriate approach to measuring outputs and inputs for Australian distributors in the current context. This specification was developed the model through a rigorous consultation process, and has been informed by industry knowledge, economic theory

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[310] Frontier, Taking account of heterogeneity between networks when conducting economic benchmarking analysis, February 2015, p. xii. CEPA, Benchmarking and setting efficiency targets for the Australian DNSPs, (NSW DNSPs), 2015, pp. 17–18.

[311] PEG, 2015, pp.52, 54. Huegin, 2015a, p.47.

[312] Economic Insights, 2015, p. 12

[313] Economic Insights, 2015, p. 12

[314] Economic Insights, 2015, p. 12

[315] Economic Insights, 2015, p. 18

and econometric expertise. As noted above, the model specification incorporates key service provider functional output variables valued by customers.

A number of submissions have proposed alternative approaches to incorporating outputs, inputs and operating environment factors into our benchmarking modelling.

We consider the alternative specifications proposed by consultants in the sections below.

The inclusion of a variable for lines with a voltage of 132 kV and above

CEPA, PEG and Frontier all include a variable for lines above 66kV in their model. [316]

As noted by Economic Insights, in the benchmarking data set, only service providers in NSW, Queensland and the ACT have significant lengths of lines above this voltage.[317] There is therefore a risk that this variable may pick up other characteristics that are shared by distributors in these states relative to distributors in the other states. This appears to be the case.[318]

A useful comparison point is the costs that Ausgrid actually allocates to these assets in its regulatory accounts which we have used to develop our operating environment factor adjustment for these assets. Ausgrid reports its costs for 66kV and above assets separately (as they are predominantly classified as dual function assets). In its category analysis RIN AusGrid allocated 7.5 per cent of its opex to 132 kV lines. However:

- CEPA's modelling implies that 31 per cent of AusGrid's opex would be allocated to these assets
- PEG's model implies that 44 per cent of AusGrid's opex would be allocated to these assets
- Frontier's model implies 34 per cent of AusGrid's opex would be allocated to these assets [319]

Incorrect output specification

We consider that a number of the alternative models have an incomplete output specification. For instance, CEPA develops a benchmarking model with only one

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[316] CEPA, Benchmarking and setting efficiency targets for the Australian DNSPs, (NSW DNSPs), 2015, p. 20. PEG, 2014, pp. 22–23.

[317] Economic Insights, 2015, p. 48
PEG uses a sample of Australian and US data to model the efficiency of the US service providers. This data set is different to that applied by Economic Insights which used service providers from New Zealand and Ontario. However as none of the US service providers have 132 kV line lengths this variable has a similar effect to including the 66kV plus variable in the Australian, Ontario and New Zealand benchmarking models.

[318] Economic Insights, 2015, pp. 48–49.

[319] Economic Insights, 2015, p. 50

primary output.[320] We consider that it is necessary to incorporate several output variables to adequately represent the functional outputs of service providers, and Economic Insights agrees.[321]

Huegin run a number of models using the outdated output specifications proposed by the AER and Economic Insights when consulting on the development of benchmarking models.[322] However, Huegin did not address the issues identified by Economic Insights when Economic Insights ran these specifications (like the multiplicative nature of the lines and transformer capacity variable).[323] These concerns were set out in the memorandum Economic Insights developed on its MTFP benchmarking.[324] We consider that these alternative output specifications have been superseded and Economic Insights agrees.[325]

Incorrect input specification

In a number of instances we have identified issues with the approach taken to incorporate inputs into alternative benchmarking models. We detail these below.

Synergies applies a DEA model with three inputs: opex, MVA of transformer capacity and the user cost of capital of distribution lines (the value used to weight capital inputs under Economic Insights' benchmarking model).[326] We consider that the addition of the user cost of capital of distribution lines means that the modelling cannot be used to draw conclusions in regards to opex efficiency.[327]

McKell's model only models a subset of opex, composed of maintenance, repair, inspection, vegetation management and similar 'upkeep' costs.[328] The upkeep costs exclude overhead costs.[329] These are a significant proportion of service provider costs. Because costs are excluded from McKell's model it does not measure the efficiency total opex (which also includes overhead costs and service provider operating costs). We prefer Economic Insights' benchmarking modelling because it estimates total opex.[330] We note that the Energy Supply Association of Australia also notes this limitation of McKell's analysis.[331]

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320 Economic Insights, 2015, pp. 7, 51.

321 Economic Insights, 2015, pp. 7, 51.

322 Huegin, 2015a, pp. 35–36.

323 Economic Insights, Memorandum – DNSP MTFP results, 2014.

324 Economic Insights, Memorandum – DNSP MTFP results, 2014.

325 Economic Insights, 2015, p. 51.

326 Synergies, 2015, p. 42.

327 Economic Insights, 2015, p. 51.

328 The McKell Institute, Nothing to gain, plenty to lose: why the government, households and businesses could end up paying a high price for electricity privatisation, 2014, p. 34.

329 ESAA, Lies, damn lies and statistics - comparing networks, 2015.

330 Economic Insights, 2015, p. 53.

331 ESAA, Lies, damn lies and statistics - comparing networks, 2015.

PEG submits that it is necessary to levelise opex prices across service providers.[332] By 'levelising' prices, PEG means that we should not use a common opex price index. Instead, PEG submits that we should make allowance for possible different price levels across service providers.[333]

Economic Insights explains that assuming a common annual opex price level and growth rate across service providers provides a more accurate and unbiased approach. This is because the mining boom in Australia has led to a high demand for field staff of the type employed by service providers right across Australia over the last several years. This has had the effect of greatly reducing any pre–existing labour price differences for field staff across the country. [334]

Economic Insights also observes that there is inadequate information to levelise Australian service provider opex prices and that PEG's attempts to introduce differences in opex price levels and price growth rates across distributors is likely to create errors.[335]

Data

In this sub-section we explain, in response to the service providers' criticisms, why our data is robust, reliable and used appropriately. First, we explain why we have used international data and our approach to incorporating it. In doing so, we address the approaches proposed by the service providers. Second, we emphasise the comparability of the data we have used. Third, we respond to the service providers' submissions on the quality of the data. Finally, we explain why our approach to conducting post-modelling adjustments is preferable to alternatives put forward by the service providers.

International data

We explained in our draft decision that Economic Insights included international data in the econometric models. Specifically, Economic Insights used databases of service providers from New Zealand and Ontario.[336] Economic Insights also investigated including data from the US but decided against doing so. This was due to the US data not being of consistent quality, incorporating data from vertically integrated monopolies (which introduces cost allocation issues) and lacking consistent data on variables such as line length and maximum demand.[337]

In response to our draft decision, the service providers and their consultants raised several concerns with Economic Insights' inclusion of international data including:

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332 PEGR, 2015, p.52 and p.55

333 Economic Insights, 2015, pp. 8–9.

334 Economic Insights, 2015, pp. 8–9.

335 Economic Insighs, 2015, pp. 8–9.

336 Economic Insights, 2015, p. 26.

337 Economic Insights, 2015, pp. 25–26.

- the model is heavily reliant on overseas data
- overseas data is not comparable with Australian data
- Economic Insights does not adequately account for differences between countries
- Economic Insights' data contains errors.

The first three issues appear to be based on a misunderstanding of how Economic Insights has used the international data. The concerns with data quality are also misplaced. Economic Insights discusses international data in detail in its report in section 3.1. We highlight the key responses below.

Rationale for including international data

As set out in the draft decision, the rationale for Economic Insights incorporating international data into its econometric modelling is not to undertake international benchmarking.[338] Rather, by including these extra data in the sample, Economic Insights can improve the precision of the results for the Australian service providers.

It is necessary to include international data because while the Australian database is robust and reliable for economic benchmarking, it is small. In particular, it shows little time-series variability—a common situation in utilities benchmarking.[339] Unlike index-based techniques such as MTFP and MPFP, econometric cost functions require a large number of observations to produce robust results.[340]

Consequently, as Economic Insights explained in its draft decision report, econometric analysis using the Australian-only data set did not produce sufficiently stable results:[341]

> After a careful analysis of the economic benchmarking RIN data we concluded that there was insufficient variation in the data set to allow us to reliably estimate even a simple version of an opex cost function model…the time series pattern of the data is quite similar across the 13 DNSPs. Hence, in this case, there is little additional data variation supplied by moving from a cross–sectional data set of 13 observations to a panel data set of 104 observations. As a consequence we are essentially trying to use a data set with 13 observations to estimate a complex econometric model. The 'implicit' degrees of freedom are near zero or even negative in some cases, producing model estimates that are relatively unstable and unreliable.

The lack of time-series variation in the Australian dataset has also affected some models developed by the service providers' consultants. CEPA, for example, acknowledge that it was unable to accurately estimate SFA models robustly and consistently using the Australian only data.[342]

338 Economic Insights, 2015, p. 20.
339 Economic Insights, 2015, pp. 20–21.
340 Economic Insights, 2015, pp. 20–21.
341 Economic Insights (2014), pp. 28-29.
342 CEPA, Benchmarking and setting efficiency targets for the Australian DNSPs, (NSW DNSPs), 2015, p. 19.

Therefore, to robustly estimate the relationship between opex and outputs using an econometric opex cost function, additional cross-sectional data—that is, more service providers—provides a means of increasing the number of observations. This is an approach PEG agrees with and has indeed undertaken.[343] Economic Insights concluded:[344]

> …to obtain robust and reliable results from an econometric opex cost function analysis we needed to look to add additional cross sectional observations which meant drawing on overseas data, provided largely comparable DNSP data were available.

By including the NZ and Ontario data, Economic Insights produced econometric results with significantly more accurate parameter estimates. Accurate parameter estimates are essential because they enable more robust opex efficiency comparisons among the Australian distributors.[345] Parameter estimates must be accurate to account for the effect of forecast output change on opex. More precise parameter estimates allow more accurate accounting for output change in forecasts of future opex productivity.[346]

Importantly, the efficiency rankings produced by the SFA model with Australian-only data are consistent with the rankings produced by the three-country database. This demonstrates that rather than influencing the results, the international data simply (albeit significantly) increases our confidence in the results.[347]

The similarity in Australian service provider rankings using both approaches is evident from Figure A.1, which we discuss below in 'Efficiency results'. It is, therefore, misleading for the service providers to contend that the model is heavily reliant on overseas data.

Approach to incorporating international data

The approach Economic Insights has taken to incorporate international data is to:

- select purpose-built economic benchmarking databases used in recent regulatory decisions which have comparable and consistent data
- explicitly account for jurisdictional differences where possible.

As we explain above, the purpose of this approach is to strengthen the confidence in the results rather than compare Australian service providers to international service providers. For this reason, many of the concerns raised by the service providers' consultants are misplaced.

343 PEG, 2014, pp. 53-57.
344 Economic Insights (2014), pp. 28-29.
345 Economic Insights (2014), p. 31.
346 Economic Insights, 2015, p. 20.
347 Economic Insights, 2015, p. 25.

Purpose-built databases

Economic Insights has only used databases with a long history of productivity measurement and which the regulators of the respective jurisdictions have recently used in their determinations. Further, Economic Insights ensured the databases contain similar variable coverage.[348]

The New Zealand database, for example, is similar in construction to the Australian database and includes consistent data from 1996 to 2013. The NZCC has used productivity studies for regulatory determinations since 2003 with the most recent (2014) using a similar output and input specification to that used by Economic Insights for this determination.[349]

Similarly, the Ontario database contains most of the same outputs as the Australian database and includes consistent data from 2002 to 2013. The OEB used this dataset in its most recent determination in 2013, following a study conducted by PEGR.[350]

Economic Insights was, therefore, satisfied that these two databases were appropriate candidates for inclusion. In contrast, upon examination of the US database prepared by PEG, Economic Insights was not satisfied that (among other things) it included enough of the key quantity variables that are fundamental to productivity measurement. Accordingly, Economic Insights did not use this database.[351]

Economic Insights observes that the NZCC and OEB undertook testing and validation of the international databases such that they were comfortable with relying on them for benchmarking in their regulatory determinations. The views of Huegin and Frontier Economics that the data contains errors or that Economic Insights has failed to apply due diligence to the data[352] are, therefore, not convincing.

Accounting for differences

Economic Insights was explicit in identifying differences between the New Zealand and Ontario databases and the Australian database. In particular, Economic Insights made adjustments for:[353]

- differences in the composition of the international databases by choosing a dataset that balanced the number of small service providers with the number of possible observations
- possible cross-country differences and inconsistencies in accounting definitions, price measures, regulatory and physical operating environments (such as the impact of harsher winter conditions in Ontario) by using country dummy variables.

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348 Economic Insights (2014), pp. 29-31;

349 Economic Insights (2014), pp. 29-31;

350 Economic Insights (2014), pp. 29-31;

351 Economic Insights (2014), pp. 29-31;

352 Frontier Economics, (NSW/ACT), 2015, p. vii. Huegin, (NSW), 2015, p.15.

353 Economic Insights (2014), pp. 29-32;

Limitations in the Ontario database meant Economic Insights included one operating environment variable and no capital input variable. However, Economic Insights was satisfied that these omissions would unlikely significantly influence the results.[354] Subsequent testing of significance levels and monotonicity properties by Economic Insights revealed this to be the case in the three models used in our decision.[355]

Despite this approach, one of the key concerns raised by the service providers' consultants is that Economic Insights does not appropriately account for differences between countries. In particular, they do not agree that the dummy variables are adequate.[356]

CEPA agrees that the dummy variables control for level differences between databases but considers they do not account for cost relationship differences.[357] Similarly, Frontier Economics and PEG submit that each service provider's costs are influenced by factors not captured by the explanatory variables in Economic Insights' model.[358]

In response to this, Economic Insights considers for such differences to have a material impact on the model results, significant differences in the technology to distribute electricity would need to exist. Economic Insights notes the international service providers deliver the same services using poles, wires and transformers so it does not agree that such a fundamental difference exists.[359] Economic Insights is, therefore, confident that the dummy variables are robust and reasonable:[360]

> Because our objective was not to undertake international benchmarking as such but, rather, to improve the precision of parameter estimates to facilitate opex efficiency measurement across the Australian DNSPs only, there is no need for the coverage of opex in each jurisdiction to be identical nor for operating environment conditions to be identical…
>
> It is hence invalid to interpret the country dummy coefficients as differences in efficiency levels as FE has done or reflections of cost disadvantages as Synergies has done.

A detailed discussion of Economic Insights' approach to incorporating international data is in section 3 of the report attached to this decision.

Inappropriate alternatives to Economic Insights' use of international data proposed by the service providers

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354 Economic Insights (2014), p. 32;

355 Economic Insights was not satisfied, following this testing, that the SFA Translog model was robust or reliable enough to be useful.

356 PEG, 2015, p. 55; Frontier, (NSW/ACT), pp. 40, 43; CEPA, Benchmarking and setting efficiency targets for the Australian DNSPs, (NSW DNSPs), 2015, p. 17.

357 CEPA, Benchmarking and Setting Efficiency Targets for the Australian DNSPs, (NSW DNSPs), 2015, p. 17.

358 Frontier, (NSW/ACT), p. 18; PEG, 2015, p. 55.

359 Economic Insights (2014), p. 14.

360 Economic Insights (2014), p. 17.

Some of the service providers' consultants have proposed alternative approaches to using international data in the manner Economic Insights has. For example, PEG advocates using US data[361] and others, including Frontier Economics[362] and CEPA[363] suggest discarding the international data and relying only on Australian data.

As we explain above and Economic Insights addresses in its report, the US database is unusable because the lack of sufficient data fundamental to productivity measurement makes it inconsistent with the Australian database. The alternative of relying only on Australian data is also not feasible due to the lack of time-series variation that may lead to unstable results, which PEG and CEPA recognise.[364]

Frontier Economics' 'strong' recommendation that we completely discard Economic Insights' model is also not feasible given the NER requirements that we conduct benchmarking.[365] Further, for the reasons outlined in this report, we consider that Economic Insights' data and modelling is robust.

Comparability of data

Our draft decision view was that the data we have relied on for economic benchmarking is robust, reliable and comparable.

We collected consistent data from all service providers using the same reporting requirements, following extensive consultation with the service providers and other stakeholders. The RIN requirements allowed some reporting flexibility, including the ability to estimate data if actual data were not available. However, the requirements and definitions were clear. Further, we required the RIN responses to be independently audited and also certified by the service providers' CEOs. Therefore, we were satisfied the data is sufficiently comparable across service providers.

In addition, on the recommendation of Economic Insights, our draft decision adjustments incorporated an allowance in favour of the service providers to allow for potential data and modelling issues:[366]

> [I]t is prudent to adopt a conservative approach to choosing an appropriate benchmark for efficiency comparisons. Adopting a conservative approach allows for general limitations of the models with respect to the specification of outputs and inputs, data imperfections and other uncertainties…
>
> Rather than adopt the frontier DNSP as the benchmark for efficiency comparisons, we are of the view that it would be prudent to instead adopt a weighted average of the efficiency scores in the top quartile of the efficiency score range…This is equivalent to allowing an additional margin on the frontier

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361 PEG, 2014, pp. 57-63

362 Frontier, (NSW/ACT), pp. xviii-xix, 100-102.

363 CEPA, Benchmarking and Setting Efficiency Targets for the Australian DNSPs, (NSW DNSPs), 2015, pp. 16-22.

364 PEG, 2015, pp. 53-57; CEPA, Benchmarking and Setting Efficiency Targets for the Australian DNSPs, (NSW DNSPs), 2015, p. 19.

365 Frontier, (NSW/ACT), pp. vii-viii.

366 Economic Insights, 2014, pp. 47-48.

DNSP's input use of 10 per cent in calculating the benchmark for the NSW/ACT DNSPs (0.95/1.1 = 0.86) and is thus a relatively generous allowance.

The service providers raised a number of concerns about the robustness of the Australian data and the comparability of service providers. In particular, submissions considered that:

- Australian service providers are among the largest in the benchmarking sample, especially Essential Energy and Ergon Energy[367]
- many variables in the economic benchmarking RIN were not provided by service providers on a consistent basis[368]
- we have not taken into account certain differences between services providers, including related party arrangements.[369]

Relative size of service providers

With reference to the appropriateness of international service providers, several consultant reports consider that the Australian service providers are disadvantaged because they have some of the longest circuit lengths in the benchmarking sample. They consider Essential Energy and Ergon Energy are particularly disadvantaged because they have the longest circuit length and the lowest customer density of all service providers.[370] They also noted that Ausgrid and Energex have a high customer numbers and ratcheted maximum demand relative to the sample average.

We disagree that the size of the Australian service providers are not a comparative disadvantage to other providers in the sample.

Rural providers with very low customer density

Economic Insights considers that the long circuit length of Essential Energy and Ergon Energy does not underestimate their efficiency. Economic Insights states that if Essential Energy and Ergon Energy were genuine outliers, it would expect the flexible translog function to given them much higher efficiency scores than the less flexible Cobb Douglas function. The results, however, are very similar.[371]

Economic Insights acknowledges that it would be desirable to have more 'large' rural providers in the sample, but considers these two service providers are unusual with no service providers in comparable countries with accessible data having the same extent

367 Frontier Economics, (NSW/ACT) 2015, pp. 25–31. Synergies, (Ergon) 2015, pp. 4–5; Huegin, (NSW), 2015, pp.58–59.

368 PwC, Jan 2015, pp. 24-32.

369 PwC, Jan 2015, pp. 33-37.

370 Frontier Economics, (NSW/ACT) 2015, pp. 25–31. Synergies, (Ergon) 2015, pp. 4–5; Huegin, (NSW), 2015, pp.58–59.

371 Economic Insights, 2015, p. 30.

of lines.[372] Economic Insights did not consider there was justification to adjust Essential Energy's and Ergon Energy's efficiency scores on the basis of their very low customer density.

While comforted by Economic Insights' reasoning, we also engaged EMCa to consider whether—from an engineering perspective—the relationship between opex and customer density changes at the very low densities of Essential Energy and Ergon Energy. EMCa found it is feasible to compare sparse rural distributors (like Essential Energy and Ergon) with other rural distributors included in the benchmarking data set.[373] As such, the findings for our benchmarking model are applicable to the sparse rural service providers.

In any event, the service providers used to derive the benchmark frontier (that we compared Essential Energy to in the draft decision) contains three rural providers—Powercor, SA Power Networks and AusNet Services. Further, we have changed the benchmark comparison point to AusNet services, who is at the bottom of the top quartile of observed scores, which means we have given more weight to (among other things) the characteristics of these rural providers. In our view, this significantly mitigates any perceived disadvantage Essential Energy and Ergon Energy face due to their low customer density.

Customer numbers and demand

While Ausgrid and Energex may have high customer numbers and ratcheted maximum demand relative to the sample average, we do not consider they are comparatively disadvantaged. Economic Insights advises that there are sufficient comparably sized service providers to conclude that Ausgrid and Energex are not significantly distant from other observations such that they would be considered outliers.[374]

The consistent results of the benchmarking models, including consistency with the MPFP model (which does not include the international data) provides comfort that Ausgrid and Energex are sufficiently comparable to other service providers in the sample.

Consistency of variables

Some submissions considered that service providers may not have provided several variables in the economic benchmarking RIN on a consistent basis.[375] We do not consider these concerns are valid, or are sufficiently significant for us to not to conduct benchmarking. Economic Insights, as an economic benchmarking expert, is well qualified to form an opinion on the appropriateness of data for economic

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372 Economic Insights (2015), p. 30 (section 3.3)

373 EMCA, 2015, p. 1.

374 Economic Insights, 2015, p. 30.

375 PwC, Jan 2015, pp. 24-32.

benchmarking. As we explained in our draft decision, Economic Insights considered the Australian database to be robust and suitable for economic benchmarking:[376]

> Given the extensive process that has been gone through in forming the AER's economic benchmarking RIN database to ensure maximum consistency and comparability both across DNSPs and over time, the database is fit for the purpose of undertaking economic benchmarking to assess DNSP opex efficiency levels and to estimate models that can be used to forecast future opex partial productivity growth rates.

The econometric models require only six aggregate variables from the service providers to function effectively (network services opex, energy delivered, customer numbers, ratcheted maximum demand, circuit length and proportion of underground cables). Many submissions on data comparability do not actually relate to these variables. Accordingly, we consider concerns raised about the following matters are not relevant to our findings:

- RAB values[377] – these are not included in the opex modelling
- differences in opex category reporting, including treatment of metering costs – Economic Insights' model's use total network services opex, which excludes metering
- revenue data – our benchmarking models do not rely on revenue
- route line length – we have not used route line length in the opex models[378]
- inconsistency in energy density and customer density calculations – these measures are not central to our analysis but, in any case, we rely on our own calculations, which are on a consistent basis
- system and operating model changes – the aggregate nature of the required variables and our precise definitions for these variables mitigate the impact of such changes
- weather adjusted maximum demand – we do not use this data

To the extent that PwC and EY submit that circuit length the data is not appropriate for use in benchmarking because some service providers have estimated it, we consider:[379]

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376 Economic Insights, 2014, p. 3.

377 RAB data is relevant to our MTFP model and opex MPFP model. We use RAB data to weight the volume of inputs and outputs. However, because MTFP is an index-based benchmarking method, the outcomes of the MTFP model will be less sensitive to the weighting of inputs than they will be to the amounts of the inputs themselves. Therefore, any purported comparability concerns with RAB data will have only a very minimal impact on the MTFP results. Economic Insights, 2015.

378 We have used route line length normalise the results of our PPIs. However, we consider that discrepancies in the measurement of route line length will not affect the conclusions of this analysis. The large differences in customer density in these models are not likely to be impacted by slight inaccuracies in the estimates of route line length. In addition, as part of our testing and validation process, we identified and adjusted for the issue with UED's route line length identified by PwC. We circulated this data set to all service providers with our draft economic benchmarking report and published this data set on our website with our draft determination.

- As we explain below, neither PwC nor EY demonstrate that the data is not suitable.
- we consider that the estimates are reasonable because the service providers are the best placed to estimate their own asset characteristics and their CEOs have certified they are the best estimates the service provider can provide
- where estimated circuit length may vary from actual circuit length, we would be concerned if service providers were able only to estimate a value—of core assets they manage—that deviated from reality to the point where it would result in a material difference to their benchmarking performance.

Differences between service providers

Some submissions raise comparability matters that are relevant to our opex modelling.[380] However, we have taken these into account in our draft and final decisions:

- differences in capitalisation policies and cost allocation methods – we considered these as part of our operating environment factor assessment and made an adjustment if we considered one was warranted[381]
- differences in vegetation management clearance requirements between states – we considered this as part of our operating environment factor assessment and made an adjustment if we considered one was warranted[382]
- differences in network age, service quality and reliability standards – we considered these as part of our operating environment factor assessment and made an adjustment if we considered one was warranted[383]
- related party arrangements – considered as part of our examination of opex factors. We considered ownership arrangements are not a key concern for total opex assessment because benchmarking enables us to compare the relative efficiency of each service provider's opex regardless of the arrangements they have in place (which are the service provider's choice)[384]
- provision reporting – service providers must develop their provision accounts in accordance with consistent Australian accounting standards so they must meet the same requirements even if they may be named differently. Further, opex reported on a cash basis and accrual basis to be approximately equal on average.[385] Hence the use of eight years of panel data to derive an average efficiency score for the period will reduce the effect that provisions could have on the benchmarking results.

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379 PWC, Jan 2015, p. 31. EY, Briefing Paper: RIN Data Review Ergon Energy, 13 February 2015, pp. 6–7.

380 PwC, Jan 2015, pp. 33-37.

381 AER, Draft decision – attachment 7, section A.5.

382 AER, Draft decision – attachment 7, section A.5.

383 AER, Draft decision – attachment 7, section A.5.

384 AER, Draft decision – attachment 7, p. 7-24.

385 Economic Insights, 2015, p. 56.

In our draft decision, we did not explicitly consider differences in the allocation of responsibility for vegetation management across states or differences in fuel mix. In this final decision, however, we consider them as part of our operating environment factor assessment in section A.6.

Data quality

The service providers and their consultants submitted they had some concerns regarding the quality of benchmarking data we have used.[386] We disagree with their submissions and maintain our draft decision view that our dataset is of good quality. As we mentioned above, Economic Insights considers our dataset is robust:

> While no dataset will likely ever be perfect, the AER's economic benchmarking RIN data provides the most consistent and thoroughly examined DNSP dataset yet assembled in Australia… the AER's economic benchmarking RIN data are also considerably more detailed, comprehensive and consistent than regulatory data in comparable countries, including the United States. The Australian output and input data used in this study are thus considered to be quite robust and to compare more than favourably with overseas datasets used in previous studies.

PEG also submits that our dataset is "generally of good quality".[387] The CCP also praised the data, noting that it was supplied by the distributors.[388] Further, Jemena Gas Networks, and AusNet Services (Gas) have recently asked us to rely on their gas data after submitting benchmarking models prepared by Economic Insights. [389] The data they have relied on has not been subject to the same rigorous testing and validation process that the economic benchmarking RIN data has been subject to.

In this sub-section we briefly reiterate our data collection and validation process before addressing previous comments regarding data quality and explaining why alternatives proposed by the service providers are unreasonable.

Data collection and validation process

The development of our benchmarking dataset has come about as the result of a public consultation process that began May 2012. We presented the full process we went through to collect, test and validate the data in our approach section. This process included several open workshops to discuss data requirements and four

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386 Essential Energy, Revised revenue proposal, 2015, p. 189; Endeavour Energy, Revised regulatory proposal, 2015, p. 169; Ausgrid, Revised regulatory proposal, 2015, p. 130; ActewAGL, Revised regulatory proposal, 2015, p. 83; CEPA Benchmarking and Setting Efficiency Targets for the Australian DNSPs, (NSW DNSPs), 2015, p. 32.

387 PEGR, 2014, p. 30.

388 CCP, Responding to NSW draft determinations and revised proposals from electricity distribution networks, 2015, p. 50.

389 Economic Insights, The Productivity Performance of Jemena Gas Networks' NSW Gas Distribution System Jemena Gas Networks (NSW) – Access Arrangement Information – Appendix 6.7, August 2009
Economic Insights, 2013-2017 Gas Access Arrangement Review – Access Arrangement Information Appendix 6B, 2012.

explicit opportunities for service providers to comment on the data prior to submitting unaudited RIN responses.[390]

Following this process, and before requiring audited RIN responses, we initiated a comprehensive testing and validation process involving:

- comparing RIN information with information previously reported by service providers (such as regulatory proposals, previous RIN responses and distributor annual reports) to ensure consistency
- reviewing time series data to identify any anomalous data points
- reviewing bases of preparation to ensure the service providers prepared the data in accordance with the RIN instructions and definitions
- comparing data across service providers to identify potential anomalies.

Where we identified anomalies or inconsistencies we drew these to the attention of the service providers. Ultimately, to ensure that the data was reliable we required independent audit of the service providers' RIN responses prior to final submission and the service providers' CEOs to sign a statutory declaration attesting to the robustness of the data.

We then published the audited RIN data on our website and called for submissions on the data.[391] In response, only Citipower and Powercor raised specific issues regarding data quality, which we addressed.[392] We subsequently undertook further review of audited RIN responses and discussed any further data issues directly with the relevant service providers.

When we consulted on our draft benchmarking reports in August 2014, we again circulated our benchmarking data set. In this process, Energex raised the only significant data-related issue, relating to the inclusion of feed-in tariffs. To account for this submission we excluded the value of feed in tariffs from opex.[393]

In the course of our testing and validation process, we found that some responses for certain variables (particularly for several operating environment variables) were not robust. Accordingly, we decided not to use these variables.

We are not professing that our benchmarking dataset is perfect. However, Economic Insights considers no dataset is ever likely to be perfect (Frontier Economics

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390 We circulated, for comment,(1) preliminary EB RIN templates (2) revised preliminary RIN templates (3) draft RIN templates (4) draft expenditure forecast assessment guidelines.

391 We did not only publish the data, but we also published the basis of preparation of each of the service providers of the data. The basis of preparation describes how the service providers completed the templates.

392 Citipower and Powercor, Publication Of The Economic Benchmarking RIN, June 2014. Citipower and Powercor commented on differences in the calculation of MVA capacity of lines across the service providers. They recommended that "The AER sensitivity test the impact on the benchmarking results by applying standard capacity values across different DNSPs". In response to this comment we undertook sensitivity tests of the data. Submissions are on our website at: http://www.aer.gov.au/node/25078.

393 Energex's submission is on our website at: http://www.aer.gov.au/node/25078.

agrees[394]), and ours is suitable for benchmarking.[395] We are satisfied that we have undertaken a very comprehensive and inclusive process to develop a database that is sufficiently robust and reliable for benchmarking purposes.

Further, the data that we have used in our benchmarking models is aggregate data that the service providers themselves require for their own purposes. This data includes historic opex, reliability, demand, customers and the number and size or capacity of key assets. The customer numbers we use, for example, are the number of National Metering Identifiers that the service providers must submit to AEMO for settlement purposes.

Without reliable information on the quantity, location, nature and condition of their networks and assets, service providers would be unable to effectively (or safely) operate and maintain their networks. We also note that the data produced in the economic benchmarking RINs is derived from the same systems the service providers use to prepare their regulatory proposals, which they use to justify increases in revenue.

Previous comments on data quality

The service providers point to past comments the AER/ACCC, AEMC, PC and Economic Insights have made about benchmarking data as a reason why they consider our current benchmarking data is not robust.[396] The submissions highlight:[397]

- the AER's 2008 opinion that it did not have robust, consistent and reliable long term data suitable for TFP
- Economic Insights' 2009 view that the regulatory data available at the time were not fit for the purpose of a robust TFP analysis of the standard required to base regulatory pricing and revenue determinations on
- the AEMC's decision in 2011 not to adopt TFP for price and revenue determinations
- the PC's conclusion in April 2013 that there was little immediate scope for benchmarking to play a decisive role in determinations due to its incipiency.

Some service providers raised similar concerns during the development of our economic benchmarking RIN, in September 2013, also referring to the AEMC's TFP review. In that process, we explained that the AEMC's comments about data

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394 Frontier, (NSW/ACT), p. 101.

395 Economic Insights, 2014, p. 3.

396 ActewAGL, Revised Regulatory Proposal, pp. 125-134, attachment C12; Ausgrid, Revised Regulatory Proposal, pp. 130-142.

397 ActewAGL, Revised Regulatory Proposal, pp. 125-134, attachment C12; Ausgrid, Revised Regulatory Proposal, pp. 130-142.

availability and quality related to data in the public domain or used in previous regulatory decisions.[398]

The same applies here. All of the above statements relate to data existing in the public domain or used in determinations at the time (that is, prior to April 2013). We collected the data we are using in this determination at the end of April in 2014.

Given the aforementioned positive comments about our *current* benchmarking data, we are not convinced that the service providers' submissions have merit.

Alternative approaches proposed by service providers

On behalf of the service providers, Frontier Economics considers we should spend more time collecting 'more consistent and reliable data across distributors' and work collaboratively with the service providers. In doing so, Frontier Economics observes that Ofgem has undertaken a decade or more of development work in respect of its data collection.[399] CEPA also comments that if we had consistent data across the Australian service providers we may not need to rely on international data.[400]

Notwithstanding our view that our data is of good quality now, this alternative is not feasible. Econometric benchmarking analysis with Australian service providers can only be conducted with the international data. This is due to the cross-sectional variation issue we discuss above. As PEG observes, the number of companies in the Australian sample will always be limited, even as additional years of data accumulate.[401]

As for Frontier Economics' observations of Ofgem, we note the following. According to CEPA, in its 1999 price review for distribution services Ofgem benchmarked operating expenditure. It did so with only one year of opex data that required a number of significant adjustments. Using this data Ofgem developed a simple benchmarking model with only one dependent variable and determined the UK service providers could reduce their opex by 16 per cent (on average). The service providers subsequently were able to reduce their opex by 20 per cent (on average).[402]

We do not consider that Ofgem's approach was perfect. It does, however, indicate that Ofgem has in previously implemented opex benchmarking using a less sophisticated and less rigorously tested database than our own to determine expenditure requirements.

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[398] AER, Draft RIN for economic benchmarking–explanatory statement, September 2013, pp. 16-17.

[399] Frontier, (NSW/ACT), pp. 102-103.

[400] CEPA, Benchmarking and Setting Efficiency Targets for the Australian DNSPs, (NSW DNSPs), 2015, p. 54-55

[401] PEG, 2015, p. 65.

[402] CEPA, Background to work on assessing efficiency for the 2005 distribution price control review, 2003, pp.43-44, 54.

Adjustments to data

CEPA submits that our approach of adjusting for identified operating environment factors not explicitly included in the econometric models is 'not in line with the approach used by Ofgem'. CEPA's view is that a better approach is to adjust for operating environment differences prior to conducting the modelling.[403]

Economic Insights disagrees that the post-modelling adjustment approach is inappropriate. Economic Insights considers that given the purpose of the study, adjustment for operating environment factors can be done either:[404]

- as part of the modelling, if sufficient information is available for all included service providers across all jurisdictions, or
- after the modelling if data for particular variables are not universally and consistently available across countries, but are available for Australian distributors.

Economic Insights has adopted the latter approach because—given we are comparing Australian service provider performance to the most efficient Australian providers—the requisite information is not available for all service providers across all jurisdictions.

Economic Insights also notes that degrees of freedom considerations limit the number of operating environment variables that can usefully be included directly in economic benchmarking models. This means that making the use of subsequent adjustment is the only way of allowing a fuller treatment of operating environment factors. Therefore, while Economic Insights' approach may be different to that adopted by Ofgem, it is a valid approach and one that makes optimal use of the information available.[405] By adopting the two step approach analysis includes allowance for the impact of many more operating environment factors than have earlier economic benchmarking studies and the alternative models advanced by the distributors' consultants.[406]

We discuss operating environment factors in detail in section A.6.

Estimation methods

In this sub-section we compare and contrast our estimation methods with the alternatives proposed by the service providers' consultants. First, we explain what we have done and why. Second, we explain why we have not used data envelopment analysis (DEA) and why the DEA analysis used by the service providers' consultants is inappropriate. Third, we demonstrate why the service providers' estimation methods are not robust or reliable.

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403 CEPA, Benchmarking and setting efficiency targets for the Australian DNSPs, (ActewAGL), p.18

404 Economic Insights, 2015, p. 18.

405 Economic Insights, 2015, p. 18.

406 Economic Insights, 2015, pp. 18–19.

Our estimation methods

We have applied the best available model for estimating efficient opex. Economic Insights explains that our Cobb Douglas SFA model is statistically superior to other benchmarking methods for the following reasons:[407]

- it specifies the relationship between opex and outputs and some operating environment factors in an opex cost function (unlike DEA and MPFP)
- it directly estimates an efficient frontier (unlike econometric models and MPFP)
- it contains a random error term that separates the effect of data noises or random errors from inefficiency (unlike econometric models, DEA and MPFP)
- the results of the Cobb Douglas SFA model can be verified with statistical testing (unlike DEA and MPFP).

In addition, Economic Insights undertook tests of the Cobb Douglas SFA model and have found that:[408]

- all the parameters are of the expected sign
- the parameter estimates all have plausible values
- estimated coefficients are statistically significant which indicates that they have been estimated to a high degree of precision
- the confidence intervals for the efficiency scores are relatively narrow.

We have further confidence that the Cobb Douglas SFA model is appropriate because Economic Insights has also been able to corroborate the SFA model by producing consistent results using:

- other sophisticated econometric opex models using the same set of explanatory variables (Cobb Douglas LSE and translog LSE) that are more appropriate than the alternatives proposed by the service providers
- the opex MPFP model, which applies a different model specification and does not rely on international data.

In addition, the results of our partial performance indicators and detailed review are consistent with the economic benchmarking results.

Data envelopment analysis

Some submissions suggested we should use DEA because we foreshadowed we would use it in our expenditure forecast assessment guideline. However, we have chosen not to apply DEA because it is an inferior modelling technique to a SFA model.

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407 Economic Insights, 2014, pp. 7–8.

408 Economic Insights, 2014, pp. 31–34.

As Economic Insights observes, DEA may identify certain service providers as efficient by default.[409] This is because DEA estimates the efficient frontier based upon the observed input and output combinations of service providers. This problem is compounded with the inclusion of additional output variables.[410] This is a particular concern when DEA is applied to a small sample of service providers (such as the Australian only data set).[411]

In addition, DEA models do not produce confidence intervals for efficiency estimates and DEA requires a large number of observations to be implemented satisfactorily. [412] Economic Insights considers that SFA is a preferable form of econometric model because it separates out the inefficiency component from the random noise component of the error term.[413]

In our expenditure forecast assessment guideline we indicated that we would use DEA. However, we also specified that we would take a holistic approach to developing benchmarking models based upon the availability of data. Once we received benchmarking data we discovered that we were able to develop a statistically superior SFA model. As such, we have decided to depart from the approach we set out in the Guideline.

The service providers' estimation methods are not sufficiently robust or reliable

A number of consultancy reports submitted have presented alternative benchmarking models to cross-check opex cost modelling by Economic Insights.[414] Depending on the model specification, these estimation methods differ in how they estimate inefficiencies, unobserved firm heterogeneity effect, and random errors. The modelling differences include:

- treatment of unobserved firm heterogeneity and its separation from inefficiency
- the distributional form applied to modelled inefficiency
- The inclusion or exclusion of a random error term and the characteristics of this random error term.

The results of these models differ to that of Economic Insights. In our view, this is because the alternative models presented by the service providers' consultants are not robust. We outline our views on the alternative models below.

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409 Economic Insights, 2015, p. 41.
410 Economic Insights, 2015, p. 41.
411 Economic Insights, 2015, p. 41.
412 Economic Insigths, 2015, p. 41.
413 Economic Insigths, 2015, p. 41.
414 Huegin, 2015(a,b), Frontier, 2015(a,b), Synergies, 2015b

Use of DEA

A number of the service providers' consultants have chosen to develop DEA models. We have noted the limitations of DEA models above.

For instance, Huegin, Synergies and Frontier apply DEA models using a variety of inputs and outputs.[415] Frontier Economics finds more service providers to be efficient when additional output variables are added to the model or variable returns-to-scale technology is imposed. This illustrates the 'efficient by default' problem when using DEA. Economic Insights notes that increasing the number of outputs from three to four increases the number of distributors with scores above 0.95 from two to seven, while also introducing variable returns to scale further increases the number with scores above 0.95 to 10 – simply because the sample is not large enough to support sensible efficiency analysis using this method.[416]

True fixed-effects (FE) model and true random-effects (RE) models

Frontier Economics developed FE and RE models. These models assume inefficiency varies randomly over time.[417] Consequently they attribute inefficiency that does not vary over time to latent heterogeneity.[418] This is an incorrect assumption where inefficiency persists over time as in such a circumstance these models will systematically underestimate inefficiency. Economic Insights notes that these models find very large mean efficiency scores which it considers would appear to be unreasonably high given what is known about the relative performance of firms in this sample from other sources.[419] Economic insights also notes that, to its knowledge, these models have not been applied by any regulator in any country due to the inherent problems with the underlying assumptions in the models.[420]

Latent class modelling and k-means clustering

Huegin, in their report for the NSW and ACT service providers, use latent class SFA models to identify heterogeneity in the dataset.[421] In this methodology, clustering methods are used to identify subsets of the sample data so that separate efficiency frontiers can be estimated for each subset. Huegin's modelling is flawed, however, because:

- Huegin did not include country dummy variables in its modelling to capture cross country differences.[422]

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415 Huegin, 2015a, Synergies

416 Economic Insights, 2015, p. 41.

417 Economic Insights, 2015, p. 33.

418 Economic Insights, 2015, p. 34.

419 Economic Insights, 2015, p. 34.

420 Economic Insights, 2015, p. 34.

421 Huegin, (NSW/ACT), 2015, p. 56.

422 Economic Insights, 2015, p. 38.

- Huegin did not report parameter estimates for the model. When parameter estimates were later provided on request, some of the estimated coefficients had the incorrect signs[423]
- Latent class modelling will understate inefficiency because dividing any data set into subsets the mean efficiency score will almost invariably increase as the sample size decreases. [424]

In their subsequent report for Ergon Energy Huegin apply a different statistical technique, k–means clustering. This is used to look for clusters (classes) in Economic Insight's data set.[425] This approach has the following problems:[426]

- the Huegin clustering exercise involves a simple comparison of means, which is a linear analysis. The Economic Insights (2014) models are non–linear economic cost function models (Cobb–Douglas and translog) which are used to capture the classic diminishing marginal returns nature of economic cost structures.
- Huegin exclude the country–level dummy variables from the analysis, which introduces misspecification.
- The clustering methods identify clusters of service providers that are similar to each other in terms of closeness of their means. They do not provide evidence that the service providers in these clusters are significantly different from each other nor that they belong to separate cost functions.

Efficiency results

In this sub-section we address the robustness and reliability of our approach, in light of the results of the service providers' alternative models. The service providers, their consultants and the McKell Institute submit that our benchmarking results are sensitive to the modelling approach and model specification adopted. They present alternatives to demonstrate this. They consider the extent of the variation in outcomes indicates the poor explanatory power of our benchmarking as a proxy for the real operating costs of the service providers.[427]

We agree that different modelling techniques and model specifications will produce different results. However, as we demonstrated above, Economic Insights' modelling is robust whereas the alternatives developed by the consultants of the service providers

[423] Economic Insights, 2015, p. 39.

[424] Economic Insights, 2015, p. 39.

[425] Huegin, (Ergon), 2015.

[426] Economic Insights, 2015, p. 39

[427] ActewAGL, RRP, 2015. p.151 p. 175. Essential, RRP, 2015, p. 182. AusGrid, RRP, 2015, p. 143. Huegin, (NSW/ACT), 2015, pp. 11-19. ActewAGL, RRP, 2015, p.131-132, p. 149; CEPA, Benchmarking and Setting Efficiency Targets for the Australian DNSPs, (NSW DNSPs), 2015, pp. 23-32; PEG, 2015, pp. 55-56; Huegin, (Ergon) 2015, pp. 35-36; Synergies, 2015 ; Frontier Economics, (NSW/ACT), 2015; McKell Institute, 2015.

are not. Economic Insights has considered the alternative models proposed by the service providers' consultants in detail and has identified significant deficiencies.[428]

Our results are robust and reliable

Our view is that the results of Economic Insights' modelling are robust and reliable because the model specification, data and estimation methods are superior to everything proposed by the service providers and their consultants. The CCP agree that the model is robust and reliable:[429]

> Our assessment is that the work is thorough, and that care has been taken in choosing appropriate models, testing them and defining their limitations including the standard errors of their estimates. We find the consistency of its partial slope coefficients (across models) and the narrowness of its standard errors reassuring. The explanatory factors that the model has chosen are consistent with those we have seen in other modelling exercises…and the ordinary least squares and least square dummy variable approaches are well accepted.

Model specification

As we outline above, Economic Insights' model specification, in combination with a subsequent adjustment for operating environment factors, is appropriate because:

- it is informed by economic theory, engineering knowledge and industry expertise
- the inputs to the model reflect the key functions of service providers and the outputs reflect what is valued by customers
- the ex post operating environment factor adjustment involves a thorough assessment of potential differences between the service provider in question and the frontier service providers.

In contrast, the alternative model specifications presented by the service providers' consultants seem to have little regard for the ultimate purpose of the benchmarking exercise. This is to, as accurately as possible, determine the efficiency of opex by examining the relationship between inputs and outputs. The service providers' alternative models either:

- Include a variable to capture the cost of lines above 66 kV that picks up other effects and leads to efficiency gaps being understated [430]
- do not cover key functional outputs—CEPA, for example, presents a function with only one or two outputs, which is not adequate to accurately model service provider cost characteristics[431]

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[428] Economic Insights, 2015, p. 53.

[429] CCP, p. 51.

[430] Economic Insights (2015), pp. v-vi.

[431] Economic Insights (2015), pp. 51.

- inappropriately measure inputs, such as Synergies use of input variables other than opex and PEGR's levelisation of opex prices.[432]

Data

As explained above, the data we have used is robust because:

- we developed the Australian dataset in consultation with the service providers and then conducted extensive testing and validation to ensure the variables relevant to the benchmarking models were reliable and fit for purpose
- the international datasets we use to improve the precision of the Australian efficiency results:
  - are used for economic benchmarking purposes by the regulators in the respective jurisdictions (OEB and NZCC)
  - contain sufficiently comparable service provider information for the purpose of enhancing the precision of the modelling results
  - have been in place in the mid–1990s and have been used in economic benchmarking since the early 2000s.

Conversely, the service providers seek to:

- either rely only on the Australian data, which does not produce stable results due to the lack of cross-sectional variation or
- include US data in the sample, which Economic Insights has demonstrated is not fit for purpose.

Estimation methods

Our use of Economic Insights modelling is appropriate as Economic Insights has applied the best available model for estimating efficient opex. They have chosen appropriate estimation methods that produce robust and reliable results for benchmarking opex. Economic Insights' Cobb Douglas SFA model is statistically superior to other benchmarking methods because it can (among other things) estimate the efficient frontier. Further the Cobb Douglas SFA model has a random error term that separates the effect of data noises or random errors from inefficiency.[433] .

Economic Insights has also been able to corroborate the SFA model by producing consistent results using:

- other sophisticated econometric opex models using the same set of explanatory variables (Cobb Douglas LSE and translog LSE) that are more robust than the alternatives proposed by the service providers

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432 Economic Insights (2015), p. 51.

433 Econoimc Insights, 2014, p. 7.

- the opex MPFP model, which applies a different model specification and does not rely on international data.

In addition, the results of our partial performance indicators and detailed review are consistent with the economic benchmarking results.

On the other hand, the service providers and their consultants have presented alternative estimation methods that Economic Insights has demonstrated are not robust because of the assumptions that underlie the modelling or the limited data set used.

Modelling results

We highlight in our discussion on international data, the importance of understanding how and why Economic Insights has used international data. Economic Insights is not using the international data to compare the absolute levels of opex between Australian service providers and their overseas peers. Rather, the purpose is to improve the precision of parameter estimates to facilitate opex efficiency measurement across the Australian distributors only.[434]

Ultimately, this means it is possible to compare efficiency scores within each jurisdiction but not across jurisdictions. The service providers' consultants have misunderstood this distinction, so the following observations and criticisms are not valid or compatible with Economic Insights' modelling approach:[435]

- reference to an Ontario firm as being the ‘frontier' or 'best performing' firm’[436]
- comparisons of raw efficiency scores across countries[437]
- attempting to interpret country dummy variables as reflecting the extent to which an Australian service provider would need to have lower opex than a New Zealand or Ontario service providers to be ‘fully efficient’[438]
- the need for reporting or operating environment ‘standardisation’ across countries[439]
- the need to include additional country dummy variables to allow for differences in exogenous variable coefficients across countries.[440]

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[434] Economic Insights (2015), pp. 25-27 (section 3.2.1)

[435] Economic Insights (2015), pp. 25-27 (section 3.2.1)

[436] FE (2015a, p.12); Huegin (2015a, p.26)

[437] FE (2015a, p.17); Synergies (2015b, p.36)

[438] FE (2015a, p.16); Synergies (2015b, p.37)

[439] PEG (2015, p.53), Synergies (2015b, pp.33–34) and FE (2015a, p.x); CEPA, Benchmarking and setting efficiency targets for the Australian DNSPs, (ActewAGL), pp.16-18.

[440] FE (2015a, pp.24–25)

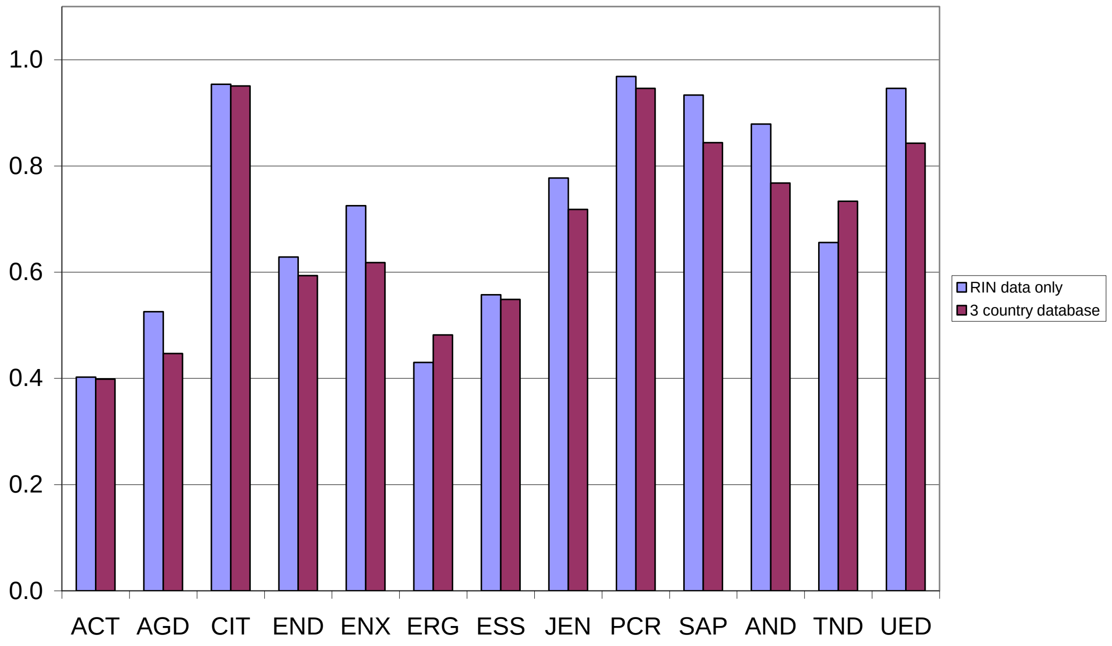
Further, Economic Insights also demonstrates that the Ontario or New Zealand data are not 'driving the results' of the Cobb Douglas SFA model as is submitted by a number of the service providers consultants.[441]

Economic Insights is also clear that it is difficult to produce stable and reliable results with the Australian data on its own:[442]

> [It] is important to recognise that the characteristics of the Australian RIN data make any econometric model estimated using only the RIN data insufficiently robust to support regulatory decisions.

However, we can demonstrate that the robust Australian efficiency results that utilise the international data are very similar to the efficiency results using the Australian data alone. Figure A.6 compares the two and proves that the international data is not driving the results of the model.

Figure A.6 Modelling results – all data and Australian only data



Source: Economic Insights, 2015

Different results to Ontario

A number of the consultants' reports submit that the efficiency results for the Ontario service providers differ markedly between those derived from (but not presented) in

441 Economic Insights, 2015, pp. 23-25.

442 PEG, 2015, pp. 65–66; Frontier Economics, (NSW/ACT), 2015, p.xi. CEPA, Benchmarking and Setting Efficiency Targets for the Australian DNSPs, (NSW DNSPs), 2015, pp.16–18. Huegin, Ergon 2015, pp.13,15.Economic Insights (2015), p. 21.

Economic Insights' 2014 report and those presented by PEG in 2013 and subsequently used by the Ontario Energy Board.[443]

Economic Insights notes that it is not surprising that the two sets of efficiency score rankings differ because Economic Insights' relate to *opex* efficiency while PEG's relate to *total* cost efficiency. The reason different efficiency measures were used in the two studies reflects the fundamentally different regulatory regimes – Australia uses building blocks regulation with its separate examinations of opex and capex whereas Ontario uses productivity–based regulation which focuses on total costs.[444]

Results from alternative modelling are not robust

Economic Insights has considered the alternative models presented by the service providers' consultants in detail and has serious flaws. These are as follows:[445]

1. The Australian data has inadequate variation to support robust model estimation where it is the only data source used and where tests for parameter differences across countries are made
2. Use of a 132kV line variable inadvertently picks up other effects and leads to efficiency gaps being understated
3. Latent heterogeneity models incorrectly allocate persistent inefficiency effects to operating environment differences
4. Inadequate observation numbers lead to some models misleadingly finding service providers to be 'efficient by default'
5. Some output and input specifications are inadequate and/or not relevant
6. Other overseas data sources unduly limit the range of variables and number of comparators that can be included

The issues identified with each of the service provider's consultant's models are set out in Table A.4.

Table A.4 Problems identified with service provider's consultant's models

Consultancy report reviewed	Data	Benchmarking method	Model specification	Main issues identified
CEPA (2015a) and CEPA	Australian only sample, 2006-2013, adjusted	pooled OLS[446] / random-effects GLS[447]	DV[448]: real opex Output: circuit length, customer	1 Use of Australian only data

[443] For example, Huegin (2015a,c) and FE (2015a)

[444] Economic Insights 2015, p. 45–46 (section 3.9).

[445] Economic Insights, 2015, p. 53.

[446] Ordinary least squares

[447] Generalised least squares

Consultancy report reviewed	Data	Benchmarking method	Model specification	Main issues identified
(2015b)	opex data	Cobb-Douglas / Translog function	density (length or km2) OEF: selective variables from: undergrounding, RAB additions, 132kV share of circuit, share of SWER Other: Year	2 Use of 132 kV variable 5 inadequate input/output specification Inappropriate adjustments to opex[449]
CEPA (2015a)	Full sample (Australia, NZ, Ontario) or jurisdiction-specific sample, 2006-2013	SFA Cobb-Douglas function	DV: real opex Output: customer number, circuit length, RMDemand OEF: undergrounding Other: Year	1 Use of Australian only data
FE (2015a)	Full sample, 2006-2013	True RE and True FE models[450] Cobb-Douglas function	DV: real opex Output: customer number, circuit length, RMDemand OEF: undergrounding Other: Year	3 Use of latent heterogeneity model
FE (2015a)	Full sample or jurisdiction-specific sample, 2006-2013	SFA Cobb-Douglas function	DV: real opex Output: customer number, circuit length, RMDemand OEF: undergrounding Other Year	1 Use of Australian only data
FE (2015a)	Australian only sample, 2013 only	DEA CRS and VRS[451]	Input: real opex Output: Energy delivered, RMDemand, customer number, before adding circuit length;	4 finding distributors efficient by default
FE (2015b)	Full sample, 2006-2013	SFA Cobb-Douglas	DV: real opex Output: customer number, circuit length, RMDemand OEF: undergrounding, squared term for customer density, share of circuit above 66kV, country dummies Other: Year	2 Use of 132 kV variable 5 inadequate input/output specification

448 Denotes dependent variable, this aligns with the input specification that we discuss above.
449 Economic Insights, 2015, p. 52.
450 True random effects and true fixed effects
451 Constant returns to scale and variable returns to scale

Consultancy report reviewed	Data	Benchmarking method	Model specification	Main issues identified
FE (2015b)	Australian only sample used for second stage regression, average of the period data	Second-stage OLS analysis	DV: raw efficiency scores from EI model and FE's modified model respectively OEF: selected variables, including share of circuit above 66kV, customer density (linear vs spatial), weather variables (e.g., wind gust speed, rainfall, temperature, humidity)	2 Use of 132 kV variable Single stage SFA is preferred, where appropriate.[452]
Huegin (2015a)	Full sample, 2006-2013	SFA Cobb-Douglas function	DV: real opex Output: customer number, circuit length, RMDemand Undergrounding or Year variable is modelled for explaining the efficiency term	5 inadequate input/output specification
Huegin (2015a)	Australian only sample, 2006-2013	Opex PFP	Seven alternative model specification previously considered by EI and AER	5 inadequate input/output specification
Huegin (2015b)	Full sample	latent class modelling	DV: real opex Output: customer number, circuit length OEF: undergrounding	3 Use of latent heterogeneity model
Huegin (2015b)	Australian only sample	K-means clustering	18 variables on four dimensions are used to group the 13 Australian distributors	3 Use of latent heterogeneity model
Huegin (2015c)	Full sample vs. Australian only sample vs. Large rural only sample	SFA	DV: opex Output: customer number, circuit length, RMDemand OEF: undergrounding	1 Use of Australian only data
McKell (2014)	Australian only sample	OLS	DV: Upkeep cost per customer IV: line length	1 Use of Australian only data 5 inadequate input/output specification
PEGR (2014)	Australian sample (2006-2013) vs. Australian and US sample	FGLS[453]	DV: real opex Output: customer number, distribution substation capacity, distribution structure kilometres –	2 Use of 132 kV variable 6 unduly limited specification due to

[452] Economic Insights, 2015, p. 37

[453] Feasible generalised least squares

Consultancy report reviewed	Data	Benchmarking method	Model specification	Main issues identified
	(unbalanced, with an addition of 170 observations for 15 US utilities 1995 to 2013)		Translog function OEF: overhead line percentage, 132kv or above network (kilometre), average rainfall, Victoria Bushfire Risk dummy, US firm dummy (relevant only to transnational data) Other: Year	data availability Stata coding error identified[454]
Synergies (2015b)	Australian and NZ sample	DEA	Output: customer number, peak demand, circuit length Input: operating costs, MVA of transformer capacity, user cost of capital associated with distribution lines	4 finding distributors efficient by default 5 inadequate input/output specification
Synergies (2015b)	Full sample or data from each jurisdiction, 2006–2013	SFA and LSE Cobb–Douglas function	DV: real opex Output: customer numbers, circuit length, RMDemand OEF: undergrounding Other: Year	1 Use of Australian only data

Source: CEPA (2015a), Benchmarking and Setting Efficiency Targets for the Australian distributors: An Expert Report for ActewAGL Distribution, 19 January.

CEPA (2015b), Ausgrid – Attachment 1.07 – David Newbery Expert Report, January.

Frontier Economics (2015a), Review of the AER's Econometric Benchmarking Models and Their Application in the Draft Determinations for Networks NSW: A Report prepared for Networks NSW, January.

Frontier Economics (2015b), Taking Account of Heterogeneity Between Networks When Conducting Economic Benchmarking Analysis: A Report prepared for Ergon Energy, February.

Huegin (2015a), Huegin's Response to Draft Determination on behalf of NNSW and ActewAGL, Technical Response to the Application of Benchmarking by the AER, 16 January.

Huegin (2015b), Heterogeneity in Electricity Distribution Networks: Testing for the Presence of Latent Classes, 12 February.

Huegin (2015c), Benchmarking Ergon Energy's Opeating Expenditure: A Study of the Relevance of the NSW Draft Decision Outcome on Ergon Energy's Benchmarking Results, 10 February.

McKell Institute (2014), Nothing to Gain, Plenty to Lose: Why the Government, Households and Businesses Could End Up Paying A High Price for Electricity Privatisation, December.

Pacific Economics Group Research (2014), Database for Distribution Network Services in the US and Australia, Final Report, 21 August.

Synergies Economic Consulting (2015), Concerns over the AER's Use of Benchmarking as It Might Apply in Its Forthcoming Draft Decision on Ergon, January.

[454] Economic Insights, 2015, p. 52.

Partial performance indicators

In this sub-section we reiterate why PPIs are an appropriate means of testing the benchmarking results. In doing so we respond to Essential Energy's submissions on our PPI analysis.

Our view in the draft decision was, and it remains our view in this final decision, that the PPI results complement the economic benchmarking results.[455]

In the draft decision, we compared the average performance the NSW service providers to their peers (and quantified the gap between Powercor—one of the economic benchmarking frontier performers) on two measures:[456]

- average annual user cost per customer for 2009–13 (Figure A.7)
- opex per customer for 2009–13 (Figure A.8).

These PPIs produced consistent results to the economic benchmarking, indicating that all three of the NSW distributors had higher costs than their peers. The gap in performance for Ausgrid and Essential Energy was more significant than for Endeavour Energy.

In its revised proposal, Essential Energy[457] submitted that 'per customer' PPI metrics are biased against rural service providers. Because of this, Essential Energy considers our PPIs illustrate the differences between the operating factors impacting each service provider rather than relative efficiency.[458] Essential Energy also submits that normalisation of PPIs by customer density can be misleading due to its view that opex at very low customer densities is highly sensitive.[459]

Per customer metrics

In our draft decision, we acknowledged that 'per customer' metrics will appear to disadvantage less dense (that is, rural) service providers because they have more assets per customer so they appear to have high higher costs than urban service providers. We also recognised that PPIs do not account for operating environment differences. As a result, we explained that we must bear these limitations of PPIs in mind when interpreting their results.[460]

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455 While an observation of high costs on a single PPI does not necessarily indicate inefficiency, similar results across a number of PPIs can be more reliable. In this respect, it is useful to compare PPI results with the economic benchmarking results.

456 AER, Draft Decision, Attachment 7, pp. 7-64 to 7-68.

457 Ausgrid and Endeavour Energy do not seem to have explicitly challenged our draft decision PPI results.

458 Essential revised proposal, pp. 201-202.

459 Essential Energy, Revised proposal attachment 7.4, pp. 13–16.

460 AER, Draft Decision, Attachment 7, pp. 7-64 to 7-68.

Indeed, we explained that Essential Energy's performance on the per customer PPIs was likely partly due to its size:[461]

> Because Essential Energy has a lower customer density than Powercor, in theory, Essential Energy should be at a cost disadvantage on this 'per customer' PPI. This is because it has more assets per customer and, therefore, more costs. The economic benchmarking results appear to support this notion because Essential Energy appears to perform worse in Figure A.7 relative to Powercor than it does on the economic benchmarking results in Figure A.6.

The reason we prefer 'per customer' metrics for PPIs is because this is consistent with the weight Economic Insights assigns to customer numbers in its output specification. Economic Insights assigns the highest weight to customer numbers because the correlation between customers and opex is stronger than that of other outputs. This view is accepted by other benchmarking experts such as PEG.

We also explained in the draft decision that, despite the inability of PPIs to account for operating environment differences, this could not wholly explain the gap in performance between Essential Energy and its peers, particularly Powercor. This is because the economic benchmarking models explicitly account for Essential Energy's customer density:[462]

> However, the economic benchmarking results nevertheless indicate that Essential Energy's costs are higher than Powercor's. The economic benchmarking techniques explicitly account for customer density. Therefore, differences in customer density can only account for part of the cost difference between Essential Energy and Powercor.

Therefore, we recognised the limitations of PPIs and acknowledged our metrics may partially distort Essential Energy's performance in an adverse way. We disagree that this approach is biased against rural service providers.

Further, as we explain above, EMCa has considered the impact of low customer density on opex performance and found it is feasible to compare sparse rural distributors' costs with other rural distributors' costs.[463]

Normalising by customer density

In our draft decision, we explained that we normalise PPIs by customer density because of the limitations of 'per customer' metrics that we mention above. Presenting metrics against customer density provides a visualisation of the service providers' relative densities and makes it easier to distinguish between urban providers, rural providers and those in between. This means that it is obvious which distributors are comparable and which are not so it is easier to make meaningful comparisons. Accordingly, we disagree with Essential Energy's view that this approach is misleading.

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461 AER, Draft Decision, Attachment 7, p. 7-66.

462 AER, Draft Decision, Attachment 7, p. 7-66.

463 EMCa, 2015, p, 1,

A.5 Category analysis and qualitative review

The aim of this section is to investigate the gap in performance that we identified in our economic benchmarking analysis between the NSW service providers and the frontier service providers. This is a two stage process where we first examine the NSW service providers' proposals and use category analysis to identify potential drivers of the gap in performance, and then conduct targeted detailed reviews based on our first stage findings. We have:

- examined the NSW service providers' explanations of opex drivers in their regulatory proposals and supporting material (stage 1)
- conducted category analysis benchmarking for major categories of opex (stage 1)
- engaged Deloitte Access Economics (Deloitte) to undertake an independent detailed review of the each of the NSW service providers' labour costs (stage 2)
- undertaken a detailed review of Essential Energy's vegetation management costs (stage 2).[464]

This analysis can corroborate our economic benchmarking analysis, which looks at the efficiency of opex overall. It can do so by identifying factors that are contributing to the NSW service providers' overall efficiency performance.

Importantly, the NER require us to form a view on total forecast opex.[465] In doing so, we are not required to assess individual projects or components of a forecast. It is, therefore, appropriate for us to rely on top down techniques such as economic benchmarking to assess whether a service provider's opex proposal reasonably reflects the opex criteria. However, while we could have relied solely on our economic benchmarking techniques to form a view about the efficiency of opex, we have supplemented that analysis with category analysis and detailed review. This is consistent with the Guideline, which explains that we will apply a number of different techniques to form a view about the efficiency of base opex.[466]

Category analysis and detailed review can assist in identifying whether base opex contains inefficiencies when they examine large portions of opex.

Therefore, we have used category analysis metrics to identify significant categories of expenditure that are high relative to other service providers. We have then investigated some of those categories of expenditure further with the aid of experts to form a view about whether those categories could be contributing to overall inefficiency. While we have not reviewed every category of expenditure, by reviewing labour costs (which

464 Our review of Essential Energy's vegetation management does not apply to Ausgrid or Endeavour Energy.

465 NER, cl. 6.5.6(c)

466 AER, Better regulation: Expenditure forecast assessment guideline for electricity distribution, November 2013, pp. 12–15.

comprise approximately 70 per cent of the NSW service providers' opex over the 2009–14 period[467]) we are examining a significant proportion of opex.

We are not using category analysis and detailed review to either examine all of opex or produce highly disaggregated findings. The NER do not require us to conduct and, indeed, the regulatory regime discourages us from conducting, a complete 'line by line' bottom up review of a service provider's operations. To this end, submissions that contend our category analysis metrics are flawed because they do not reconcile with the economic benchmark results misunderstand these techniques.[468] Category analysis and detailed review are not designed to reconcile with our overall benchmarks, they are designed to identify and explain the drivers of efficiency performance.

As set out in section A.2, in the context of information asymmetry between the regulator and the service provider, it is neither feasible nor desirable for the regulator to make findings at a granular level about the manner in which a service provider should operate. It is for the service provider's management to decide how best to operate its network with the opex that we determine reasonably reflects the opex criteria. We have primarily formed a view about efficiency drawing on the results of overall outcomes (economic benchmarking), which is corroborated by the detailed review.

A.5.1 Position

As part of our draft decision review of the NSW service providers' regulatory proposals, we found all three service providers stated in their proposals that they were facing stranded labour problems due to reductions in capex, resulting in a need to incur voluntary redundancy costs.[469] This suggested labour costs could be one of the drivers of the NSW service providers' benchmarking performance.

We also found that Essential Energy submitted a step down in vegetation management expenditure in the forecast period, this, and other evidence from its proposal, suggested vegetation management practices may also be a driver of Essential Energy's benchmarking performance. [470]

Further, when we compared components of the NSW service providers' opex to its peers using category analysis we found that they had 'very high' costs on labour and overheads metrics compared to most of their peers. We also found that Essential Energy had 'very high' costs on the vegetation management metrics, and that its total vegetation management expenditure had increased significantly over the 2009–13 period.

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[467] See, for example, NSW service provider responses to annual RINs for 2012-13.

[468] ActewAGL, Revised regulatory proposal: 2015–19 regulatory control period, January 2015, pp. 189.

[469] Ausgrid, Regulatory Proposal, p. 59; Essential, Regulatory Proposal, p. 78; Networks NSW, Submission on AER issues paper, pp. 12-16.

[470] Essential Energy, Regulatory Proposal, p. 73; Essential Energy, Regulatory proposal appendix item 6.2 – Vegetation management review findings, p. 13.

Accordingly, (and because these categories account for a significant proportion of the NSW service providers' opex) we engaged Deloitte to conduct an independent detailed review of each of the NSW service providers' labour practices. We also conducted a review of Essential Energy's vegetation management opex. Through the detailed reviews, we found significant issues in these categories of the NSW service providers' opex, which we considered was evidence of base year inefficiency, supporting our benchmarking results.

In their revised proposals, the NSW service providers disagreed with our draft decision findings, particularly those arising from detailed review. While we have carefully considered the NSW service providers' submissions, our final decision is:

- category analysis is an appropriate technique for diagnosing areas for further qualitative review; and
- our further qualitative reviews demonstrate that:
    - the NSW service providers' labour practices are likely key drivers of their benchmarking performance relative to their peers
    - Essential Energy's vegetation management opex is also likely a key driver of Essential Energy's benchmarking performance.

Category analysis

Our category analysis techniques indicate that the NSW service providers may be comparable to some of their peers for certain categories of opex but appear to have high or very high opex on others. In particular, they appear high on labour and overheads. We use category analysis metrics to assist in identifying the categories of opex to examine further in our detailed review.

Table A.5 shows the summary of the category analysis results.

Table A.5 Summary of category analysis metrics – NSW service providers' relative costs (average over 2008–09 to 2012–13)

	Ausgrid	Endeavour	Essential
Labour	Very High	High	Very High
Total overheads	Very High	High	Very High
Total corporate overheads	Comparable	Comparable	Very high
Total network overheads	Very High	High	Comparable
Maintenance	High	High	Comparable
Emergency response	High	High	High
Vegetation management	High	High	Very High

Source: AER analysis.

Note: In this final decision, we re-examined our summary of the category analysis metrics and consider that Endeavour Energy's network overhead should be interpreted as 'high,' rather than 'comparable'. We also consider that Essential Energy's corporate overhead should be interpreted as 'very high,' rather than 'high'.

We discuss category analysis in more detail in section A.5.3.

Detailed review of labour and workforce practices

The category analysis results and our findings from reviewing the NSW service providers' regulatory proposals suggest they have high labour costs. Deloitte's view is that for the majority of the 2009–14 period, the NSW service providers incurred labour costs that were higher than efficient levels.[471]

For the final decision, we engaged Deloitte to consider the material provided by the NSW service providers in response our draft decision, and consider whether the additional information and submissions affected their initial findings.

Deloitte maintain its view that the NSW service providers' high labour costs and workforce practices mean that their respective proposed opex base years were not efficient.[472] Deloitte found that:[473]

- the NSW service providers had high labour costs over the 2009–14 period due to having more employees than their peers, rather than high costs per employee

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471 Deloitte Access Economics, *NSW distribution network service providers labour analysis*, November 2014, p. iv.

472 Deloitte Access Economics, *NSW distribution network service providers labour analysis: addendum to 2014 report*, April 2015, pp. vii.

473 Deloitte Access Economics, *NSW distribution network service providers labour analysis: addendum to 2014 report*, April 2015, pp. ii–v.

- because the NSW service providers' employ a relatively higher proportion of their employees through enterprise bargaining agreements (EBAs), restrictive EBA clauses have a greater impact on their workforce flexibility
- the optimum level of outsourcing is likely to be higher than the level the NSW service providers outsourced at over the 2009–14 period.

Further, in response to submissions in its revised proposal about the adverse impact of the dispersed nature of its network on labour costs, Deloitte found that Essential Energy could potentially achieve significant cost savings by implementing a local service agent (LSA) model. Powercor achieved significant efficiencies from implementing an LSA model following privatisation.[474]

Deloitte also considered new evidence provided by the NSW service providers affirmed its 2014 findings that, although the NSW service providers have made significant efficiency gains, most of these take place after the 2012–13 base year.[475]

Detailed review of vegetation management

The category analysis results and our findings from reviewing Essential Energy's regulatory proposal suggest that it has high vegetation management costs. We considered that the Select Solutions report (and Essential Energy documentation discussing it), submitted by Essential Energy with its regulatory proposal, demonstrates there are inefficiencies in its vegetation management practices in the 2012–13 base year.[476] While Essential Energy may have since improved its practices, the evidence suggests it had not done so in 2012–13.

Therefore, we maintain our view that Essential Energy's vegetation management practices are likely to be a driver of its poor benchmarking performance.

A.5.2 Draft position

In our draft decision, we considered information in the NSW service providers' regulatory proposals and findings from category analysis metrics supported an examination of labour costs and of Essential Energy's vegetation management opex in further detail. Through our detailed review, we found significant issues in these categories of the NSW service providers' opex, which we considered was evidence of base year inefficiency, supporting our benchmarking results.

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474 Deloitte Access Economics, *NSW distribution network service providers labour analysis: addendum to 2014 report*, April 2015, pp. v-vi.

475 Deloitte Access Economics, *NSW distribution network service providers labour analysis: addendum to 2014 report*, April 2015, pp. vi-vii.

476 Select Solutions, *Review of Essential Energy Vegetation Management Strategy–Final Report*, 22 March 2013; Essential Energy, *Vegetation Management Strategy and Implementation Plan for Additional Expenditure – FY 2013 to 14*, February 2013.

We engaged Deloitte to conduct a targeted detailed review of the NSW service providers' labour and workforce practices. Deloitte found:

- evidence that the NSW service providers' expenditure and approaches to resourcing their capex programs were not consistent with that of a prudent or efficient service provider. In particular Deloitte stated that there is strong evidence to indicate:[477]
  - each service provider relied too heavily on hiring internal labour resources rather than using temporary external contractors to undertake their capex programs;
  - Ausgrid entered into a MOU which appears to have driven its costs up, or at a minimum entrenched them at a relatively high level;
  - all service providers' labour related capex was impacted by unionised workforces that were relatively inflexible, high cost and unproductive compared to their peers.
- evidence of inefficiency in each of the service providers' labour costs and practices. For much of the 2009–14 regulatory period it appears likely that the service providers' labour costs were heavily impacted by:[478]
  - a relatively inflexible workforce with limited ability to innovate or respond to changing circumstances;
  - labour costs entrenched in EBAs, which are well above peer costs;
  - in some cases, poor management of labour costs, for example in relation to overtime;
  - union opposition to management attempts to reduce costs and/or improve productivity.

Deloitte considered these factors were apparent to a different extent across all three service providers but, in general, it appears that Endeavour Energy commenced programs to improve its efficiency at an earlier stage than Ausgrid and Essential Energy.[479]

From our review of Essential Energy's vegetation management practices, we identified that it had engaged Select Solutions in December 2012 to review its vegetation management strategy.[480] Select Solutions' review found that Essential Energy must move to a "significantly more efficient" vegetation management model to reduce the

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477 Deloitte, *NSW Distribution Network Service Providers Labour Analysis*, November 2014, p. iii.

478 Deloitte, *NSW Distribution Network Service Providers Labour Analysis*, November 2014, p. iv.

479 Deloitte, *NSW Distribution Network Service Providers Labour Analysis*, November 2014, p. 64.

480 Essential Energy, *Vegetation Management Strategy and Implementation Plan for Additional Expenditure – FY 2013 to 14*, February 2013, pp. 10–11.

impact of its expenditure on customer prices.[481] Select Solutions found several causes of inefficiency, including:[482]

- attributing too much vegetation management effort to reactive spot clearing rather than proactive cyclic maintenance;
- primarily engaging contractors for cutting on a demonstrably less efficient hourly rate basis;
- less than optimal outsourcing.

While Essential Energy's proposal suggested it would implement Select Solutions' recommendations in the forecast period, this provided evidence that these inefficiencies existed in the base year. Therefore, we were satisfied that vegetation management practices contributed to Essential Energy's high opex in the 2012–13 base year.

A.5.3 Revised proposals and submissions

In this section, we summarise and respond to the issues the NSW service providers' raised in their revised regulatory proposals. For the reasons that follow, we remain of the view that labour is a driver of the NSW service providers' benchmarking performance. In the case of Essential Energy, we also remain of the view that its vegetation management practices are another driver of its benchmarking performance,

We first present our response to issues regarding the detailed retailed review, because Deloitte provide further evidence of inefficiencies in the NSW service providers' labour and workforce practices. We have not significantly changed our views in response to the NSW service providers' concerns with our evidence from their proposals and the category analysis metrics.

Detailed review of labour and workforce practices

Deloitte considered the NSW service providers' submissions and provided further analysis on the efficiency of the service providers' labour costs during the 2009–14 regulatory period. The NSW service providers' submissions have not caused Deloitte to change its findings on the number of employees, inefficient labour practices and the impact on base year efficiency.[483]

[481] Essential Energy, *Vegetation Management Strategy and Implementation Plan for Additional Expenditure – FY 2013 to 14*, February 2013, p. 13.

[482] Select Solutions, *Review of Essential Energy Vegetation Management Strategy–Final Report*, 22 March 2013.

[483] Deloitte Access Economics, *NSW distribution network service providers labour analysis - addendum to 2014 report*, April 2015, pp. ii–vii.

The NSW service providers submitted two joint consultants' reports (KL Gates and CEG) in response to our draft decision and Deloitte’s findings.[484] Endeavour Energy and Essential Energy also submitted their own labour analysis, and Ausgrid engaged Arup to review its historic workforce planning.[485]

In the addendum to their 2014 report, Deloitte:[486]

- clarified that over 2009–14 the NSW service providers had high labour costs, due to having more employees than their peers, rather than having high costs per employee. Deloitte presented further information on actual labour costs to support its view
- maintained the view that EBA clauses which constrain workforce flexibility and contribute to an increased number of employees
- maintained the view that outsourcing provides benefits by imposing competitive pressure on the internal workforce to improve productivity. Deloitte considers that gains through outsourcing realised by the Victorian service providers is one of the key reasons for the productivity gap between them and the NSW service providers
- found that that the NSW service providers have realised savings in labour costs through reducing the number of staff, and are forecasting further savings, but that most of the reductions take place after the base year, 2012–13
- undertook research into the Local Service Agent (LSA) model, and considers that with the LSA outsourcing model there is the possibility that Essential Energy could realise significant cost savings.

We outline the NSW service provider's submissions and Deloitte's response to the submissions below.

Evidence of high labour costs

The NSW service providers submitted that Deloitte failed to provide sufficient evidence of high labour costs.[487] Deloitte conducted further analysis of labour costs and confirmed that over 2009–14 the NSW service providers had high labour costs. However, this was due to them having more employees than their peers rather than higher costs per employee, which Figure A.7 demonstrates. Figure A.7 compares the

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[484] K&L Gates, *Networks NSW: Comparison and analysis of enterprise bargaining agreements for distribution networks*, January 2015; Competition Economists Group, *Labour unit cost – review of Deloitte report*, January 2015.

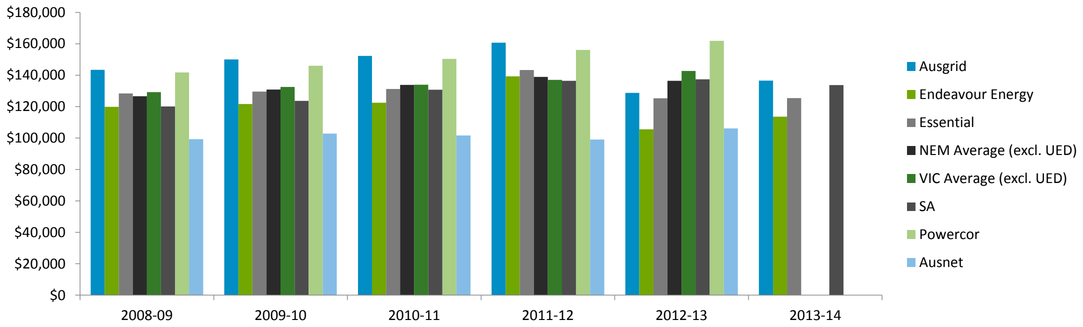
[485] Endeavour Energy, Revised regulatory proposal – Attachment 6.01: Response to AER's comments on inefficient labour practices, January 2015; Essential Energy, Revised regulatory proposal, attachment 7.5; ARUP, Ausgrid labour analysis report, January 2015.

[486] Deloitte Access Economics, *NSW distribution network service providers labour analysis - addendum to 2014 report*, April 2015, pp. ii–vii.

[487] Ausgrid, Revised regulatory proposal, January 2015, pp. 155–161; Endeavour Energy, Revised regulatory proposal, January 2015, pp. 183–186; Essential Energy, Revised regulatory proposal , January 2015, pp. 194–200.

NSW service providers' labour costs per ASL to similar NEM service providers and the averages of the Victorian and NEM service providers.[488]

Figure A.7 Labour cost per ASL, 2008-09 to 2013-14 (2013–14, $real)

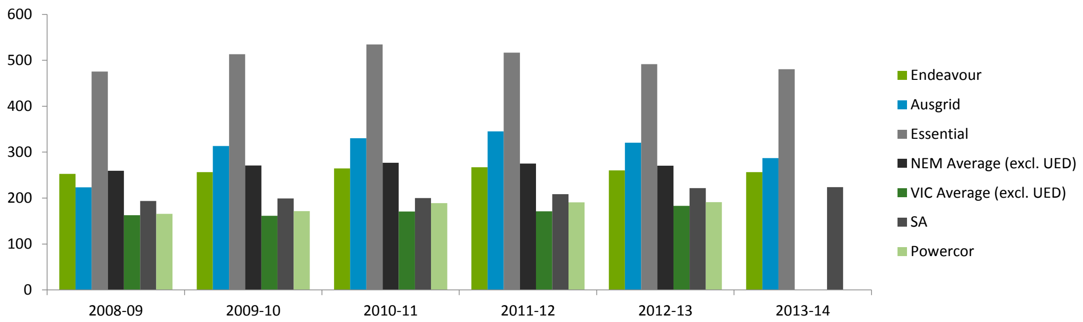


Source: Deloitte Access Economics, *NSW distribution network service providers labour analysis - addendum to 2014 report*, April 2015, p. 19; Category analysis RINs.

Note: This graph is in financial years, but the Victorian distributors report on the basis of calendar years. The Victorian distributors have not yet reported their 2014 data.

However, because the NSW service providers have more ASLs per customer than many of their peers, permanent staff levels are likely driving high labour costs, per Figure A.8.

Figure A.8 Average staffing levels per 100,000 customers, 2008-09 to 2013-14



Source: Deloitte Access Economics, *NSW distribution network service providers labour analysis - addendum to 2014 report*, April 2015, p. 22; Category analysis RINs.

Note: This graph is in financial years, but the Victorian distributors report on the basis of calendar years. The Victorian distributors have not yet reported their 2014 data.

Figure A.8 shows Average Staffing Levels (ASLs) per 100,000 customers. It shows that Ausgrid, Essential Energy and to a lesser extent Endeavour Energy have

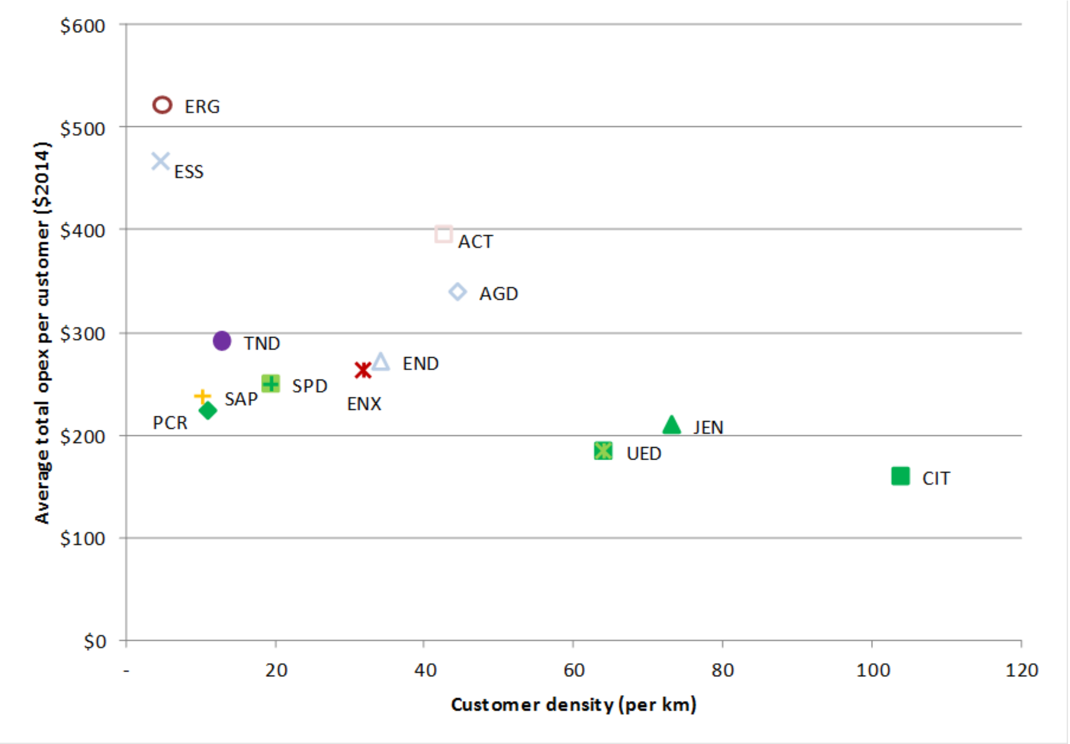
[488] The Victorian and NEM figures exclude United Energy because it outsourced the vast majority of all operational work over the period.

significantly more employees than the average of service providers in Victoria (excluding UED[489]), and SA Power Networks whom our economic benchmarking show to be more efficient.[490]

This metric will be influenced by the amount service providers outsource but we do not consider that accounting for all differences in outsourcing practices is required when comparing ASLs per customer. Lower ASLs per customer may indicate a greater degree of outsourcing, and vice versa. However, it is not possible to fully control for outsourcing given that service providers do not tend to contract for inputs (people). Rather, they contract to deliver a certain output.

Since labour forms a large proportion of opex (approximately 70 per cent, for the NSW service providers) opex per customer is indicative of labour costs per customer. Figure A.9 shows Ausgrid and Essential Energy have higher opex per customer than most of their peers and Endeavour Energy has higher costs than many of its peers.

Figure A.9 Average annual opex per customer for 2009–2013 against customer density ($2013-14)



Source: Economic benchmarking RIN responses.

489 The Victorian and NEM figures exclude United Energy because it outsourced the vast majority of all operational work over the period.

490 Rural service providers tend to perform unfavourably on this metric compared to their urban peers, because they must operate and maintain more assets per customer. This result is evident from the greater ASL per customer exhibited by Essential Energy relative to Ausgrid and Endeavour Energy. Considering this, we note that SA Power Networks is a predominantly rural service provider and outperforms the three NSW service providers.

Figure A.9 compares service providers with varying mixes of internal staff and outsourcing. It is apparent that the NSW service providers' high ASL is a driver of high opex and, therefore, high labour costs.

To this end, service providers who outsource will likely have done so because they expect to realise efficiencies. Indeed, as we discuss below, the service providers who perform better on labour cost per customer, ASL per customer and opex per customer have realised efficiency gains due to outsourcing. The NSW service providers, on the other hand, have not explored all opportunities to outsource.

If we compare the NSW service providers to Powercor, for example it is evident that the NSW service providers are employing higher proportions of internal labour. Powercor has higher labour costs per ASL but much lower ASLs per customer. This indicates that it is outsourcing low skilled work, but retaining high skilled workers in house. Powercor's low opex per customer in Figure A.9.

On the other hand, the NSW service providers have high labour costs per ASL and very high ASLs per customer. This indicates they are employing a large amount of internal staff at a high cost. Such an approach, is not necessarily inefficient, but appears to be contributing to their very high opex per customer (high in the case of Endeavour Energy) in Figure A.9 (and our economic benchmarking). As a result, the NSW service providers could potentially achieve efficiencies by outsourcing more.

Outsourcing will not necessarily be the lowest cost option in every circumstance. However, as we discuss below, Deloitte considers that the NSW service providers, due to restrictions on outsourcing in their EBA, face limitations on resourcing flexibility and cost. Deloitte considers the gains through outsourcing realised by the Victorian service providers is one of the key reasons for the productivity gap between them and the NSW service providers.[491]

Number of employees

In response to Deloitte's analysis of EBA provisions, the NSW service providers submitted comparisons of EBA conditions across Australian utilities.[492] They considered that their wages and employment conditions compare favourably against peers when all employment conditions are considered.[493]

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[491] Deloitte Access Economics, *NSW distribution network service providers labour analysis - addendum to 2014 report*, April 2015, p. 30.

[492] K&L Gates, *Networks NSW: Comparison and analysis of enterprise bargaining agreements for distribution networks*, January 2015; Competition Economists Group, *Labour unit cost – review of Deloitte report*, January 2015.

[493] Ausgrid, Revised regulatory proposal, January 2015, pp. 159–160; Essential Energy, Revised regulatory proposal , January 2015, pp. 197–200; Essential Energy, Revised regulatory proposal – Attachment 7.5: NSW DNSP labour analysis, January 2015, p. 38; Endeavour Energy, Revised regulatory proposal, January 2015, pp. 183–186; K&L Gates, Networks NSW: Comparison and analysis of enterprise bargaining agreements for distribution networks, January 2015, p. 13; Competition Economists Group, Labour unit cost – review of Deloitte report, January 2015, pp. 1–3;

Deloitte presented further analysis of the EBA clauses which constrain workforce flexibility and contribute to an increased number of employees. Deloitte found that the majority of service providers[494] cannot carry out forced redundancies as a result of provisions in their respective EBAs.[495] It considered that these provisions are an important impediment to any program of reductions in workforce size, outside of natural attrition.[496] However, Deloitte reiterates that the NSW service providers have a higher proportion of their workforces employed under EBAs than service providers in other states. This amplifies the inflexibilities in the NSW service providers' EBAs.[497]

Outsourcing during the 2009–14 regulatory period

The NSW service providers submitted that outsourcing is not appropriate in all circumstances, and note much of the Victorian service providers outsourced work is outsourced to related parties.[498]

Deloitte agreed with the NSW service providers' that outsourcing is not appropriate in all circumstances. However, it considered that the optimum level is likely to be higher than that of the NSW service providers over 2009–14 because the Victorian service providers outsource more of their opex and have attributed some of their efficiency gains to outsourcing.[499] Deloitte maintained its view that outsourcing also provides benefits by imposing competitive pressure on the internal workforce to improve productivity. Deloitte considered that gains through outsourcing realised by the Victorian service providers is one of the key reasons for the productivity gap between them and the NSW service providers.[500]

Deloitte also noted that, even after accounting for the Victorian service providers' outsourcing to related parties and assuming it is no more efficient than an internal workforce (which they disagree with), the Victorian service providers still outsource around 25 percent more opex than the NSW service providers.[501]

494 8 out of 12 distributors.

495 Deloitte Access Economics, *NSW distribution network service providers labour analysis - addendum to 2014 report*, April 2015, pp. 23–26.

496 Deloitte Access Economics, *NSW distribution network service providers labour analysis - addendum to 2014 report*, April 2015, p. 26.

497 Deloitte Access Economics, *NSW distribution network service providers labour analysis - addendum to 2014 report*, April 2015, p. 27.

498 Ausgrid, Revised regulatory proposal, January 2015, p. 160; Essential Energy, Revised regulatory proposal , January 2015, p. 199.

499 Deloitte Access Economics, *NSW distribution network service providers labour analysis - addendum to 2014 report*, April 2015, p. 30.

500 Deloitte Access Economics, *NSW distribution network service providers labour analysis - addendum to 2014 report*, April 2015, p. 30.

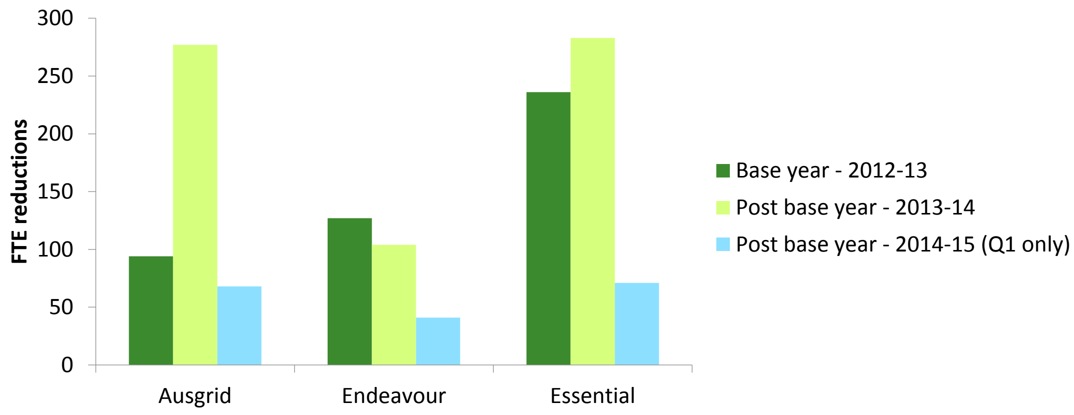
501 Deloitte Access Economics, *NSW distribution network service providers labour analysis - addendum to 2014 report*, April 2015, p. 29.

Efficiency programs and base year efficiency

The NSW service providers submitted that the AER and Deloitte did not take into account the information they provided to show that they have implemented significant efficiency programs in the 2009–14 regulatory period.[502]

Using the new information provided on efficiency programs conducted by Endeavour and Ausgrid, Deloitte undertook new analysis of the timing of reductions in FTEs. It found that the NSW service providers have managed to achieve significant reductions in labour costs through reducing the number of staff, and are forecasting further savings, but that most of the reductions take place after the base year, 2012–13 (see Figure A.10).[503]

Figure A.10 FTE reductions (non-TSA) in and after the base year



Source: Deloitte (2015); Ausgrid, Revised regulatory proposal, Attachment 6.04, 19 January 2015, pp. 5-6.

Note: FTE reductions relate to capex and opex.

Non-TSA FTEs are those not related to the sale of the distributors' retail businesses.

Regional depots and the Local Service Agent model

In its revised regulatory proposal, Essential's Energy submitted that the dispersed nature of its network constrains the open market from cost effectively proving alternative sources of labour and services in regional locations.[504]

In response, Deloitte undertook research into the LSA outsourcing model, and considered that by applying the LSA model there is the possibility that Essential Energy could realise significant cost savings.[505]

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[502] Essential Energy, Revised regulatory proposal , January 2015, pp. 195–196; Endeavour Energy, Revised regulatory proposal, January 2015, pp. 182–183.

[503] Deloitte Access Economics, *NSW distribution network service providers labour analysis - addendum to 2014 report*, April 2015, p. 46.

[504] Essential Energy, Revised regulatory proposal – Attachment 7.6: Productivity, January 2015, p. 3.

[505] Deloitte Access Economics, *NSW distribution network service providers labour analysis - addendum to 2014 report*, April 2015, pp. 37–43.

Deloitte found the LSA model had significantly increased the operational efficiency of Powercor’s regional network areas. These efficiency outcomes were associated with:[506]

- reductions in the absolute number of depots and sites;
- reductions in staff per depot, with more flexibility in rostering;
- cultural change, driven by the small business incentives to reduce costs. Once the LSA model was established, significant efficiencies were identified and achieved in a range of existing processes, driven by a more cost-conscious approach and the need to reduce overtime.

Deloitte considered that Essential Energy could realise similar benefits implementing a LSA model. Essential Energy was formed as an amalgamation of small council networks, similar to Powercor, and therefore the location of many of its sites and depots remains a function of historical arrangements.[507] We consider Essential Energy could realise these efficiencies in addition to those gains identified in the Networks NSW document entitled *Delivering efficiencies for our customers*.[508]

Detailed review of vegetation management

We maintain that our detailed review into Essential Energy's vegetation management expenditure provides evidence of the gap in performance in its base opex as observed in our economic benchmarking.

In particular, we consider the Select Solutions report (and Essential Energy documentation discussing it) submitted by Essential Energy with its regulatory proposal demonstrates there are inefficiencies in its vegetation management practices in the 2012–13 base year. While Essential may have since improved its practices, the evidence suggests it had not done so in 2012–13. Therefore, the costs in 2012–13 are overstated.

In its revised proposal, Essential Energy disagreed with the conclusions of our draft decision analysis of its vegetation management expenditure. Ausgrid and Endeavour Energy also commented that we have used the review of Essential Energy's vegetation management program to support our view that the other service providers are inefficient. We consider these issues separately.

Essential Energy's submission on the detailed review

Essential Energy submitted that if we had undertaken our task in a proper manner we would have been satisfied that the proposed vegetation management costs were the

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506 Deloitte Access Economics, *NSW distribution network service providers labour analysis - addendum to 2014 report*, April 2015, p. 40.

507 Deloitte Access Economics, *NSW distribution network service providers labour analysis - addendum to 2014 report*, April 2015, p. 41.

508 Essential Energy, *Regulatory Proposal: Attachment E.1*.

efficient and prudent level of expenditure to achieve its regulatory obligations. Essential Energy and Advisian (engaged by Networks NSW) have submitted material with Essential Energy's revised proposal in which they considered:[509]

- Essential Energy and Ergon Energy are only good comparators on customer density; and are not good comparators in relation to clearance requirements, bushfire risk and outage information;
- we were incorrect in our assessment of clearance requirements in NSW compared to other jurisdictions;
- we were incorrect in assessment of bushfire risk in NSW compared to other jurisdictions;
- it is inappropriate for us to rely on benchmark expenditure in a single year to forecast ongoing efficient costs;
- Powercor and SA Power Networks (who are service providers in the top quartile of our economic benchmarking results) have increased vegetation management opex at a greater rate over the period;
- the Select Solutions report is outdated and does not apply to Essential Energy's current practices;
- our view that vegetation management overhead is too high is incorrect, and is a consequence of Essential Energy's overhead allocation model; and
- Essential Energy's forecast costs were based on external delivery of vegetation management, which it considers, provides a level of satisfaction as to the efficiency of its costs.

We have had regard to the information submitted by Essential Energy and Advisian. However, we consider the following factors are important in drawing conclusions about vegetation management as a driver of costs and its impact on Essential Energy's revealed opex in 2012–13:

- Essential Energy proposed a negative step change to vegetation management based on a forecast reduction in expenditure. This was due to 'strategic reform initiatives'.[510]
- The strategic reform initiatives were based on analysis performed by Select Solutions. Select Solutions presented its findings in a report dated March 2013. Select Solutions' review found that Essential Energy must move to a "significantly more efficient" vegetation management model to reduce the impact of its

[509] Essential Energy, Revised regulatory proposal – Attachment 7.10: Response to AER decision on vegetation management expenditure, January 2015; Essential Energy, Revised regulatory proposal, January 2015, pp. 200–201; Advisian, Review of AER Benchmarking, January 2015, p. 72.

[510] Essential Energy, Regulatory proposal, May 2014, p. 73.

expenditure on customer prices.[511] Select Solutions identified sixteen recommendations to improve efficiency, 12 of which it considered were very high priority.[512] These include:

- introduce a more fit-for-purpose vegetation management system similar to systems used by some distributors in Victoria
- increase the proportion and frequency of proactive cyclic management
- demobilise existing corridor reclamation program
- implement better approaches to tree removal and trimming
- optimise aerial patrol use
- manage stakeholders better
- employ contractors on an agreed rate per fixed unit of work
- outsource additional scope and cut work.

Essential Energy noted that there are recommendations from the report in the process of being implemented. It follows that they could not have been implemented in the 2012–13 base year. This year is the relevant year for determining the appropriateness of Essential Energy's revealed costs as the starting point for determining an estimate of efficient and prudent total forecast opex.[513] That Essential Energy is now improving its practices simply confirms they were not efficient in 2012–13. We therefore consider the Select Solutions report is not outdated and is directly relevant to our analysis.

As a result, although Powercor's and SA Power Networks' vegetation management opex may have increased at a greater rate over the period this does not justify the increase in Essential Energy's opex. Further, as we explain in section A.6, there are other factors driving the increases in these service providers' vegetation management expenditure over the period.

We disagree with Essential Energy's submissions on clearance requirements and bushfire risk. However, differences in clearance requirements and bushfire risk are operating environment factors that are relevant in forming a view on the appropriate adjustment to base year opex. As a result, we consider these in section A.6 in the context of their impact on overall opex rather than vegetation management as a category.

Regarding Essential Energy's other concerns identified above, we did not place significant weight on this analysis in the draft decision detailed review. Comparisons to Ergon Energy, Powercor and SA Power Networks were observations about the level of

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[511] Essential Energy, *Vegetation Management Strategy and Implementation Plan for Additional Expenditure – FY 2013 to 14*, February 2013, p. 13.

[512] Select Solutions, *Review of Essential Energy Vegetation Management Strategy–Final Report*, 22 March 2013, pp. 15–16.

[513] Essential Energy, Revised regulatory proposal – Attachment 7.10: Response to AER decision on vegetation management expenditure, January 2015, pp. 5–6.

Essential Energy's expenditure compared to its peers, which provided context for the review. Similarly, observations about the level of overhead provided context. We placed most weight on the findings of the Select Solutions review, noting that Essential Energy had proposed a step down in its vegetation management opex in the forecast period (rather than in the base year).

Therefore, we maintain our draft decision view that Essential Energy's performance on our economic benchmarking techniques is likely to be partly driven by its vegetation management opex.

Application of this detailed review to Ausgrid and Endeavour Energy decisions

The NSW service providers submitted that we relied on an erroneous and inconsistent assessment of Essential Energy’s vegetation management expenditure to support our view that all the NSW service providers are inefficient.[514]

Our detailed review of vegetation management relates to Essential Energy only. We did not use the results of the review to support our view that all of the NSW service providers are have inefficient vegetation management practices. We stated that we decided to undertake a detailed review of Essential Energy's vegetation management because:[515]

- its expenditure increased significantly over the 2009 to 2013 period; and
- its own regulatory proposal identified inefficiencies in its vegetation management.

Although Endeavour Energy and Ausgrid appeared to have high costs compared to some service providers on average, their costs remained relatively stable over the 2009–13 period compared to Essential Energy. We therefore did not undertake a detailed review of vegetation management for these two service providers.

Category analysis

In our draft decision, the category analysis metrics suggested there may be inefficiencies in the NSW service providers' opex requiring further review. We decided to review those categories in further detail. Having considered the service providers' submissions, we maintain the view that category analysis is useful as a diagnostic tool.

Ausgrid and Essential Energy, in their revised proposals, considered that our category analysis metrics are biased and flawed. They submitted:[516]

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[514] Essential Energy, Revised regulatory proposal, January 2015, p. 189, Endeavour Energy, Revised regulatory proposal, January 2015, pp. 176–177; Ausgrid, Revised regulatory proposal, January 2015, p.149; Advisian, *Review of AER Benchmarking*, January 2015, p. 4.

[515] AER, Draft Decision NSW distribution network service providers, November 2014, section A.4.3.

[516] Ausgrid, Revised regulatory proposal, January 2015, pp.164–167 ; Essential Energy, Revised regulatory proposal, January 2015, pp. 201–203.

- the metrics illustrate the significant differences between the operating factors impacting each service provider rather than relative efficiency
- we did not consider the individual network and operating risks of each service provider or assess the underlying costs and cost drivers that support their opex proposals
- Essential Energy cannot be compared to AusNet/Powercor/SA Power Networks because it is so much larger than those service providers.
- While we acknowledge that category analysis inherently contains some of the limitations, as discussed above, we are not using category analysis in the manner the NSW service providers suggest. We consider that category analysis is suited to identifying areas for further review, not for determining opex forecasts. For this purpose, we do not require such precision in our metrics.

The techniques that we do place significant weight on in determining opex forecasts, such as economic benchmarking, detailed review and operating environment factor assessment, appropriately take into account the above considerations.

Further, in forming a view on the appropriate adjustment to base opex, we have taken into account the potential for residual data, modelling and other uncertainties.

We comment below on some specific category analysis issues raised by the NSW service providers.

Overheads

For the reasons set out below, we consider the overhead metrics presented in our draft decision are appropriate.

Essential Energy rejected our conclusion in the draft decision that its overheads are “very high," and considered that size, scale and geographic dispersion are drivers of overheads. Essential Energy considered that:[517]

- corporate overheads need to be adjusted downward because 26% of its corporate overhead is closely related to network overhead;
- its total overheads are comparable to other rural service providers on a per km basis (as we found its network overheads to be).

First we consider the need to adjust for a part of network overheads that is present in corporate overhead is unnecessary when we also examine total overheads.

Second, we chose to present total overheads per customer because total overheads are likely to vary with changes in the amount of work done on the network. We consider that customer numbers are a good proxy for this. We consider corporate

[517] Essential Energy, Revised regulatory proposal –Attachment 6.4 corporate overhead and divisional network overhead, January 2015, pp. 3–4;

overheads are primarily driven by customer numbers, but customer numbers also affect network overhead, therefore presenting total overhead per customer is appropriate.

We chose to normalise network overheads costs by circuit kilometre because asset volumes are the primary driver of network overhead costs alone, rather than customer numbers. We do however; consider that customer numbers can have an impact on network overhead. For example, an expansion of a network into a new area requires additional network assets, which need to be managed; however, network expansions occur to serve additional customers.

We also found that Essential Energy's labour costs per customer were very high. This finding supports the view that its total overhead costs are high, since labour costs are a large portion of total overheads. Because the NSW service providers performed poorly on labour (and implicitly, overheads) we engaged Deloitte to undertake a detailed review of these expenditures.

The detailed review found the NSW service providers' labour and workforce management expenditure was not efficient and prudent, which supports the results from the total overhead category analysis metric.

Maintenance

For the reasons set out below, we consider the maintenance metric presented in our draft decision is appropriate.

Ausgrid considered that customer density as a normaliser for the maintenance metric is flawed. Ausgrid submitted we have not adequately accounted for:[518]

- differences between urban and rural service providers and the extent density can differ across the network;
- differences in assets and its maintenance intensity.

We recognise that all service providers will have differences in assets and density, however we consider the differences in assets reflects to some extent the service providers' capital works program. The service provider has discretion over much of its capital works program, and may invest in more assets than an efficient and prudent service provider would require. These decisions will affect their maintenance costs. It does not, however, mean that service providers are not comparable on this metric. Nor do we agree that the frontier businesses are at a substantial natural advantage. We consider factors that may affect maintenance such as asset age and volumes in more detail in section A.6.9.

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[518] Ausgrid, Revised regulatory proposal, January 2015, p. 166.

Vegetation management

For the reasons set out below, we consider the vegetation management metrics presented in our draft decisions are appropriate. However, we do recognise issues with one of the metrics.

The NSW service providers considered there are a number of issues with our vegetation management category analysis assessment. In particular:[519]

- vegetation management does not take into account for factors such as vegetation type, tree density, rainfall, council and environment group pressures and differences in responsibility for veg management between jurisdictions;
- we have conceded inaccuracies in route line length and calculated our own route line length instead of using the route line length figures provided; and
- we use average data for 2009 to 2013 which includes a time when the Victorians were significantly underspending on veg management.

Ernst & Young, in a report provided with Ergon Energy's submission, also highlighted that the service providers have estimated route line length in alternative ways in the economic benchmarking RIN, which could call into question the comparability of the data. [520]

As we explain above category analysis is used to identify areas of concern for further review, not to prove inefficiency. We do not consider we need to account for all differences in the network environment (tree type, rainfall, terrain etc.) for vegetation management, because we are using category analysis as a diagnostic tool. However, we have further considered bushfire risk and differences in jurisdictional responsibilities as part of our assessment of operating environment factors (Section A.6).

We recognise there are issues with the measurement of line length in this metric, and we treat the results of that metric with caution. However, as we note above, we have used category analysis as a diagnostic tool to assist with identifying key areas for further review. While the vegetation management metric may not be perfect, we do not agree that it is so flawed it cannot be used for deciding whether to consider vegetation management expenditure and practices in further detail.

In addition, this metric was not the only tool we have used it identify areas of opex for further review. Our other vegetation management metric showed a significant increase in Essential Energy's total vegetation management expenditure over the 2008–09 to 2012–13 period. Combined with Essential Energy's regulatory proposal recognising inefficiencies existed in its vegetation management practices, we formed the view that detailed review was necessary.

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[519] Ausgrid, Revised regulatory proposal, January 2015, pp. 166–167; Endeavour Energy, Revised regulatory proposal, pp. 187–188; Endeavour Energy, Revised regulatory proposal: Attachment 6.04 Response to AER on vegetation management costs, January 2015, pp. 10–12.

[520] Ernst & Young, Briefing paper: RIN data review, February 2015, pp. 6–7.

We disagree that using an average expenditure over the 2009–13 is an issue in comparing vegetation management opex, because we do not consider the Victorian service providers significantly underspent on vegetation management prior to the Black Saturday bushfires. In our discussion of safety outcomes (Section A.6.6), we note that prior to the bushfires, Energy Safe Victoria found AusNet Services and Powercor to be "generally compliant" with their regulatory obligations.[521] We consider that the increase in the Victorian service providers' vegetation management opex is a consequence of complying with stricter requirements under the Victorian Electric Line Clearance obligations (see Section A.6.6).

Emergency response

Essential Energy considered that there were issues with our analysis of its emergency response opex. Essential Energy submitted that:[522]

- the duration of an interruption should not be disregarded because it is a good indication as to the effort required to access and rectify the outage; and
- we had incorrectly measured emergency response per customer interruption rather than supply interruption, and had included major event days.

Essential Energy then present a metric of expenditure per supply interruption, which indicates that they perform comparably to other rural service providers.[523]

We recognise there may be issues with this metric. However we consider that regardless of the emergency response metric shown, none of the NSW service providers performed significantly poorly on emergency response opex to warrant a detailed review of this expenditure category.

Findings from NSW service provider's regulatory proposals

In our draft decision, we found evidence from the NSW service providers' regulatory proposals and submissions that indicated their historical opex are inefficient. We have considered the submissions of the service providers in their revised proposals and maintain that the material sourced is evidence of a gap in performance to the frontier service providers, as indicated by our economic benchmarking.

The NSW service providers considered that we had misrepresented material from their regulatory proposals. The NSW service providers submitted:[524]

- recognising a need for a downward revision is not an admission that past expenditure is inefficient and their forecasts were prepared in light of changing circumstances

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[521] VBRC, vol 2, chapter 4, pp. 159–164.

[522] Essential Energy, Revised proposal attachment 7.4, pp. 49–50.

[523] Essential Energy, Revised proposal attachment 7.4, pp. 50–51.

[524] Ausgrid, Revised regulatory proposal, January 2015, pp. 153–155, 161; Endeavour Energy, Revised regulatory proposal, January 2015, p. 181; Essential Energy, Revised regulatory proposal, January 2015, pp. 193–194.

- stranded costs are not evidence of inefficiency and
- enterprise agreements with their employees are legal obligations that cannot be rescinded.

Downward revisions as admission of past inefficiency

Ausgrid disagreed with our view that there is evidence of inefficiency from its regulatory proposal and submissions. Specifically, we noted that the NSW service providers have stated they have stranded labour problems due to reductions in capex, which we considered was evidence of inefficiency in their historical opex.[525]

Ausgrid considered that our view was a misrepresentation of its regulatory proposal, because one cannot forecast required expenditure without considering the anticipated operating environment and changing circumstances.[526] Ausgrid submitted that for the 2009–14 period, the AER approved a significant capital investment program, and resources allocated to that program are no longer required.[527]

Ausgrid submitted:[528]

> Our regulatory proposal appropriately recognises a need to have a lower opex requirement for the forthcoming regulatory period reflective of the underlying drivers and circumstances of the forthcoming regulatory period. These drivers are the catalyst for the need to have a lower efficient cost base, as compared to the previous period, which is only appropriate. Recognition of a need to have a lower efficient opex is recognition of the changing circumstances, environment and drivers; not a recognition that the prior period expenditure is inefficient.

In addition, Ausgrid considered it demonstrated that base year opex is efficient having regard to the efficient opex forecast approved by us for the 2009–14 period; and having regard the incentive scheme to incentivise it to improve its efficiency.[529]

We disagree with this view. We do not assume that a service providers' revealed opex is efficient because it underspent its allowance. The NER provides the service providers with an incentive framework in addition to an opex forecast. The Efficiency Benefits Sharing Scheme (EBSS) allows service providers to retain some of the efficiency gains realised beyond the revealed costs from the previous regulatory period. Therefore, the regulatory regime encourages the service providers to continuously improve their efficiency.

We said in the Guideline that we would assess the efficiency of base year expenditures, to determine if it is appropriate for us to rely on a service provider's

525 AER, Draft Decision NSW distribution network service providers, November 2014, section A.4.1.
526 Ausgrid, Revised regulatory proposal, January 2015, p. 153.
527 Ausgrid, Revised regulatory proposal, January 2015, p. 154.
528 Ausgrid, Revised regulatory proposal, January 2015, p. 155.
529 Ausgrid, Revised regulatory proposal, January 2015, p. 155.

revealed costs for future forecasting.[530] All of the evidence we now have before us indicates that Ausgrid's actual expenditure in 2012–13 is not an appropriate starting point for forecasting total opex requirements over 2014–19.

As we explain in section 7.3, we consider the appropriateness of the service providers' revealed expenditure in the base year, to determine the starting point for an estimate of efficient and prudent opex in the forecast period. Our decision is dependent on the assessment tools we have at our disposal at the time of the decision and we take into account new information when new information becomes available. In 2009, on the basis of the evidence before us, and also having regard to the circumstances in which we made our decision, we determined what we considered to be an appropriate basis for forecasting total opex for the period 2009–14.

Since our 2009–14 decision, we are now able to benchmark the service providers' opex using various benchmark modelling techniques. We have also applied a range of other quantitative and qualitative techniques to test the validity and consistency of the results. All stakeholders should expect us to use new techniques and information when they become available.[531]

New information from these techniques suggests that Ausgrid's and Essential Energy's revealed expenditure in their proposed base years is not an appropriate basis for forecasting opex over the 2014–19 regulatory period.[532] This view is supported by submissions.[533] For example, our benchmarking results indicate that Ausgrid spends considerably more on a standardised basis than most other businesses in the NEM to provide services required to achieve the opex objectives in a comparable manner. In assessing future forecasts we need to have regard to this new information.

However, we have not moved away from revealed costs. Rather, we have used new techniques to ensure that we are better able to make a decision that reasonably reflects the opex criteria. Our approach represents a refinement of our longstanding approach to assessing opex.

[530] AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, p. 11.

[531] We have indicated in previous decisions and in defending those decisions our preference to use up to date information where possible. The Tribunal has endorsed this approach and indicated a similar preference: see for example Application by Ergon Energy Corporation Limited (Labour Cost Escalators) (No 3) [2010] ACompT 11 at [61] to [62].

[532] As discussed in Section A.7, we consider Endeavour Energy's revealed opex may be an appropriate basis for forecasting opex over the 2014–19 period.

[533] Consumer challenge panel, Submission to AER responding to NSW draft determination and revised proposals, February 2015, p. 55; AGL, Submission on NSW DNSPs draft decisions, February 2015, p. 2; Energy Markets Reform Forum, Submission to the AER draft decision and revised proposals from Ausgrid, Endeavour Energy and Essential Energy, February 2015, p. 54; Energy Retailers Association of Australia, Submission on NSW electricity distribution draft determinations 2014-2015 to 2018-19, February 2015, p.2; NSW Irrigators' Council, Submission - Draft decision - Essential Energy distribution determination (2015-16 to 2018-19), February 2015, p. 8; Origin, Submission to AER draft determination for NSW electricity distributors, February 2015, p. 6; Public Interest Advocacy Centre, Submission to the Australian Energy Regulator's draft determination for Ausgrid, Endeavour Energy and Essential Energy, February 2015, pp. 27–28.

Stranded costs as evidence of inefficiency

The NSW service providers disagreed with our view that stranded costs are clear evidence of inefficiencies.[534] Essential Energy considered that our statements were factual errors, relied on to conclude that its proposed operating expenditure contained material inefficiencies.[535] Ausgrid considered its 'stranded costs' reflect a change in the amount of fixed divisional and corporate overheads allocated to operating costs, as a necessary consequence of its reduced capex program. Ausgrid also noted that its transitional regulatory proposal and the initial proposal did not include expenditure on stranded unproductive labour. These submissions only included the costs of exiting excess resources.[536] Endeavour's revised proposal suggested that its stranded resources primarily arose from the Blended Delivery Model, which is increasing capex outsourcing,[537] and stated that it does not have any stranded labour.

As we note in Section A.5.2, Deloitte's view is that the service providers relied too much on hiring permanent staff for their large but temporary programs in the last regulatory period. It considered that Ausgrid's resourcing decisions were not efficient because the increase in its permanent workforce far outweighed the limited outsourcing it undertook.[538] Because of EBA restrictions, the service providers cannot remove excess staff, which means they are stranded.

We do not consider an objectively efficient and prudent service provider would be facing stranded labour in these circumstances because it would hire an appropriate mix of permanent and contractual staff, commensurate with its forecast work program and the relevant business risks.

Further, Deloitte observes that the NSW service providers' revised proposal views on stranded labour appear to contradict information provided during its 2014 review.[539]

Enterprise agreements are legal obligations but not regulatory obligations

The NSW service providers submitted that certified enterprise agreements are a regulatory obligation on all employers. They considered we cannot conclude that obligations imposed by labour regulations and certified enterprise agreements can be

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534 Ausgrid, Revised regulatory proposal, January 2015, p. 154; Essential Energy, Revised regulatory proposal, January 2015, p. 173.

535 Essential Energy, Revised regulatory proposal, January 2015, p. 173.

536 Ausgrid, Revised regulatory proposal, January 2015, p. 154

537 Endeavour Energy, Revised Regulatory Proposal Attachment 6.01, p. 16–17.

538 Deloitte has not has not changed its view from its 2014 report that Ausgrid 'arguably relied too heavily on internal labour resources', which is evidence their base year was not efficient. Deloitte Access Economics, *NSW distribution network service providers labour analysis - addendum to 2014 report*, April 2015, p. 34.

539 Deloitte Access Economics, NSW Distribution Network Service Providers Labour Analysis, November 2014, p. 31; Deloitte Access Economics, *NSW distribution network service providers labour analysis - addendum to 2014 report*, April 2015, p. vi.

unilaterally and retrospectively rescinded by economic regulation, nor does the NEL enable us to do so.[540] We disagree with this view.

As we discuss in section A.3, we agree that enterprise agreements place certain legal obligations on service providers, which they must comply with. However, our view is they do not fall within the definition of 'regulatory obligation or requirement' under the NEL.[541]

Further, the service providers' interpretation is contrary to the requirement in clause 6.5.6(a) for a proposal to include the *total* forecast opex for a regulatory period. It is important to note that when we determine total forecast opex, we set a total forecast within an overall framework that is incentive based. The assessment of the opex forecast must be seen in the context of the overall legislative framework established by the NER and NEL.

While contractual or other obligations which do not fall within the definition are not regulatory obligations or requirements so defined, a service provider can still direct the revenue it recovers from customers (or from other sources) to comply with those obligations. The costs of compliance with obligations that are not within the definition of 'regulatory obligation or requirement' are treated like the other costs a service provider incurs.

In this context, we take the view that the opex criteria should be understood as applying an objective test—albeit a test that applies to a particular network and must therefore incorporate certain individual circumstances of that network. The intention behind the regulatory scheme is to set an objectively determined forecast for the operating costs of the network that should be funded by consumers.[542] If a service provider can better this forecast in its actual spending it is rewarded with the cost savings. If it overspends the forecast it bears the costs.

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540 Ausgrid, Revised regulatory proposal, January 2015, p. 161; Endeavour Energy, Revised regulatory proposal, January 2015, p. 181; Essential Energy, Revised regulatory proposal, January 2015, pp. 193–194.

541 NEL, section 2D.

542 AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, p. 93.

A.6 The net impact of operating environment factor adjustments

When undertaking a benchmarking exercise, circumstances exogenous to a service provider should generally be taken into account. By taking into account exogenous circumstances, one can determine the extent to which cost differences are exogenous or due to inefficiency.[543] The purpose of our assessment of operating environment factors (OEFs) is to account for these exogenous circumstances.

In its Final Rule Determination on the Economic Regulation of Network Service Providers The AEMC stated:

> The final rule gives the AER discretion as to how and when it undertakes benchmarking in its decision-making. However, when undertaking a benchmarking exercise, circumstances exogenous to a NSP should generally be taken into account, and endogenous circumstances should generally not be considered. In respect of each NSP, the AER must exercise its judgement as to the circumstances which should or should not be included.[544]

The AEMC also noted that:

> The intention of a benchmarking assessment is not to normalise for every possible difference in networks. Rather, benchmarking provides a high level overview taking into account certain exogenous factors. It is then used as a comparative tool to inform assessments about the relative overall efficiency of proposed expenditure. [545]

In the course of the current ACT, NSW, Queensland and SA regulatory determinations, we have considered more than 60 OEFs that we, service providers and other stakeholders have referred to. We considered each factor using our three OEF criteria of exogeneity, materiality, and duplication. We do not provide an adjustment for non-exogenous or duplicative factors. For material, exogenous and non-duplicative factors, we make an adjustment to the level of that materiality. If such a factor is immaterial, we take a different approach that nonetheless recognises that such factors may have an impact on a service provider, albeit a small one.

In response to our draft decision, the NSW service providers submitted that we had not considered their circumstances.[546] [547] [548]ActewAGL submitted that our assessment of its OEFs was unsubstantiated.[549]

543 Oakley Greenwood, *Review of NSW DBs Regulatory Submissions*, 5 August 2014, p. 16.

544 AEMC, Rule Determination, National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, November 2012, p. 113.

545 AEMC, Rule Determination, National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, November 2012, pp 107-108.

546 Ausgrid, Revised Regulatory Proposal, 20 January 2015, p. 129.

547 Endeavour Energy, Revised Regulatory Proposal, 20 January 2015, p. .

548 Essential Energy, Revised Regulatory Proposal, 20 January 2015, p. 168.

We have considered the OEFs raised by the ACT and NSW service providers, other service providers and other stakeholders.

We also consider that our approach to OEFs appropriately allows service providers to recoup at least efficient costs. In addition to adjusting for the material OEFs identified, we have provided an adjustment for the collective effect of immaterial OEFs that are exogenous and not accounted for elsewhere. Service providers receive positive 0.5 per cent adjustments for OEFs identified as immaterial that may disadvantage them or where there the direction of the advantage is uncertain. In future reviews, as we collect more information on OEFs, we are likely to adopt a stricter approach to the consideration of OEFs.

A.6.1 Final position

We have provided an input margin of 11.7, 12.9, and 10.7 per cent to Ausgrid, Endeavour, and Essential, to account for differences in operating environment factors (OEFs), not accounted for in Economic Insights' SFA model.[550] We have come to this conclusion after assessing more than 60 different OEFs that we, service providers, and other stakeholders identified in the process of this review and in response to our benchmarking report.

We identified four OEFs that we consider require OEF adjustments. The first adjustment is to account for the effect of differences in subtransmission configurations on service providers' opex. The second accounts for differences in licence conditions across jurisdictions on opex. The third accounts for the impact of different occupational health and safety regulations on service providers' opex. The fourth relates to termite exposure.

During the course of our investigations we also identified additional OEFs that did not meet our OEF adjustment criteria because they would not individually create material differences in opex.

Although individually the effects of these OEFs on opex may not be material, their combined effect may be. To allow for the collective effect that these OEFs may have, we have provided an allowance of 4.7 per cent, 6.7 per cent, and 5.4 per cent to Ausgrid, Endeavour, and Essential respectively. The method we used is discussed further in our approach section.

The table below summarises the adjustments. Details on the calculation of each adjustment can be found below in the detailed discussions for each OEF.

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549 ActewAGL, Revised Regulatory Proposal, 20 January 2015, p. 159.

550 The comparison firms are all service providers that score equal to or above the benchmark comparison point on Economic Insights' Cobb Douglas SFA benchmarking model, which is our preferred economic benchmarking method.

Table A.6 Summary of final decision on OEF adjustments

Factor	Ausgrid	Endeavour	Essential	Reasons against OEF criteria[551]
Subtransmission	5.2%	4.9%	3.1%	• The boundary between distribution and transmission is not determined by service providers • Data from Ausgrid's regulatory accounts suggest that subtransmission assets are up to twice as costly to operate as distribution assets. • Economic Insights' SFA model does not include a variable that accounts for subtransmission assets.
Licence conditions	1.2%	0.7%	1.2%	• The network planning requirements in the NSW service providers licence conditions are not determined by service providers. • Category analysis and economic benchmarking RIN data suggest that the increased transformer capacity to meet the 2005 and 2007 change in licence conditions may lead to a material increase in maintenance expenditure. • Economic Insights' SFA model does not include a variable that accounts for changes in licence conditions.
OH&S regulations	0.5%	0.5%	0.5%	• OH&S regulations are not set by service providers. • Data from the ABS and a PwC report commissioned by the Victorian Government suggest that differences in OH&S regulations may materially affect service provider's opex. • Economic Insights' SFA model does not include a variable that accounts for differences in OH&S legislation.
Termite Exposure	0.0%	0.2%	0.6%	• The prevalence of termites in a geographic area is beyond service providers' control. • Data on Powercor's termite management costs and data from the CSIRO on the range of termites suggest that the Essential Energy may have a material cost disadvantage due to termite exposure. • Economic Insights' SFA model does not include a variable that accounts for differences in termite exposure.

551 Our OEF criteria, Exogeneity, materiality, and duplication, are explained in detail in our section on our approach to OEFs. Total do not sum due to rounding.

Factor	Ausgrid	Endeavour	Essential	Reasons against OEF criteria[551]
Immaterial factors	4.7%	6.7%	5.4%	There are various exogenous, individually immaterial factors not accounted for in Economic Insights' SFA model that may affect service providers' costs relative to the comparison firms. While individually these costs may not lead to material differences in opex, collectively they may.
Total	11.7%	12.9%	10.7%	

Source: AER analysis.

We have made several key changes since our draft decision. We have included material OEF adjustments for licence conditions and termite exposure, and removed the material OEF adjustment for bushfire risk. We have made these changes in response to points raised by the NSW service providers, and their consultants.

We have considered all of the submissions made to us on OEFs, but not all service providers have had the same opportunities to provide information on the OEFs that affect their costs yet. We have sought information on some of the OEFs raised by the ACT, NSW and Queensland service providers from the Victorian service providers, but our review has focused on the OEFs in the context of the current decisions. The Victorian service providers have not yet had the same opportunity to present us their cost disadvantages. In future reviews we expect that the Victorian service providers and other stakeholders will provide further information on the effect of OEFs. These submissions may reveal cost advantages that the NSW service providers have relative to the Victorian service providers. Cost advantages have the effect of decreasing the total adjustment made to a service provider's opex for OEFs. Therefore our current approach may favour the ACT, NSW, and Queensland service providers to the extent that not all of their cost advantages have been revealed.

In line with the AEMC,[552] we have separated the analysed factors into five groups which are considered separately below:

- Customer factors
- Endogenous factors
- Geographic factors
- Jurisdictional factors
- Network factors.

[552] AEMC, *Rule determination: National Electricity Amendment (Economic Regulation of Network Service Providers)*, November 2012, p. 113.

A.6.2 Draft position

In our draft decision we provided adjustments for OEFs. We identified three material OEFs that required OEF adjustments. The first adjustment was to account for the effect of differences in subtransmission configurations on service providers' opex. The second accounted for the impact of different occupational health and safety regulations on service providers' opex. The third accounted for differences in the cost of managing bushfire risk across jurisdictions on opex. We also took into account the collective impact of immaterial factors on opex.

The table below summarises our draft decision on OEF adjustments.

Table A.7 Summary of draft decision on OEF adjustments

Factor	Ausgrid	Endeavour	Essential
Subtransmission	5.5%	5.0%	2.5%
OH&S regulations	0.5%	0.5%	0.5%
Bushfire regulations	-2.4%	-2.4%	-2.4%
Individually immaterial factors	6.4%	6.9	7.5
Total	10%	10%	10%

Source: AER analysis.

A.6.3 Revised proposals and submissions

In response to our draft decision on operating environment factors (OEFs) we received submissions from ActewAGL, Ausgrid, Endeavour Energy, Ergon Energy, and Essential Energy. We also received submissions from their consultants and other stakeholders. We received submissions on the majority of the OEFs examined in our draft decision. Many of these submissions raised no new substantive issues. However, we did receive further substantive submissions on a number of the OEFs examined in the draft decision. We also received submissions on several new OEFs and on our approach to OEFs.

We received further submissions on:

- Asset Age
- Asset volumes
- Bushfire risk
- Capitalisation practices
- Customer density
- Environmental regulations
- Humidity and rainfall

- Licence conditions
- Line length
- Occupational Health and Safety regulations
- Proportion of wooden poles
- Subtransmission

New OEFs that were raised included:

- Activity scheduling
- Advanced Metering Infrastructure
- Communication networks
- Contaminated land management
- Critical National Infrastructure
- Cultural heritage obligations
- Demand management
- Division of vegetation management responsibility
- Environmental variability
- Line sag
- Network access
- Non recurrent costs
- Outsourcing
- Past ownership
- Reliability outcomes
- Rising lateral mains
- Safety outcomes
- Solar uptake
- SWER
- Termite exposure
- Transmission connection point charges
- Unregulated services

The following points on our approach were also raised:

- Non recurrent costs
- Treatment of endogenous factors
- Quantum of operating environment factors
- Quantum of the effect of material factors

- Quantum of the effect of immaterial factors

No substantive issues were raised on:

- Building regulations
- Capital Contributions
- Contestable services
- Corrosive environments
- Customer requirements
- Economies of scale
- Environmental regulations
- Extreme weather events
- Grounding conditions
- Topographical conditions
- Load growth
- Load factor
- Mix of demand to non-demand customers
- Planning regulations
- Population growth
- Proportion of 22kV and 11kV lines
- Ratio of underground to overhead lines
- Risk appetite
- Service classification
- Shape factors
- Skills required by service providers
- Temperature
- Topography
- Traffic management requirements
- Underground services
- Work and operating procedures
- Work conditions

We address all of the new evidence and further submissions presented to us in the relevant sections below. We have not repeated analysis for OEFs considered in the draft decision where no new substantive issues were raised.

Additionally, we have also considered OEFs raised by other service providers in their regulatory proposals and revised regulatory proposals. We have also considered submissions on those proposals where relevant. We have done this for consistency in our approach to OEFs and to capture the effect of relevant OEFs on the NSW service providers' opex.

A.6.4 Approach to operating environment factors

It is important to recognise that service providers do not operate under exactly the same operating environment factors (OEFs). OEFs may have a significant impact on measured efficiency through their impact on a service provider's opex. It is desirable to adjust for material OEF differences to ensure that when comparisons are made across service providers, we are comparing like with like to the greatest extent possible. By identifying the effect of OEFs on costs one can determine the extent to which cost differences are exogenous or due to inefficiency.[553]

Some key OEFs are directly accounted for in Economic Insights' SFA model. Where this has not been possible, we have considered the quantum of the impact of the OEF on the NSW service providers' opex relative to the comparison firms. We have then adjusted the SFA efficiency scores based on our findings on the effects of OEFs.

We have accounted for OEFs using a two step process. In the first step we have assessed whether an adjustment for an OEF would meet our OEF criteria: exogeneity, materiality, and duplication. In the second step, we assessed OEFs that met the exogeneity and duplication criteria to estimate the collective effect that they may have on service providers' opex. The purpose of the second step is to account for the effect of OEFs that do not meet the materiality criterion individually, but which do meet the criterion when considered collectively.

OEF assessment: Step one

Where an OEF meets all three of our OEF adjustment criteria we have provided an OEF adjustment. Our three OEF criteria are as follows:

1. **Exogeneity:** The first criterion is that an OEF should be outside the control of service providers' management. Where the effect of an OEF is within the control of service provider's management we would not generally provide an adjustment for the OEF.[554] Adjusting for that OEF may mask inefficient investment or expenditure.
2. **Materiality:** The second criterion is that an OEF should create material differences in service providers' opex. Where the effect of an OEF is not material, we would generally not provide an adjustment for the factor. We do note, however, that we have provided a collective adjustment for individually immaterial factors.[555] [556]

[553] Oakley Greenwood, *Review of NSW DBs Regulatory Submissions*, 5 August 2014, p. 16.

[554] AEMC, *Rule determination: National Electricity Amendment (Economic Regulation of Network Service Providers)*, November 2012, p. 113.

[555] We have treated any OEF that will increase a service provider's opex by 0.5 per cent or more, relative to other service providers, as material. We chose 0.5 per cent as the materiality threshold because this is the materiality threshold we used in the Economic Benchmarking RIN. The materiality threshold relates to differences between the previous cost allocation method (CAM) and the current CAM. If service providers' current CAMs lead to material differences in reported opex compared to their past CAM, they are required to backcast their costs using their current CAM. The comparable threshold for preparing financial statements, in AASB 1031: Materiality, is between 10 and 5 per cent.

3. **Duplication:** The third criterion is that the OEF should not have been accounted for elsewhere. Where the effect of an OEF is accounted for elsewhere, we have not provided an adjustment for that factor. To do so would be to double count the effect of the OEF.[557] [558]

Given the nature of OEFs, as circumstances that differ between service providers, we have had to rely on a wide array of different information sources. For each OEF we have considered the evidence before us in making our conclusions. In some cases this has meant calculating the effect of OEFs using different types of data or methods. The calculation of OEF's below explains how we have taken this into account.

OEF assessment: Step two

In the second stage of our OEF assessment we have considered if each individually immaterial OEF, that meets the exogeneity and duplication criteria, will provide a cost advantage or disadvantage to the relevant service provider.

Where an individually immaterial OEF is likely to provide a cost disadvantage we have provided a positive adjustment equal to our materiality threshold, 0.5 per cent, in our collective adjustment for immaterial factors. We have also done this where there is some doubt about if an individually immaterial OEF will provide a cost advantage or disadvantage. Alternatively, where an individually immaterial OEF is likely to provide a cost advantage we have provided an OEF adjustment of negative 0.5 per cent in our collective adjustment for individually immaterial OEFs.

There is one exception to this. Where we have been able to quantify the effect of a factor that is individually immaterial we have only adjusted for the amount quantified. We consider that this provides a transparent and reasonable approach to estimating the effect of factors that individually may not be material but collectively may be.

We consider that this is an appropriately conservative approach. We note that the AEMC has stated that the purpose of benchmarking is not to normalise for every possible difference between networks. However, after considering the impact of more than 60 proposed OEFs, in addition to adjusting for 4 material OEFs, we have provided an adjustment for the collective effect of 20 immaterial OEFs. We consider it is appropriate to take this additional step in our benchmarking analysis given this is the first time we have applied benchmarking and the information on OEFs available to us at this stage. We also note that we have provided positive adjustments where the

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[556] We also note that irrelevant OEFs will also be captured by the materiality criterion. Where an OEF is not relevant, for example it does not affect the comparison firms or the service provider being benchmarked, it will not lead to a difference in opex.

[557] For example, Economic Insights' SFA model captures the effect of line length on opex by using circuit length as an output variable. In this context, an operating environment adjustment for circuit length would double count the effect of route line length on opex. Another example is that we exclude metering services from our economic benchmarking data. In this case, an operating environment adjustment would remove the metering services from services providers' benchmarked opex twice.

[558] We also note that the SFA model uses dummy variables that account for all systematic differences in operating environments between the Australian and overseas service providers.

direction of advantage for immaterial factors is unclear. This is to allow service providers to recoup at least efficient costs incurred as a result of those immaterial OEFs, consistent with the revenue and pricing principles in the NEL. In future, as our information set improves we may reconsider our approach to immaterial OEFs.

The table below provides a summary of the quantification of the effect of immaterial factors.

Table A.8 Summary of individually immaterial OEF adjustments[559]

Factor	Ausgrid	Endeavour	Essential
Asset lives	0.5%	0.5%	-0.5%
Building regulations	0.5%	0.5%	0.5%
Bushfires	-0.5%	-0.5%	-0.5%
Capitalisation practices	-0.5%	0.5%	-0.5%
Corrosive environments	0.5%	0.5%	0.5%
Cultural heritage obligations	0.5%	0.5%	0.5%
Environmental Regulations	0.5%	0.5%	0.5%
Environmental variability	-0.5%	-0.5%	0.5%
Extreme weather events	0.5%	0.5%	0.5%
Grounding conditions	0.5%	0.5%	0.5%
Network access	-0.1%	0.5%	0.4%
Planning regulations	0.5%	0.5%	0.5%
Proportion of 11kV and 22kV lines	0.5%	0.5%	0.5%
Rainfall and humidity	0.5%	0.5%	0.5%
Specialised skills	0.5%	0.5%	0.5%
Solar uptake	-0.5%	-0.5%	-0.5%
Topography	0.5%	0.5%	0.5%
Traffic management	0.5%	0.5%	0.5%
Transformer capacity owned by customers	-0.2%	0.1%	0.0%
Division of vegetation management	0.5%	0.5%	0.5%

[559] Totals do not reconcile due to rounding.

Factor	Ausgrid	Endeavour	Essential
responsibility			
Total	4.7%	6.7%	5.4%

Source: AER analysis.

OEF assessment: comparison point

To determine if an OEF provides a cost advantage, or disadvantage, to a service provider we first determine who the service provider is being compared to. For the purpose of estimating the effect of OEFs, the comparison point is the customer weighted average of the service providers that score equal to or above the benchmark comparison point. This compares the service providers being benchmarked to all service providers at or above the benchmark point. This ensures that the operating circumstances of all the comparison firms are taken into account when assessing a service provider's base year opex. This allows a better estimate of service providers' underlying efficiency than a comparison to the service provider at the benchmark comparison point. Using the single firm at the benchmark comparison point could lead to OEF adjustments that unfairly advantage or disadvantage service providers.

For example, there may be a situation where there is an OEF that affects the service provider at the benchmark comparison point and other service providers above the benchmark comparison point differently. Providing an OEF based on a comparison to the service provider at the benchmark comparison point would lead to an OEF adjustment that would not reflect the broad variety of operating environments that the comparison firms operate in. This is because there are other service providers above the benchmark comparison point that may be advantaged or disadvantaged by the OEF under consideration. For this reason, as a comparison point for OEF assessment, we use the customer weighted average of all service providers that are at or above the benchmark comparison point.

OEF assessment: calculation of OEFs

We have had to estimate the impact of OEFs using different data sources. In some circumstances we have had access to the information required to estimate the incremental efficient cost of an OEF. In others we have only had the historical costs of the service provider being benchmarked to estimate the effect.

Where the efficient incremental costs can be estimated, the relevant OEF adjustment can be made in isolation. This is because the OEF adjustment is the percentage increase on the efficient costs estimated by the SFA model. An example of this is shown in Table A.9 below. The example shows how an adjustment would be calculated, using information on efficient costs, in the case that a service provider required a 50 per cent OEF adjustment.

Table A.9 Worked example of impact of an OEF where efficiency of costs has been demonstrated

Cost component		$m 2013
Firm's costs including exogenous factor	A	$150
Efficient costs estimated by SFA model	B	$100
Cost incurred for OEF	C	$50
OEF adjustment	D=(B+C)/B-1	50%
Forecast of efficient costs including OEF	E=B*(1+D)	$150

Source: AER analysis.

Where we only have information on the historical share of opex an OEF represents for the service provider being benchmarked,[560] the OEF adjustment must be calculated with reference to the impact of other OEF adjustments. This change is made to translate the impact of the OEF on the service provider's historical costs, to the OEF adjustment to the efficient base year costs forecast by the SFA model.

This is done for two reasons. Treating the historical cost as fully efficient runs the risk of overcompensating the service provider. This is because those costs may contain some inefficiency. Additionally, if the impact of OEFs on historical opex is not taken into account, the OEF may over or undercompensate the service provider; depending on the direction of the adjustment. This is because the starting point to estimate the percentage change in opex due to the OEF will be affected by OEFs.

The NSW service providers are affected by two OEFs where information on the efficient costs is not available: customer owned distribution capacity and licence conditions. The calculation of the adjustment to these factors can be found in the OEF summary spreadsheet attached to this decision.

In the following sections we consider the points raised by stakeholders in response to the OEF methodology used in our draft decision.

Treatment of endogenous circumstances

In response to our draft decision, ActewAGL submitted that controllable OEFs require OEF adjustments. ActewAGL submitted:

> "ActewAGL Distribution considers that to be robust and informative benchmarking should recognise and quantify the impact of […] controllable drivers of cost differences such as differences in accounting treatments and differences in work practices and operating techniques."[561]

[560] In the case that there is no evidence to suggest those costs are efficient.

[561] ActewAGL, Revised Proposal, 20 January 2015, pp. 157-158.

Differences in work practices and operating techniques are endogenous. The AEMC provides guidance on what it considers to be an endogenous factor that should not be taken into account when benchmarking. It stated:

> "Endogenous factors not to be taken into account may include:
>
> • the nature of ownership of the NSP;
>
> • quality of management; and
>
> • financial decisions."[562]

Differences in opex due to work practices and operating techniques are a direct outcome of management decisions. Therefore we do not provide an OEF adjustment for them. In general we consider that any OEFs that are a result of the quality of management do not meet the exogeneity OEF criterion.

We do note that differences in accounting practices may lead to differences in opex that are unrelated to quality of management. As a result we have taken into account the effect of capitalisation practices in our benchmarking.

Non-recurrent costs

In response to our draft decision, ActewAGL raised the issue of non-recurrent costs included in ActewAGL's base year. ActewAGL considers that an OEF adjustment should be made for one off costs included in its base year.[563]

We are not satisfied that an OEF adjustment should be made for non-recurrent costs. Providing an OEF for non-recurrent costs would treat those costs as if they were recurrent. Economic Insights' benchmarking results are used as the basis for our forecast of opex. If we adjust the benchmarking results with an OEF adjustment for non-recurrent costs, it has the effect of including those non-recurrent costs in our opex forecast.

Additionally, an OEF adjustment for a non-recurrent cost would not meet the duplication OEF criterion. Economic Insights' SFA model takes non-recurrent costs into account. The SFA efficiency scores are based on the average performance of service providers over the period. Therefore the effects of transitory increases or decreases in relative opex efficiency are reduced. Also SFA modelling accounts for transitory variations in data using a compound stochastic variance term. This statistical technique accounts for random shocks in opex.[564]

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562 AEMC, Rule Determination, National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, November 2012, page 113.

563 ActewAGL, Revised Proposal, 20 January 2015, pp. 160-161.

564 Aigner, D.J., C.A.K. Lovell and P. Schmidt, Formulation and estimation of stochastic frontier production function models, Journal of Econometrics 6, 21-37, 1977, p. 25.

Quantum of operating environment factors

In response to our draft decision, Huegin and Frontier Economics submitted that we have not taken into account all relevant OEFs. [565] [566] Frontier considers our examination of OEFs is incomplete because it does not cover all possible differences. Huegin considers that we have not provided detailed analysis or justification for deeming variables as insignificant, and that there is not adequate data available to conduct such tests. Huegin and Frontier also submitted that the AER's quantification of OEFs was arbitrary.[567] [568] However, Frontier and Huegin did not explain what elements of our OEF adjustment they considered arbitrary and as such it is difficult to respond to their criticisms.

We have examined more than 60 OEFs raised by service providers and other stakeholders, including those suggested by Huegin and Frontier.

We consider that we have accounted for all material differences. We have also accounted for some immaterial differences. We agree with Frontier that it is unlikely that we have covered all possible differences between the service providers, but this is not the purpose of our OEF adjustments. The AEMC has stated that the purpose of benchmarking is not to normalise for every possible difference in networks, but to provide a high level view of efficiency taking into account certain exogenous factors. [569] Given the number of factors examined, and the incentives for service providers to identify factors that materially increase their costs, we consider it is likely that we have considered all factors that will materially affect the NSW service providers' opex. Further, we have provided a quantification of immaterial factors which is at the upper bound of what we would expect to see on the basis of the information before us. Our benchmark comparison point also includes an appropriate margin for potential modelling, data, and other uncertainties.

Huegin did not provide any examples where we have not provided analysis or justification for deeming variables insignificant. Where quantitative data were available, we tested the materiality of the OEF using that data. Where qualitative information was provided we considered that; for example in our consideration of grounding conditions.

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565 Huegin, *Response to draft determination on behalf of NNSW and ActewAGL - Technical response to the application of benchmarking by the AER*, January 2015, pp. 51-52.

566 Frontier Economics, Review of AER's econometric models and their application in the draft determination for Networks NSW, January 2015, pp. xviii, 25-38, 91-95, and 98.

567 Huegin, *Response to draft determination on behalf of NNSW and ActewAGL - Technical response to the application of benchmarking by the AER*, January 2015, p. 52.

568 Frontier Economics, *Review of AER's econometric models and their application in the draft determination for Networks NSW*, January 2015, p. 98.

569 AEMC, Rule Determination, National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, November 2012, page 113.

Quantum of material operating environment factors

In response to our draft decision Huegin submitted that our quantification of OEF adjustments, identified as material, is inaccurate and will not adequately compensate service providers. It submitted that the total dollar value of opex that our OEF adjustments provide Ausgrid is not sufficient to cover the costs that they actually incur in operating its subtransmission network. [570]

The OEF adjustment that we calculated for Ausgrid's subtransmission assets is based on two things. It is based on the costs it incurs for its subtransmission assets, relative to the costs of its other assets, and the amount of subtransmission it has relative to other service providers. Over the period 2001 to 2013, per kilometre, Ausgrid spent up to 94 per cent more on maintaining subtransmission assets above 66kV than on its other assets. We therefore assumed that subtransmission assets are therefore twice as costly to operate as distribution voltage assets. Subtransmission assets account for 5.2 per cent more of Ausgrid's lines than the customer weighted average firms. Therefore if subtransmission lines are twice as costly to operate, then Ausgrid's opex should be 5.2 per cent higher due to the extra subtransmission lines it must operate.

Our OEF adjustments are intended to provide an allowance to service providers for the efficient costs of OEFs that impose a cost disadvantage on them relative to the comparison firms. Where material inefficiency exists it is likely that the actual opex a service provider incurs as a result of those OEFs will be greater than the opex that our adjustments provide. Ausgrid and Huegin have not provided evidence to suggest that Ausgrid's subtransmission opex is more efficient than its total opex.

Huegin also notes that we have made adjustments to the frontier target rather than the input opex.[571] We have done both depending on the information available to us. However, regardless of the method we have used, our OEF adjustments provide a sufficient amount for service providers to recover the efficient costs associated with their OEFs. This is explained in our calculation of OEFs section above.

ActewAGL submitted that our approach to OEF's is circular.[572] ActewAGL submitted:

> Constructing a substitute base year opex by applying an inefficiency factor to the OEF’s assumes before-hand that ActewAGL Distribution is inefficient. The AER’s approach is circular. The AER assumes (for the purposes of OEF adjustments) that ActewAGL Distribution is inefficient to construct a comparative benchmarked efficiency score, which is then deployed to conclude that ActewAGL Distribution is inefficient relative to other DNSPs.

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[570] Huegin, *Response to draft determination on behalf of NNSW and ActewAGL - Technical response to the application of benchmarking by the AER*, January 2015, pp. 51-52.

[571] Huegin, *Response to draft determination on behalf of NNSW and ActewAGL - Technical response to the application of benchmarking by the AER*, January 2015, pp. 51-52.

[572] ActewAGL, Response to information request AER065, 31 March 2015, p. 2.

This is not entirely correct. While a service provider's benchmark efficiency score may be lower than it would be if it were not affected by OEFs, it will be able to recoup all of its efficient costs under our approach. This is explained our calculation of OEFs section above.

ActewAGL also submitted that the AER cannot assume that any inefficiency found in a component of opex can be found in others.[573] Our approach to OEF adjustments does not assume inefficiency found in a part of ActewAGL's opex can be found in others. Our approach to OEF adjustments applies the estimated level of total opex efficiency to OEF adjustments where there is no evidence that expenditure associated with an OEF is more or less efficient than the service provider's total opex efficiency.

Quantum of immaterial operating environment factors

ActewAGL, and the consumer challenge panel, have submitted that they consider our quantification of the effect of immaterial factors is arbitrary.[574] [575]

In our draft decision, we exercised our regulatory judgement and provided the NSW service providers with an adjustment for OEFs that we had found to be immaterial. We did this because the precise quantum of the immaterial factors may not be possible to estimate accurately in all cases. We decided to take an appropriately conservative approach, and provided the NSW service providers an uplift on the quantum of the identified material factors to 10 per cent.

Having regard to the submissions made on this approach, and in the interest of regulatory consistency and transparency, we have decided to change our approach to quantifying the effect of immaterial OEFs. Our new approach to quantifying the combined impact of immaterial factors is explained in detail in the OEF approach section above.

A.6.5 Customer factors

Customer Density

We are not satisfied that an OEF adjustment for customer density would meet the duplication OEF adjustment criterion. The effect of customer density is captured by variables in Economic Insights' SFA model.

We adopted the same position in our draft decision.

In response to our draft decision we received several submissions from service providers and their consultants on customer density. CEPA, Huegin, and Advisian

[573] ActewAGL, Response to information request AER065, 31 March 2015, p. 2.

[574] ActewAGL, *Revised Proposal*, 20 January 2015 p. 161.

[575] Consumer Challenge Panel, Consumer Challenge Panel (CCP2 Panel) Submission on Energex and Ergon Energy Capex and Opex Proposals, 30 January 2015, p. 21-23.

submitted that linear density fails to adequately capture the cost disadvantage faced by rural networks.[576] [577] [578]

CEPA considered a spatial density variable should be used because it is generally significant in its models.

Huegin considered that linear density does not appropriately account for differences in customer density because it considers linear density does not account for:

- intra–network differences in density
- differences in meshed and radial designs and
- the increase in decentralised service functions required to service a larger area.

Advisian submitted that linear density will not account for differences in customer density because:

- spatial and linear density are not highly correlated
- more decentralised service functions are required to service a larger area and
- a study by London Economics and PowerNex found the effect of spatial density to be significant.

We are not satisfied that linear density is insufficient to capture the effects of customer density. This is because opex will be driven by the length of line that must be maintained rather than the area that the service provider nominally covers. Using a measure of spatial density may cover nominally servicing areas in which a service provider has no assets or customers. An example of this, provided by Economic Insights, is the Northern Territory distributor: Power and Water Corporation. [579] Nominally, Power and Water Corporation's service area is all of the Northern Territory.[580] In reality, Power and Water Corporations electricity distribution network covers Darwin and Katherine (with a transmission line between the two) on its main network with smaller networks around the Territory serviced mostly by isolated, diesel generator–based systems.[581] Therefore measuring customer density using Power and Water Corporations nominal service area would provide a misleading picture of the customer density of Power and Water Corporation's network.

This also applies to the consideration of Ergon Energy, Essential Energy, and SA Power Networks. Although Ergon Energy is nominally responsible for electricity

576 CEPA, Benchmarking and Setting Efficiency Targets for the Australian DNSPs, (ACT), 2015, p. 24.

577 Huegin, Huegin's response to draft determination on behalf of NNSW and ActewAGL, 16 January 2014, pp. 45-46.

578 Advisian, Opex Cost Drivers: ActewAGL Distribution Electricity (ACT), 16 January 2015, pp. 36-45.

579 Economic Insights, April 2015, pp. 14-15.

580 Power and Water Corporation, About Power and Water, available at: https://www.powerwater.com.au/about_power_and_water [last accessed 9 March 2015].

581 Power and Water Corporation, Electricity Map, available at: https://www.powerwater.com.au/community_and_education/student_resources/maps/electricity_map [last accessed 9 March 2015].

distribution across all of Queensland (except South East Queensland), there are large parts of western Queensland where it has no assets. Similarly, there are parts of western NSW and the great dividing ranges that are nominally part of Essential's service area, but to which Essential provides no services. There are also large parts of northern South Australia where SA Power Networks has no assets.

We are not satisfied that differences in intra-network density will materially affect Economic Insights' SFA benchmarking results. All service providers will have variations in density within their networks. To the extent that a network has a greater number of lines per customer than other services, this will be captured in customer density at the total level. Huegin has not provided sufficient evidence to demonstrate that intra-network variations will materially affect costs across service providers. Huegin's measure of population dispersion multiplies the number of dwellings in each location by the distance of that location from the state capital. This metric assumes it is necessary to supply each location directly from the state capital. However, each location is not supplied directly from the state capital. Therefore, Huegin's measure is likely to overstate the effect of population dispersion, particularly for larger states. This is because larger states will have more locations far from their state capital, regardless of their density.

We are not satisfied that the variables in Economic Insights benchmarking SFA model are insufficient to account for differences in costs between meshed and radial network designs. Lower density areas will tend to be serviced by radial hub and spoke networks. Higher density areas will tend to be serviced by meshed networks. As Economic Insights SFA model accounts for linear density we consider that it does account for differences in radial and mesh network designs.

We are also satisfied that Economic Insights' SFA model accounts for the decentralised costs associated with operating hub and spoke distribution networks. This is because a hub and spoke distribution network will have more circuit length per customer. Economic Insights' SFA model uses circuit length as an output variable. As the circuit length variable increases so does opex. The increase in the circuit length variable will therefore compensate service providers for the additional circuit length they must operate.

We also consider that the study by London Economics and PowerNex Associates does not provide evidence that linear density does not capture the effects of spatial density. The study finds that linear density and customer density can both be used to explain the relationship between cost and customer density. However, the study does not conclude that one measure is better than the other for measuring the relationship between cost and density. We also consider that the results from the London Economics and PowerNex Associates models are not appropriate for estimating the magnitude of the effect of customer density on costs. This is due to the model specifications used and their results. The models use one output, customer numbers, and two density measures (customer density and energy density), which we consider are insufficient to properly capture the output dimensions. Evidence for this is that some of the estimated coefficients have the opposite sign as would be expected (energy density) or implausible values (customer numbers).[582]

In response to CEPA's observation that it found spatial density to be a significant explanatory variable, we consider that one should not include variables solely on the basis they appear to have statistically significant explanatory power. Including a variable without a sound economic basis behind it has the opportunity to produce misleading results. We are not satisfied that there is a sound intuition behind including a variable for spatial density. As discussed above including a variable for spatial density has the potential to forecast an increase in opex for servicing areas where service providers have no assets.

Network length

We are not satisfied that an OEF adjustment to account for differences in network length would meet the duplication OEF adjustment criterion. To the extent that line length has an effect on costs, Economic Insights' SFA model accounts for that effect. Economic Insights' SFA model accounts for differences in line length as it includes circuit length as an output variable.

Network length is the length of a service provider's network. It can be measured using route line length or circuit line length. Route line length is distance between service providers' poles. Circuit line length is the length of lines in service, where a double circuit line counts as twice the length. All else equal, the longer a service providers' network length is the more costs they will incur.

Advisian considered that the results of Economic Insight's SFA model on line length are not intuitive. [583] The example that it gives is that all else being equal the Economic Insights SFA model assumes that Ausgrid requires 60 per cent of the opex per meter that CitiPower requires and Endeavour requires 44 per cent per meter.

Line length is not the only output produced in providing electricity distribution services. The intuition behind the model is that if line length increases without customer numbers and demand increasing, the amount that a service provider will need to spend per meter of line will decrease. This makes sense because the service provider will not have to provide extra transformer capacity or customer service for the additional line length. This demonstrates that one would not expect there to be a one to one relationship between line length and cost, all else being equal. If there were a one to one relationship between cost and line length, then electricity distribution with multiple outputs would exhibit decreasing returns to scale when considering all inputs.

582 London Economics International and PowerNex Associates, Customer Density and Distribution Service Costs, 11 November 2011, p. 12.

583 Advisian, Review of AER benchmarking: Networks NSW, 16 January 2015, pp. 41 -42.

Advisian also noted that the opex a service provider will incur per km of circuit will be affected by the number of poles it has.[584] [585] Advisian noted that urban comparison firms have fewer poles per customer than their NSW or ACT counterparts. It also noted that Essential has more poles per customer than the rural comparison firms.[586] This would be expected. Essential has more lines per customer than the rural comparison firms so it would typically also have more poles. Similarly, one would expect that ActewAGL, Ausgrid and Endeavour to have more poles per customer than the urban comparison firms because they have more lines per customer. We do note however, that United Energy has a similar number of poles per customer as Ausgrid and ActewAGL despite having higher customer density. This is likely due to the fact that it has a lower level of undergrounding.

Economic Insights' SFA model accounts for the number of poles per customer through customer density effects and the inclusion of a variable for undergrounding. We discuss the effects of customer density in detail in our customer circumstances section. Undergrounding was discussed in our draft decision.

A.6.6 Endogenous factors

Activity scheduling

We are not satisfied that an OEF adjustment for differences in activity scheduling would meet the exogeneity OEF adjustment criterion. How a service provider chooses to schedule its business processes is a management decision.

Activity scheduling is the scheduling of routine network inspection and maintenance activities.

Ergon Energy's consultant Huegin, submitted that activity scheduling will lead to cost differences across service providers.[587] Huegin stated that a high degree of maintenance costs for service providers are preventative activities such as inspections. The scheduling of inspections will determine the workload, and therefore costs of those preventative activities.

How frequently a service provider chooses to inspect its assets is a management decision. We note that some environmental conditions may lead to more frequent asset inspections or maintenance. We have considered these environmental conditions as they have been raised by stakeholders. Examples of these include asset age and humidity.

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584 Advisian, Review of AER benchmarking: Networks NSW, 16 January 2015, p. 43.

585 Advisian, Opex Cost Drivers: ActewAGL Distribution Electricity (ACT), 16 January 2015, p. 48.

586 The rural comparison firms are: Ausnet Services, Powercor, and SA Power Networks.

587 Huegin, Ergon Energy Expenditure Benchmarking, 17 October 2014, p. 14.

Capitalisation practices

We are not satisfied that an OEF adjustment for differences in capitalisation policy between the NSW service providers and the comparison firms would meet the materiality OEF criterion. Differences in capitalisation policy will not lead to material differences in total opex between the NSW service providers and the comparison firms.

For clarification, capitalisation practices include both service providers decision on the relative quantity of capital and operating costs and also the policies service providers use to classify costs as assets or expenses. Using different mixes of assets and expenses to provide will affect the operating expenditure a service provider incurs. Differences in the policies service providers use to classify costs as assets or expenses will affect the opex service providers record. Both of these have the potential to affect service providers' efficiency scores in Economic Insights SFA model. However, choices on capital inputs and accounting policies are management decisions so would not satisfy the exogeneity OEF criterion. Nonetheless, because these differences may lead to differences in costs unrelated to efficiency, we have treated this OEF as if it satisfies the exogeneity OEF criterion.

In our draft decision, we did not provide an OEF adjustment for capitalisation practices. We considered the effect of capitalisation practices on the service providers. With the exception of ActewAGL who appeared to be an outlier, we were satisfied no adjustment was necessary. This is because the NSW service providers' capex opex ratios were within a similar range of to the comparison firms' ratios. In coming to this conclusion we considered the effects that Australian accounting standards, utilisation of capital, the relative efficiency of service providers' capex and opex programs, and the position of service providers in their asset replacement cycles would have on capitalisation practices.[588]

Since our draft decision, ActewAGL,[589] Advisian,[590] CEPA,[591] the Consumer Challenge Panel,[592] Frontier,[593] SAPN,[594] and the NSW Service Providers[595] [596][597] have all raised the issue of the effect of capitalisation practices on benchmarking.

ActewAGL CEPA, and SA Power Networks specifically noted that differences in the allocation of overheads will affect Economic Insights' benchmarking results. Advisian

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588 AER, Draft Decision NSW distribution network service providers, November 2014 pp. 47-48 and 112-1131.

589 ActewAGL, *Revised Regulatory Proposal*, 20 January 2015, pp. 142-413.

590 Advisian, Opex Cost Drivers: ActewAGL Distribution Electricity (ACT), 16 January 2015, p. 76.

591 CEPA, Benchmarking and Setting Efficiency Targets for the Australian DNSPs, (ActewAGL), 2015, p. 11.

592 Consumer Challenge Panel, Submission to the AER: Responding to NSW draft determination and revised proposals, February 2015, p. 51.

593 Frontier Economics, Review of the AER's econometric models and their application in the draft determination for Networks NSW, January 2015, p. 91.

594 SA Power Networks, Response to information request SAPN 004, 19 December 2014, p. 13.

595 Ausgrid, Revised Proposal, 20 January 2015, p. 147.

596 Endeavour Energy, Revised Proposal, 20 January 2015, p. 174.

597 Essential Energy, Revised Proposal, 20 January, p. 187.

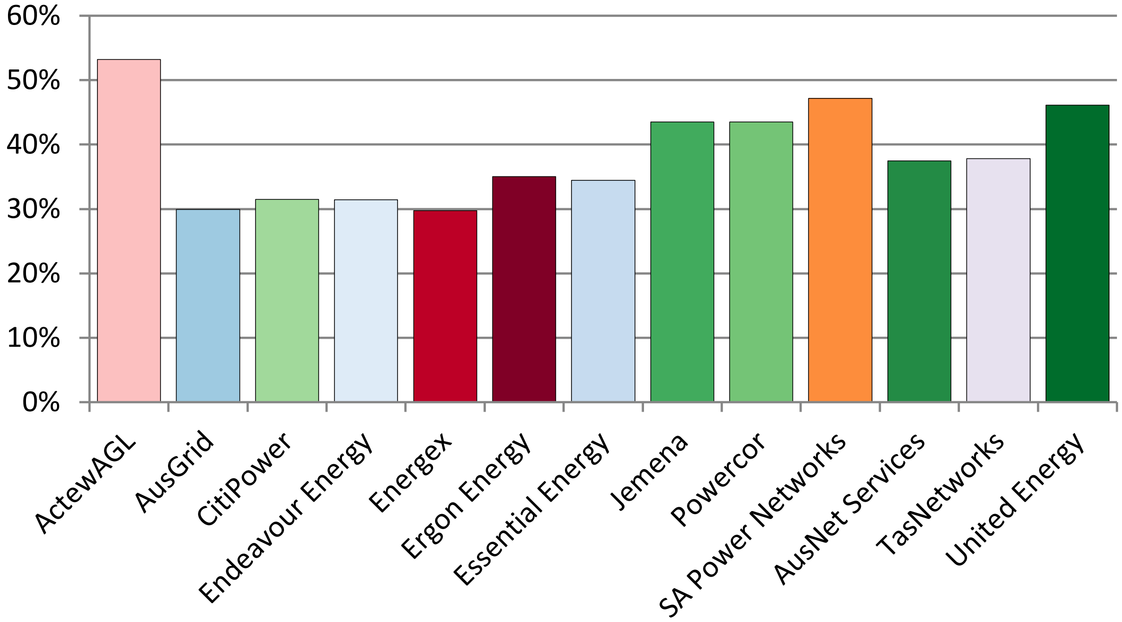
considered that the AER should adjust the comparison firms for their capitalisation practices. The Consumer Challenge Panel considers that NSW and Queensland service providers' access to low cost debt funding would make the AER's approach to capitalisation overly generous. Frontier noted that differences in accounting approaches and capital utilisation would affect Economic Insights' benchmarking results. The NSW and service providers stated that the AER had not analysed the effects of capitalisation policies.

After considering all of these submissions, we are satisfied that our initial position remains the best approach. We agree with Frontier Economics that differences in accounting practices and capital utilisation will affect service providers' capitalisation rates. We also consider that the relative efficiency of service providers' opex and capex programs and their position in their asset replacement cycle will affect service providers' capitalisation rates. Some of these factors are related to service providers' efficiency and some are the result of other things, such as accounting decisions. As a result we will only provide a material OEF adjustment to service provider's benchmarking results where their opex as a percentage of total capital and operating expenditure (totex) is not broadly consistent with its peers'. We also note that the results of Economic Insights MTFP benchmarking are broadly consistent with the results of its parametric benchmarking. MTFP estimates productivity across both capex and opex. Similar results on opex benchmarking and MTFP indicate the opex benchmarking results are not heavily influenced by capitalisation practices.

We are not satisfied that it is necessary to make adjustments to all of the service providers in the sample to adjust for differences in the reported allocation of overheads to opex and capex. The method in which service providers allocate direct costs between capex is also likely to affect capitalisation rates. As a result rather than focusing on indirect costs it is better to compare the ratio of total opex to total capex. This measure will take into account the allocation of overheads between opex and capex, but also other factors such as opex capex trade-offs.

Figure A.11 below shows that opex made up between 30 to 45 per cent of totex for most NEM service providers in the benchmarking period, with the NSW service providers expensing less of their costs than the comparison firms.

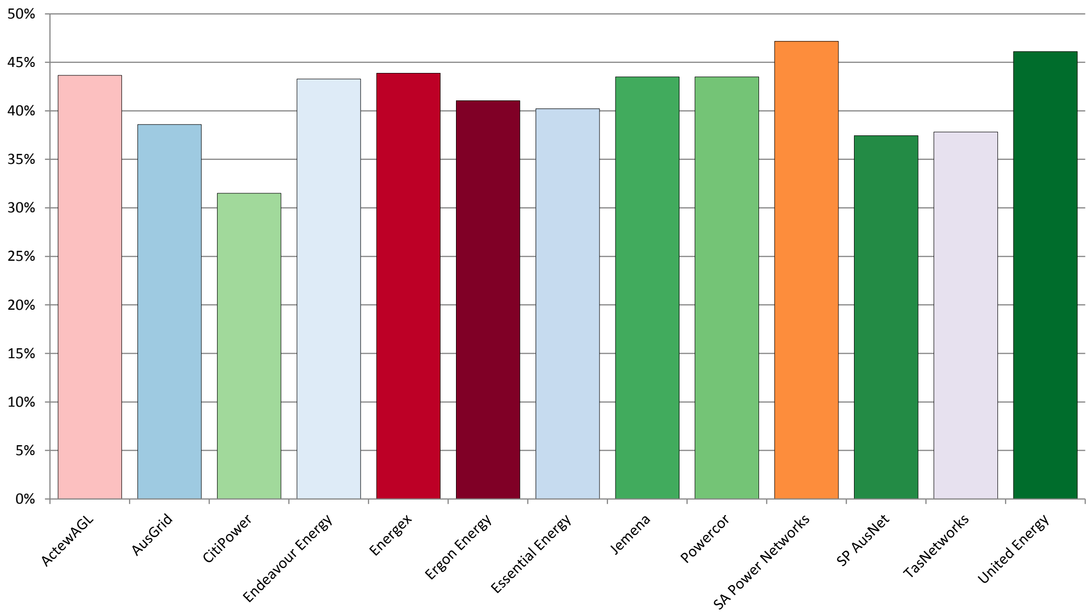
Figure A.11 Average opex as a percentage of totex, 2006 to 2013



Source: Economic benchmarking RIN

Figure A.12 below shows opex as a percentage of totex in the forecast period for the ACT, NSW, and Queensland service providers. Figure A.12 also shows opex as a percentage of totex for all other service providers during the benchmarking period. We note that the forecast of Endeavour's opex as a percentage of totex (43.3 per cent) is similar to the customer weighted average for the comparison firms (42.5 per cent). Opex as a percentage of totex for Ausgrid (38.6 per cent) and Essential (40.2 per cent) is slightly lower than the customer weighted average for the comparison firms.

Figure A.12 Forecast opex as a percentage of totex for ACT, NSW and Queensland service providers (2014-19 and 2015-20), and average actual opex as a percentage of totex for other service providers (2006 to 2013).



Source: Economic Benchmarking RIN responses 2006 to 2013; AER Analysis

Note: Opex as a percentage of totex is based on standard control services costs for the forecast expenditures. It is based on network services for the historical expenditures. This is because we do not forecasts capex for network services. We forecast capex for standard control services only.

Figure A.11 and Figure A.12 show that in the benchmarking period and the forecast period the NSW service providers have similar opex to capex ratios as the customer weighted average of the comparison firms. As a result we consider that differences in capitalisation practices are not likely to lead to material differences in opex between the NSW service providers and the comparison firms.

Although we consider that differences in capitalisation practices will not to lead to material differences in opex between the NSW service providers and the comparison firms, we have included it in our adjustment for immaterial factors. Economic Insights' SFA model does not include a variable that directly accounts for differences capitalisation practices. Also as discussed above, differences in capitalisation practices may lead to differences in opex that are not related to efficiency and are not accounted for in Economic Insights' SFA model.

Ausgrid and Essential are likely to have a cost advantage as they tend to expense fewer costs than the comparison firms Figure A.11 and Figure A.12 above show classify less of their costs as opex than the comparison firms. As a result, capitalisation practices contribute negative 0.5 per cent to the adjustment for immaterial OEFs for Ausgrid and Essential. Conversely, we have provided a positive 0.5 per cent adjustment for Endeavour. This is because although Figure A.11 shows that in the past it expensed less of its costs than the comparison firms, Figure A.12 shows that in the future it will expense more of its costs. As a result we consider that Endeavour's capitalisation practices may provide it a slight cost disadvantage on opex benchmarking.

Communication networks

We are not satisfied that an OEF for the availability of commercially available communication networks would meet our materiality or duplication OEF adjustment criteria. To the extent that service providers in low customer density areas may have to use alternative solutions where there is no mobile telephone coverage, this will be correlated with customer density. Also, three of the five comparison firms also face similar challenges in providing network services.

In support of Essential Energy's revised proposal, Essential Energy's COO, Mr. Humphreys, submitted that Essential Energy is unique in terms of the need to provide a two way radio network across 95 per cent of NSW.[598] Mr Humphreys also submitted that there is no commercial service available that provides state wide coverage with required reliability at an economic cost.

The need for two way communication in areas where there are limited commercial alternatives will be correlated with customer density. This is because the fewer customers there are in a service area, the less likely it is to be covered by a commercial communications network. As Economic Insights' SFA model accounts for customer density, as discussed above, we are not satisfied that it does not appropriately account for the availability of commercial communications networks.

Also an adjustment for differences in communication networks is not likely to meet the materiality OEF adjustment criterion. The necessity to provide an extensive two way communication system between control room and field staff, where there are limited commercial options, is not unique to Essential Energy. Other rural service providers, including the comparison firms AusNet Services, Powercor, and SA Power Networks face similar challenges providing a reliable communication system. There are areas in all three of those service providers' network areas that do not have mobile telephone coverage.[599]

Contaminated land management

We are not satisfied that an OEF adjustment for contaminated land management would meet the exogeneity or materiality OEF criteria. To the extent that electricity distribution assets have the potential to contaminate land, all service providers must manage this risk. The cost consequences of not managing this risk prudently in the past should not be visited on consumers.

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598 Gary Humphreys, Statement of Gary Humphries Chief Operating Officer Essential Energy, 19 January 2015, pp. 12 to 13.

599 Telstra, Our Coverage, available at: https://www.telstra.com.au/mobile-phones/coverage-networks/our-coverage [last accessed: 10 April 2015].

We are not satisfied that an OEF adjustment for contaminated land management would meet the materiality OEF adjustment criterion. All NEM service providers have obligations to prevent land contamination due to the operations of their networks. Where environmental regulations were not as stringent in the past due to a lack of knowledge industry wide, this is a problem that would have affected all service providers. Therefore if this were the case, all service providers would face similar problems with contaminated land.

We consider that an OEF adjustment for contaminated land management would not satisfy the exogeneity OEF criterion. A prudent service provider would take appropriate action to minimise the risk of land contamination associated with its activities.

There may be some circumstances in which environmental regulations are different across jurisdictions. In this case a prudent service provider operating under the less stringent regulations would take action to appropriately manage its environmental risk being mindful of obligations in other jurisdictions. If a service provider did not undertake sufficient risk mitigation, where best industry practice is to manage that risk, that is a reflection of the quality of that service provider's management. The costs of such mismanagement should not be visited on consumers.

In the case that a service provider acquired assets with land contamination from another service provider, in a competitive market, the cost of that remediation will be factored into the price of the acquisition. That is the firm responsible for the contamination will have paid for the future remediation costs by receiving a lower payment for the contaminated assets. As a result end users would not need to pay for contaminated land remediation.

Outsourcing

We are not satisfied that an OEF adjustment for differences outsourcing practices between the NSW service providers and the comparison firms would meet the exogeneity OEF adjustment criterion. Service providers choose to what extent they outsource.

In response to our 2014 draft decision for ActewAGL, Advisian raised opportunities for outsourcing as an OEF that might lead to material differences in opex.[600] Advisian noted that the small size of the ACT and the small number of network service providers in its area prevents ActewAGL from utilising contractors in a similar manner to the comparison firms. Advisian considered that the smaller amount of available work prevents contractors from achieving efficiencies that are available in denser areas serviced by a greater number of service providers.

We consider that the scale of the NSW service providers would allow them to support a mature and efficient contracting market. All of the NSW service providers have more customers than any of the comparison firms. As a result we consider that the NSW

600 Advisian, Opex Cost Drivers: ActewAGL Distribution Electricity (ACT), 16 January 2015, pp. 95-98.

service providers have the opportunity to outsource. The extent to which they do or do not is a management decision. We discuss outsourcing in more detail in our detailed review of the NSW service providers' labour practices.

Advisian also notes that service providers must retain sufficient in house capacity to act as an informed purchaser when interacting with contractors.[601] We do not consider that this would limit the NSW service providers' ability to assess contractors' bids. The amount of expertise that would need to be maintained is minimal in terms of overall employees. It would be sufficient to maintain one or two experienced staff to assess tenders.

Reliability outcomes

We are satisfied that an OEF adjustment for reliability outcomes is not necessary. It raises the first and third operating environment criterion. We are not satisfied that an OEF adjustment for reliability outcomes would meet the duplication and exogeneity OEF adjustment criteria. Reliability is appropriately captured by Economic Insights' Cobb Douglas SFA model. Further, reliability outcomes are to some extent within management control.

In response to our draft decision the service providers and their consultants submitted that the benchmarking we used to estimate base year opex did not incorporate reliability.[602] PEG and Advisian also had some detailed comments regarding the incorporation of reliability into our benchmarking.[603] We address these concerns below. In this section we also outline why we consider our estimate of base opex is sufficient for the NSW service providers are able to meet their minimum reliability standards.

Consideration of reliability in setting our base year opex

In our draft decision we considered the reliability of the NSW service providers as it was incorporated as an output in Economic Insights' MPFP benchmarking. The consistency between our opex MPFP benchmarking and our Cobb Douglas SFA model indicated that the Cobb Douglas SFA efficiency scores reasonably reflected the efficient, prudent opex costs of the NSW service providers meeting their relevant reliability obligations.

Economic Insights' MTFP and opex MPFP benchmarking indicated that the NSW networks could provide their current levels of reliability at much lower cost. The MTFP and opex MPFP benchmarking included the number of customer minutes off supply as

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601 Advisian, Opex Cost Drivers: ActewAGL Distribution Electricity (ACT), 16 January 2015, p. 97.

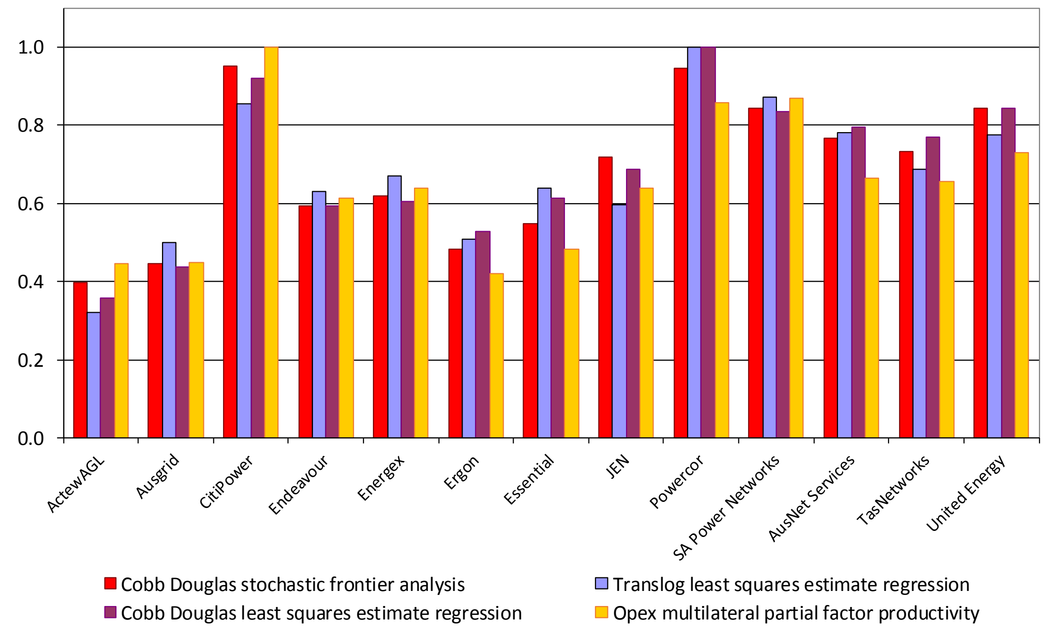
602 ActewAGL, RRP, 2015, p. 163. Advisian, 2015, p. 59. Essential, RRP, 2015, pp. 42–44. ActewAGL, Revised regulatory proposal, 2015, pp. 61-79. (ActewAGL, RRP, 2015). AECOM, Impact of AER Draft Determination on Service and Safety, 2015, p. 20. CEPA, Benchmarking and Setting Efficiency Targets for the Australian DNSPs, (NSW DNSPs), 2015, p. 32. AusGrid, Statement of Chief Operating Officer of Ausgrid (CONFIDENTIAL), January 2015. Jacobs, Regulatory Revenue Decision, Reliability Impact Assessment, 2015, p. 12.

603 Advisian, Review of AER benchmarking, 2015, p. 59. PEGR, 2015, p. 51.

a negative output. Hence, poor reliability would be reflected in poor MTFP and opex MPFP performance.

Figure A.13 shows Economic Insights' opex MPFP, SFA and LSE scores for each of the service providers. This figure indicates that, measured under all our different economic benchmarking techniques, the NSW service providers could provide their services at lower cost.

Figure A.13 DNSP average opex efficiency scores, 2006-13



Importantly, the opex MPFP scores are closely aligned with the efficiency scores of our Cobb Douglas SFA model. This is demonstrated by the two sets of efficiency scores being highly correlated with a correlation coefficient of 0.95. This means that to the extent that reliability performance is different across service providers, its impact on opex efficiency is not significant. Therefore, we consider the Cobb Douglas SFA model reasonably reflects the efficient and prudent costs of providing efficient services, taking into account reliability performance.

While there is not perfect correlation between the opex MPFP scores and the Cobb Douglas efficiency scores, the scores are very close for AusGrid and Endeavour. We also note that as Essential performs slightly worse under the opex MPFP benchmarking, so the adoption of the Cobb Douglas SFA model is to its advantage.

To cross-check that the results of our Cobb Douglas SFA model and our opex MPFP model appropriately factor in reliability performance, we have further looked at the reliability performance of the NSPs and developed some reliability partial performance indicators (PPIs).

Figure A.14 shows the relationship between the number of interruptions per customer (SAIFI) and customer density.

Figure A.15 shows the relationship between the average minutes off supply per customer (SAIDI) and customer density.

Figure A.14 SAIFI against customer density

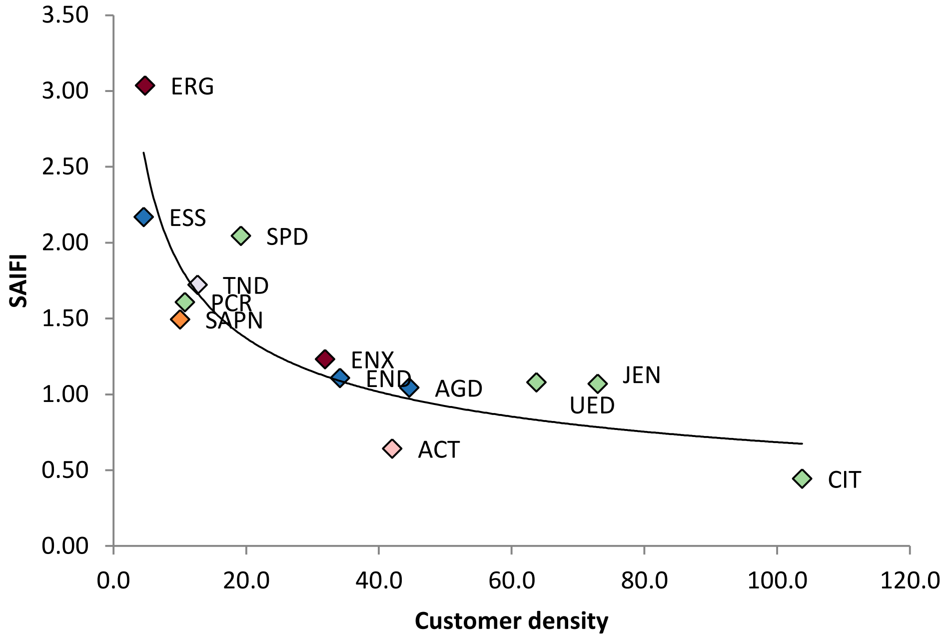
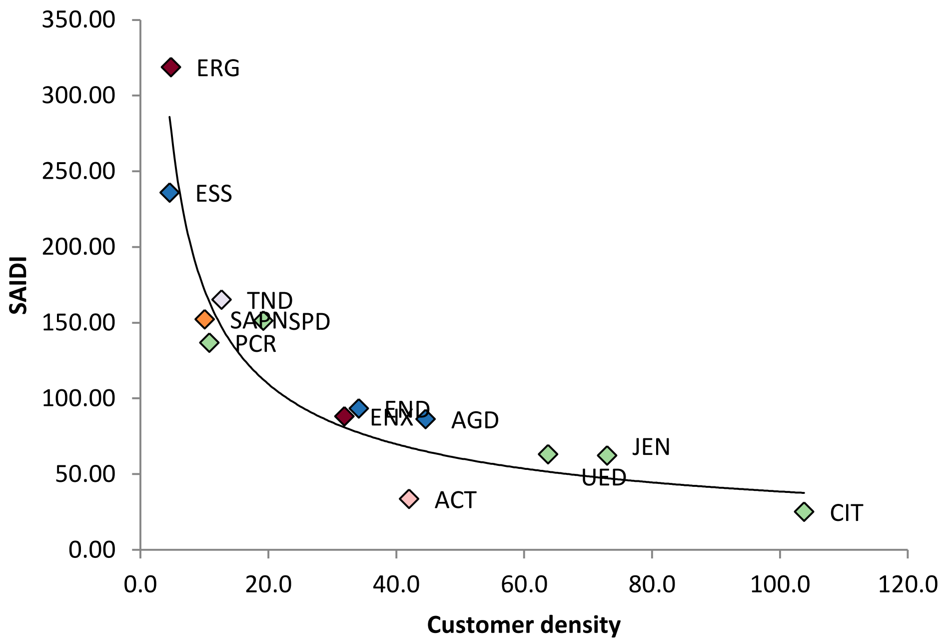


Figure A.15 SAIDI against customer density



As shown in these figures there is an inverse relationship between customer density and reliability. This is expected to be the case as less dense networks will have more exposed lines per customer. Holding everything else constant, the more exposed lines within a network, the greater the chance for incidences that will adversely affect reliability.

Most networks have a level of reliability that is close to their expected level given their customer density, as reflected by the reliability scores being close to the trend line. This indicates that the reliability performance of the benchmark service providers is not materially different from that of the NSW service providers.

Detailed criticisms

In response to our draft determination the consultants of the NSW and ACT service providers, Advisian and PEG raised some detailed concerns regarding the incorporation of reliability into our benchmarking analysis. We address these concerns below.

Advisian

On the issue of reliability, Advisian submitted:

> 1) "The “ceteris paribus” assumption of constant reliability implicit in the benchmark model does not hold, and some adjustment is necessary to reflect changes in reliability, an issue not dealt with at all in the preferred SFA model.
>
> 2) Economic Insights' reliance on analysis period averages for its benchmarking models means that the effect of declining reliability performance on opex over the analysis period is not captured in its models (which by implication assumes that opex is driven by absolute SAIDI). In practice the relationship between opex and reliability is driven by a combination of the absolute level that has historically been achieved, the specific network environment and the change in SAIDI over the analysis period.
>
> 3) The trade-off between SAIFI and CAIDI to achieve a SAIDI target highlights that reliability can be achieved by a combination of Opex and Capex programs. No attempt has been made in the AER’s benchmarking to “normalise” the approaches taken by DNSPs in this regard. This gives rise to the potential for what otherwise may be a sensible and efficient Opex / Capex trade off being judged as an Opex efficiency / inefficiency."[604]

We address these points below.

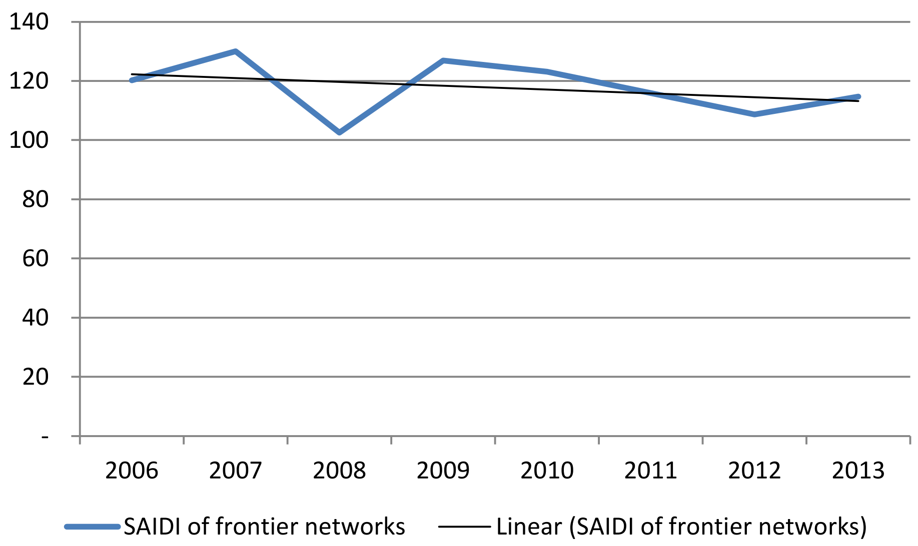
Advisian submitted that the frontier networks have exhibited decreasing reliability performance. It considered that the assumption of constant reliability in the AER's modelling does not hold and that the AER's benchmarking should be adjusted to reflect this.

We do not consider that the frontier networks have exhibited decreasing reliability performance. On both SAIDI and SAIFI measures the performance of the frontier

[604] Advisian, Review of AER benchmarking, 2015, p. 59.

networks have improved. Figure A.16 shows the weighted average SAIDI of the frontier networks over the benchmarking period.[605] This shows that the SAIDI of the frontier networks has improved over the benchmarking period.

Figure A.16 SAIDI of frontier networks against long term average

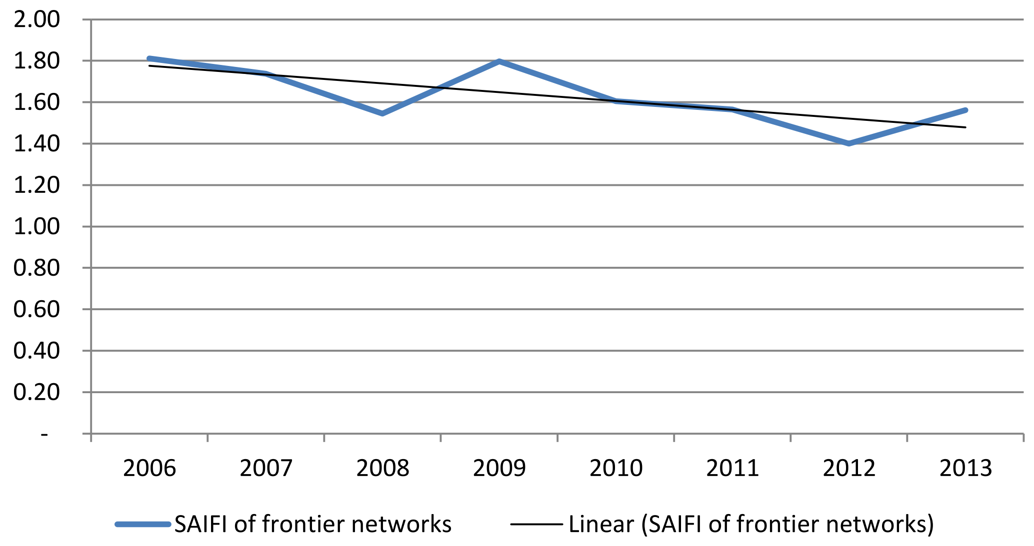


Note: SAIDI is calculated excluding excluded outages and MED days consistent with Advisian's approach.

Figure A.17 presents the SAIFI performance of the frontier networks. Again under this analysis SAIFI of the frontier networks has improved over the benchmarking period. Figure A.16 and Figure A.17 show that SAIFI has been improving at a faster rate than SAIDI for the frontier networks. This means that CAIDI of the frontier networks will appear to deteriorate over time.

[605] The weighted average has been calculated based upon customer numbers in accordance with our approach to calculating the benchmarking frontier. Advisian also indicates that it calculates a weighted average however does not outline how it did so. Advisian argues that under its weighted average the performance of the networks has deteriorated. This is contrary to our analysis.

Figure A.17 SAIFI of frontier networks against long term average



Note: SAIDI is calculated excluding excluded outages and MED days consistent with Advisian's approach.

Advisian stated that CAIDI for the frontier networks has declined across the benchmarking period. We agree that this is the case, but consider that this is not a concern. CAIDI represents the average time required to restore service. [606] CAIDI is not a measure of the detriment of outages to consumers. The IEEE calculate SAIDI in the following manner:[607]

$$CAIDI = \frac{SAIDI}{SAIFI}$$

Under this calculation CAIDI will deteriorate if SAIFI improves at a faster rate than SAIDI. This is the case for the frontier networks. However, under this scenario customers experience fewer interruptions and fewer minutes off supply and are hence better off.

Advisian submitted that Economic Insights' reliance on analysis period averages for its benchmarking models means that the effect of declining reliability performance on opex over the analysis period is not captured in its modelling.[608] As noted above, this statement appears to be incorrect as reliability performance for the frontier networks as measured by SAIDI and SAIFI has improved over the period according to our measures. Advisian also submitted that that the trade-off between SAIFI and CAIDI to achieve a SAIDI target highlights that reliability can be achieved by a combination of

606 IEEE Power Engineering Society, IEEE Guide for Electric Power Distribution Reliability Indices, 2004, p. 5.

607 IEEE Power Engineering Society, IEEE Guide for Electric Power Distribution Reliability Indices, 2004, p. 5.

608 Advisian. 2015, p. 59.

Opex and Capex programs.[609] Advisian submitted that no attempt has been made in the AER's benchmarking to "normalise" the approaches taken by distributors in this regard. As we point out in our consideration of capitalisation policies above the NSW networks have spent more on capex over the benchmarking period than the frontier networks. This should put these networks at an advantage under our benchmarking analysis. This is because the additional expenditure on capex should reduce outages and improve their opex performance under our benchmarking.

Further, we note that the frontier networks have significantly increased their opex on maintenance and vegetation management.[610] This additional opex should reduce outages caused by vegetation and asset failure. However increasing opex will disadvantage the frontier networks under our benchmarking of opex. This is because, as Advisian states, these networks could have instead undertaken capital programs to reduce outages. Therefore, we do not consider that normalisation of the results to account for the trade-off between SAIFI and CAIDI is necessary.

Pacific Economic Group Research

PEGR questioned the way in which reliability was included in the scale index:

> The impact of reliability on opex is a complicated empirical issue. Good reliability may require higher opex, but it also depends on weather, forestation, system undergrounding, AMI, and system reinforcements. EI's approach to reliability unfairly favors urban utilities in Victoria and ACT since these utilities enjoy favorable reliability operating conditions.[611]

In response to this comment Economic Insights notes that PEGR does not provide an explanation how the Victorian and ACT service providers differ from the NSW urban service providers which face broadly similar 'reliability operating conditions'. Rather, Economic Insights notes that it is likely that the Victorian and ACT distributors have focussed more on improving their reliability.[612]

Management control of reliability

We consider that there are a number of actions that management can undertake in order to control the level of reliability within their networks. This includes spending more on vegetation management and maintenance. Advisian also notes actions that management can take to manage reliability.[613] Though outages are often caused by exogenous circumstances, reliability outcomes are not fully exogenous to management control.

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609 Advisian. 2015, p. 59.

610 From 2008–9 to 2012–13 the frontier networks increased their expenditure on vegetation management and maintenance on average by 171 per cent and 77 per cent respectively (in nominal terms).

611 PEGR, 2015, p. 51.

612 Economic Insights, 2015, pp. 5-6.

613 Advisian, Review of AER benchmarking, 2015, p. 59.

Further, in our benchmarking we apply the Institute of Electrical and Electronics Engineers standard to exclude the effects of major events that are caused by to extreme weather or other events. Consequently reliability outcomes that we have included in our benchmarking reflect business as usual circumstances. Thus the reliability in our benchmarking relates to events that are within management control.

Meeting reliability standards

Under the NER we must set opex at the level consistent with the operating expenditure criteria. This includes the prudent, efficient opex to meet reliability standards.[614]

We consider that our estimate of base opex reasonably reflects the efficient and prudent costs for meeting reliability standards. Based on our benchmarking analysis, as outlined above, we consider that that the NSW service providers can deliver their current levels of reliability at lower cost. Our base year opex is sufficient for the NSW service providers to maintain their reliability at their current levels as the base year opex allowance is based upon their reliability over the benchmarking period.

If the current level of reliability was worse than the minimum reliability standards then the opex allowance might not reflect the costs of meeting these standards. However, the NSW service providers have been outperforming their minimum reliability standards.

Figure A.18 and Figure A.19 show that Essential and Endeavour have outperformed their reliability targets in every instance over the last five years.

Figure A.20 shows Ausgrid's performance against its reliability standards. This figure indicates that Ausgrid has been meeting the standards in almost every instance over the last five years.

As such, we are comfortable that our substitute base opex reflects the efficient, prudent costs of meeting the reliability standards. Given this we do not consider that the NSW service providers require and adjustment to meet their minimum reliability standards.

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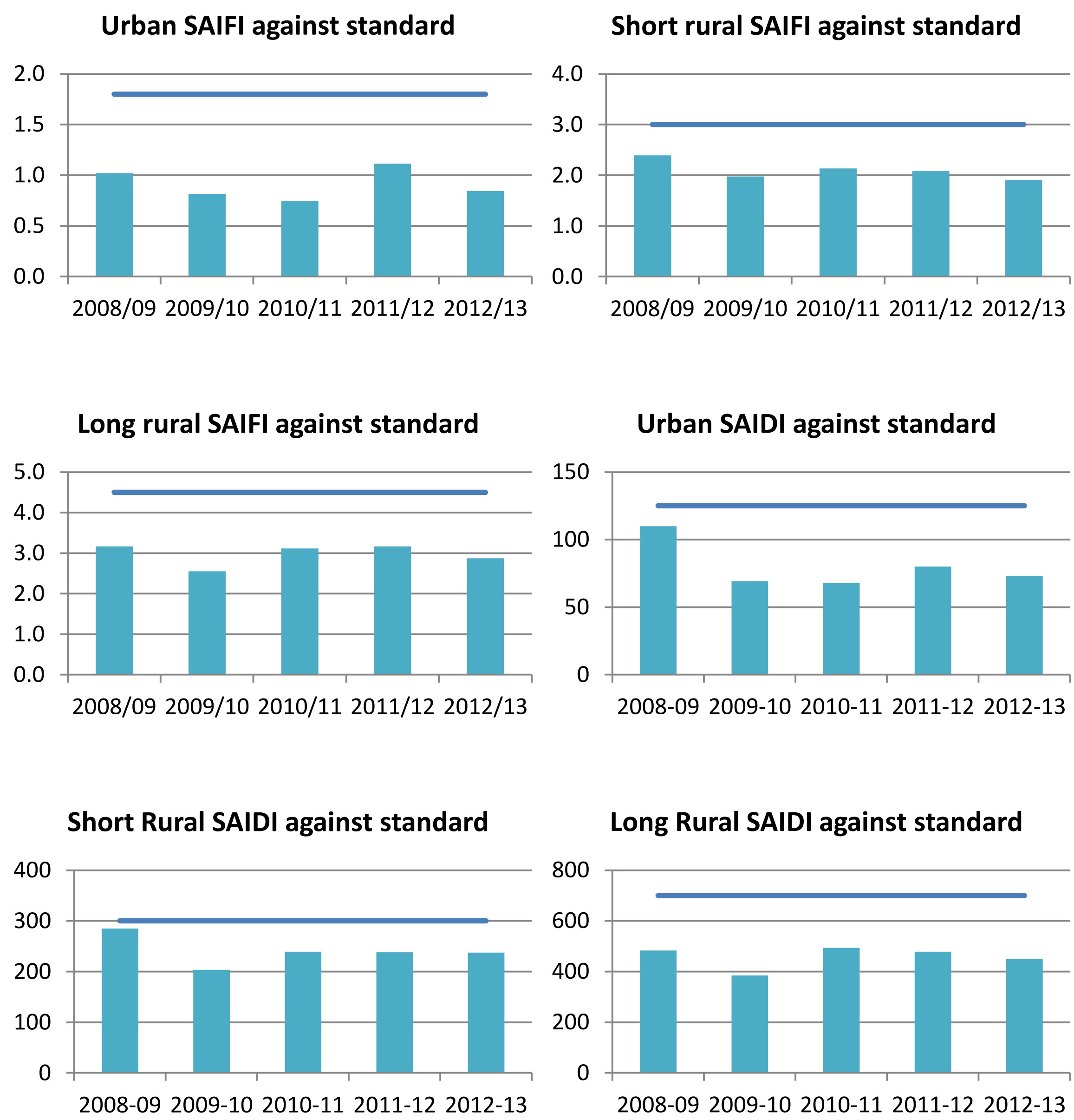
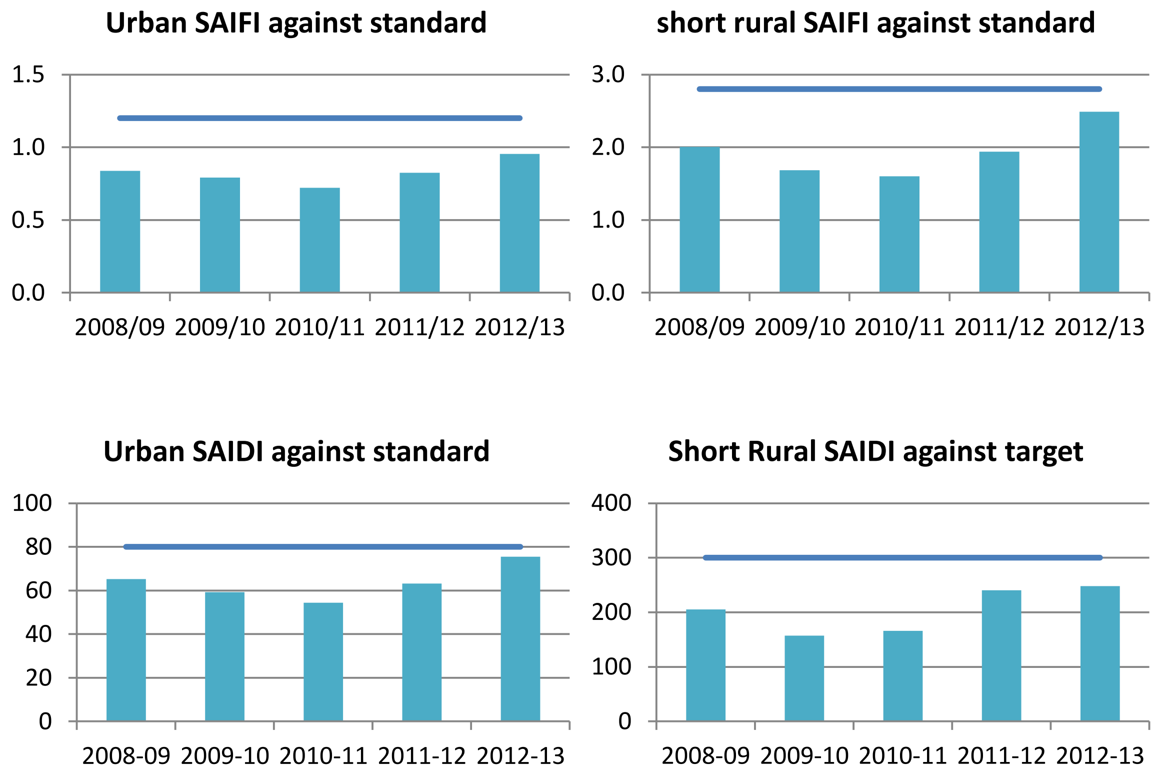
[614] NER cl. 6.5.6 (a) and (c)

Figure A.18 Essential Energy's performance against its current reliability standards



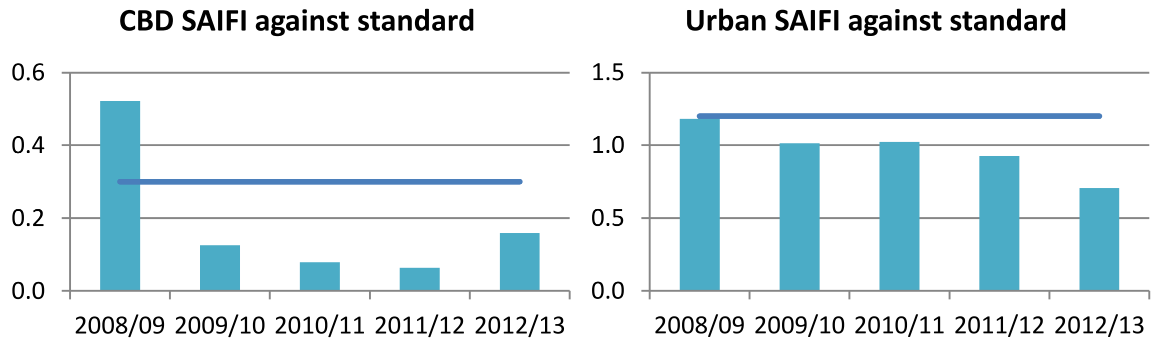
Source: AER analysis

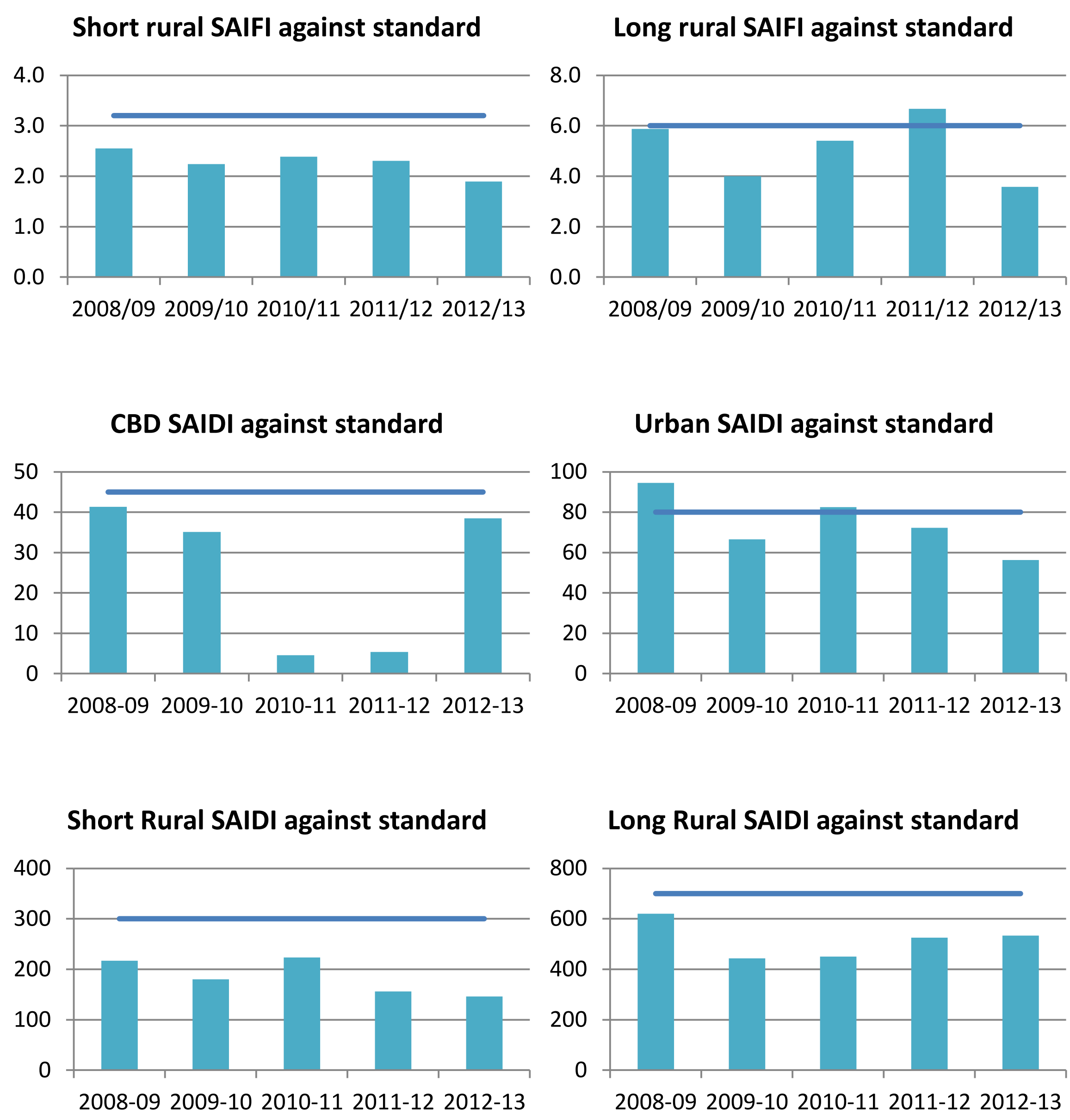
Figure A.19 Endeavour Energy's performance against its current reliability standards



Source: AER analysis

Figure A.20 Ausgrid's performance against its current reliability standards





Safety outcomes

We are not satisfied that an OEF adjustment for service providers' safety outcomes would meet the duplication OEF adjustment criterion. Safety outcomes are implicitly accounted for in the SFA benchmarking model as the comparison firms all operate safe networks.

In response to our draft decision, the NSW service providers stated that:

> It is … our view that the AER draft decision does not provide sufficient revenues to maintain the safety of the system consistent with achievement of the NEO. [615] [616] [617]

In response to our statement, that peers in other states are able to provide safe reliable services at lower overall levels of opex, they submitted:

> "We disagree with this statement and draw the attention of the AER to recent critical electrical network failure events in other states which have had, or had the potential to, impact the lives and wellbeing of the public." [618] [619] [620]

The critical network failures to which they refer are bushfires in Victoria and Western Australia. [621] [622] [623]

They also quote the Victorian Bushfires Royal Commission (VBRC) which stated:

> "Distribution businesses' capacity to respond to an ageing network is, however, constrained by the electricity industry's economic regulatory regime." [624] [625] [626]

The NSW service providers list their safety obligations and describe how their asset management systems allow them to discharge their regulatory obligations at lowest cost. [627] [628] [629] They consider that if they were to operate at a lower cost it would lead to an increase in safety risks for their workers and members of the public. They commissioned R2A and Jacobs to analyse the effects of the decrease in opex on safety outcomes. R2A[630] and Jacobs[631] found that the number of safety incidents would increase. The NSW service providers also noted backlogs in maintenance tasks and increases in asset fires identified by Energy Safe Victoria (ESV). ActewAGL made similar statements and provided a report by AECOM which was based on a similar premise to the R2A report commissioned by the NSW service providers.[632] Ausgrid, Endeavour, and Essential also submitted statements from their Chief Operating

615 Ausgrid, Revised Proposal, 20 January 2015, p 29.
616 Essential, Revised Proposal, 20 January 2015, p 36.
617 Endeavour, Revised Proposal, 20 January 2015, p 32.
618 Ausgrid, Revised Proposal, 20 January 2015, p 29.
619 Essential, Revised Proposal, 20 January 2015, p 36.
620 Endeavour, Revised Proposal, 20 January 2015, pp 33.
621 Ausgrid, Revised Proposal, 20 January 2015, p 29.
622 Essential, Revised Proposal, 20 January 2015, p 37.
623 Endeavour, Revised Proposal, 20 January 2015, p 33.
624 Ausgrid, Revised Proposal, 20 January 2015, p 29.
625 Essential, Revised Proposal, 20 January 2015, p 37.
626 Endeavour, Revised Proposal, 20 January 2015, p 33.
627 Ausgrid, Revised Proposal, 20 January 2015, pp 29-32.
628 Essential, Revised Proposal, 20 January 2015, pp 37-39.
629 Endeavour, Revised Proposal, 20 January 2015, pp 33-36.
630 R2A, Asset / System Failure Safety Risk Assessment: Client Reference Networks NSW RFQE2, January 2015
631 Jacobs, Networks NSW - Draft Determination Review: System Capex & Maintenance Prudency Assessment, 15 January 2015.
632 AECOM, The Impact of the AER's Draft Decision on ActewAGL's Service and Safety Performance, 15 January 2015.

Officers (COOs) that presented their opinions on the safety and reliability outcomes of our draft decision on opex. [633] [634] [635]

We are not satisfied that an OEF adjustment for safety outcomes would meet the duplication OEF adjustment criterion. All of Economic Insights' models implicitly account for safety. This is because the comparison firms operate safe networks.

The Victorian service providers operate safe networks. Just as the NSW service providers are required to submit Safety Management Systems to the NSW Department of Resources and Energy, the Victorian service providers are required under Part 10 of the *Electricity Safety Act 1998* to submit Electricity Safety Management Schemes to ESV. In addition to this they are also required to submit Bushfire Mitigation Plans and Electric Line Clearance Management Plans. [636] The NSW service providers have claimed that the effect of the Black Saturday bushfires is evidence that the Victorian service providers do not operate safe networks. However, prior to the Black Saturday bushfires ESV found AusNet Services and Powercor, the two service providers subject of class actions after Black Saturday, were “generally compliant” with their regulatory obligations. [637] We also note that the fact that Endeavour Energy is currently facing a class action relating to the 2013 Blue Mountains bushfires does not necessarily mean that Endeavour Energy operates an unsafe network. We discuss bushfire risk and regulations in more detail in Geographic factors below.

The comments by VBRC raised by the NSW service providers relate to asset replacement rather than opex. We determine forecasts for total capital and operating expenditure not asset replacement programs. Nonetheless our capex forecast, which is determined in part by reference to our repex model, takes into account the specific circumstances of service providers, including the rate at which their assets fail. We also note that the VBRC made its comment prior to our last determination for the Victorian service providers. In the AER's following determination the AER acknowledged that:

> "there have been changes to the safety regime that applies to the Victorian DNSPs. … This has led to a reassessment of replacement expenditure for a number of the DNSPs, which the AER has undertaken in consultation with Energy Safe Victoria (ESV), and a substantial increase in the allowance."[638]

The NSW service providers, and R2A, [639] have also noted that ESV has stated that there has been an increase in the number of asset failures over the 2011 to 2013

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[633] Trevor Armstrong, Statement of Trevor Armstrong Chief Operating Officer Ausgrid, 19 January 2015, pp. 32 - 36.

[634] Rod Howard, Statement of Rod Howard Chief Operating Officer Endeavour Energy, 19 January 2015, pp.29-30.

[635] Gary Humphreys, Statement of Gary Humphries Chief Operating Officer Essential Energy, 19 January 2015, pp. 22 to 28.

[636] ESV, Safety performance report on Victorian Electricity Networks 2013, June 2014, p. 5.

[637] VBRC, vol 2, chapter 4, pp. 159 to 164.

[638] AER, Final decision: Victorian electricity distribution network service providers: Distribution determination 2011–2015, October 2010, p. iv.

[639] R2A, Asset / System Failure Safety Risk Assessment: Client Reference Networks NSW RFQE2, January 2015 pp. 18-19

period. This is true, but ESV also noted that given the works done by the Victorian service providers it would have expected that the number of asset failures would decrease.[640] ESV therefore considers that the increase in failures may have been due to unfavourable weather conditions and the increasing average age of assets in Victoria.[641] [642]

ESV noted that in 2012 overall management of the Victorian Networks was good.[643] ESV noted that in 2011 the performance of the Victorian Networks, with regard to asset failure, was consistent with the performance of networks elsewhere in Australia and that in other areas they performed adequately.[644] ESV found in 2010 that overall there was a good standard of inspection and timely repair by the industry although some service providers performed better than others.[645] More recently, in 2014 ESV noted:

- The Victorian service providers have comprehensive Electricity Safety Management Systems, many supplemented by other management systems and certification such as PAS 55, ISO 9001, ISO 14001, AS4801 and OHSAS 18001[646]
- Asset maintenance in Victoria, in accordance with bushfire mitigation plans, was adequate for the 2013-2014 bushfire season, with no areas of non-compliance observed[647]
- In general, the Victorian service providers' Electric Line Clearance Management Plans were clear, well presented and that there was a strong connection between safety plans and activities in the field[648]
- Despite the extensive effort put into condition assessment and asset replacement, failure rates in Victoria had increased. While some service providers, notably United Energy, were behind schedule in their asset replacement programs all would be able to complete their five year programs by 2015[649]
- The number of fire starts in Victoria was above the F factor set by the AER, partly due the increasing age of assets and partly due to adverse weather conditions.[650]
- All of the Victorian service providers were on schedule to meet the electric line clearance requirements as agreed upon with ESV. Although CitiPower and Powercor were granted 12 months extensions from the original timeframes.[651]

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[640] ESV, Safety performance report on Victorian Electricity Networks 2012, June 2013, p.7.
[641] ESV, Safety performance report on Victorian Electricity Networks 2012, June 2013, p.7.
[642] ESV, Safety performance report on Victorian Electricity Networks 2013, June 2014, p. 5.
[643] ESV, Safety performance report on Victorian Electricity Networks 2012, June 2013, p.7.
[644] ESV, Safety performance report on Victorian Electricity Networks 2011,August 2012, p. i.
[645] ESV, Safety performance report on Victorian Electricity Networks 2010, 2011, p. i.
[646] ESV, Safety performance report on Victorian Electricity Networks 2013, June 2014, p. 24.
[647] ESV, Safety performance report on Victorian Electricity Networks 2013, June 2014, p. 26.
[648] ESV, Safety performance report on Victorian Electricity Networks 2013, June 2014, pp. 29-30.
[649] ESV, Safety performance report on Victorian Electricity Networks 2013, June 2014, pp. 31-50 and 61-78.
[650] ESV, Safety performance report on Victorian Electricity Networks 2013, June 2014, pp. 61-78.
[651] ESV, Safety performance report on Victorian Electricity Networks 2013, June 2014, pp. 50-60.

- The Victorian service providers go to considerable lengths to prevent unauthorised access and ensure that assets are secure[652]
- The underlying trend for serious injuries from electrical causes to the public and Victorian service providers workers was similar to previous years[653]
- There were some opportunities for improvement and areas requiring attention in the Victorian service provider's work practices[654]
- We note that ESV highlighted issues relating to fire starts, asset failures, and work practices. ESV notes that the increase in fire starts in 2013 may be due to adverse weather conditions and aging assets. The replacement rate of assets relates to repex, not opex, as discussed above. On concerns about work practices, we note that service providers in Victorian tend to have higher levels of workplace safety than other areas of the NEM. This is discussed below.

Other measures of network safety also suggest that the comparison firms perform similarly or better than the NSW service providers. These measures include LTIFR, vegetation contacts with assets, and reliability for customers on life support devices.

On Lost Time Injury Frequency Rate (LTIFR) the comparison firms generally tend to outperform the ACT, NSW, and QLD service providers. LTIFR measures the number of injuries suffered in the workplace that lead to one or more shifts being missed for every million hours worked. The LTIFR for the NEM service providers over the 2009 to 2013 period is shown below.

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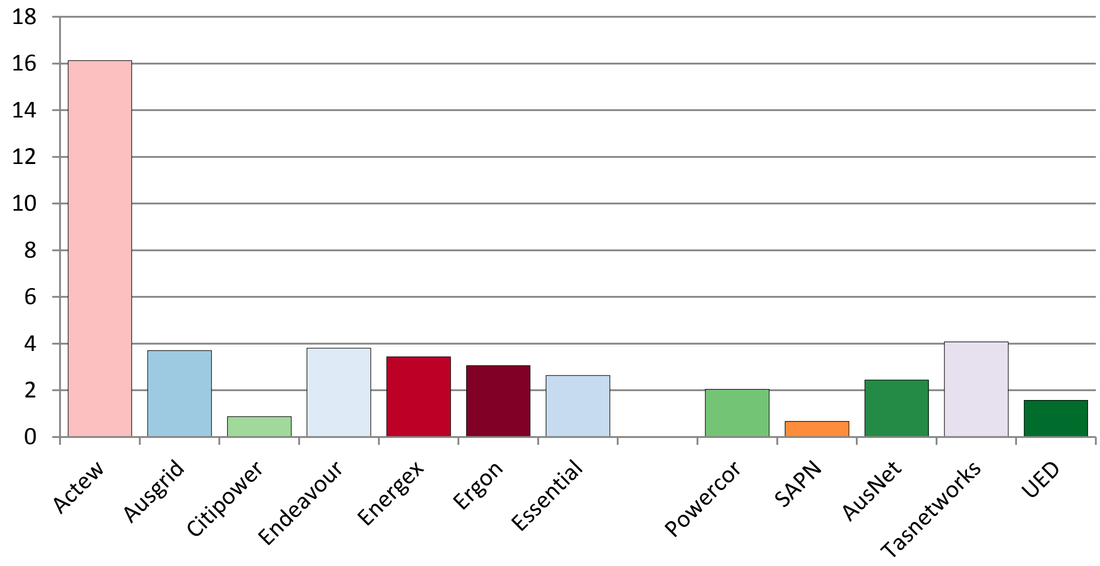
[652] ESV, Safety performance report on Victorian Electricity Networks 2013, June 2014, p. 78.

[653] ESV, Safety performance report on Victorian Electricity Networks 2013, June 2014, p. 82.

[654] ESV, Safety performance report on Victorian Electricity Networks 2013, June 2014, p. 87.

Figure A.21 LTIFR for NEM service providers (2009 to 2013)



Source: ActewAGL,[655] Ausgrid,[656] AusNet Services,[657] CitiPower,[658] Endeavour Energy,[659] Energex,[660] Ergon Energy,[661] Essential Energy,[662] Powercor,[663] SAPN,[664] TasNetworks,[665] United Energy.[666]

Notes: ActewAGL changed its reporting systems in 2011 therefore its datum only covers the period July 2011 to December 2013. TasNetwork's datum does not include contractors prior to 2012. Endeavour, Essential and SAPN data do not included contractors. AusNet's Datum relates to its gas, distribution and transmission business segments. Jemena is not displayed because it claimed confidentiality over its datum.

On vegetation contacts causing fires per 1000km of overhead route line length, the comparison firms tended to have similar performance to the NSW and QLD distributors, with ActewAGL having a higher number of defects.[667] [668] [669] [670]

In the absence of other available data we have considered the measures available to us. One such measure relates to incidents in which businesses report (under the Retail

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655 ActewAGL, Response to Information Request AER ACTEW 053, 9 February 2015.
656 Ausgrid, Response to Information Request AER AUSGRID 044, 23 January 2015.
657 AusNet Services, Response to LTIFR Information Request, 9 January 2015.
658 CitiPower, Response to Information Request on LTIFRs, 2 February 2015.
659 Endeavour Energy, Response to Information Request AER Endeavour 037, 16 January 2015.
660 Energex, Response to Information Request AER Energex, 23 January 2015.
661 Ergon Energy, Response to Information Request AER Ergon008, 7 January 2015.
662 Essential Energy, Response to Information Request AER Essential 033, 23 January 2015.
663 CitiPower, Response to Information Request on LTIFRs, 2 February 2015.
664 SA Power Networks, Response to Information Request AER SAPN 012, 20 January 2015.
665 TasNetworks, Response to LTIFR information request, 21 January 2015.
666 United Energy, Response to LTIFR Information Request, 27 January 2015.
667 Category Analysis RIN Responses to template 2.7 and Economic Benchmarking RIN Responses to templates 6 and 8.
668 Ausgrid, Response to Information Request Ausgrid 052, 17 February 2015.
669 Endeavour, Response to Information Request Endeavour 044, 16 February 2015.
670 Essential Energy, Response to Information Request Essential 083, 16 February 2015.

Law Compliance procedures and guidelines) breaches, or potential breaches, of the life support provisions in the Retail Law and Rules. These provisions set out the manner and timing by which businesses provide registered life support customers with notice of a planned interruption and prohibit disconnection of premises with registered life support needs. We acknowledge that this is an incomplete measure as data are only available for the ACT, NSW, SA and Tasmanian service providers and rely on reports from businesses. However, based on the information available, there is no evidence that the comparison firms perform worse on this measure.

Since the AER assumed enforcement responsibilities in South Australia it has not issued any infringement notices in relation to (alleged) breaches of the life support provisions by SA Power networks. However, Essential Energy, Endeavour Energy, and Ausgrid - have paid penalties totalling $140 000 following the issue of infringement notices by the Australian Energy Regulator in relation to 7 incidents in which customers known to require life support equipment lost electricity supply unexpectedly. [671][672] The AER assumed responsibility for retail regulation under the NECF in South Australia on 1 February 2013 and 1 July 2013 in NSW. While South Australia has a smaller population than NSW, SA Power Networks has a similar number of customers (851766) to Endeavour Energy (940028) and Essential Energy (854231).

The findings of the Jacobs and R2A reports are based on the assumption that the NSW service providers will reduce their work programs in response to our draft decision.[673] [674] The COO statements are also based on this premise. [675] [676] [677] R2A and Mr Armstrong assume no efficiencies will be found, while Jacobs, assume that the NSW service providers will be able to find some opex efficiencies, Mr Howard and Mr Humphreys do not make clear what level of efficiencies they consider Endeavour and Essential could find.

Our draft decision was not made on the assumption that the NSW service providers would reduce their work programs. It was made on the basis that the comparison firms can provide a safe service for less opex than the NSW service providers. The NSW service providers have not provided sufficient evidence to show that they are not be capable of finding similar efficiencies or that the comparison firms operate unsafe networks.

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671 AER, NSW electricity distributors pay $100 000 in penalties regarding their life support obligations, available at http://www.aer.gov.au/node/30100 [last accessed 23 March 2015].

672 AER, NSW and Tasmanian electricity distributors pay $60,000 in penalties regarding their life support obligations, available at https://www.aer.gov.au/node/30944 [last accessed 23 March 2015].

673 Jacobs, Networks NSW - Draft Determination Review: System Capex & Maintenance Prudency Assessment, 15 January 2015, pp. 4, 47-52 and 57.

674 R2A, Asset / System Failure Safety Risk Assessment: Client Reference Networks NSW RFQE2, January 2015, pp. 14-15.

675 Trevor Armstrong, Statement of Trevor Armstrong Chief Operating Officer Ausgrid, 19 January 2015, pp. 32 - 36.

676 Rod Howard, Statement of Rod Howard Chief Operating Officer Endeavour Energy, 19 January 2015, pp.29-30.

677 Gary Humphreys, Statement of Gary Humphries Chief Operating Officer Essential Energy, 19 January 2015, pp. 22 to 28.

The Jacobs and R2A reports also did not provide sufficient evidence to suggest that the comparison firms' opex is at a level that prevents them from providing services at an acceptable level of safety.[678] [679]

The R2A report raised the issue of recent increases in asset failure in Victoria already discussed above. R2A also submitted that the proposed changes would lead to Ausgrid's asset inspection cycles to increase to eight years from five years. [680] However, the Victorian service providers, which make up the majority of the comparison firms, are required to inspect their assets every three years in Hazardous Bushfire Risk Areas and every five years in all other areas. [681]

Jacobs submitted that we have not robustly substantiated a position on whether the asset age profiles of the comparison firms are appropriate for benchmarking the NSW distributors. [682] However, it provided no analysis of our WARL measure to support the claim and even noted that Endeavour Energy itself uses a WARL model to forecast its repex costs. [683] Jacobs also considered that we have overlooked the FMECA/RCM models used by the NSW service providers. [684] The comparison firms also use similar condition based service optimisation models[685] [686][687][688] but provide services at a lower cost.

Jacobs has also stated that it considers we have not adequately substantiated a position on the proportion of expenditure reductions which are expected to be absorbed through an increase in risk profile. [689] We expect all opex reductions to be made through finding opex efficiencies with no negative impact on safety outcomes. Where the NSW service providers are unable to provide a prudent level of safety with the level of opex that reflects the opex criteria, we would expect their shareholders to bear the cost.

The COO statements do not offer evidence to suggest that the comparison firms' opex is at a level that prevents them from providing services at an acceptable level of safety.

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678 Jacobs, Networks NSW - Draft Determination Review: System Capex & Maintenance Prudency Assessment, 15 January 2015, p. 50.

679 R2A, Asset / System Failure Safety Risk Assessment: Client Reference Networks NSW RFQE2, January 2015 pp. 18-19

680 R2A, Asset / System Failure Safety Risk Assessment: Client Reference Networks NSW RFQE2, January 2015 pp. 14-15.

681 Electricity Safety (Bushfire Mitigation) Regulations 2013, s. 7.(i).

682 Jacobs, Networks NSW - Draft Determination Review: System Capex & Maintenance Prudency Assessment, 15 January 2015, p. 50.

683 Jacobs, Networks NSW - Draft Determination Review: System Capex & Maintenance Prudency Assessment, 15 January 2015, Appendix B.

684 Jacobs, Networks NSW - Draft Determination Review: System Capex & Maintenance Prudency Assessment, 15 January 2015, p. 4.

685 Powercor, Bushfire Management Plan 2014–19, 10 July 2014, p. 15.

686 CitiPower, Bushfire Management Plan, 1 July 2014, p. 17.

687 SA Power Networks, Regulatory Proposal: Attachment 7.2, 2014, p. 64.

688 AusNet services, Bushfire Management Plan: Electricity Distribution Network, 22 July 2014, p. 37.

689 Jacobs, Networks NSW - Draft Determination Review: System Capex & Maintenance Prudency Assessment, 15 January 2015, p. 50.

Based on the above evidence, we consider that the comparison firms operate safe networks at lower levels of opex, such that no OEF adjustment is necessary to account for safety.

Unregulated Services

We are not satisfied that an OEF adjustment for differences in the unregulated services that service providers engage in would meet the exogeneity OEF adjustment criterion. The extent to which a service provider engages in unregulated activities is under management's control.

In response to our 2014 draft decision for ActewAGL, Advisian submitted that ActewAGL will have a cost disadvantage relative to the comparison firms because of differences in the provision of unregulated activities.[690] Advisian submitted that the volume or appetite for pursing unregulated revenue is fundamentally an internal matter for service providers', and therefore an OEF adjustment for the scale of unregulated activities is inappropriate.[691] However, Advisian submitted that ActewAGL is prevented from providing unregulated services because of its geographically isolated position.

We are satisfied that there are opportunities for the NSW service providers to provide unregulated services. This is because they have large markets available to them. All of the NSW service providers have more customers than any of the comparison firms. As a result we consider that the NSW service providers have the opportunity to provide unregulated services. The extent to which they do provide unregulated services is a management decision.

A.6.7 Geographic factors

Bushfire risk

We are not satisfied that an OEF adjustment for differences in bushfire risk between the NSW service providers and the comparison firms would meet the materiality OEF adjustment criterion. Differences in bushfire risk between the NSW service providers and the comparison firms will not lead to material differences in opex.

In our draft decision, we provided a negative OEF adjustment for bushfire risk. This was for three reasons. Although service providers can take action to manage their bushfire risk, the natural environment and regulations with which they must comply are beyond their control. In the aftermath of the Black Saturday bushfires additional requirements were placed on the Victorian service providers which has led to an increase in the opex they require. Also, bushfire risk is not accounted for in Economic Insights' SFA model.

[690] Advisian, Opex Cost Drivers: ActewAGL Distribution Electricity (ACT), 16 January 2015, p. 98.

[691] Advisian, Opex Cost Drivers: ActewAGL Distribution Electricity (ACT), 16 January 2015, p. 86.

In response to our draft decision we received submissions from Essential Energy[692] and Ergon Energy[693] on the effect of differences in bushfire regulations and bushfire risk on opex.

Essential Energy submitted that the vegetation management standard, an important driver of bushfire mitigation costs, in NSW is similar to the Victorian standard but more onerous than the Queensland standard. [694] Essential Energy also submitted that although it was not directly governed by the resulting Victorian legislation, it would be negligent for it to ignore the findings of Victorian Bushfires Royal Commission (VBRC).[695] Essential also submitted bushfire mapping to show that it operated in some areas of high bushfire risk. [696]

Ergon Energy submitted that the AER should consider if the additional bushfire risk mitigation measures put in place were to increase the prudency of the Victorian service providers' expenditures. It also noted that because regulations exist in the context of broader obligations it is difficult to quantify the cost impact of changes in obligations.[697]

Essential, Endeavour, and Ausgrid all raised the safety implications of bushfire risk in their revised regulatory proposals.[698] [699] [700] The safety outcomes for the comparison firms and the NSW service providers are considered under safety outcomes in the endogenous factors section above. We consider the effect of bushfire risk and regulations on opex below.

Environmental risk

We are still satisfied that the Victorian service providers face a higher level of bushfire risk than the NSW service providers. This is based on the evidence presented in our draft decision, data from the Bureau of Transport Economics, mapping provided by Essential Energy, and statements made by Essential Energy on the bushfire risk faced by Victorian service providers.

Data collected by the Bureau of Transport Economics shows that on average over the period 1967 to 1999 bushfires caused more economic losses in Victoria than in NSW.

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692 Essential Energy, Revised Proposal: Attachment 7.10, 20 January 2015, pp. 8-19

693 Ergon Energy, Submission on the Draft Decisions: NSW and ACT distribution determinations 2015–16 to 2018–19, 13 February 2015, p. 18-19.

694 Essential Energy, Revised Proposal: Attachment 7.10, p. 10.

695 Essential Energy, Revised Proposal: Attachment 7.10, p. 10.

696 Essential Energy, Revised Proposal: Attachment 7.10, pp. 15-16.

697 Ergon Energy, Submissions on the Draft Decisions: NSW and ACT distribution determinations 2015–16 to 2018-19, 13 February 2015, pp. 18 -19.

698 Ausgrid, Revised Proposal, 20 January 2015, p. 164.

699 Endeavour, Revised Proposal, 20 January 2015, p. 186.

700 Essential, Revised Proposal, 20 January 2015, p. 48. And p. 200.

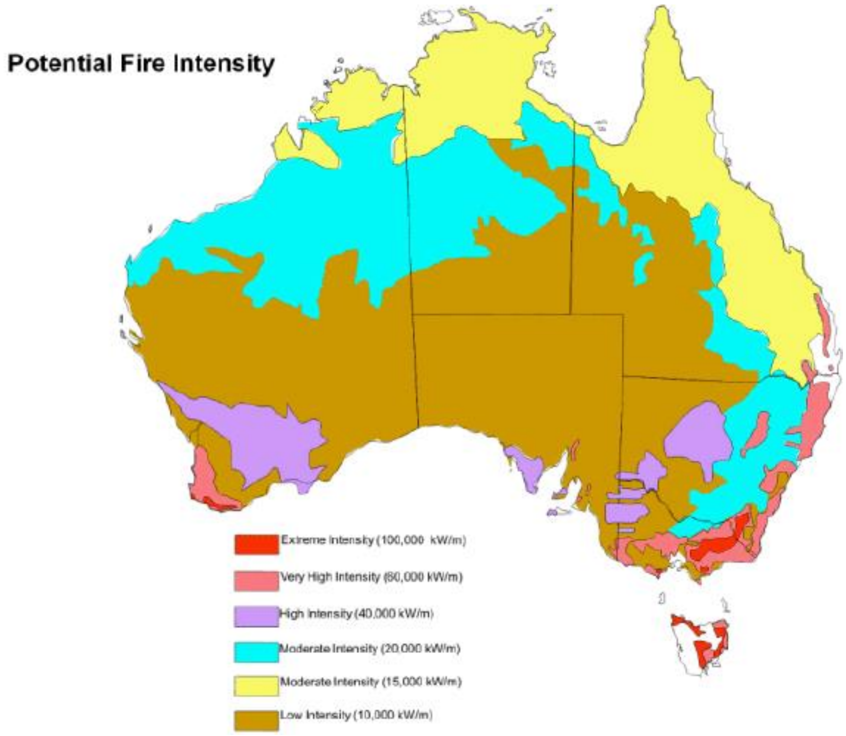
Table A.10 Past cost of bushfires 1967-1999

	ACT	New South Wales	Queensland	South Australia	Tasmania	Victoria
GSP 2012/13 ($m 2013)	35 088	476 434	290 158	95 123	24 360	337 493
Average cost of bushfires 1967-1999 ($m 2013)	10.9[701]	16.8	0.4	11.9	11.2	32.4
% of GSP	0.03%	0.00%	0.00%	0.01%	0.05%	0.01%

Source: BTE[702] and ABS[703] [704] [705]

In its revised proposal Essential Energy provided two bushfire risk maps. Both maps show that most of Victoria is at high risk due to bushfires. These two maps are shown in Figure A.22 and Figure A.23.

Figure A.22 Map of potential fire intensity



Source: Dr Kevin Tolhurst[706]

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701 Includes costs from the 2003 Canberra bushfires

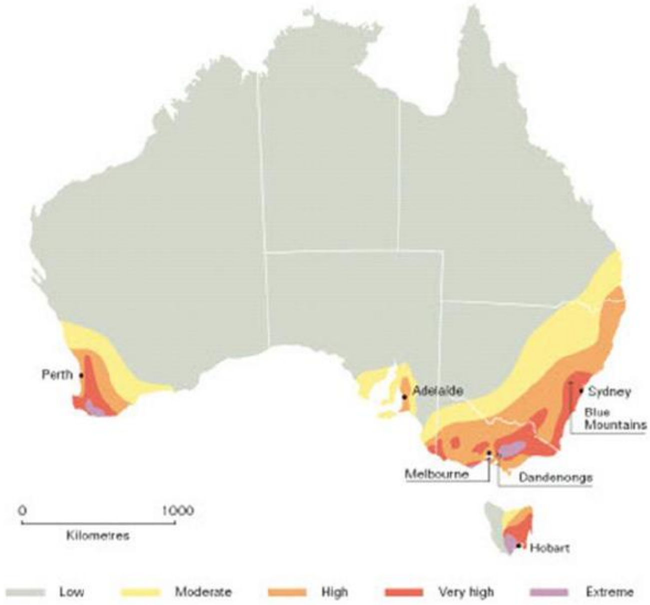
702 BTE, *Economic costs of natural disasters in Australia,* 2001, p. 35.

703 ABS, 5220.0 - Australian National Accounts: State Accounts, 2012-13

704 ABS, 6401.0 - Consumer Price Index

705 ABS, 1301.0 - Year Book Australia, 2004

Figure A.23 Map of bushfire potential zones in Australia



Source: Johnson, R. W., Blong R. J. and Ryan C.J. [707]

Additionally Essential Energy has stated:

> " South-eastern Australia contains large areas of relatively high bushfire risk with historically, the likelihood and consequence of catastrophic fires being more prominent in Victoria in comparison to other states."[708]

Bushfire related regulatory requirements

Another indicator of bushfire risk is the bushfire related regulations that apply to a service provider. The regulations that a service provider must comply with are a direct imposition on a service provider's costs. The regulations related to mitigating bushfire risk were more stringent in Victoria than in NSW during the benchmarking period. There were increased regulatory obligations placed on the Victorian service providers after the Black Saturday bushfires which occurred in 2009. Also, during the benchmarking period, vegetation management regulations were stricter for Victorian service providers than for the NSW service providers.

In the aftermath of the Black Saturday bushfires many changes were recommended to the operation and management of the Victorian distribution systems. These obligations do not exist in NSW and include:

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[706] Essential Energy, Revised Proposal: Attachment 7.10, 20 January 2015, p. 16.

[707] Johnson, R. W., Blong R. J. and Ryan C.J. 1995. Natural Hazards Potential Map of the Circum-Pacific Region: Southwest Quadrant, 1995, pp. 51-52.

[708] Essential Energy, Network Management Plan: Chapter 4 - Bushfire Risk Management Plan, p. 5.

- Changes to the Electric Line Clearance Regulations leading to a forecast step change in opex of $205 million ($2010) over the 2011 to 2015 period[709] [710]
- Audit programs for line spreaders[711]
- Audit programs for vibration dampeners[712]
- Increased asset inspection frequencies,[713] and
- Audits of asset inspectors.[714]

The largest part of these step changes in opex were related to changes in the Victorian Electric Line Clearance obligations. The Victorian regulations set out clearance distances that must be observed, except where otherwise approved by the Victorian safety regulator, Energy Safe Victoria (ESV). On the other hand the NSW regulations allow the NSW service providers some discretion on the clearances they observe.

The Victorian *Electricity Safety (Electric Line Clearance) Regulations 2010* and *2005,* prescribe (among other things) minimum clearance spaces for power lines that become progressively stricter in areas of higher bushfire risk.[715] Under the *Electricity Safety (Electric Line Clearance) Regulations* the Victorian service providers are able to ask for exemptions from the regulations, where they can demonstrate to ESV that appropriate risk mitigation is in place, under regulation 10. Many of these exemptions were removed after the Black Saturday bushfires and have led to an increase in costs for the Victorian service providers.[716] [717] [718] [719] We do note that the Victorian service providers have been provided with some temporary exemptions while they transition to compliance with the new requirements.[720]

The NSW *Electricity Supply (Safety and Network Management) Regulation 2014, 2008 and 2002* set out the statutory objectives for the NSW service providers relating to vegetation clearance and bushfire risk. The regulations require the NSW service

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709 AER, *Victorian electricity distribution network service providers: Distribution determination 2011-2015 – Final Decision appendices*, September 2012, p. 301.

710 AER, Final Decision: CitiPower Ltd and Powercor Australia Ltd vegetation management forecast operating expenditure step change, 2011–2015, August 2012, p. 2.

711 Victorian Government, *Implementing the Government's Response to the 2009 Victorian Bushfires Royal Commission*, May 2011, p. 61.

712 Victorian Government, *Implementing the Government's Response to the 2009 Victorian Bushfires Royal Commission*, May 2011, p. 61.

713 Victorian Government, Implementing the Government's Response to the 2009 Victorian Bushfires Royal Commission, May 2011, p. 59.

714 Energy Safe Victoria, Regulatory Impact Statement: Electricity Safety (Bushfire Mitigation) Regulations 2013, 25 February 2013, p. 3.

715 *Electricity Safety (Electric Line Clearance) Regulations 2010, Schedule*.

716 CitiPower and Powercor Australia, Response to AER Queries Received 8 January 2015, 30 January 2015, p. 3.

717 United Energy, Response to request for Information on Bushfire Regulations and Opex Productivity, 23 January 2015, p. 5.

718 AusNet Services, Response to AER bushfire regulation and productivity info request, 23 January 2015, p. 2.

719 Jemena, Response to questions concerning bushfire regulations and productivity, 3 February 2015, p. 18.

720 Energy Safe Victoria, Annual Safety Performance Report 2011, 31 August 2012, p. 44.

providers to prepare a safety management system. Part of this plan relates to vegetation management. The NSW regulations however do not mandate minimum vegetation clearance distances.[721] [722] [723]The practices in the NSW service providers' vegetation management plans, contained in the safety management systems, refer to ISSC3: Guideline for managing vegetation near powerlines. ISSC3 provides guidance on vegetation clearance distances. While compliance with the safety management system is mandatory, organisations or individuals may choose to depart from the recommendations of the guideline provided that the necessary duty of care is exercised and regulatory requirements are fulfilled.[724]

Also under the NSW *Electricity Supply (Safety and Network Management) Regulation 2014,* the Director-general of the Department of Water and Energy directed the NSW service providers to incorporate the Code of Practice - Electricity Transmission and Distribution Asset Management 2009 into their safety management systems.[725] Although the code lists ISSC3 as a standard relevant to the code, the NSW service providers are able to depart from the code if they provide justification in their licence compliance annual report.[726]

Given the requirements set out in *Electricity Supply (Safety and Network Management) Regulation 2014* mentioned above, the NSW service providers are able to unilaterally change their vegetation standards. Although the Victorian service providers can negotiate their standards with ESV, they are not able to change their standards unilaterally.

ISSC3 also appears to be less restrictive in the practices it recommends than the Victorian regulations. In general, for distribution voltages, the clearances set out in the Victorian regulations are larger than those in the NSW guideline: in particular for short low voltage lines. The below tables provide a comparison of the clearances in ISSC3 and the Electric Line Clearance Regulations 2005. Comparison has been made between ISSC3 and the 2005 Electric Line Clearance Regulations. The 2010 Electric Line Clearance Regulations require larger clearances.

721 *Electricity Supply (Safety and Network Management) Regulation 2014*, section 7(1)(iv).

722 *Electricity Supply (Safety and Network Management) Regulation 2008,* section.

723 *Electricity Supply (Safety and Network Management) Regulation 2002,* section.

724 Industry Safety Steering Committee, *ISSC 3: Guideline for Managing Vegetation Near Powerlines*, 2005, p. 3.

725 Essential Energy, Revised Proposal: Attachment 7.10, January 20 2014, p. 9.

726 NSW Department of Water and Energy, *Code of Practice Electricity transmission and distribution asset management,* February 2009, p. 5.

Table A.11 Comparison of clearances for insulated cables in all areas

	Near the pole	Spans up to 40 meters	Spans above 40 meters but less than 70 meters	Spans exceeding 70 meters
Aerial bundled cable	NSW requirement larger	NSW requirement larger	Victorian requirement larger	NSW requirement larger
Insulated cable	Victorian requirement larger	Victorian requirement larger	Victorian requirement larger	Victorian requirement larger

Source: ISSC3[727] and Electric Line Clearance Regulations 2005[728]

Table A.12 Comparison of clearances in low bushfire risk areas

	Near the pole	Spans up to and including 40 meters	Spans greater than 40 meters
Bare and Covered Low voltage	Victorian requirement larger	Victorian requirement larger	NSW requirement larger
High voltage distribution	Victorian requirement larger	Same	NSW requirement larger
66kV	Victorian requirement larger	Victorian requirement larger	NSW requirement larger

Source: ISSC3[729] and Electric Line Clearance Regulations 2005[730]

[727] Industry Safety Steering Committee, *ISSC 3: Guideline for Managing Vegetation Near Powerlines*, 2005, p. 32.
[728] Electricity Safety (Electric Line Clearance Regulations) 2005, p.18
[729] Industry Safety Steering Committee, *ISSC 3: Guideline for Managing Vegetation Near Powerlines*, 2005, p. 30.
[730] Electricity Safety (Electric Line Clearance Regulations) 2005, p.22.

Table A.13 Comparison of clearances in high bushfire risk areas

	Near the pole and spans up to 30m	Spans above 30m and up to 45m	Spans above 45m up to 70m	Spans exceeding 70m up to 350 metres	Spans exceeding 350 metres
Bare and low covered low voltage	Victorian requirement larger	Victorian requirement larger	Victorian requirement larger	NSW requirement larger	NSW requirement larger
High voltage distribution	Victorian requirement larger	Same	NSW requirement larger	NSW requirement larger	NSW requirement larger
66kV	Victorian requirement larger	Victorian requirement larger	Same	NSW requirement larger	NSW requirement larger

Source: ISSC3[731] and Electric Line Clearance Regulations 2005[732]

Both ISSC3 and the Electric Line Clearance Regulations allow exceptions from the clearances they contain provided the service provider takes appropriate risk mitigation measures.[733] [734] [735] Of the $205 million (2010) approved by the AER for the change in the Victorian Electric Line Clearance Regulations, the two largest changes were the removal of exceptions for regrowth around insulated cables and in high bushfire risk areas outside of the fire season. The removal of these two exceptions led to a $158 million (2010) step change in opex. With regard to these two exemptions it appears that the obligations were similar prior to the introduction of the 2010 regulations, but more stringent in Victoria after.

Both ISSC3 and the Electric Line Clearance Regulations 2005 allow exceptions for insulated cables.[736] [737] These exceptions allow small branches and leaves to enter clearance zones provided they are not thicker than 15mm and 10mm respectively. The 2005 regulations also allowed for larger branches to enter the clearance zone provided an annual risk assessment was conducted. This exception was removed from the Electric Line Clearance Regulations 2010. In this respect the current Victorian obligations require more than the industry guideline in NSW, while the 2005 regulations were similar.

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731 Industry Safety Steering Committee, *ISSC 3: Guideline for Managing Vegetation Near Powerlines*, 2005, p. 30.

732 Electricity Safety (Electric Line Clearance Regulations) 2005, p.25.

733 Industry Safety Steering Committee, *ISSC 3: Guideline for Managing Vegetation Near Powerlines*, 2005, p. i.

734 *Electricity Safety (Electric Line Clearance) Regulations 2010, Regulation 10.*

735 *Electricity Safety (Electric Line Clearance) Regulations 2010, Regulation 10.*

736 Industry Safety Steering Committee, *ISSC 3: Guideline for Managing Vegetation Near Powerlines*, 2005, p. 32

737 Electricity Safety (Electric Line Clearance Regulations) 2005, Part 2, Clause 9.

Under the Electric Line Clearance Regulations 2005 Energy Safe Victoria gave exemptions to the Victorian service providers which allowed vegetation to grow into clearance zones in bushfire prone areas, provided no vegetation defects remained at the beginning of the fire season. When the Electric Line Clearance Regulations 2010 replaced the 2005 regulations, the exemptions were not renewed. ISSC3 does not recommend any seasonal difference in clearance zones.

While in this situation, the current Victorian regulations and ISSC3 seem to be similar, there is evidence to suggest that ISSC3 allows the NSW service providers some flexibility with its recommended clearance zones. In practice the NSW service providers have exercised judgement and applied the state guideline for vegetation management in a flexible manner.

ISSC3 has been the industry guideline for vegetation management in NSW since 2005. The guideline states that service providers may depart from the guideline provided they take appropriate risk mitigation measures. The differences in the way the NSW service providers apply the guideline demonstrates the flexibility that it affords. For example, Ausgrid and Essential allow regrowth into the ISSC3 recommended clearance zones in between clearance cycles.[738]

Additionally, there seems to be a focus on maintaining the visual amenity of trees in ISSC3 that provides the NSW distributors flexibility in how they treat vegetation which is not present in the Victorian Electric Line Clearance Regulations.[739] [740]

Therefore the two changes in bushfire related regulatory obligations that have most affected the opex of the Victorian service providers represent an increase in obligations relative to those faced by the NSW service providers.

Duty of care

Essential Energy submitted:

> "Despite not being directly subject to the regulatory instruments applicable to Victoria, Essential Energy concluded that in the event that there were bushfires in its distribution area that compromise public safety and property or that damage the environment, and it could be shown that Essential Energy had not reasonably foreseen and taken all reasonable actions to mitigate the possibility of vegetation encroachment and equipment failure being the cause, Essential Energy would be exposed to the significant likelihood of criminal prosecution and civil action at the highest levels of the state and federal courts."[741]

[738] Networks NSW, Executive Leadership Group Meeting 17 October 2013: Vegetation Management and Overhead Line Inspection, Post Meeting Edits as a Result of Discussion.

[739] (Electricity Supply (Safety and Network Management) Regulation 2014 (NSW) section 5

[740] Electricity Safety (Electric Line Clearance) Regulations 2010 section 2(3)).

[741] Essential Energy, Revised Proposal: Attachment 7.10, 20 January 2015, p. 18.

We consider that this point has merit to the extent that service providers in NSW and Victoria face similar risks due to bushfire. On the evidence before us, Victorian has greater bushfire risk to NSW. Therefore, one would expect that less expenditure would be required to mitigate those risks in NSW.

Additionally, although each of the NSW distributors must in exercising their duty of care take notice of events in other jurisdictions, any changes to their practices would be in response to their individual risks. This continual evolution of the duty of care is something all service providers will face. For example, even before the Black Saturday bushfires Powercor began trialling LiDAR technology.[742]

On balance we are satisfied that in discharging their duty of care, the NSW service providers may choose to adopt bushfire mitigation practices such as those applying to the Victorian providers after Black Saturday, where they are relevant to the risks they face.

Impact of differences on opex

Differences in bushfire risk and related regulations between the comparison firms and each of the NSW service providers will provide each of the NSW service providers with a cost advantage.

Differences in bushfire risk have the potential to create material differences in the opex required to operate the comparison firms' opex relative to any one of the NSW service providers. In Victoria for the 2011–2015 period, the increase in regulatory obligations related to bushfires was forecast to account for 9.0 per cent of total opex.[743] [744] [745] [746] [747] [748] [749] [750] [751] Although a prudent service provider would take into consideration changes in practices in other states, it would only adopt those practices to the extent that they are appropriate given their circumstances. On the evidence in front of us, in general, Victoria faces higher risk of bushfires than NSW. Additionally, our examination of vegetation management regulations, the most costly part of electricity service providers' bushfire mitigation practices, show the requirements in Victoria are stricter.

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742 IJM Consulting, Bushfire Mitigation Powercor Australia: Final Audit Report 2008, Audit Report, p. 4.

743 AER, *Final decision: CitiPower Ltd and Powercor Australia Ltd vegetation management forecast operating expenditure step change*, August 2012, p. 2.

744 AER, *CitiPower Pty Distribution determination 2011-15*, September 2012, p. 17.

745 AER, *Powercor Australia Ltd Distribution determination 2011-15*, October 2012, p. 26.

746 AER, *Final decision: Powercor cost pass through application of 13 December 2011 for costs arising from the Victorian Bushfire Royal Commission*, May 2011, p. 96

747 AER, *Final decision - appendices: Victorian electricity distribution network service providers - Distribution determination 2011-2015*, October 2011, p. 301-304.

748 AER, *Final Decision: SP AusNet cost pass through application of 31 July 2012 for costs arising from the Victorian Bushfire Royal Commission*, 19 October 2012, p. 3.

749 AER, *SPI Electricity Pty Ltd Distribution determination 2011-2015*, August 2013, p. 20.

750 AER, *Jemena Electricity Network (Victoria) Ltd: Distribution determination 2011-2015*, September 2012, p. 22.

751 AER, *United Energy Distribution: Distribution determination 2011-2015*, September 2012, p. 19

Although we consider it is likely that the Victorian service providers will have a cost disadvantage relative to the NSW service providers due to differences in bushfire risk and related regulatory obligations, we consider there will be some mitigating factors. The change in regulations only came about after the Black Saturday bushfires. All service providers have a duty of care. Also other factors will affect bushfire mitigation costs such as vegetation density, urbanity, undergrounding, and divisions in responsibility for vegetation management. We note that urbanity (customer density) and undergrounding are accounted for in Economic Insights' SFA model so we have focussed on the effect of the timing of the change, duty of care, and vegetation density.

Although the increase in opex associated with the new bushfire risk mitigation obligations for the Victorian service providers was quite large, it only affected the end of the benchmarking period. The new obligations came into effect at various times from 2010. As a result they only affected the last three years of the benchmarking period. This more than halves the effect of the impact of the change in regulations on the benchmarking results.

As mentioned above all service providers have a duty of care. As a result they must take all reasonable measures to ensure the safety of their networks. As the NSW service providers also face bushfire risk, although not to the same extent as those in Victoria, it may be prudent for them to adopt some of the practices required in Victoria after the Black Saturday bushfires. However, the Victorian service providers were still affected by the regulations for the final three years of the benchmarking period.

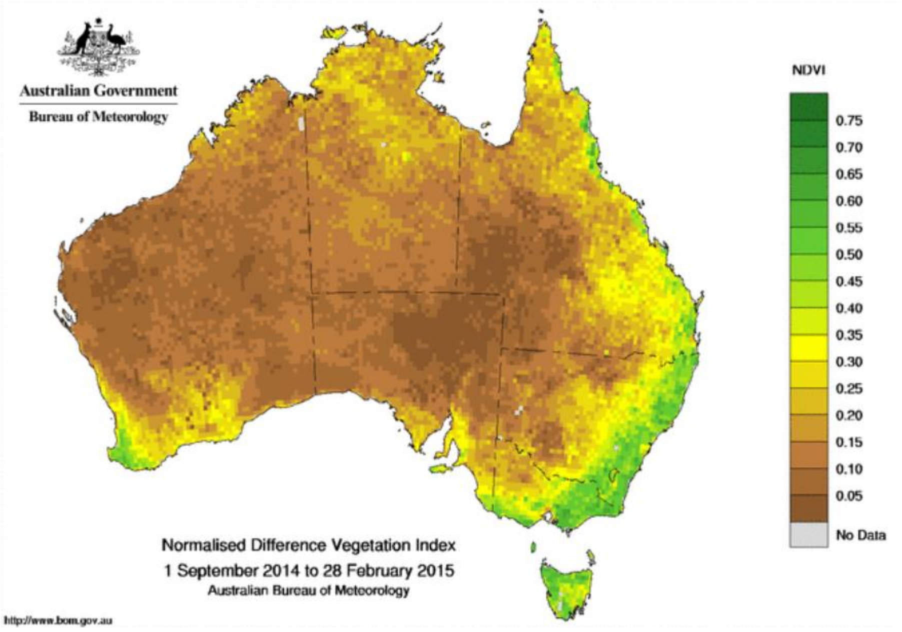
In its report for the NSW service providers, Pacific Economics Group noted that forestation may affect service providers' opex.[752] Ausgrid and Endeavour have higher vegetation density in their rural service areas than some of the comparison firms (shown in Figure A.24 below), this may offset some of the effect of the more stringent bushfire regulations in Victoria. The fact that AusNet, which operates in a higher vegetation density region than Powercor, required a similar increase in expenditure for the increase in vegetation clearance obligations to Powercor, despite having only half the network length, supports this conclusion. On the other hand vegetation density in the NSW service providers' network areas may not be as great an issue because most lines are run through road easements or paddocks. Also, as a percentage of network services opex, Ausgrid spends less on vegetation management than AusNet, Powercor, SA Power Networks, and United Energy. Endeavour spends less than AusNet, Powercor, SA Power Networks, and a slightly more than United Energy.[753] [754]

[752] Pacific Economics Group, Statistical Benchmarking for NSW Distributors, January 2015, p. 35.

[753] Category Analysis RIN response data, template 2.1 Expenditure Summary.

[754] Economic Benchmarking RIN response data, template 3 Opex.

Figure A.24 Normalised Difference Vegetation Index: 6 Month Average September 2014 to 28 February 2015



Source: Bureau of Meteorology[755]

We are satisfied that the more stringent vegetation management obligations and bushfire risks in Victoria are likely to outweigh the higher vegetation density in Ausgrid and Endeavour's service area. The forecast percentage increases in opex due to the change in bushfire regulations for Powercor and AusNet were 11.5 and 11.3 per cent respectively. These are both greater than the average percentage of opex that that Ausgrid and Endeavour spent on vegetation management during the 2009 to 2013 period, 6 and 8 per cent respectively. [756] [757]

Figure A.24 above shows that overall Essential has vegetation density comparable to western Victoria. Essential spends a similar percentage of opex, 20 per cent, on vegetation management as Powercor (18 per cent) and AusNet (22 per cent).[758]

On balance we are satisfied that the Victorian service providers will face a cost disadvantage relative to the NSW service providers due to differences in bushfire risk and related regulations. However, as there are offsetting factors mentioned above, it is uncertain if those differences will lead to a material cost advantage for the NSW service providers. As a result we have decided to treat bushfire risk as an immaterial OEF for the purpose of benchmarking comparisons between the NSW service providers and the comparison firms. The geographic characteristics and settlement

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[755] Bureau of Meteorology, Six-monthly NDVI Average for Australia, available at http://www.bom.gov.au/jsp/awap/ndvi/index.jsp [last accessed 1 March 2015].

[756] Category Analysis RIN response data, template 2.1 Expenditure Summary.

[757] Economic Benchmarking RIN response data, template 3 Opex.

[758] Category Analysis RIN data, template 2.1 Expenditure Summary.

patterns of a network area are beyond the control of service providers. Economic Insights' SFA model does not account for differences in bushfire risk. Therefore, in accordance with our treatment of individually immaterial OEFs we have provided a negative 0.5 per cent adjustment in our collective adjustment for immaterial OEFs to account for differences in bushfire risk.

Corrosive elements

We are not satisfied that an OEF adjustment for corrosive environments would meet the materiality OEF adjustment criterion. All service providers have assets that corrosive elements affect.

In our draft decision we did not provide an OEF adjustment for corrosive elements. This was on the basis that all service providers are affected by corrosive elements. While salts affect assets in coastal areas, dusts affect assets in inland areas. While all service providers will be affected to some extent, the differences in the corrosive elements in each area will lead to differences in design and operational considerations that may affect opex. However, sufficient evidence was not provided to show that these differences would be material.

In response to our draft decision, we received no evidence that the NSW service providers have greater or lesser exposure to corrosive elements than the comparison firms.

However, in accordance with our treatment of immaterial OEFs we have provided a positive 0.5 per cent adjustment for differences in exposure to corrosive elements. Although an OEF adjustment for differences in exposure to corrosive elements is not likely to lead to material differences in opex, the differences they do cause would meet the exogeneity and duplication OEF criteria. The prevalence of corrosive compounds in a network area is beyond service providers' control and Economic Insights' SFA model does not have a variable to account for it. We have provided a positive 0.5 per cent adjustment because it is unclear if differences in exposure to corrosive elements will lead to a cost advantage or disadvantage for the NSW service providers relative to the comparison firms.

Environmental Variability

We are not satisfied that an OEF adjustment for environmental variability would meet the materiality OEF adjustment criterion. Intra-network environmental variability will not lead to material differences in opex.

In its regulatory proposal Ergon Energy raised intra-network environmental variability as an issue that would lead to material differences in opex between it and the comparison firms.[759] Ergon Energy submitted metrics on the variability of temperature, rainfall, and humidity to support this claim. These metrics showed that Ergon has the

[759] Ergon Energy, Regulatory Proposal: Attachment 0A.01.01, 31 October 2014, pp. 12-13.

highest level of intra-network variability in humidity, rainfall, and temperature. Ergon considers this variability of environment within its network presents Ergon Energy with a significant challenge in the development of optimal maintenance schedules and resource allocation. Ergon did not quantify the effect of these scheduling and logistic issues on its opex. Further, Ergon Energy did not adequately explain the link between environmental variability and increased maintenance scheduling costs or resource allocation costs.

We are not satisfied that differences in environmental variability will lead to material differences in opex. In developing maintenance schedules and managing inventories, all service providers must manage a large range of assets. The major driver of this heterogeneity is technological change. As the technology of electricity distribution advances over time, service providers install different types of assets. However, the older assets, based on a different technology remain. Managing this complexity is one of the core competencies of an asset manager. Ergon has provided no information that demonstrates that the incremental complexity involved in managing the potential differences in assets in different environmental zones will materially add to the challenges that all service providers face.

Additionally we note that the majority of the comparison firms (AusNet services, Powercor, and SA Power Networks) are predominantly rural service providers that must operate in environmentally diverse circumstances.

However, as this factor satisfies the exogeneity and duplication OEF criteria, we have included it in our OEF adjustment for immaterial factors. As the majority of comparison firms are rural service providers, the customer weighted average comparison firm is likely to operate in a service area with a more variable climate than Ausgrid or Endeavour. However, as the comparison firms include CitiPower and United Energy, Essential is likely to have a cost disadvantage. An OEF adjustment for environmental variability is also likely to satisfy the exogeneity and materiality OEF adjustment criteria. Differences in environment within a network's service are beyond service providers' control and Economic Insights' SFA model does not capture differences in environmental variability. As a result we have provided a negative 0.5 per cent adjustment to Ausgrid and Endeavour but a positive 0.5 per cent adjustment to Essential in our OEF adjustment for immaterial factors.

Extreme weather events

We are not satisfied that an OEF adjustment for differences in exposure to extreme weather events would meet the materiality OEF adjustment criterion.

In support of its 2014 regulatory proposal, Ausgrid submitted a report by Evans and Peck that identified major weather events as an OEF that may affect benchmarking results.[760] Evans and Peck present analysis from the Bureau of Transport Economics (BTE) that estimate the magnitude of the costs imposed by disasters in Australia. These costs include the estimated costs of bushfires, cyclones, earthquakes, floods, landslides, and severe storms in Australia over the period 1967-1999.[761]

In our draft decision we did not provide an OEF for extreme weather events.[762] This is because they are not likely to create material differences in opex between the NSW service providers and the comparison firms. On the basis of the data from the BTE, the average annual economic impact of severe storms is low in NSW, Victoria, and South Australia. The NSW service providers did not make any submissions on our draft position for this OEF.

However, we have included this factor in our adjustment for immaterial factors. It satisfies the exogeneity and duplication criteria. Service providers cannot control the weather and Economic Insights' SFA model does not include variables that account for the effects of extreme weather. As the impact of extreme weather events is higher in NSW than in Victoria or South Australia, when normalised for GSP, we have provided a positive 0.5 per cent adjustment for extreme weather events.

Grounding conditions

We are not satisfied that an OEF for grounding conditions would meet the materiality OEF adjustment criterion. The installation of earth grids is a very small part of service providers' costs. There is no evidence to suggest that there are material differences in grounding conditions between the NSW service providers and the comparison firms.

Electricity distribution requires the use of earthing or grounding connection to aid in the protection and monitoring of the network. In rural areas, service providers use the earth as the return path for some forms of electricity distribution. These systems require service providers to create an electrical earth, usually from embedding conductors or rods in the ground. The effectiveness of these earths varies depending on the soil type and the amount of moisture in the soil.

In our draft decision we did not provide an OEF adjustment for grounding conditions. This was on the basis that the maintenance of earth grids are a very small part of service provider's costs.

In response to our draft decision, we received no evidence that there are differences in grounding costs between the NSW service providers and the comparison firms that would lead to material differences in opex.

[760] Evans and Peck, *Review of factors contributing to variations in operating and capital costs structures of Australian service providers*, November 2012, pp. 66-7.

[761] Evans and Peck, *Review of factors contributing to variations in operating and capital costs structures of Australian service providers*, November 2012, p. 66.

[762] We considered this factor under the title natural disasters in our draft decision.

However, in accordance with our treatment of immaterial OEFs we have provided a positive 0.5 per cent adjustment for differences in grounding conditions. An adjustment for grounding conditions would satisfy the exogeneity and duplication OEF criteria. Soil conditions are beyond service providers' control and Economic Insights' SFA model does not have a variable that accounts for them. We have provided a positive 0.5 per cent adjustment because it is unclear if differences in grounding conditions will lead to a cost advantage or disadvantage for the NSW service providers relative to the comparison firms.

Humidity and rainfall

We are not satisfied that an OEF for differences in humidity and rainfall between the NSW service providers and the comparison firms would meet the materiality OEF adjustment criterion. Differences in humidity between the NSW service providers and the comparison firms are unlikely to lead to material differences in opex. This is because differences in humidity are will have a greater impact on asset replacement rather than maintenance costs.

In response to our draft decision, Essential Energy submitted that we had not taken into account differences in the rate of fungal rot between the NSW service providers and the comparison firms.[763] Essential Energy presented two maps produced by the CSIRO that indicated that wooden objects in the northern half of coastal NSW are more prone to fungal rot than Victoria. Essential Energy stated this would lead to greater pole maintenance costs. Essential Energy provided no quantification of the impact that these differences would have on costs.

In response to questions from the AER about the effect of rainfall and humidity on poles, cross arms, transformers and assets using SF6 as an insulator, Ergon Energy submitted that high rainfall and humidity increases the degradation of timber assets.[764] It also submitted that asset failures in high rainfall areas make up 40 per cent of asset failures although they only make up five per cent of the area of Queensland.[765] Ergon Energy also stated that it has a special inspection program for pole tops in areas that have rainfall of above 1500mm per annum. This leads to inspection costs being higher for poles in its higher rainfall areas.

We agree with Essential Energy that wooden poles in the north of coastal NSW will be more susceptible to fungal rot than poles in the comparison firms' service areas. However, we do not consider that this will lead to material differences in opex between the comparison firms and the NSW service providers. This is because fungal rot is more likely to lead to increased pole replacement than increased maintenance costs. Maintenance activities for poles are predominantly inspection and antifungal treatment. These are generally carried out at the same time.

763 Essential Energy, Revised Proposal: Attachment 7.4, 20 January 2015, p. 30 to 31.

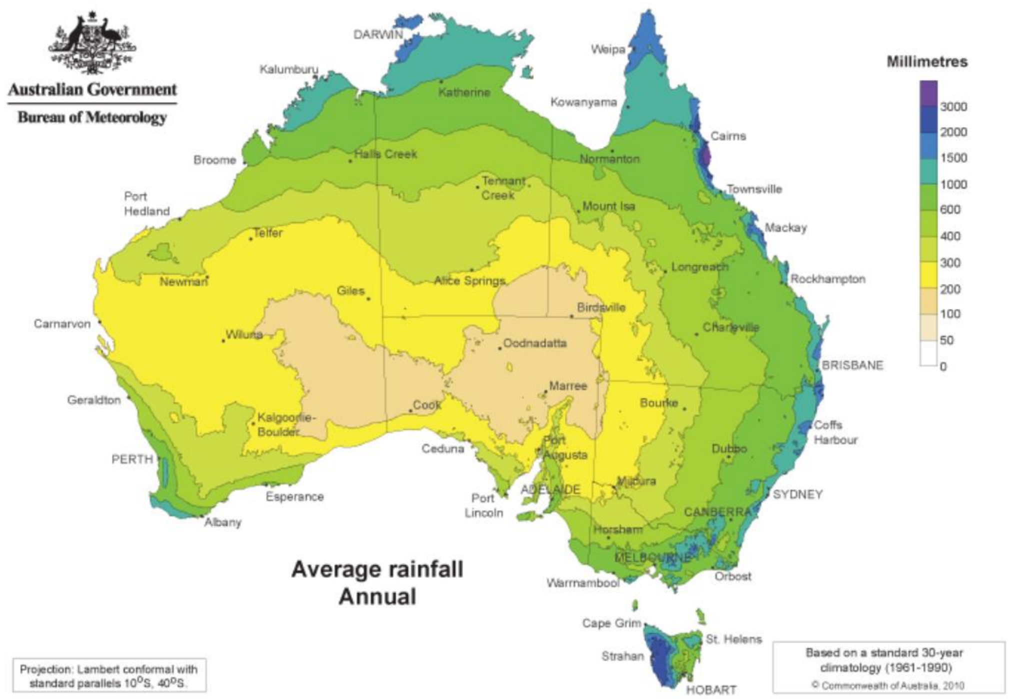
764 Ergon Energy, Response to information request ERG018(3), 30 January 2015.

765 Ergon Energy, Response to information request ERG018(3), 30 January 2015, p. 5.

The Victorian service providers are required to inspect their assets every three years in Hazardous Bushfire Risk Areas and every five years in Low Bushfire Risk Areas.[766] This practice has been in place since 2011.[767] Ergon[768] and Essential[769] generally inspect their pole assets and pole top assets every four years. Ausgrid[770] and Energex[771] reported five year inspection cycles and Endeavour Energy[772] reported four and a half year cycles.

We do note that the Ergon Energy carries out more expensive crossarm inspections in high rainfall areas. However, Ergon Energy has provided no evidence to indicate that the benefit of these inspections outweighs the additional costs relative to the aerial inspections used by other service providers to inspect crossarm health. Further in the case of the NSW service providers, only Essential Energy has a small part of its network that is subject to average rainfalls in excess of 1500mm a year. See Figure A.25 below.

Figure A.25 Average Annual Rainfall in Australia 1961 to 1990



Source: Bureau of meteorology[773]

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[766] Electricity Safety (Bushfire Mitigation) Regulations 2013, Regulation 6.

[767] Electricity Safety Amendment (Bushfire Mitigation) Regulations 2011, Regulation 7.

[768] Ergon Energy, Response to information request ERG018(3), 30 January 2015, p. 5.

[769] Essential Energy, Response to Category Analysis RIN template 2.8 (2013-14).

[770] Ausgrid, Response to Category Analysis RIN template 2.8 (2013-14).

[771] Energex, Response to Category Analysis RIN template 2.8 (2013-14).

[772] Endeavour Energy, Response to Category Analysis RIN template 2.8 (2013-14).

[773] Bureau of Meteorology, Annual Rainfall Average: Product Code: IDCJCM004, available at http://www.bom.gov.au/jsp/ncc/climate_averages/rainfall/index.jsp [last accessed 18 March 2015].

We note that the increased rate of timber degradation in NSW and Queensland may manifest itself in higher replacement rates. Our repex model takes this into account by using observed replacement rates as the basis for forecast replacement quantities.

On balance we are not satisfied that differences in rainfall and humidity are likely to lead to material increases in opex between the NSW service providers and the comparison firms. However we consider that the increased susceptibility of timber to fungal rot on the north and central coast of NSW may lead to a marginal increase in opex for the NSW service providers. It is also appropriate to provide an adjustment for humidity and rainfall as it would satisfy the exogeneity and duplication criteria. The weather and climate are beyond the control of service providers and there is no variable in Economic Insights' SFA model that accounts for differences in humidity between the NEM service providers. In accordance with our approach to immaterial OEFs, we therefore consider it appropriate to provide a positive 0.5 per cent adjustment for humidity and rainfall to the NSW service providers.

Skills required by service providers

We are not satisfied that an OEF adjustment for differences in skills required by service providers would meet the materiality OEF adjustment criterion. Differences in the skills required by service providers are not likely to lead to material differences in costs. All service providers require broadly the same skills.

As service providers operate in different environments, they may require different skills. For example, rural networks may hire pilots to carry out asset inspections and transport staff and equipment. However, overall, service providers require employees with similar qualifications and skills. We note that we are benchmarking the same core services provided by all networks.

In our draft decision we did not provide an adjustment for these reasons. We received no new substantive submissions on this OEF in response to our draft decision.

We have included this factor as part of the allowance for immaterial OEFs. This is because although differences in the skills required by service providers are unlikely to lead to material differences in opex, it is logical that there will be some differences. An adjustment for differences in skills required would satisfy the exogeneity OEF adjustment criterion. Different environmental conditions may require specialised expertise not required by other NEM service providers. Also differences in the skills required are not accounted for in Economic Insights' SFA model. As there is uncertainty as to which service providers will have cost advantages on this OEF we have provided a positive 0.5 per cent OEF for differences in skills required by service providers.

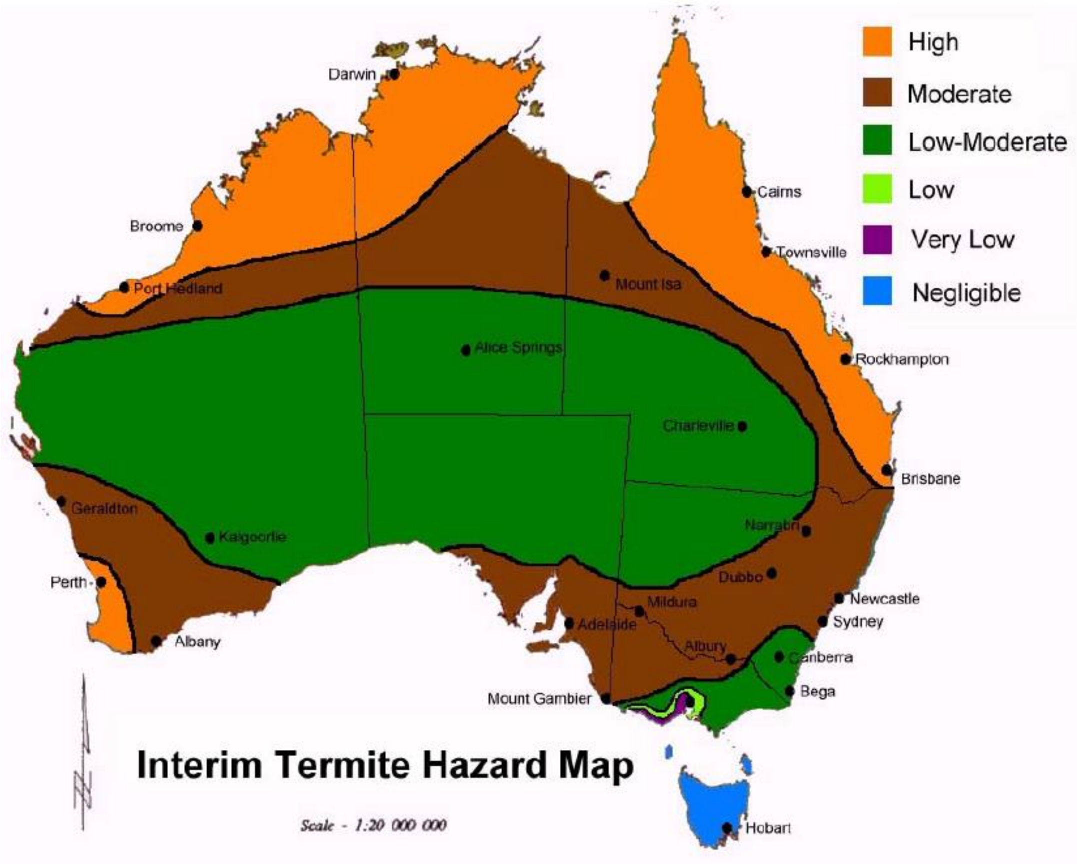
Termites

We are satisfied that an OEF adjustment for differences in termite exposure between the NSW service providers and the comparison firms would satisfy all of our OEF adjustment criteria. The range of termites is beyond service providers' control. Termite management can be a material cost. There are no variables in Economic Insights' SFA model for difference in termite exposure.

In response to our draft decision, the NSW service providers' consultant Huegin raised termites as an OEF that may lead to differences in opex between the NSW service providers and the comparison firms.[774] Ergon Energy also raised this point in its regulatory proposal.[775] Both Huegin and Ergon Energy submitted different maps to substantiate their claims. Both broadly show that Southern and Eastern Victoria are low risk, North Western Victoria and NSW are moderate risk, and coastal Queensland is high risk. It is not clear what the source of the data behind these maps are.

The CSIRO has published a similar map,[776] based on surveys of the incidence of termites and termite infestations of dwellings across Australia. It is shown below in Figure A.26.

Figure A.26 CSIRO Termite Hazard Map of Australia



In its 2011 regulatory proposal, Powercor requested a step change for increased expenditure on treating termite infested poles. Powercor forecast that over the 2011 to

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[774] Huegin, *Response to draft determination on behalf of NNSW and ActewAGL - Technical response to the application of benchmarking by the AER*, January 2015, p. 47.

[775] Ergon Energy, Regulatory Proposal: Attachment 0A.01.01, pp. 15-16.

[776] Cookson, L.J. and Trajstman, A.C., Termite Survey and Hazard Mapping, June 2002, p. 34.

2015 period its average annual expenditure on termite management would be $0.3 million ($2010) per year.[777] Using this figure in conjunction with data from Powercor's response to the Category Analysis RIN, this indicates that the average cost of termite treatment per wooden pole for Powercor is around 96 cents per annum ($2013/14). Ergon Energy, also provided some information that showed the average opex for responding to asset failures caused by termites was 22.7 per cent of the cost of treating infested poles for the 2011/12 to 2013/14 period.[778] Therefore we estimate that the average total cost of treating infested poles and responding to termite induced asset failures is $1.18 per wooden pole for Powercor.[779]

We estimated termite management costs per pole for the NSW service providers and the comparison firms. We multiplied the cost per pole for Powercor by different rates, depending on the location of the relevant firm and infestation rates from the CSIRO.[780] [781] This was to account for differences in infestation rates across service areas.

We estimate that the NSW service providers would spend $1.2 ($2013/14) more per pole than the customer weighted average of the comparison firms for termite management. Multiplying the marginal termite management cost per wooden pole by the number of wooden poles for each service provider,[782] provides an estimate of the value of the cost disadvantage. The disadvantage is $0.09 million, $0.3 million, and $1.4 million (2013/14) for Ausgrid, Endeavour, and Essential respectively annually. Adding these estimates to the efficient opex, determined by the SFA model, suggests a 0 per cent, 0.2 per cent, and 0.6 per cent cost disadvantage for Ausgrid, Endeavour, and Essential.

Although the effect of termites on Ausgrid and Endeavour's opex is immaterial, in accordance with our approach to quantifying immaterial OEFs, we will provide an OEF adjustment that reflects the quantified impact.

As a result we consider that OEF adjustments of 0 per cent, 0.2 per cent, and 0.6 per cent for Ausgrid, Endeavour, and Essential are appropriate.

Topography

We are not satisfied that an OEF adjustment for topography would meet the materiality OEF adjustment criterion. Differences in topography between the service providers are not likely to lead to material differences in opex.

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[777] AECOM, Climate change impact assessment on Powercor Australia for 2011–2015 EDPR, 30 September 2009, pp. 70–75.

[778] Ergon Energy, Response to AER Information Request AER ERG 018(4), 6 February 2015, p. 2.

[779] 1.18=0.96*1.227

[780] Cookson, L. J. and Trajstman, A. C., Termite Survey and Hazard Mapping, June 2002, pp. 6 and 29.

[781] We assumed the NSW service providers, AusNet, CitiPower, and UED were respectively 158 per cent, 93 per cent, 42 per cent, and 52 per cent as likely to be affected by termites as Powercor. These are based on incidence rates from Cookson and Trajstman's termite survey.

[782] The number of wooden poles for each service provider was taken from the category analysis RIN responses.

Our draft decision did not make any adjustment for topography. In response to our draft decision, we received no evidence that the NSW service providers incur greater opex than the comparison firms due to differences in topography.

Adverse topographical conditions affect many NEM service providers. For example, the Great Dividing Range runs through some distribution network areas. Operating in mountainous regions may lead to higher costs in some operating areas such as maintenance, emergency response, and vegetation management due to access issues, even if this is not likely to be a material cost. We note that AusNet Services, the comparison service provider at the benchmark comparison point, has a similarly mountainous operating environment to Ausgrid and Endeavour, but a more mountainous operating area than Essential. However, most of the comparison service providers operate in a relatively flat area compared to NSW service prvoiders. Therefore, the NSW service providers may have a cost disadvantage relative to the comparison service providers due to topography.

However, in accordance with our treatment of immaterial OEFs we have provided a positive 0.5 per cent adjustment for differences in topography. An adjustment for topography would satisfy the exogeneity and duplication OEF criteria. The landforms in service providers' network areas are beyond their control and there is no variable in Economic Insights' SFA model to account for differences topography. We have provided a positive 0.5 per cent adjustment because it is unclear if differences in topography will lead to a cost disadvantage for the NSW service providers relative to the comparison firms.

A.6.8 Jurisdictional factors

Building regulations

We are not satisfied that an OEF adjustment for differences in building regulations across jurisdictions would meet the materiality OEF criterion. The Building Code of Australia (BCA) provides a set of nationally consistent, minimum necessary standards of relevant safety (including structural safety and safety from fire), health, amenity and sustainability objectives for buildings and construction.[783]

The Australian Building Codes Board (ABCB) is a Council of Australian Government standards writing body that is responsible for the National Construction Code (NCC) that comprises the BCA and the Plumbing Code of Australia (PCA). It is a joint initiative of all three levels of government in Australia and was established by an intergovernment agreement (IGA) signed by the Commonwealth, States and Territories on 1 March 1994. Ministers signed a new IGA, with effect from 30 April 2012.[784] The BCA contains technical provisions for the design and construction of buildings and

783 ABCB, The Building Code of Australia, available at; http://www.abcb.gov.au/about-the-australian-building-codes-board . [last accessed 4 September 2014].

784 ABCB, About the Australian Building Codes Board, available at; http://www.abcb.gov.au/about-the-australian-building-codes-board . [last accessed 4 September 2014].

other structures, covering such matters as structure, fire resistance, access and egress, services and equipment, and energy efficiency as well as certain aspects of health and amenity.[785]

Therefore we did not provide an OEF adjustment for Building regulations in our draft decision.

We are still satisfied that an OEF adjustment for differences in building regulations between the NSW service providers and the comparison firms does not satisfy the materiality OEF adjustment criterion. We were unable to identify any building regulations that would lead to material differences in opex. The NSW service providers also did not submit evidence that demonstrated that there were material differences. However, in accordance with our treatment of immaterial OEFs we have provided a positive 0.5 per cent adjustment for differences in building regulations. An adjustment for differences in building regulations would satisfy the exogeneity and duplication OEF adjustment criteria. Building regulations are not determined by service providers and there are no variables in Economic Insights' SFA model that account for differences in them. We have provided a positive 0.5 per cent adjustment in our collective adjustment for immaterial OEFs because it is unclear if building regulations will lead to a cost advantage or disadvantage for the NSW service providers relative to the comparison firms.

Cultural heritage

We are not satisfied that an OEF adjustment for differences in cultural heritage management across jurisdictions would meet the materiality OEF adjustment criterion. We do not see evidence to suggest that differences in cultural heritage management requirements would lead to material differences in opex.

In response to questions from the AER on the OEFs that materially affect its costs, Ergon Energy submitted that cultural heritage obligations impose additional management and operational costs on it.[786] Specifically Ergon Energy identified staff training and awareness, special alert and management processes and additional operational precautions for native title cultural heritage. Ergon Energy provided a map showing areas where native title has been found to exist and where claims have been made. Ergon Energy did not quantify the costs it incurs for its native title or other cultural heritage programs.

Many service providers have cultural heritage obligations. For example, the Victorian service providers most comply with the *Planning and Environment Act 1987*, the *Heritage Act 1995*, and the *Aboriginal Heritage Act 2006* in providing services. The NSW service providers have not provided evidence to suggest the costs they incur to meet their obligations will be materially different to comparison firms.

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[785] ABCB, The Building Code of Australia, available at; http://www.abcb.gov.au/about-the-australian-building-codes-board . [last accessed 22 March 2015].

[786] Ergon Energy, Response to AER information request Ergon 002, 17 December 2014, p. 7-9

Therefore we are not satisfied that differences in cultural heritage obligations will lead to material differences in opex between the NSW service providers and the comparison firms. However, there is likely to be some differences in obligations that will lead to immaterial differences in opex. An adjustment for differences in cultural heritage obligations would also satisfy the exogeneity and duplication OEF adjustment criteria. Cultural heritage obligations are not determined by service providers and there are no variables in Economic Insights' SFA model that account for differences in them. As the direction of cost advantage is unclear, we have included an adjustment of positive 0.5 per cent for differences in cultural heritage obligations in our adjustment for immaterial factors.

Environmental regulations

We are not satisfied that an OEF adjustment for differences in environmental regulations across jurisdictions would meet the materiality OEF adjustment criterion. Environmental regulations are not likely to create material differences in costs between the NSW service providers and the comparison firms.

In our draft decision, we investigated how environmental regulations may lead to material differences for the opex that service providers require, but were unable to find any reliable evidence that such differences exist. The way various jurisdictions administer environmental regulation varies considerably.[787] While the Commonwealth has some involvement, most environmental planning functions are carried out by state or local governments. We consider it is likely that differences in environmental regulations faced by service providers will lead to differences in costs, but we do not have any evidence to suggest that these differences will lead to material differences in opex.

In response to our draft decision, Ausgrid stated that our opex forecast would not provide it with sufficient opex to manage its environmental programs. Programs it stated would be affected include:

- contaminated site assessment
- oil containment installation and maintenance
- environmental civil works
- fluid filled cable maintenance and replacement
- washbay monitoring and maintenance
- water treatment plant monitoring and maintenance
- Polychlorinated biphenyl removal programs.[788]

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787 Productivity Commission, *Performance Benchmarking of Australian Business Regulation: Local Government as Regulator*, July 2012, p. 386-390.

788 Ausgrid, Revised Regulatory Proposal: Attachment 1.15, 20 January 2015, p. 1.

Essential Energy raised the same issues.[789] Endeavour Energy did not raise all of the issues raised by Ausgrid and Essential Energy, but it did raise contaminated site assessment and oil containment, installation and maintenance.[790] Neither Ausgrid, Endeavour, or Essential quantified the opex associated with these programs.

ActewAGL also submitted that environmental obligations in the ACT differ.[791] However, ActewAGL did not explain how its obligations differ or provide any evidence that any differences, to the extent that they exist, will lead to material differences in opex.

While Ausgrid has provided an explanation of the works it must undertake, it did not provide evidence that there are any differences in the scope of those works relative to the Victorian service providers. Additionally it did not provide evidence that any difference in the scope of environmental impact mitigation works, to the extent that it exists, would lead to material differences in opex.

All of the NEM service providers undertake similar environmental impact mitigation activities to those identified by Ausgrid. While the relative expenditure of these activities may vary across service providers, they are practices that are common industry wide. This in, conjunction with our benchmarking results, suggests that the comparison firms undertake similar activities at lower cost. We do note that some service providers may have already finished their PCB removal programs. Additionally, although small area treatment as it relates to substations is common, large scale water treatment is not a common practice. Ausgrid did not provide any evidence that its water treatment plant monitoring and maintenance program related to large scale water treatment.

We are not satisfied that an OEF adjustment for differences in environmental regulations between the NSW service providers and the comparison firms would meet the materiality OEF adjustment criterion. We were unable to identify any environmental regulations that would lead to material differences in opex. The NSW service providers also did not submit evidence that demonstrated that there were material differences.

However, in accordance with our treatment of immaterial OEFs we have provided a positive 0.5 per cent adjustment for differences in environmental obligations. An OEF adjustment for environmental obligations would also satisfy the exogeneity and duplication OEF criteria. Environmental obligations are not determined by service providers and Economic Insights' SFA model does not include any variables that account for differences in them. We have provided a positive 0.5 per cent OEF in our collective adjustment for immaterial OEFs because it is unclear if environmental obligations will lead to a cost advantage or disadvantage for the NSW service providers relative to the comparison firms.

789 Essential Energy, Revised Regulatory Proposal: Attachment 1.9, 20 January 2015, p. 3.

790 Endeavour Energy, Revised Regulatory Proposal, 20 January 2015, pp. 37-38.

791 ActewAGL, Revised Proposal, 20 January 2015, p. 3.

Occupational Health and Safety regulations

We are satisfied that it is necessary to provide the NSW service providers with a positive 0.5 per cent OEF adjustment for differences in Occupational Health and Safety Regulations (OH&S). This is because an OEF adjustment for OH&S regulations satisfies all three OEF adjustment criteria. OH&S regulations are outside of the control of service providers. Differences in OH&S regulation are likely to create material differences in opex between the NSW service providers and the comparison firms. Economic Insights' SFA model does not account for differences in OH&S regulations.

We provided an OEF adjustment for OH&S regulations in our draft decision for the above reasons. Details on the quantification of our OH&S adjustment can be found in our draft decision. The quantification was based on findings from a report by PwC. [792] This report was commissioned by the Victorian Government to estimate the cost to the Victorian economy of transitioning to the Work Health and Safety (WHS) Laws that apply in the other NEM jurisdictions.

In response to our draft decision Ergon Energy's consultant, PwC, made a submission on our adjustment for differences in jurisdictional OH&S differences.[793] PwC made four observations on our application of its findings to estimate an OEF adjustment for differences in OH&S obligations. PwC stated that its report on the impact of the WHS laws only considered the potential costs borne by Victorian businesses. It stated that the total cost of complying with the new WHS laws was not considered. It stated that its findings do not directly reflect costs facing network service providers. It also considered normalising the annualised cost by Victoria's Gross State Product (GSP) could be misleading. We address each of these comments below.

The OEF adjustment for OH&S obligations is designed to quantify the effect of the cost advantage that the Victorian service providers have over other service providers. As the report estimates the cost of transitioning to the WHS laws for Victoria, it provides an estimate of the cost avoided by Victorian businesses by not having to comply with the WHS laws. We also note that PwC has provided no evidence that the costs of complying with the WHS laws would be different in Queensland than Victoria.

It is not appropriate to consider the total cost of complying with and implementing the WHS laws for the purpose of an OEF adjustment. OEF adjustments are not required for non-recurrent costs. Providing an OEF for non-recurrent costs treats those costs as if they were recurrent. Economic Insights' benchmarking results are used as the basis for our forecast of opex. If we adjust the benchmarking results with an OEF adjustment for non-recurrent costs, it has the effect of including those non-recurrent costs in our forecast of opex. Essentially, providing an OEF adjustment for non-recurrent costs

792 PricewaterhouseCoopers, *Impact of the Proposed National Model Health Work and Safety Laws in Victoria*, April 2012.

793 PricewaterhouseCoopers, Review of AER's methodology of adjusting for differences in occupational health and safety obligations, 12 February 2015.

leads to those costs being treated as recurrent costs. This is not appropriate because it would provide an allowance for costs that will not be incurred.

The challenges in safely operating high voltage assets that network service providers must take into account will be similar to those that power generators face. Although PwC's report's findings show that the costs of adopting the laws are not uniformly distributed across Victorian businesses we have taken steps to account for this. We adjusted the average impact across the Victorian economy to reflect the observed differences between most firms surveyed and the business type that most resembled the network service providers: power generators. We note that network service providers are likely to incur higher costs for OH&S obligations than power generators due to their scale. This is why we adopted a percentage adjustment, calculated using the average cost to the Victorian economy,[794] rather than the average annualised cost per power generator, which was only $5,210 ($2011-12). PwC did not propose an alternative method to account for differences between the state average and network service providers.

Using Victorian Gross State Product (GSP) to estimate the materiality of regulatory changes within Victoria is appropriate. Volatility in growth rates across states will not affect this. We estimated the percentage of goods and services produced in Victoria that the annualised increase in OH&S costs would have accounted for if they were incurred in 2012. The estimate of GSP used was from 2012. The estimates of compliance costs which formed the basis for PwC's report were also from financial year 2012. Because we are comparing two figures that relate to the same state, variability between states will not affect the comparison.

Licence conditions

We are satisfied that it is necessary to provide an OEF adjustment for differences in licence conditions across jurisdictions. The adjustments are 1 per cent, 0.6 per cent, and 1 per cent for Ausgrid, Endeavour Energy, and Essential Energy respectively. OEF adjustments for the 2005 and 2007 licence conditions meet the exogeneity, materiality, and duplication OEF criteria. Past licence conditions are likely to materially affect opex because they mandated that the NSW service providers install significant redundant capacity they may not have in the absence of those conditions. Economic Insight's SFA model will only account for feeders installed to meet those standards, not substation capacity. On the basis of the Economic Benchmarking RIN and Category

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[794] The annual costs forecast by PwC for the implementation of the new OH&S laws were equivalent to 0.24 per cent of the Gross State Product of Victoria in financial year 2012. Because electricity distribution work environments may present more danger than the average work environment across the economy we multiplied this amount by 2.5. The PwC report suggests that the annualised ongoing costs for power generators would be almost two and a half times greater than for the majority of other businesses. This suggests that the Victorian service providers have a 0.6 per cent cost advantage relative to the other NEM service providers. However, as SA Power Networks accounts for 21 per cent of the comparison firm's customers, the customer weighted average cost advantage the comparison firms have is 0.5 per cent.

Analysis RIN data the effect on opex of the past licence conditions is greater than 0.5 per cent of opex.

In our draft decision we did not provide an OEF adjustment for licence conditions. This is because most of the expenditures made to meet the licence conditions were capital in nature, the conditions for the forecast period were similar to those in other states, and reliability was accounted for in some of Economic Insights' models.

In response to our draft decision, ActewAGL and the NSW service providers' consultant Advisian noted that the number of assets that a service provider uses to operate its network will drive its operating costs.[795] [796] Advisian submitted that it considers that the variables in Economic Insights' models ignore the cost of maintaining a larger number of assets. In particular, Advisian raised the effect of assets installed for the purpose of compliance with planning standards in schedule 1 of the 2005 and 2007 NSW licence conditions. We have not considered the effects of schedules 2 and 3 because they provide interruption frequency and duration targets similar to those found in other jurisdictions. [797] [798]

We consider capital investment to meet the 2005 and 2007 planning requirements may warrant an OEF adjustment. This is because the planning requirements were determined by parties that were beyond the NSW service providers' control. Therefore it satisfies the exogeneity OEF. It is also not accounted for in the ratcheted demand variable in Economic Insights' SFA model. This is because it required the NSW service providers to install transformer capacity that was not required to meet peak demand.

We also consider that an OEF adjustment for capex to meet the 2005 and 2007 planning requirements is not sufficiently captured by the variables in the SFA model. While expenditure on feeder redundancy will be captured by the circuit length variable, not all expenditure in transformer capacity redundancy is captured by the ratcheted maximum demand variable. Circuit length captures the effect of investment in new feeders because each new feeder installed will increase the circuit length variable. This in turn will increase the opex forecast by Economic Insights SFA model. However, increases in transformer capacity do not increase the ratcheted demand variable. As a result, the SFA model will forecast no change in required opex where there is an increase in transformer capacity that is not made in response to an increase in demand.

We have estimated the impact of the increased transformer capacity required to meet the 2005 and 2007 planning requirements using the Economic Benchmarking and Category Analysis RIN responses. The Economic Benchmarking RIN responses

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[795] Advisian, Review of AER benchmarking: Networks NSW, 16 January 2015, pp. 41 -46.

[796] Advisian, Opex Cost Drivers: ActewAGL Distribution Electricity (ACT), 16 January 2015, p. 50.

[797] NSW Minister for Energy, *Design, Reliability and Performance Licence Conditions For Distribution Network Service Providers*, 1 December 2007, Schedules 2 and 3.

[798] NSW Minister for Energy and Utilities, *Design, Reliability and Performance Licence Conditions Imposed on Distribution Network Service Providers by the Minister for Energy and Utilities*, 1 August 2005, Schedules 2 and 3.

provide data on the amount of transformer capacity at the distribution and zone substation levels. The Category Analysis RIN provides some indication of the amount of expenditure that is related to maintaining those assets. Both the RINs provide information at the zone and distribution substation level. While the Economic Benchmarking RIN provides some information on the capacity for subtransmission transformers, the category analysis RINs do not provide expenditure data. We have estimated the share of opex attributable to subtransmission substation maintenance using data from AusGrid's category analysis RIN responses. This is because Ausgrid provides data on the costs associated with its dual function assets and its single function assets separately. Neither Endeavour nor Essential have any assets classified as dual function.

To estimate the increase in transformer capacity due to the planning standards for each distributor we have used the percentage increase in transformer capacity less the percentage increase in ratcheted demand over the 2006 to 2013 period. For Ausgrid we have used the total increase in capacity. For Essential Energy and Endeavour Energy we have excluded the increase in distribution transformer capacity. This is because Essential Energy and Endeavour Energy were not required to increase their distribution transformer capacity to comply with the 2005 and 2007 planning standards.[799] [800] The 2005 and 2007 planning requirements mandated N-2 redundancy in CBD areas and N-1 redundancy in all other areas for subtransmission and zone substation transformer capacity.[801] The planning requirements also mandated N-1 redundancy for distribution substations in CBD areas. Endeavour Energy and Essential Energy have no CBD feeders. [802] [803] Therefore the redundancy conditions for distribution substations would not have led to any increases in opex for them. The Economic Benchmarking RIN data indicate that after accounting for increases in demand, Ausgrid, Endeavour Energy, and Essential Energy's subtranmission and zone substation transformer capacities increased by 22, 18, and 31 per cent respectively. Ausgrid's distribution transformer substation capacity also increased by 10 per cent.

To estimate the percentage of opex the NSW service providers expend on subtranmission, zone, and distribution substation transformer maintenance, we used data from the Category Analysis RIN. Specifically, we used the amounts the NSW service providers allocated to zone and distribution substation maintenance in response to template 2.7 of the Category Analysis RINs. In financial year 2014 Ausgrid, Endeavour Energy, and Essential Energy reported that zone substation maintenance made up 3.4, 3.6, and 3.9 per cent of opex respectively. In financial year 2014 Ausgrid reported that distribution substation maintenance made up 3.5 per cent of its opex. To estimate the impact of subtranmission maintenance, we found what

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[799] NSW Minister for Energy, *Design, Reliability and Performance Licence Conditions For Distribution Network Service Providers*, 1 December 2007, Schedule 1.

[800] NSW Minister for Energy and Utilities, *Design, Reliability and Performance Licence Conditions Imposed on Distribution Network Service Providers by the Minister for Energy and Utilities*, 1 August 2005, Schedule 1.

[801] Except for zone substations with a capacity of less than 5 MVA, which required no redundancy.

[802] Essential Energy, *Electricity Network Performance Report 2013/14*, 2014, p. 24.

[803] Endeavour Energy, *Electricity Network Performance Report 2013/14*, 2014, p. 10.

percentage zone substation maintenance was of total maintenance for Ausgrid and applied this percentage to Ausgrid's dual function asset maintenance opex. This results in an estimate of 0.3 per cent of opex being attributable to subtransmission substation maintainance.

This suggests that the amount of opex required to maintain the mandated transformer capacity is 1 per cent ([1-{1/1.22}] x 3.7+[1-{1/1.1}] x 3.8), 0.6 per cent ([1-{1/1.18}]x3.9), and 1 per cent ([1-{1/1.31}]x4.2) of historical opex for Ausgrid, Endeavour Energy, and Essential Energy respectively. When converted from the OEF adjustment to historical opex to the OEF adjustment to the efficient level of opex, as discussed in our calculation of OEFs section above, these figures imply a 1.2, 0.7, and 1.2 per cent OEF adjustment for Ausgrid, Endeavour and Essential respectively. Therefore an OEF adjustment for transformer capacity installed to meet the 2005 and 2007 planning standards satisfies the materiality OEF adjustment criterion.

Planning regulations

We are not satisfied that an OEF adjustment for differences in planning regulations across jurisdictions would meet the materiality OEF adjustment criterion. Differences in planning regulations are not likely to create material differences in opex across jurisdictions.

In our draft decision we did not provide an OEF adjustment for differences in planning obligations. This was on the basis of the findings of a Productivity commission review of the impact of planning regulations on businesses across Australia.[804] The finding of this review was that given the extent of differences, it is a challenge to compare the planning systems of the states and territories: individual indicators are often heavily qualified and thus so are comparisons between jurisdictions. [805] As a result, the Productivity Commission did not attempt to construct an overall 'league table' of state and territory performance.[806] This suggests that although planning regulations differ across jurisdictions, and are therefore likely to create some differences in costs, that differences in planning regulations are not likely to lead to material differences in costs.

We are not satisfied that an OEF adjustment for differences in planning regulations between the NSW service providers and the comparison firms meets the materiality OEF adjustment criterion. We were unable to identify any planning regulations that would lead to material differences in opex nor were the NSW service providers.

However, in accordance with our treatment of immaterial OEFs we have provided a positive 0.5 per cent adjustment for differences in planning obligations. An OEF

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804 Productivity Commission, *Performance Benchmarking of Australian Regulation: Review of Planning Regulations*, April 2011.

805 Productivity Commission, *Performance Benchmarking of Australian Regulation: Review of Planning Regulations*, April 2011, Volume 1, p. XXVIII.

806 Productivity Commission, *Performance Benchmarking of Australian Regulation: Review of Planning Regulations*, April 2011, Volume 1, p. XXXI.

adjustment for difference in planning regulations would meet the exogeneity and duplication OEF adjustment criteria. Planning regulations are not determined by service providers and Economic Insights' SFA model does not include variables to account for differences in planning regulations. We have provided a positive 0.5 per cent adjustment because it is unclear if planning obligations will lead to a cost advantage or disadvantage for the NSW service providers relative to the comparison firms.

Division of vegetation management responsibility

We are not satisfied that an OEF adjustment for the division of responsibility for vegetation management would meet the materiality OEF adjustment criterion. This is because it is not likely to lead to a material difference in costs between the NSW distributors and the comparison firms.

ActewAGL,[807] Ausgrid,[808] Endeavour,[809] Ergon,[810] [811]and Essential,[812] have all raised the division of responsibility for vegetation management as a factor that may affect benchmarking results. In some jurisdictions, for example Queensland, service providers are responsible for vegetation clearance from all network assets. In others, other parties, notably councils and roads authorities, are responsible for some vegetation clearance. As a result some service providers must undertake additional activities in the provision of network services.

Overall, we are not satisfied that differences in the division of responsibility for vegetation management will lead to material differences in opex between the NSW distributors and the comparison firms. Service providers in NSW and Victoria all share responsibility for vegetation management with other parties.

Section 48 of the *Electricity Supply Act 1995* (ES Act) sets out the division of responsibility for vegetation management between service providers and other parties in NSW. Under Section 48 of the ES Act, the cost of carrying out vegetation management may be recovered by service providers from the owner of the premises on which a tree is situated if:

- after the electricity works were first installed, an owner or occupier of the premises caused or permitted the tree to be planted, in circumstances in which the owner or occupier ought reasonably to have known that interference with the works would result; or

[807] ActewAGL, Revised Proposal, 20 January 2015, p. 199.

[808] Ausgrid, Revised Proposal, 20 January 2015, p. 149.

[809] Endeavour Energy Revised Proposal, 20 January 2015, p. 176.

[810] Ergon Energy, Response to information request Ergon 002, 19 12 2014, p. 21.

[811] Ergon Energy, Submissions on the Draft Decisions: NSW and ACT distributions 2015-16 to 2018-19, 13 February 2015, p. 19.

[812] Essential Energy, Revised Proposal, 20 January 2015, p. 189.

- the land on which the tree is located, and which the works are located, was the subject of an easement in favour of the service provider (or a predecessor of the service provider) when the tree was planted.

As a result the NSW service providers are able to recover the costs of vegetation management of trees belonging to councils or other landholders.

In Victoria, Sections 84A to 84D of the *Electricity Safety Act 1998* set out the division of responsibility for vegetation management between service providers and other parties.[813] [814][815] Landholders are responsible for vegetation management of any lines that exclusively service their property. Councils are responsible for vegetation management of any trees on public land in a declared area.[816] Service providers are responsible for vegetation management of all other trees that encroach on their network.

In South Australia, Part 5 of the Electricity Act 1996 (SA) and the Electricity (Principles of Vegetation Clearance) Regulations 2010 set out the division of responsibility for vegetation management between service providers and other parties.[817] Under this legislation SA Power Networks is responsible for clearance of all lines with three exceptions. SA Power Networks is not responsible where it has entered into a vegetation clearance scheme with a council under section 55(1a) of the *Electricity Act 1996 (SA)*. There are no such agreements with councils currently in place.[818] SA Power Networks is not responsible for clearance of cultivated vegetation from private powerlines. [819] SA Power Networks is also not responsible for clearing trees encroaching on powerlines where the tree was planted in contravention of the (Principles of Vegetation Clearance) Regulations 2010 schedule 2.[820] This is similar to the requirement under subsection 48(4) of the ES Act, except that there is more guidance on what will interfere with the works.

The NSW service providers stated that they are responsible for vegetation management of their entire network. This is because they have a duty to ensure the safety of their networks. They also stated that there are few situations in which other parties are responsible for vegetation management in their networks. This is because the service provider must confirm the tree was planted after the electricity works were established and that the current owner planted the trees in order to establish responsibility. The NSW service providers also noted that they have failed to recoup

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813 CitiPower and Powercor, Response to information request on vegetation management responsibility, 17 February 2015, p. 2.

814 Jemena, Response to information request on vegetation management responsibility, 13 February 2015, p. 1.

815 AusNet Services, Response to information request on vegetation management responsibility, 16 February 2015, p. 1.

816 Declared areas are urban areas where the local council has responsibility for vegetation management as declared under section 81 of the *Electricity Safety Act 1998* by the Governor in Council.

817 SA Power Networks, Response to information request AER SAPN 021, 13 February 2015, p. 1.

818 SA Power Networks, Response to information request AER SAPN 021, 13 February 2015, p. 1.

819 SA Power Networks, Response to information request AER SAPN 021, 13 February 2015, p. 1.

820 Electricity Act 1996 (SA), subsection 55(3).

their vegetation management costs from other responsible parties in the past despite formal notifications to councils.[821] [822][823]

We do not consider that this makes the NSW service providers financially responsible for vegetation management of their entire network. The Victorian service providers also have a duty to ensure the safety of their networks.[824][825] The Victorian service providers are able to organise for other responsible parties (for example councils and other landholders) to fulfil their responsibilities under the *Electric Line Clearance Regulations*. The NSW service providers have not demonstrated that it is not possible for them to do the same.

We are not satisfied that differences in the division of responsibility for vegetation management in Victoria, South Australia and NSW will lead to material differences in opex between the NSW service providers and the comparison firms. Both the Victorian Service providers and the NSW service providers have advantages and disadvantages with regard to the division of responsibility between service providers and other parties. Additionally the division in responsibility between service providers and other parties is similar for the NSW service providers and SA Power Networks as discussed above.

The Victorian service providers have some cost advantage because private residents are responsible for keeping trees clear from service lines which solely services their land. However, under section 48 of the ES Act, some private residents in NSW are also responsible for trimming trees that encroach on their service lines. Under section 48 of the ES Act a party is responsible for trimming trees if they planted the tree after the electricity works were first installed. This includes trees encroaching on service lines. Also, the NSW service providers may have some cost advantage with regard to the responsibilities of councils to trim encroaching vegetation. This is because section 48 of the ES Act applies to all of NSW meaning that wherever councils plant a tree, or permit a tree to be planted, they are responsible for the trimming of that tree. In Victoria, councils are only responsible for vegetation management of trees on public land in specific areas declared under section 81 of the Electricity Safety Act 1998.

The division of responsibility for vegetation management between service providers and other parties in SA and NSW are similar. Both service providers are responsible for all ensuring that vegetation is kept clear from all lines unless that vegetation was planted in a way that would interfere with powerlines. However SA Power Networks is not required to trim trees encroaching on private powerlines. This is unlikely to lead to

[821] Ausgrid, Response to information request Ausgrid 049, 16 February, 2015. p. 3.

[822] Endeavour Energy, Response to information request Endeavour 052, 13 February 2015, p. 3.

[823] Endeavour Energy, Response to information request Endeavour 042, 13 February 2015, p. 3.

[824] CitiPower and Powercor, Response to information request on vegetation management responsibility, 17 February 2015, p. 1.

[825] AusNet Services, Response to information request on vegetation management responsibility, 16 February 2015, p. 1.

a material difference in costs because private overhead lines only make up 1.5 per cent of SA Power Network's total overhead route line length.[826]

We have included these differences in our adjustment for immaterial factors. Although we are not satisfied that there will be material differences in costs between the NSW service providers and the comparison firms, they are likely to lead to some differences in opex. Also an OEF adjustment for differences in the division of responsibility for vegetation management would meet the exogeneity and duplication OEF adjustment criteria. The division of responsibility for vegetation management is not determined by service providers and it is not accounted for by variables in Economic Insights' SFA model. As there is some uncertainty of the direction of cost advantage due to differences in vegetation management, it contributes positive 0.5 per cent to the collective adjustment for immaterial factors for the NSW service providers.

Traffic management

We are not satisfied that an OEF adjustment for traffic management would meet the materiality or duplication OEF adjustment criteria. Traffic management requirements across Australia are based on a nationally consistent standard. Differences in traffic management costs related to density will be captured by Economic Insights' SFA model.

Traffic management is the direction of motorist and pedestrian movements around worksites using temporary traffic signage and traffic controllers.

State and territory road authorities generally base their traffic control at roadwork sites requirements on AS1742 Part 3: Guide to traffic control devices for works on roads.[827] Therefore cost differences due to jurisdictionally differences will be immaterial.

Traffic management costs generally correlate with the volume of traffic near the worksite. We consider that traffic management will have a greater overall impact on expenditure in higher density areas than in lower density areas. Economic insights' SFA model accounts for differences in customer density. For more detail see our consideration of customer density above and in our draft decision.

In response to our draft decision we received no evidence to suggest that differences in traffic management practices in NSW, Victoria, and SA lead to material differences in opex.

We have included jurisdictional differences in traffic management in our adjustment for immaterial factors. Although the density related differences in traffic management are captured in Economic Insights' SFA model, the jurisdictional differences in requirements are not. These jurisdictional differences are likely to lead to some difference in cost and are not determined by service providers. As a result an OEF

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826 SA Power Networks, Response to information request AER SAPN 021, 13 February 2015, p. 4.

827 National Approach to Traffic Control at Work Sites, Publication no: AP-R337/09, Austroads 2009, p1

adjustment for traffic management would satisfy the exogeneity OEF adjustment criterion. Also, because Economic Insight's SFA model does not account for differences in traffic management regulations it would satisfy the duplication OEF adjustment criterion. Therefore, we have provided included a 0.5 per cent adjustment for the NSW service providers in our collective adjustment for immaterial factors.

A.6.9 Network factors

Advanced metering infrastructure

We are not satisfied that an OEF adjustment for differences in Advanced Metering Infrastructure (AMI) deployments would satisfy the OEF adjustment criteria. Pursuing the ability to share overheads between network services and other services is a business decision on service diversification. The ability to share overheads between network services and metering services are not likely to lead to material differences in network services opex. AMI costs are excluded from network services opex.

Advanced metering infrastructure is another term for smart meters. Smart meters are electricity usage meters that communicate meter readings directly to electricity distributors, eliminating the need for staff to read meters in person.

In response to our 2014 draft decision Advisian, ActewAGL's consultant, suggested the point that the Victorian service providers can share their fixed overhead costs with their AMI programs.[828] Huegin also noted that Ofgem excludes costs related to smart meter deployments.[829]

Advisian considers that this gives the Victorian service providers a cost advantage relative to other service providers. Other service providers also provide metering services, but are not making a major change in their metering fleet in the way the Victorian service providers are. Overhead costs are often shared on the basis of costs incurred by functional areas. Therefore, Advisian considers the large costs involved in the AMI deployment will allow the Victorian service providers to allocate more of their overhead costs to metering than other service providers.

There are two issues with Advisian's analysis. The first is that the extent to which a service provider can share overheads across its services is the result of management decisions. The second is that differences in AMI deployments will not materially affect network services opex.

As discussed in the unregulated services section above the extent to which service providers can share overheads across services is the result of business decisions on service diversification. Therefore an OEF adjustment for differences in AMI programs would not satisfy the exogeneity OEF adjustment criterion.

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828 Advisian, Opex Cost Drivers: ActewAGL Distribution Electricity (ACT), 16 January 2015, pp. 83-86.

829 Huegin, *Response to draft determination on behalf of NNSW and ActewAGL - Technical response to the application of benchmarking by the AER*, January 2015, p. 23.

Additionally, fixed overheads are only a part of total overheads. As service providers increase in scale and scope they will incur more overheads. As a result, although the Victorian service providers are able to share fixed costs between network services and its AMI programs, the AMI programs also add to the pool of shared overheads. As a result an OEF adjustment for differences in AMI programs would not meet the materiality OEF adjustment criterion.

We also note that Advisian's analysis relates to the Victorian service providers rather than the comparison firms. SA Power Networks, is also one of the comparison firms. We note that although SA Power Networks did not have the ability to share its fixed overheads between network services and an AMI program, it is one of the best ranking service providers under all of Economic Insights' benchmarking models.

We are also satisfied that an adjustment for AMI deployments would not satisfy the duplication OEF criterion. Network services opex, which has been used in Economic Insights' SFA model excludes metering services costs. As metering services costs are not included in the network services costs, the efficiency scores from Economic Insights' SFA model will not be affected by metering services costs.

Asset age

We are not satisfied that an OEF for differences in asset age between the NSW service providers and the comparison firms would meet the materiality OEF adjustment criterion. Asset age is not likely to lead to material differences in opex between the NSW service providers and the comparison firms. Asset age is only likely to affect some opex categories. Also the NSW service providers seem to have similar weighted average remaining lives (WARLs) to the comparison firms.

Not all opex categories are affected by asset age. The opex categories that will generally be affected by differences in asset age are emergency response and routine preventative maintenance on high value assets.

The amount of maintenance opex does not increase with age for all assets. Asset age will not greatly affect maintenance opex for most assets. Low value assets, such as distribution lines and transformers make up the bulk of service providers' assets. Low value assets like these are inspected on a regular basis but they will generally not incur routine maintenance interventions in the way higher voltage assets do.[830] Asset age will more often affect routine maintenance intervals for high value, strategically important, assets such as subtransmission lines and zone substations. However, maintenance on zone substations and assets operating above subtransmission lines generally only accounts for a small part of service providers' opex.

While a network with an older asset base will tend to experience more asset failures, asset failures only account for a part of emergency response costs. As assets age,

830 Energy Market Consulting Associates, Relationship between Opex and Customer density for Sparse Rural Networks, 2.3.2 Routine and Non Routine Maintenance., April 2015.

they in general they will become more likely to fail. Therefore a service provider with older assets would be more likely to incur emergency response costs for asset failure. However emergency response opex is also incurred for other occurrences including: weather, 3rd party damage to the network, vegetation, and animal contact. [831]

In our draft decision, we did not provide an OEF adjustment for asset age. We considered the effect of asset age on service providers' costs and we were satisfied no adjustment was necessary. In coming to this conclusion we considered estimates of the service providers' Weighted Average Replacement Lives (WARL). [832] The NSW service providers did not appear to have WARLs materially different to those of the comparison firms.

Since our draft, Advisian, [833] Ausgrid[834] and Essential Energy[835] have all raised the issue of the effect of asset age on the results of Economic Insights' benchmarking.

Advisian, Ausgrid and Essential Energy stated that the AER's assessment of asset age is incorrect because the standard lives reported in the AER's RIN data do not appropriately represent the age of service providers' assets. Advisian then presented two alternative methods of measuring average network asset age. One shows the cumulative percentage of assets above the reported mean asset life and the other shows the cumulative percentage of assets over 50 years old.

Our calculation of the WARL and standard asset lives in our repex model are different to this. Rather than using the standard asset lives reported in the RINs, the standard lives assumed in the calculation of the WARL, used in our draft decision, were based on benchmark standard lives calculated by the repex model. As a result, the asset lives were not based on depreciation assumptions. They were based on the average asset lifespans realised for each asset class by the NEM service providers. Therefore the statements made by Advisian on our calculation of the WARL used in our draft decision do not hold true.

The alternative methods of presenting asset age proposed by Advisian also have drawbacks. The first method, the cumulative percentage of assets over their mean asset age, is subject to the problem Advisian considered that our calculation of the WARL was subject to. That is it is dependent on the mean asset lives reported in the category analysis RINs, which in some cases may be dependent on service providers' accounting assumptions. The second method, which compares the percentage of assets older than 50 years, is affected by, as noted by Advisian, differences in assets

[831] Energy Market Consulting Associates, Relationship between Opex and Customer density for Sparse Rural Networks, 2.3.4 Emergency Response., April 2015.

[832] AER, Draft Decision NSW distribution network service providers, November 2014 pp.128-129.

[833] Advisian, Review of AER benchmarking: Networks NSW, 16 January 2015, pp. 73-74.

[834] Ausgrid, Revised Proposal, 20 January 2015, pp. 96-97.

[835] Essential Energy, Revised Proposal, 20 January, p. 186.

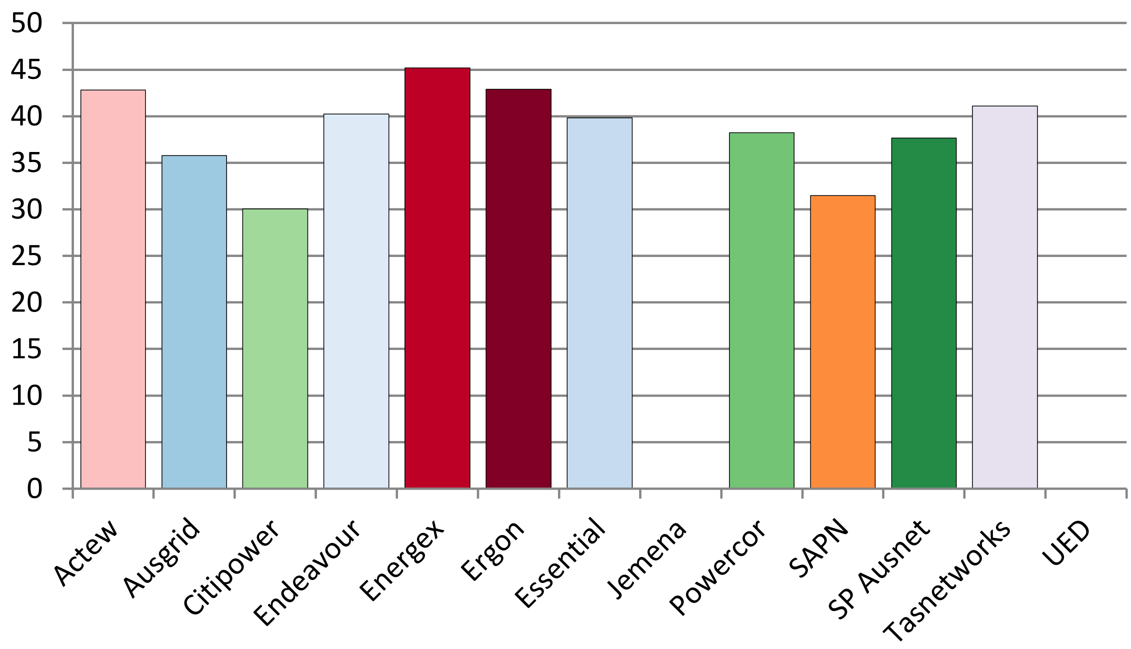
used by the service providers.[836] The example used by Advisian is that SA Power Networks uses stobie poles which have long asset lives.

Our calculation of the WARL is not subject to either of these issues. As mentioned before, the asset lives in our calculation of the WARL are based on benchmarked asset lives. As a result we consider that it is a better measure for network age comparisons. Further, we note Endeavour Energy itself uses WARL measures to forecast its repex costs.[837]

Nonetheless, in considering Advisian's statements we have considered an additional measure of asset age. In addition to our consideration of the benchmark WARL used in the draft decision, we have considered a measure based on the observed level of replacement for each service provider.

The WARL in our draft decision uses benchmark unit rates and asset lives based on the unit rates and replacement rates observed across the NEM (benchmark WARL). The new measure uses service providers' own unit rates and replacement rates (observed WARL). Figure A.27 and Figure A.28 below compares all NEM service providers' on both WARLs. We note that we have excluded Jemena and United Energy because we have some concerns with some of their asset replacement data.

Figure A.27 Benchmarked Weighted Average Remaining Life for each NEM service provider

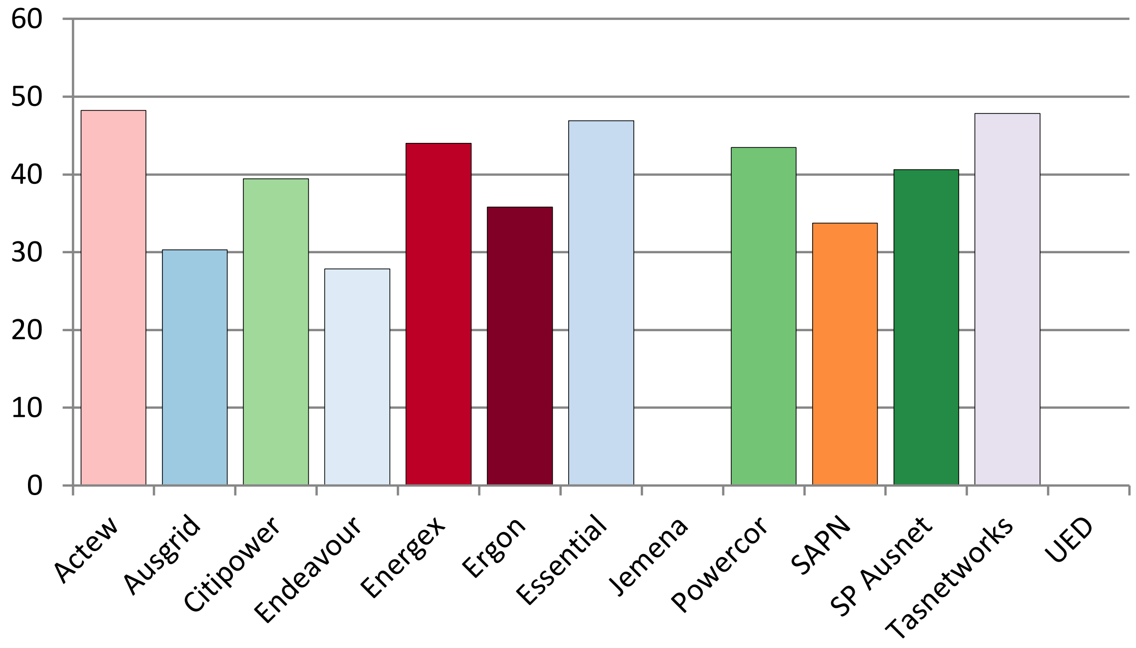


[836] Advisian, Review of AER benchmarking: Networks NSW, 16 January 2015, p. 75.

[837] Jacobs, Networks NSW - Draft Determination Review: System Capex & Maintenance Prudency Assessment, 15 January 2015, Appendix B.

Source: Category analysis RIN data, AER Analysis

Figure A.28 Observed Weighted Average Remaining Life for each NEM service provider



Source: Category analysis RIN data, AER Analysis

Both the benchmarked WARL and observed WARL have strengths and weaknesses as measures. The benchmarked WARL allows comparison of service providers independent of the quality of service providers' management, because the same unit costs and standard lives are used for all service providers. The observed WARL accounts for unobservable differences between service providers as it is based on the unit rates and standard lives revealed by service providers' actions over the 2009 to 2013 period.

The drawback of the benchmarked WARL is that it treats all service providers as if they operate in the same operating environment. This is because differences in service providers' operating environment will affect their asset lives and also their unit costs.

The drawback of the observed WARL is that it is affected by service providers' management strategies. This is because the unit rates and standard asset lives realised will be affected by management decisions during the sample period.

As both WARL measures have strength and weaknesses, we have considered both in comparing the relative asset ages of the NEM service providers.

Ausgrid has a lower remaining life than the comparison firms on both WARL measures. This suggests that Ausgrid's asset base is relatively further from old age than the comparison firms. As a result it is likely that Ausgrid has a cost disadvantage relative to the comparison firms due to asset age.

Endeavour has a higher benchmarked WARL but a lower observed WARL than the comparison firms. On this basis it is difficult to determine if Endeavour will have a cost advantage or disadvantage relative to the comparison firms due to asset age.

Essential has a higher remaining life than the comparison firms on both WARL measures. This suggests that Essential's asset base is relatively further from old age than the comparison firms. As a result it is likely that Essential has a cost advantage relative to the comparison firms due to asset age.

Although it will not lead to material differences in opex, asset age is likely to lead to some difference in opex between the comparison firms and NSW service providers. An OEF adjustment for asset age would also meet the exogeneity and duplication OEF adjustment criteria. The date a network was established is beyond service providers' control and there are no variables in Economic Insights' SFA model that account for it. Therefore we have included adjustments for asset age in our adjustments for immaterial factors for Ausgrid, Endeavour, and Essential. As Ausgrid appears to have a cost disadvantage on asset age, and it is unclear if Endeavour has a cost disadvantage, we have provided a positive 0.5 per cent adjustment for those service providers. As Essential appears to have a cost advantage we have made a negative 0.5 per cent adjustment to Essential.

Asset volumes

We are not satisfied that an OEF adjustment for the volume of assets used to provide services over its network would meet the exogeneity or duplication OEF adjustment criteria. Network service providers have direct control over the assets that they choose to install and Economic Insights SFA model account for the drivers of asset installation.

In our draft decision we did not provide an adjustment for the volume of assets used by service providers. We examined if an OEF was required for demand supplied and line length. We concluded that Economic Insights' SFA model adequately account for these factors so no adjustment was required.

In response to our draft decision, ActewAGL, the NSW service providers' consultant Advisian, and the NSW Chief Operating Officers noted that the number of assets that a service provider uses to operate its network will drive its operating costs.[838][839][840][841] Advisian submitted that it considers that the variables in Economic Insights' SFA model ignores the cost of maintaining a larger number of assets. In particular, Advisian raised these points with regard to line length and transformer capacity. We address line length above in our consideration of customer factors.

In general, we consider that demand side variables should be used to determine the benchmark opex required. This is because it is a good measure of the capacity that a

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[838] Advisian, Review of AER benchmarking: Networks NSW, 16 January 2015, pp. 41-54.

[839] Advisian, Opex Cost Drivers: ActewAGL Distribution Electricity (ACT), 16 January 2015, pp. 45 -59.

[840] Trevor Armstrong, Statement of Trevor Armstrong Chief Operating Officer Ausgrid, 19 January 2015, pp. 31.

[841] Gary Humphreys, Statement of Gary Humphries Chief Operating Officer Essential Energy, 19 January 2015, p. 4

service provider must maintain to provide distribution services. Using measures driven by the value of assets[842] or volume of assets installed runs the risk of rewarding service providers for inefficiently overinvesting. As a result, such expenditure would not meet the exogeneity OEF criterion. This is because the extent of investment in assets to meet the realised customer demand is at the discretion of the service provider.

Advisian submitted that the amount of transformer capacity installed by service providers is likely to affect our benchmarking results.[843] [844] Advisian considers that the ratcheted peak demand variable will not take into account the spatial element of demand or additional capacity installed for system security. We address the issue of additional capacity installed for system security under our consideration of licence conditions.

The ratcheted peak demand variable in Economic Insights' SFA model accounts for the spatial element of demand. This is because it uses non-coincident system demand. As a result service providers that have separated commercial and residential areas will not be disadvantaged in Economic Insights' SFA model.

Advisian also submitted that service providers should be compensated for transformer capacity installed. This is because it must be installed to meet forecast demand.[845] Therefore having excess capacity is not necessarily inefficient.

This dilemma faces all service providers. All service providers must install transformer capacity to meet forecast demand. Therefore to the extent that a service provider must invest in excess capacity, this will be captured in ratcheted maximum demand. As a result if a service provider systematically overinvests in excess capacity transformer capacity, this is evidence that service provider's management performs relatively worse in responding to changes in demand conditions. As a result, benchmarking on the basis of installed capacity rather than ratcheted peak demand has the potential to reward inefficient investment.

Critical National Infrastructure

We are not satisfied that an OEF for Critical National Infrastructure (CNI) meets the exogeneity OEF adjustment criteria. To the extent that a service provider decides to invest in physical security to a greater extent than other service providers, that is a management decision for the service provider.

In response to our draft decision, Huegin raised CNI as an OEF that may lead to differences in opex.[846] Huegin noted that Ofgem excludes costs associated with CNI from its totex benchmarking. CNI are electricity distribution sites designated by the UK

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[842] CEPA, Benchmarking and Setting Efficiency Targets for the Australian DNSPs, (ActewAGL), 2015, p. iv-5.

[843] Advisian, Review of AER benchmarking: Networks NSW, 16 January 2015, p. 44.

[844] Advisian, Opex Cost Drivers: ActewAGL Distribution Electricity (ACT), 16 January 2015, pp. 51 -57.

[845] Advisian, Opex Cost Drivers: ActewAGL Distribution Electricity (ACT), 16 January 2015, pp. 51 -57.

[846] Huegin, *Response to draft determination on behalf of NNSW and ActewAGL - Technical response to the application of benchmarking by the AER*, January 2015, p. 23.

Department of Energy and Climate Change (DECC).[847] All sites confirmed by DECC as Category 3 CNI or above are eligible for ex ante funding in accordance with the "Physical Security Upgrade Programme".[848] We note that Huegin has provided no explanation of how this relates to the Australian context.

Ofgem provides an allowance for CNI programs in the UK following guidance from a government agency called The Centre for the Protection of National Infrastructure (CPNI)[849]. In Australia CNI projects are undertaken at the discretion of service providers following industry wide guidelines.[850]

Based on the evidence before us, we are not satisfied that the NSW service providers' regulatory responsibilities for CNI are greater than other service providers'. As a result, providing an OEF adjustment for CNI does not meet the exogeneity OEF adjustment criterion. To the extent that the NSW service providers choose to invest more in physical security than other service providers, that is a management decision for the NSW service providers.

Customer owned distribution transformers

We are not satisfied that an OEF adjustment to account for differences in the amount of transformer capacity owned by customers would meet the materiality OEF criterion. The amount of distribution capacity owned by customers is relatively small, and the distribution transformer maintenance as a percentage of opex is also small. As a result, the maintenance avoided by service providers with customers who own their substations is not considered material.

In some cases, customers take electricity from service providers at higher voltages. In these cases the customer will own and operate transformer equipment to deliver electricity to the voltages they require for their uses. By not having to maintain distribution transformer equipment to service those customers, service providers gain a cost saving when compared against energy and demand throughput.

In response to our draft decision, ActewAGL's consultant Advisian noted that the differences in the amount of distribution transformer capacity owned by customers will lead to differences in service provider's opex.[851] Advisian submitted that ActewAGL would have a cost disadvantage because it has a lower percentage of customer owned distribution transformation equipment connected to its network than other service providers.

Differences in the amount of distribution transformer capacity owned by customers is also not likely to lead to material differences in opex between the service providers.

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[847] Ofgem, RIIO-ED1: Glossary of terms, 2014, p. 6.

[848] Ofgem, RIIO-ED1: Final determinations for the slow-track electricity distribution companies: Business plan expenditure assessment, 28 November, 2014, p. 99-100.

[849] Seconomics, National Grid Requirements, 31 January 2013, p. 40.

[850] ActewAGL, Regulatory Proposal, June 2008, p. 64.

[851] Advisian, Review of AER benchmarking: Networks NSW, 16 January 2015, pp. 41 -49.

These differences may lead to a cost disadvantage of 0.1 per cent for Endeavour and a cost advantage of 0.1 per cent for Ausgrid. It appears that Essential would have neither an advantage or disadvantage.

Distribution substation maintenance only accounts for on average 2.6, 1.9, and 0.1 per cent of Ausgrid's, Endeavour's, and Essential's network services opex.[852] Ausgrid, Endeavour, and Essential own 89.6, 99.2, and 90.8 per cent of distribution transformer capacity connected to their networks.[853] The Frontier firms on average, weighted by customer numbers, own 93.9 per cent of distribution transformer capacity.[854] On this basis Ausgrid's and Essential's distribution substation maintenance opex may be 4.5 and 3.3 per cent lower and Endeavour Energy's may be 5.6 per cent higher than they would be if their customers owned a similar percentage of distribution transformers as the frontier service providers' customers. This suggests Endeavour may have a 0.1 per cent cost disadvantage at the total network services opex level, while Ausgrid and Essential have cost advantages of 0.1 and zero per cent respectively. As these figures represent increases and decreases in the NSW service providers' historical opex, they must be adjusted represent changes in efficient opex as discussed in the calculation of OEFs section above. This suggests a decrease in efficient opex of 0.2 per cent for Ausgrid no change for Essential, and a 0.1 per cent cost advantage for Endeavour.

However, following our approach to accounting for immaterial factors we have included differences in the amount of customer owned distribution transformer capacity in our adjustment for immaterial OEFs. An OEF adjustment for differences in customer owned distribution transformer capacity would meet the exogeneity and duplication OEF adjustment criteria. The number of customers that take electricity at high distribution voltages is not determined by service providers and there are no variables in Economic Insights' SFA model to account for it. Given that we are able to estimate the potential cost impact of differences in ownership of distribution transformer capacity, we have used these figures for the relevant contributions to the immaterial factors OEF adjustment.

Demand management

We are not satisfied that an OEF adjustment for differences in the demand management service providers' undertake would meet the duplication OEF criterion. Demand management is a capex opex trade-off. We have considered the impact of capex opex trade-offs under the capitalisation practice OEF.

Demand management is the use of various strategies to change customers' electricity use. By changing energy use, service providers can avoid the need for large investments in network upgrades to meet a peak demand that only occurs for a small part of the year. In this way service providers can reduce their capex by using opex.

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852 Category Analysis RIN responses, template 2.8.

853 Economic Benchmarking RIN response, template 6. Physical assets.

854 Economic Benchmarking RIN responses, template 6. Physical assets.

The decision to undertake demand management is a capex opex trade-off. Service providers face many of these trade-offs. Other examples include the choice to rent or buy depots, to run lines over or underground, to replace or maintain. We consider that where a capex opex trade-off exists, the decision on whether to provide an OEF adjustment should be considered in the broader context of service providers' capex to opex ratio. This is because a service provider may utilise a solution that is opex intensive in one area, but overall may have a preference for capital intensive solutions. In this situation providing a positive OEF adjustment for an opex intensive solution would overcompensate the service provider. This is because focusing only on opex capex trade-off OEFs that disadvantage service providers will upwardly bias the total OEF adjustment.

In our capitalisation practices section we compare the capex opex ratios for the NEM service providers. Figure A.11 shows that, after our adjustment for differences in capitalisation practices, the NSW service providers expense a similar amount of their costs to the comparison firms. We have accounted for differences in capitalisation practices in our collective adjustment for individually immaterial OEFs. Therefore, we are satisfied that differences in opex due to demand management in service provider's networks are accounted in our consideration of capitalisation practices.

Line sag

We are not satisfied that OEF adjustment for line sag would meet the exogeneity OEF criterion. A prudent service provider would design its network to take into account the demand it services and the environment it operates in. Specifically, network businesses design and construct overhead lines so that they are compliant with the statutory obligations under all standard operating conditions.

Overhead electrical lines expand when heated and this results in the “sag” of the line increasing. Line heating is caused by environmental factors and by the delivery of energy through the line.

Ergon Energy raised the point that high loads and temperatures lead to significant conductor sag. As Ergon Energy is obliged to maintain regulatory clearances of all conductors, its opex includes a system of measuring and actively repairing line sag to ensure regulatory compliance.[855]

All NEM service providers use similar line design criteria to account for sag which take into account, among other things, ambient temperature, solar radiation, and wind speed. The extent to which a service provider finds that it has a systemic issue with regard to line sag is a reflection of the quality of its management in applying the line design criteria. As a result an OEF adjustment for line sag would not satisfy the exogeneity OEF adjustment criterion.

855 Ergon Energy, AER information request AER Ergon 002, 17 December 2014, p. 14.

Network Accessibility

We are not satisfied that an OEF adjustment for differences in network accessibility would meet the materiality OEF adjustment criterion. We estimate access track maintenance does not contribute to material differences in opex between the comparison firms and the NSW service providers.

In response to AER questions, Ergon Energy indicated that it considered differences in network accessibility as an OEF that materially affects its costs.[856] Vegetation management, line maintenance and asset inspections require access to assets. Ergon Energy considers that high rainfall results in significant damage to access tracks due to washouts, vegetation growth and subsidence. When asked, Ergon Energy did not provide evidence of differences in costs in access track maintenance between high and low rainfall areas of its network.[857] Nonetheless, economic benchmarking RIN data indicates that Ergon Energy has a greater percentage of its network that does not have standard vehicle access than the comparison firms. In 2013/14, 36 per cent of Ergon Energy's network did not have standard vehicle access. In comparison, the weighted average for the comparison firms was only 5 per cent.[858]

Ergon Energy indicated that over the 2010 to 2014 period on average it incurred $4.9 million ($2014/15) for access track maintenance at a cost of $97 per kilometre of network route with non-standard vehicle access.[859] [860]

Using the unit rate for Ergon Energy's access track maintenance, and route line lengths without standard vehicle access, we estimated the percentage of network services opex that the comparison firms expend on access track maintenance. Using these figures we estimate that on average over the 2010 to 2014 period, the percentage of the comparison firms' network services opex, weighted by customer numbers, for access track maintenance was 0.15 per cent.

Using the same method, we estimated that access track maintenance accounts for 0.02, 0.69, and 0.55 per cent of network services opex for Ausgrid, Endeavour, and Essential respectively. This implies that, relative to the comparison firms, Ausgrid, has a negative 0.1 per cent cost advantage on access track maintenance costs. We estimate that Endeavour has a 0.5 per cent cost advantage and Essential has a 0.4 per cent cost advantage.

We have included these advantages and disadvantages in our collective OEF adjustments for immaterial factors. This is because although an OEF for network access does not meet the materiality OEF criterion it meets the exogeneity and duplication criteria. The amount of a service provider's network with non-standard

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[856] Ergon Energy, Response to information request AER Ergon 02, 17 December 2014, p. 13.

[857] Ergon Energy, Response to information request AER Ergon 018(3), 30 January 2015, p. 7.

[858] Economic Benchmarking RIN.

[859] Ergon Energy, Response to information request AER Ergon 018(3), 30 January 2015, p. 7.

[860] Ergon Energy, Economic Benchmarking RIN responses, 2013 and 2014, Template 8. Operating Environment.

vehicle access is likely to be determined by land use that is beyond service providers' control. Also, there are no variables in Economic Insights' SFA model that account for differences in non-standard vehicle access.

Past ownership

We are not satisfied that an OEF adjustment for past ownership would meet the exogeneity or materiality OEF adjustment criteria. The AEMC has stated that the nature of ownership should not be taken into account as it is endogenous. Managing a fleet of various asset types installed in response to different management, environmental, demand, and technological circumstances is a core business function of electricity network service providers.

In response to our draft decision Essential Energy raised intra-network variability as an issue that would lead to material differences in opex between it and the comparison firms.[861] It stated that the legacy of being an amalgamation of different service providers with different practices and standards would lead to it having a cost disadvantage relative to the Victorian service providers. Essential Energy provided no practical examples of how these differences would lead to it having a cost disadvantage. It is not clear how Essential considers this will affect costs, but one interpretation is that Essential's precursor organisations may have adopted different technologies, potentially leading to increased complexity in asset management. We note that the other NSW service providers are also the amalgamation of various service providers.[862] Ausgrid and Endeavour did not raise this as an issue that would materially affect their costs.

The Victorian service providers did not inherit a highly homogenous network derived from one legacy network. Up until privatisation there were 12 municipal service providers,[863] known as Municipal Electricity Undertakings, operating across the Melbourne area in addition to the State Electricity Commission of Victoria. CitiPower, Jemena, Powercor and United Energy all own assets that were previously owned by one or more of these Municipal service providers. Additionally, all of the NEM Electricity service providers must manage a variety of different assets installed in response to different circumstances and evolving technologies. The optimal choice of asset will depend on the technology available at the time, the demand the asset must serve, and the environment in which the asset is being installed. All service providers will have a variety of different assets installed at different times.

Further Essential Energy has not demonstrated that if its asset base is more heterogeneous, that any such difference in heterogeneity will lead to a material increase in costs.

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861 Essential Energy, Revised Proposal: Attachment 7.4, p. 25.

862 Stewart Smith, Electricity and Privatisation, NSW Parliamentary library research service,1997, p. 3.

863 Victorian Government, Victorian Government Gazette, No 54 1961, 3 July 1961.

Therefore we are not satisfied that that differences past ownership between the NSW service providers and the Victorian service providers will lead to material differences in opex.

We are also not satisfied that an adjustment for differences in past ownership satisfies the exogeneity OEF adjustment criterion. The AEMC has stated that the nature of ownership of service providers is an endogenous factor that should not be taken into account when undertaking benchmarking. [864]

Proportion of 22kV and 11kV lines

We are not satisfied an OEF adjustment for the proportions of 22kV and 11kV lines in the network would meet the materiality OEF adjustment criterion. Operating a network using a 22 kV high-voltage distribution system rather than an 11kV high-voltage distribution system is unlikely to create material differences in opex between service providers.

The comparison firms include service providers with both 22kV and 11kV network configurations. Powercor and AusNet, and CitiPower and SAPN, represent the two extremes in terms of 11kV and 22kV networks - Powercor and AusNet are predominantly 22kV systems while CitiPower and SAPN have predominantly 11kV systems. If this factor were material to the costs of the service providers, we would expect this to be most apparent when comparing these four service providers. On Economic Insights' MPFP and opex cost function benchmarking AusNet, CitiPower, Powercor and SAPN all perform well. This suggests that this factor is not material to overall performance.

In our draft decision we adopted this approach and included differences in high voltage distribution system configuration in our adjustment for immaterial OEFs.

In response to our draft decisions, Advisian made observations already included in the initial regulatory proposals.[865] However, Advisian provided no new evidence to suggest that differences in high voltage distribution system configuration would lead to material differences in opex between the NSW service providers and the comparison firms.

In accordance with our approach to estimating the combined effect of OEFs that do not meet the materiality OEF adjustment criterion, we have accounted for differences in high voltage distribution systems in our immaterial OEF adjustment. Although it does not satisfy the materiality criterion, an adjustment for the proportions of 22kV and 11kV lines would satisfy the exogeneity and duplication criteria. The technology that was available at the time a network was established is beyond service providers' control. Economic Insights' SFA model dos not include any variables that account for the proportion of 11kV and 22kV lines. In theory operating a 22kV network would provide a

[864] AEMC, Rule Determination, National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, November 2012, p. 113.

[865] Advisian, Review of AER benchmarking: Networks NSW, 16 January 2015, p. 46

small reduction in opex costs. Therefore differences in high voltage distribution systems contribute 0.5 per cent to the immaterial factor adjustments for the NSW service providers.

Proportion of wooden poles

We are not satisfied that an OEF adjustment for differences in the proportion of wooden poles in service providers' networks would not meet the duplication OEF criterion. The decision on whether to use wooden, concrete, steel, or fiberglass poles is a trade-off between capex, opex and service levels. We have considered the impact of capex opex trade-offs under the capitalisation practices OEF and service levels under reliability outcomes.

In response to our draft decision Essential Energy raised the proportion of wooden poles in its network as a factor that may increase its opex relative to the comparison firms.[866] It submitted that because wooden poles make up a greater part of its network than the comparison firms it is more exposed to the effects of timber decay than other service providers. Essential Energy did not provide any quantification of the effect that this may have on its costs.

In addition to this, we consider that the decision on whether to use wooden, concrete, steel, or fiberglass poles is a capex opex trade-off. This is because higher capital cost poles are generally less opex intensive. For example concrete poles do not require the inspection drillings and anti-fungal treatments that wooden poles do. However concrete poles are more costly to install.

Service providers face many of these trade-offs. Other examples include the choice to rent or lease depots, to run lines over or underground, to replace or maintain. We consider that where a capex opex trade-off exists the decision on whether to provide an OEF adjustment should be considered in the broader context of service providers' capex to opex ratio. This is because a service provider may utilise a solution that is opex intensive in one area, but overall may have a preference for capital intensive solutions. In this situation providing a positive OEF adjustment for an opex intensive solution would overcompensate the service provider. This is because there will be other areas of their operations where it utilises capital intensive solutions but will not receive negative OEF adjustments.

In our capitalisation practices section we compare the capex opex ratios for the NEM service providers. Figure A.11 and Figure A.12 shows that the NSW service providers tend to capitalise a similar amount of costs to the comparison firms. As they capitalise a similar amount to the comparison firms at a total level, providing an OEF adjustment for differences in the proportion of timber poles used would overcompensate them. This is because focusing only on opex capex trade-off OEFs that disadvantage the NSW service providers will upwardly bias the total OEF adjustment. The appropriate

[866] Essential Energy, Revised Proposal: Attachment 7.4, 20 January 2015, p. 32.

measure is the opex capex ratio at the total level. We have included an adjustment for differences in capitalisation practices in our collective adjustment for individually immaterial factors.

Therefore, we are not satisfied that differences in opex due to the proportion of wooden poles in service provider's networks are not accounted for in our consideration of capitalisation practices.

Rising lateral mains

We are not satisfied that an OEF adjustment for rising lateral mains would meet the materiality OEF adjustment criterion. Service providers in the NEM are generally not responsible for maintaining mains within apartment complexes.

Rising and lateral mains are three phase mains, or busbars, that run through apartment buildings to which multiple service lines are connected.[867]

In response to our draft decision, Huegin raised rising and lateral mains as an OEF that may lead to differences in opex.[868] Huegin noted that Ofgem excludes costs associated with rising and lateral mains from its totex benchmarking. In the UK some service providers have a significant amount of mains running throughout apartment complexes.[869] Ofgem adjusts its totex benchmarking to remove costs associated with those assets.[870] Huegin did not provide any indication of why this may be an issue in the NEM.

We are not satisfied that it is necessary to provide an OEF adjustment for rising and lateral mains. While some service providers in the UK have substantial rising and lateral mains fleets, in general NEM service providers do not run electricity distribution mains through apartment complexes. In NEM jurisdictions, usually the demarcation between the service providers' assets and customers' assets is either at the boundary of the customer's property or on the outside of the customer's building. In some situations, service providers do own mains that run through a customer's premises that supply a substation. However, all NEM service providers have some substations located on customers' premises and there is no indication that this provides a cost disadvantage where it occurs. Aside from mains that supply substations, it is exceedingly unusual for a service provider to own distribution mains within an apartment building.

We are not satisfied that an adjustment for rising and lateral mains satisfies the materiality OEF criterion. In general NEM service providers do not own, and are not

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867 Ofgem, RIIO-ED1: Glossary of terms, 2014, p. 23.

868 Huegin, *Response to draft determination on behalf of NNSW and ActewAGL - Technical response to the application of benchmarking by the AER*, January 2015, p. 23.

869 SP Energy Networks, SP Energy Networks 2015-2023 Business Plan: Annex Rising Mains and Laterals Strategy, March 2014, pp. 3-4.

870 Huegin, *Response to draft determination on behalf of NNSW and ActewAGL - Technical response to the application of benchmarking by the AER*, January 2015, p. 23.

responsible for maintaining rising and lateral mains. As a result we estimate that rising lateral mains maintenance will lead to no differences in the opex incurred by NEM service providers.

Solar uptake

An OEF adjustment for differences in solar photovoltaic (PV) installations between the NSW service providers and the comparison firms would not satisfy the materiality OEF adjustment criterion. The penetration rate for small scale solar installations is similar for Victoria and NSW.

In response to inquiries from the AER, Energex stated that solar PV had impacted its network field operating costs due to an increase in voltage complaints, investigations and requirement to re-balance the loading on the three phase network.[871]

We looked to compare the uptake of PV installations in service providers' networks. We compared the number of solar PV installations deemed by the Clean Energy Regulator per customer in each jurisdiction.[872] The number of deemed solar installations was greatest in South Australia. SA Power Networks, the sole service provider in South Australia, is one of the comparison firms.

Table A.14 Deemed PV installations per 100 connections

	Deemed small scale solar installations per 100 connections
ACT	8.7
NSW	8.7
Queensland	20.8
South Australia	21.5
Victoria	9.1

Source: Clean Energy Regulator; AER analysis.

The number of deemed solar installations per customer is roughly the same for Victoria, where most of the comparison firms are located, and NSW.

Given this, there is not sufficient evidence to conclude that differences in the rate of PV installations between the NSW service providers and the comparison firms, will lead to material differences in opex.

However, as the PV penetration rate is higher in SA and slightly higher in Victoria than in NSW, it is likely that the comparison firms will have a cost disadvantage relative to the NSW service providers due to differences in PV uptake. An adjustment for

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871 Energex, Response to information request AER EGX 001 Question A, 17 December 2014, p. 9.

872 Clean Energy Regulator, Small-scale installations by postcode, available at: http://ret.cleanenergyregulator.gov.au/REC-Registry/Data-reports [last accessed 31 March 2015].

differences in PV penetration would meet the exogeneity and materiality OEF adjustment criteria. The decision to install PV is a customer's choice and there are no variables to account for differences in PV penetration rates in Economic Insights' SFA model. As a result we have included differences in opex due to solar PV installations as a 0.5 percentage point decrease in our immaterial OEF adjustments for the NSW service providers.

Subtransmission

We are satisfied that it is necessary to provide an OEF adjustment for differences in subtransmission network configuration between the NSW service providers and the comparison firms. An adjustment for differences in subtransmission network configuration raises all of our three OEF adjustment criteria. The boundary between transmission and distribution networks is the result of historical decisions made by state governments when dividing electricity networks. Differences in subtransmission configuration are likely to lead to material differences in the cost of providing network services. Differences in subtransmission configurations are not accounted for elsewhere in Economic Insights' SFA model.

In our draft decision we provided an OEF adjustment for the same reasons.

The transition point between transmission and distribution varies across jurisdictions and within service providers. All service providers take supply from transmission Grid Exit Points (GXPs) across a range of voltages. In some jurisdictions the transition point occurs at a higher voltage. This means that distribution service providers are responsible for the operation, and costs, of more of the electricity supply chain.

In response to our draft decision, this issue was raised by Advisian,[873][874] Frontier Economics,[875] and CEPA[876]. Advisian submitted that we should have considered the effect of differences in undergrounding in our adjustment. Frontier and CEPA considered that the proportion of subtransmission should be used as an environmental variable in Economic Insights' SFA model. Both noted that it is statistically significant and its inclusion reduces the observed difference in efficiency scores between Australian distributors.

In response to Advisian's report we have investigated the effect of undergrounding. We calculated the adjustment using only overhead subtransmission lines. This resulted in an adjustment less favourable to Ausgrid and Essential, but more favourable to Endeavour.

We consider that it is more appropriate to use total subtransmission line length to calculate the adjustment for subtransmission. This is because it is a proxy for the size of the subtransmission network that service providers must operate. This includes

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873 Advisian, Review of AER benchmarking: Networks NSW, 16 January 2015, pp. 46 -49.

874 Advisian, Opex Cost Drivers: ActewAGL Distribution Electricity (ACT), 16 January 2015, pp. 52 -55.

875 Frontier Economics, Taking account of heterogeneity between networks when conducting economic benchmarking analysis, February 2015, pp. 38-39

876 David Newbery, Cambridge Economic Policy Associates: Expert report, January 2015 p. 18.

switchgear and transformers. Considering only underground subtransmission line length will distort this. Also Economic Insights' SFA model includes a variable to account for differences in the proportion of undergrounding.

Economic Insights does consider that it is appropriate to include subtransmission directly as an operating environment variable in the SFA model [877] and we agree. Only the NSW, Queensland and ACT service providers report any line lengths over 66 kV in Australia[878]. There is therefore a risk that this variable may pick up other characteristics that are shared by service providers in these states relative to service providers in the other states. Evidence for this is that the coefficients in the CEPA, Frontier Economics, and PEGR models suggests that subtransmission lines are between 9 and 48 times more expensive to operate than distribution lines. [879] This is more than six times higher than the costs reported by Ausgrid in its regulatory accounts for the last 10 years.[880]

While we consider that including a variable in the SFA model for subtransmission is not appropriate, we consider it is appropriate to include a post-modelling adjustment. This is because differences in network boundary are exogenous, likely to materially affect service provider's costs, and are not accounted for elsewhere in the SFA model.

Since our draft decision we have received economic benchmarking RIN data for 2014 for all businesses reporting on financial years. We have updated our OEF adjustment for subtransmission to reflect the most recent year of data available. This is because it is more reflective of the NSW service providers' opex requirements in the forecast period.

The adjustments are calculated by subtracting the percentage that subtransmission lines represent of total lines operated by the weighted average of the comparison firms from that for the relevant service provider. The recommended OEF adjustments for subtransmission are therefore:

- Ausgrid: 5.2 per cent[881]
- Endeavour Energy: 4.9 per cent[882]
- Essential Energy: 3.1 per cent.[883]

SWER

We are not satisfied that an OEF adjustment for the proportion of Single-wire earth-return (SWER) included in a network would meet the exogeneity or duplication OEF adjustment criteria. The proportion of SWER included in a network is a result of past

877 Economic Insights, April 2015, p. vii.

878 Four of the 27 included New Zealand DNSPs report very short lengths of line over 66 kV.

879 Economic Insights, April 2015, p. 49.

880 Energy Australia regulatory accounts financial year 2001 to financial year 2009, Category Analysis data financial year 2009 to 2013.

881 10.5-5.3=5.2

882 10.2-5.3=4.9

883 8.4-5.3=3.1

management decisions and it will be correlated with customer density, which is captured in Economic Insights' SFA model.

In response to our draft decision, Advisian,[884][885] CEPA,[886] and Synergies[887] raised the point that the cost of operating SWER lines is different to other lines. Advisian and CEPA submitted that SWER is cheaper to operate than other lines. Synergies on the other hand submitted that it is more expensive to operate because it is less reliable, which results in greater network restoration costs.

SWER is a mature technology that has been available to network service providers for decades. SWER systems are low capital and maintenance cost distribution systems, which have been installed and operated in many rural parts of the world. The high cost of network extension to rural areas, which are often characterized by scattered communities with low load densities, requires the use of low cost options to ensure economic viability. In SWER power distribution networks, the earth itself forms the current return path of the single phase system leading to significant cost savings on conductors, poles and pole top hardware compared to conventional systems. However, challenges exist in SWER with regard to voltage management, reliability, earthing and safety as well as the dependence on earth conductivity to supply consumer loads.

A 2009 study by PB Associates identified SWER as the most cost effective option for the connection of remote customers.[888] This study showed that SWER supplies were less than half the cost of other overhead solutions. This is supported by a World Bank review of SWER undertaken in 2006.[889]

An OEF adjustment for SWER does not meet the exogeneity OEF adjustment criterion. There was nothing preventing NSW service providers from using SWER in low demand low density areas of their networks. SWER has been available for use in Australia since the first half of the 20th century. To the extent that SWER is a cheaper method to distribute electricity, its use or absence, is a reflection of past managerial efficiency or inefficiency.

To the extent that SWER can be used in low density low demand environments, the effect of SWER on opex will be correlated with customer density. As Economic Insights SFA model accounts for customer density, it will also account for the proportion of SWER used by a service provider. As mentioned in our draft decision, in our consideration of customer density, asset complexity will be correlated with customer

884 Advisian, Opex Cost Drivers: ActewAGL Distribution Electricity (ACT), 16 January 2015, pp. 57-59.

885 Advisian, Review of AER benchmarking: Networks NSW, 16 January 2015, pp. 50-52.

886 CEPA, Benchmarking and Setting Efficiency Targets for the Australian DNSPs, (ActewAGL), 2015, pp. 26, 30, and 68.

887 Synergies, Concerns over the AER's use of benchmarking as it might apply in its forthcoming draft decision on Ergon, January 2015, p. 26

888 Parsons Brinckerhoff, Indicative costs for replacing SWER lines, 28 August 2009, p. iv.

889 The World Bank, Sub-Saharan Africa: Introducing Low-cost Methods in Electricity Distribution Networks, October 2006, p. xvi.

density. In this case, SWER is a less complex asset designed to serve low loads through a single wire instead of multiple circuits.

Transmission connection point charges

We are not satisfied that an OEF adjustment for transmission connection point charges would meet the duplication OEF adjustment criterion. Transmission connection point charges have been excluded from network services opex: the opex data used in Economic Insights' SFA model.

Transmission connection point charges are charges for electricity transmission services.

In response to our draft decision, Huegin raised transmission connection point charges as an OEF that may lead to differences in opex.[890] Huegin noted that Ofgem excludes transmission connection point charges from its totex benchmarking.

In the NEM, transmission connection point charges are not included in network services opex. We are not satisfied that it is necessary to provide an OEF adjustment for transmission connection point charges. Economic Insights' SFA model uses network services opex.

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[890] Huegin, *Response to draft determination on behalf of NNSW and ActewAGL - Technical response to the application of benchmarking by the AER*, January 2015, p. 23.

A.7 The benchmark comparison point and adjustments to base opex

The purpose of any adjustment to base opex is to develop an appropriate starting point from which to build our alternative estimate of forecast opex that we are satisfied will reasonably reflect the opex criteria. We do this using a range of techniques, including benchmarking. If we make an adjustment to base opex, it is not the end of our assessment, merely one stage of it. However, the effect of removing spending from base opex that does not reflect the opex criteria can be significant because service providers rely heavily on total actual opex incurred in the base year in their revised proposals to develop their proposed forecast.

If our analysis indicates that a service provider's base opex is materially inefficient for the purposes of forecasting opex in the coming regulatory control period even after its individual circumstances (such as exogenous factors) are accounted for, it would not be appropriate to use the base opex for the purpose of constructing a forecast that is intended to reflect the opex criteria. If we relied upon unadjusted revealed costs to build a forecast, it would include spending that does not reflect the opex criteria for each year of the new regulatory period.

Accordingly, making an appropriate adjustment to base opex is an important part of our assessment approach in circumstances where we find evidence for material inefficiency in the base year costs. This issue has been the subject of a range of submissions and responses from stakeholders.

This part of our decision is, essentially, about how much of the actual opex of a service provider in the base year does not reasonably reflect the opex criteria when reviewed using the approach we are applying for the 2014–19 regulatory period.

A.7.1 Position

Having considered all the relevant evidence we consider there is material inefficiency in Ausgrid's and Essential Energy's base year opex. We do not, however, consider material inefficiency exists in Endeavour Energy's base opex.

For Ausgrid and Essential Energy, to rely on their revealed expenditure in the base year when developing our alternative forecast would result in an estimate of total forecast opex that would not reasonably reflect the opex criteria. For the purposes of constructing an alternative opex forecast that we think will reasonably reflect the opex criteria, we have adjusted their base opex amounts downwards by an appropriate margin having regard to the RPPs, the opex factors and the NEO.

For Endeavour Energy's base year opex, because we are not satisfied that it contains material inefficiency it does not require an adjustment. We, therefore, consider it appropriate to use Endeavour Energy's base opex when developing our alternative forecast. This is a departure from our draft decision. Our benchmarking analysis is nevertheless relevant in our assessment of other components of Endeavour Energy's alternative total opex forecast, such as a consideration of its proposed step changes.

We disagree with the service providers' submissions that advocate we should abandon our benchmarking techniques and the extent to which we rely upon our benchmarking results.[891] Therefore, we continue to place significant weight on the results of Economic Insights' preferred model (Cobb Douglas SFA) in estimating necessary reductions in base opex.

However, in light of submissions from service providers, we have reconsidered our approach to determining the most appropriate way to make an adjustment.[892] As we explain in the Guideline, our preference is to rely on revealed expenditure as an appropriate basis for forecasting efficient, prudent and realistic opex when service providers are appropriately responding to the incentive framework. Therefore, rather than adjusting all service providers below the most efficient performer (the frontier) the Guideline approach is to adjust revealed opex when our analysis demonstrates it is *materially* inefficient.[893]

We have looked to international regulators' application of benchmarking for guidance on benchmark comparison points. However, while many regulators apply benchmarking, the application differs across regulatory regimes. Rather, when determining the appropriate point at which to make an adjustment to expenditure, they do so having regard to their regulatory framework and the task before them. Similarly, we have decided on the benchmark comparison point (the threshold at which we make an adjustment to base opex) having regard to our regulatory framework and the task before us.

We have decided, on balance, for this decision the appropriate benchmark comparison point is the lowest of the efficiency scores in the top quartile of possible scores rather than the average approach we used in our draft decision. This is equivalent to the efficiency score for the business at the bottom of the upper third (top 33 per cent) of companies in the benchmark sample (represented by AusNet Services). Our approach of using benchmarking as a basis for making adjustments to opex is consistent with Ofgem's approach.[894]

This reduces the benchmark comparison point from 0.86 to 0.77. In making this change to our approach, we have carefully considered the submissions we have received, the requirements in the NEL and NER, the Guideline approach and the advice of Economic Insights. The purpose of assessing base opex under the Guideline approach is to identify material inefficiency. We must ensure, therefore, that our

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[891] Ausgrid, Revised Regulatory Proposal, pp. 10, 151; Endeavour Energy, Revised Regulatory Proposal, pp. 9, 179; Essential Energy, Revised Regulatory Proposal, pp. 13, 191.

[892] For example, ActewAGL, Revised Regulatory Proposal, 2015, pp. 117, 126-129, Ausgrid, RRP, 2015, pp. 139–140.

[893] AER, *Expenditure Forecast Assessment Guideline*, November 2013, p. 22.

[894] Noting that Ofgem now assesses total expenditure rather than capex and opex separately. See, for example, Ofgem, RIIO-ED1–Final determinations for the slow-track electricity distribution companies-Overview, 28 November 2014, Chapter 4.

comparison point appropriately reflects our satisfaction that a service provider's revealed opex is *materially* inefficient before we reduce it.

This change reduces our estimate of the necessary adjustments to base year opex significantly. However, given this is our first application of economic benchmarking, our view is this application is appropriate for this determination. That is, we have allowed a wide margin between the frontier firm (0.95) and the benchmark comparison point (0.77). Service providers should be aware, however, that as we refine our approach and receive more data, we may reduce the size of that margin when making adjustments to base opex to develop alternative opex forecasts.

Applying this approach, we have decided to adjust Ausgrid's and Essential Energy's revealed expenditure by $118.0 million (24.0 per cent) and $109.8 million (26.3 per cent), respectively. Table A.15 shows the resulting adjustments. The adjustments incorporate:

- a reduced benchmark comparison point of 0.77 in Economic Insights' SFA model
- an allowance for exogenous circumstances of 12 per cent for Ausgrid, 13 per cent for Endeavour Energy, and 11 per cent for Essential Energy based on our detailed assessment set out in section A.6.

These adjustments are consistent with the approach we have outlined in the Guideline and allow us to develop a forecast that best reflects the opex criteria in the NER to achieve the NEO.[895]

As a result of this modification to our approach from the draft decision, our final decision adjustments are lower than those put forward in our draft decision. Table A.15 shows that we are no longer adjusting Endeavour Energy's base opex for the purpose of constructing an alternative opex forecast.

Table A.15 Final decision base opex adjustments

	Ausgrid	Endeavour	Essential
Proposed base opex, nominal	503.6	271.6	461.0
- debt raising costs, nominal	-0.4	-	-0.3
- New CAM, nominal	3.7	-	-
- New service classification, nominal	-34.8	-55.1	-59.8
Adjusted total opex, nominal	472.2	216.5	401.0
Base opex, real 2013–14 (end of year)	492.2	225.7	418.0

[895] AEMC, Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, pp 10.

	Ausgrid	Endeavour	Essential
Substitute base, real 2013–14 (end of year)	**374.2**	**233.3**	**308.2**
Difference in base opex	118.0	-7.6	109.8
Percentage base opex reduction	**24.0%**	**N/A**	**26.3%**

Source: AER analysis.

A.7.2 Draft position

In our draft decision, we assessed the base opex of each service provider. We noted that each service provider used its actual incurred opex incurred in 2012–13 as the base for forecasting its opex for the 2014–19 period. Each service provider's forecast opex was, therefore, heavily reliant on this actual opex figure in its proposal.

Applying the approach outlined in the Guideline, we analysed the NSW service providers' actual opex. We used techniques including a variety of benchmarking models, partial productivity indictors, category analysis and detailed review. These techniques consistently revealed that the service providers' actual opex used to devise the forecast opex in their proposals was not comparable with the benchmark opex of an efficient service provider. Accordingly, relying on this as a starting point without adjustment would not generate an opex forecast that reasonably reflects the opex criteria.

To quantify an appropriate adjustment to base opex in the context of this evidence, we used the same techniques that we used to assess the NSW service providers' actual opex.

A.7.3 Revised proposal and submissions

In their revised proposals, ActewAGL and the NSW service providers submitted common issues regarding how we make adjustments to base year opex. We have carefully considered these submissions as part of our decision on the appropriate benchmark comparison point and the adjustment process.

The appropriate benchmark comparison point

In their revised proposals, the ACT and NSW service providers submitted that our approach to adjustments is different to that of other regulators.[896] ActewAGL contends, for example, that we have erred by placing reliance on a single benchmarking model

[896] ActewAGL, Revised Regulatory Proposal, 2015, pp. 117, 126-129, Ausgrid, RRP, 2015, pp. 139–140.

as different benchmarking approaches imply differing base year opex adjustments.[897] ActewAGL and its consultants also submit that:[898]

- our efficiency gap is large and inconsistent with international precedent
- our application of benchmarking results is inconsistent with international practice and literature
- our target is not appropriately cautious when compared to Economic Insights' previous views as expressed in publications.

The service providers have also submitted that, by using average efficiency scores as the basis for our adjustment, we have used a 'false frontier'[899] and, additionally, that our roll forward approach has been applied incorrectly.[900]

In light of submissions, we have reconsidered our approach to making an adjustment and we have modified it appropriately for this final decision. This involves consideration of the appropriate technique, the benchmark comparison point and the appropriate application of our technique.

The best technique for the adjustment

Consistent with our draft decision approach, we continue to adopt Economic Insights' recommendation to rely on the Cobb Douglas SFA model as the preferred technique upon which we base an adjustment to revealed opex. Our rationale for this is SFA is the most statistically superior method because it directly estimates efficiency, separate from the error term.[901] We provide more detail on Economic Insights' preference to use SFA in section A.4.

The benchmark comparison point

In this final decision, we have reconsidered the appropriate benchmark comparison point following submissions on our approach. In doing so, two questions are relevant:

- should the benchmark comparison point be the best performing business?
- if not, what is the appropriate point at which we are satisfied there is evidence of material inefficiency in the base opex?

Should we use the best performing business as our comparison point?

We explain in the Guideline that our preference is to rely on revealed expenditure as an appropriate basis for forecasting efficient, prudent and realistic opex when service

897 ActewAGL, Revised Regulatory Proposal,, 2015, p. 118.

898 ActewAGL, Revised Regulatory Proposal, pp. 168-173; CEPA, Benchmarking and setting efficiency targets for the Australian DNSPs, (ActewAGL), 2015, p. 134.

899 Ausgrid, Revised Regulatory Proposal, pp. 143-144; ActewAGL Revised Regulatory Proposal, pp. 166-175.

900 ActewAGL Revised Regulatory Proposal, p. 166; Frontier Economics, (NSW/ACT), 2015, p.97, PEGR, 2015, p.64. CEPA, Benchmarking and Setting Efficiency Targets for the Australian DNSPs, (NSW DNSPs), 2015, p.35.

901 Economic Insights (2014), section 5.

providers are appropriately responding to the incentive framework. Therefore, we created a threshold in the Guideline—we would adjust revealed opex when our analysis demonstrates it is *materially* inefficient.[902]

The first opex criterion (efficient costs) suggests that the most appropriate benchmark comparison point may be the top performing business because economic theory would not consider a lower point to be efficient. The theoretical comparison point is therefore 0.95. However, the NER also contain the qualifier 'reasonably reflects'.[903] This provides us with discretion to determine how far from the frontier a service provider must be before we are satisfied, in accordance with the Guideline approach, that it is 'materially inefficient'.

In determining what is 'materially inefficient', we recognise that there should be an appropriate margin for forecasting error, data error and modelling issues. Our view is, therefore, that using this discretion it is appropriate to choose a lower comparison point than the frontier firm.

In our draft decision, we adopted this approach. On Economic Insights' recommendation, we used the weighted average efficiency scores of all service providers with efficiency scores greater than 0.75 as the benchmark comparison point.[904] This enabled us to incorporate a margin for potential data and modelling issues, and resulted in a comparison point of 0.86. However, submissions by the service providers and their consultants consider our draft decision approach was inconsistent with approaches taken by other regulators such as Ofgem, Norway, the NZCC (New Zealand Commerce Commission) and the OEB (Ontario Energy Board).[905]

What is the appropriate benchmark comparison point?

Having considered the service providers' submissions, we turned our mind to how international regulators have applied benchmarking. However, we have found that no uniform approach exists. International regulators use benchmarking to, for example:[906]

- assess efficient opex (UK, Ireland)
- determine industry-wide productivity growth (NZ, Germany)
- group service providers and assign group-specific stretch factor as part of the X factor (Ontario, NZ, Japan)

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902 AER, *Expenditure Forecast Assessment Guideline*, November 2013, p. 22.

903 NER, clause 6.5.6(c) states:

The AER must accept the forecast of required operating expenditure of a Distribution Network Service Provider that is included in a building block proposal if the AER is satisfied that the total of the forecast operating expenditure for the regulatory control period ***reasonably reflects*** *each of the following (the operating expenditure criteria):*

(1) ***the efficient costs*** *of achieving the operating expenditure objectives…*

904 Economic Insights (2014), section 7.

905 Ausgrid, pp. 150-151, Attachments 1.05 and 1.07.

906 ACCC/AER (2012), Benchmarking Opex and Capex in Energy Networks, ACCC/AER Working Paper number 6, May.

- apply model results directly to allowed revenue/price formula (Netherlands, Austria, Germany, Denmark, Finland, Norway)
- Form basis of negotiation (California).

In terms of setting the benchmark comparison point:[907]

- the NVE in Norway, where the regulatory regime is to set total cost, uses an industry average firm
- the EMA in Finland uses a firm-specific target (based on an average of DEA and SFA results) to determine efficient opex
- the OEB in Canada has previously used firm-specific stretch factors assigned to three cohorts (0.2% top quartile, 0.4% middle two quartiles and 0.6% bottom quartile) to set efficient opex
- the NZCC in New Zealand, where the regime is based on total cost, determines industry-wide productivity growth to determine the X factor
- Ofgem in the UK has weighted three models together and set the frontier (based on the upper quartile company) after they have been combined.[908]

Therefore, regulators choose benchmark comparison points on the basis of the task in hand in the context of the legislative frameworks under which they operate. The comfort we can take from this is that the most appropriate approach is to determine a benchmark comparison point in accordance with our regulatory framework.

We have decided, on balance, for this decision, that the appropriate benchmark comparison point is the lowest of the efficiency scores in the top quartile of possible scores rather than the average approach we used in our draft decision. This is equivalent to the efficiency score for the business at the bottom of the upper third (top 33 per cent) of companies in the benchmark sample (represented by AusNet Services). Our revised comparison point is appropriate for the following reasons.

First, our draft decision averaging approach produced an unusual result for service providers ranked in the top quartile of efficiency scores, but below the average of that top quartile. These service providers would require an efficiency adjustment to reach the average benchmark comparison point (because their scores are below the average) despite being efficient enough to be ranked in the top quartile and, hence, included in the average.

Second, given it is our first application of benchmarking, it is appropriate to adopt a cautious approach. We have decided to increase the margin for error for modelling and data issues provided for in the draft decision (which reduced the benchmark comparison point from 0.95 to 0.86).

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907 ACCC/AER (2012), Benchmarking Opex and Capex in Energy Networks, ACCC/AER Working Paper number 6, May.

908 CEPA, Benchmarking and Setting Efficiency Targets for the Australian DNSPs, (NSW DNSPs), 2015, pp. 30-31.

Third, we consider this approach better achieves the NEO and RPPs. In particular we have considered:[909]

- the principle that we should provide service providers with an opportunity to recover at least their efficient costs
- we wish to create a high-powered efficiency incentive (which supports making an adjustment when it is clear there is material inefficiency in revealed costs) but we are mindful of providing sufficient stability to promote efficient investment
- our decision should allow a return that is commensurate with both regulatory and commercial risks.

A number of service providers, representing more than a third of the NEM, and operating in varied environments, are able to perform at or above our benchmark comparison point. We are confident that a firm that performs below this level is, therefore, spending in a manner that does not reasonably reflect the opex criteria. An adjustment back to an appropriate threshold is sufficient to remove the material over-expenditure in the revealed costs while still incorporating an appropriately wide margin for potential modelling and data errors and other uncertainties. Economic Insights agrees that this approach is appropriate.[910]

Our approach of using benchmarking as a basis for making adjustments to opex is also consistent with Ofgem's approach.[911]

This approach results in a comparison point significantly lower than the frontier firm's efficiency. Reducing the efficiency target from 0.95 (CitiPower) to 0.86 represented a 9 per cent allowance for the service providers. Changing the target to 0.77 (AusNet Services) increases that reduction by a further 10 per cent. Overall, this is a 19 per cent reduction from the frontier firm under the SFA model.

Our operating environment factor adjustments are percentage adjustments relative to the frontier. Therefore, the operating environment factor adjustments in Figure A.3 will not reflect the absolute percentages reported above. That is, the dark blue proportion represents 12 per cent for Ausgrid, 13 per cent for Endeavour Energy and 11 per cent for Essential Energy of the frontier efficiency score rather than an addition of 11, 12 or 13 percentage points on top of the SFA opex efficiency score.

Figure A.29 below shows the efficiency scores for the NSW service providers compared to our benchmark comparison point, represented by the red line (AusNet Services). The blue line represents the frontier firm (CitiPower).

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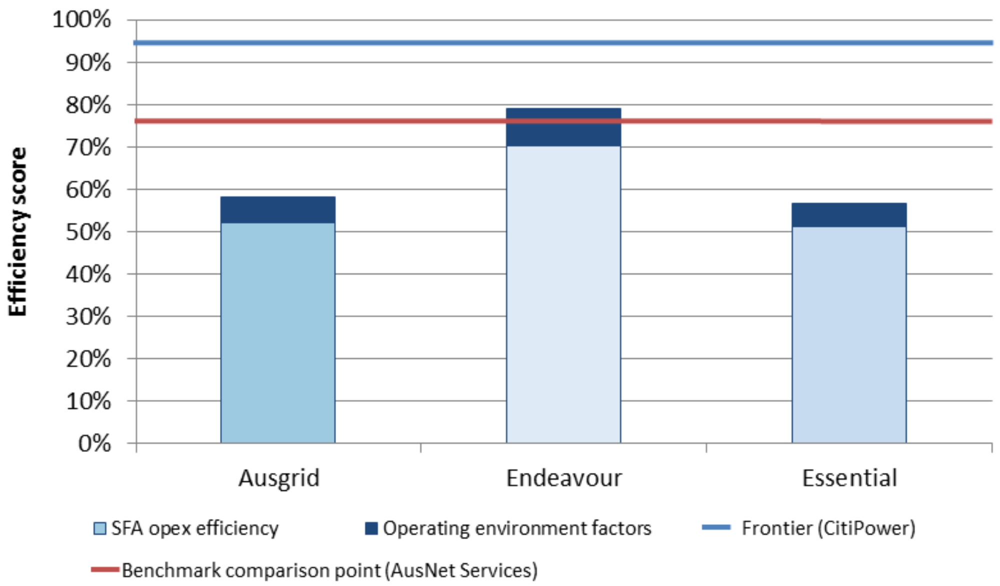
909 NEL, section 7A.

910 Economic Insights (2015), section 5.1.

911 Noting that Ofgem now assesses total expenditure rather than capex and opex separately. See, for example, Ofgem, RIIO-ED1–Final determinations for the slow-track electricity distribution companies-Overview, 28 November 2014, Chapter 4.

Our operating environment factor adjustments are percentage adjustments relative to the frontier. Therefore, the operating environment factor adjustments in Figure A.3 will not reflect the absolute percentages reported above. That is, the dark blue proportion represents 12 per cent for Ausgrid, 13 per cent for Endeavour Energy and 11 per cent for Essential Energy of the frontier efficiency score rather than an addition of 11, 12 or 13 percentage points on top of the SFA opex efficiency score.

Figure A.29 Comparison of raw SFA efficiency scores to the revised benchmark comparison point, adjusted for operating environment factors



Source: AER analysis.

Note: The raw SFA efficiency scores displayed are 'rolled forward' from a period-average basis (for 2006-2013) to the 2012–13 base year. We explain this below in our discussion of the adjustment process.

Our operating environment factor adjustments are percentage adjustments relative to the frontier. Therefore, the operating environment factor adjustments in Figure A.3 will not reflect the absolute percentages reported above. That is, the dark blue proportion represents 12 per cent for Ausgrid, 13 per cent for Endeavour Energy and 11 per cent for Essential Energy of the frontier efficiency score rather than an addition of 11, 12 or 13 percentage points on top of the SFA opex efficiency score.

Figure A.29 demonstrates an appropriately conservative difference between the frontier firm and our benchmark comparison point. Due to the lower comparison point, we consider Endeavour Energy's base opex does not require an adjustment. We emphasise, however, that we do not consider Endeavour Energy's revealed opex is necessarily efficient. The change in our approach simply means we consider it is not *materially* inefficient, allowing for an appropriate margin for error, taking account of the RPPs.

As we refine our approach and continue to receive more data—all service providers must submit data each year— we may revise our benchmark comparison point when making adjustments to base opex to develop alternative opex forecasts.

The adjustment process

The mechanics of determining the adjustment include several steps. In essence, it involves using the SFA model to estimate average period efficiency, which we adjust to take into account the reduced benchmark comparison point and operating environment factor allowances. We then roll this average period efficient opex forward to the 2012–13 base year to compare efficient base opex to the service provider's reported base opex.[912]

The service providers submit that both using an average approach and rolling it forward are inappropriate.[913] Here, we clarify why we consider our approach is appropriate.

Average period efficiency scores

A key reason we use average period efficiency scores is because they moderate the impact of year-specific fluctuations not under the control of the service provider (such as weather conditions) while also reducing the scope for the service provider to strategically reduce its reported opex in a single, nominated benchmark year. [914]

Average efficiency results also provide us with a better estimate of underlying recurrent expenditure not influenced by year on year changes, which we require for the Guideline approach to estimating total forecast opex.

In addition, because the sample period is the eight years from 2006 to 2013, Economic Insights considers the average is sufficiently recent to avoid the potential loss of current relevance.[915] Economic Insights also considers the performance gap has not narrowed for the following reasons:[916]

- the NSW service providers' decisions to include a large negative change in provisions in 2013 provide an artificial impression that their performance is considerably better in 2013 than if changes in provisions were excluded
- the Victorian service providers experienced a negative rate of technical change (which leads to a negative rate of opex partial productivity growth) due to allowed step changes following the implementation of Victorian Bushfires Royal Commission recommendations

912 We use the standard control services opex as reported in the service provider's regulatory accounts.

913 Ausgrid, Revised Regulatory Proposal, pp. 143-144; ActewAGL Revised Regulatory Proposal, pp. 166-175; Frontier Economics, (NSW/ACT), 2015, p.97, PEGR, 2015, p.64. CEPA, Benchmarking and Setting Efficiency Targets for the Australian DNSPs, (NSW DNSPs), 2015, p.35.

914 Economic Insights (2015), section 4.1.

915 Economic Insights (2015), section 4.1.

916 Economic Insights (2015), section 4.3.

- the SFA and LSE models calculate average efficiency levels over the period and these averages incorporate the influence of the situation at the end of the period. That is, they calculate average efficiency for the period rather than midpoint efficiency. Therefore, because the efficiency score is an average, it already partially allows for changed conditions at the end of the period (assuming they have in fact changed).

Rolling forward average scores to the base year

Because we compare average efficiency, we must 'roll forward' the average efficient opex to the 2012–13 base year, because that is the relevant starting point for estimating total forecast opex that reasonably reflects the opex criteria. We do this by applying the measured rate of change, which accounts for the difference between output, price and productivity in the 2012–13 base year and at the period average (2006 to 2013).[917] The rate of change value varies for each service provider due to differing growth rates.

Rolling forward average efficiency to the 2012–13 base year allows for differences in service providers' relative opex growth rates between the average and the base year. This means that if a service provider has increased its constant price opex between the average of the period and 2012–13 by less than that which the rate of change formula allows, it would receive a smaller base year opex reduction compared to that implied by its average efficiency score.

Conversely, if the service provider has increased its constant price opex by more than that which the rate of change formula allows, it would receive a larger base year opex reduction compared to that implied by its average efficiency score.[918]

Final decision adjustments

Table A.16 and Table A.17 demonstrate the steps involved in making the adjustments to Ausgrid's and Essential Energy's base year opex.

Table A.16 Steps for making the adjustment to base opex – Ausgrid

	Description	Output	Calculation
Step 1 – Start with Ausgrid's average opex over the 2006 to 2013 period	Ausgrid's network services opex was, on average, $509.3 million ($2013) over the 2006 to 2013 period.	$509.3 million ($2013)	
Step 2 —Calculate the	Our preferred economic benchmarking model is	44.7 per cent[919]	

[917] This differs slightly from the rate of change we apply in Appendix B. While the approach is the same, to trend base opex forward over the forecast period, we apply forecast growth. When rolling forward average efficient opex, we apply measured growth because we can observe what has actually changed between the period average and the base year.

[918] Economic Insights, 2015, pp. 45-46.

	Description	Output	Calculation
raw efficiency scores using our preferred economic benchmarking model	Economic Insights' Cobb Douglas SFA model. We use it to determine all service providers' raw efficiency scores. Based on Ausgrid's customer numbers, line length, and ratcheted maximum demand over the 2006 to 2013 period Ausgrid's raw efficiency score is 44.7 per cent.		
Step 3—Choose the comparison point	For the purposes of determining our alternative estimate of base opex, we did not base our estimate on the efficient opex estimated by the model. The comparison point we used was the lowest of the efficiency scores in the top quartile of possible scores (represented by AusNet Services). According to this model AusNet Services' opex is 76.8 per cent efficient based on its performance over the 2006 to 2013 period. Therefore to determine our substitute base we have assumed a prudent and efficient Ausgrid would be operating at an equivalent level of efficiency to AusNet Services.	76.8 per cent[920]	
Step 3— Adjust Ausgrid's raw efficiency score for operating environment factors	The economic benchmarking model does not capture all operating environment factors likely to affect opex incurred by a prudent and efficient Ausgrid. We have estimated the effect of these factors and made a further reduction to our estimate where required. We have determined an 11.7 per cent reduction to Ausgrid's comparison point based on our assessment of these factors. A material operating environment factor we considered was not accounted for in the model is the different subtransmission configurations in NSW.	68.7 per cent	= 0.768 / (1 + 0.117)
Step 4—Calculate the percentage reduction in opex	We then calculate the opex reduction by comparing Ausgrid's efficiency score with the adjusted comparison point score.	35.0 per cent	= 1 – (0.447 / 0.687)
Step 5—Calculate the midpoint efficient opex	We estimate efficient opex at the midpoint of the 2006 to 2013 period by applying the percentage reduction in opex to Ausgrid's average opex over the period. This represents our estimate of efficient opex at the midpoint of the 2006 to 2013 period.	330.9 million ($2013)	= (1 – 0.350)* 509.3 million
Step 6— Trend midpoint efficient opex forward to 2012–13	Our forecasting approach is to use a 2012–13 base year. We have trended the midpoint efficient opex forward to a 2012–13 base year based on	359.0 million ($2013)	= 330.9 × (1+ 0.0848)

[919] Economic Insights, *Economic Benchmarking Assessment of Operating Expenditure for NSW and ACT Electricity DNSPs*, November 2014, p. 37.

[920] Economic Insights, *Economic Benchmarking Assessment of Operating Expenditure for NSW and ACT Electricity DNSPs*, November 2014, p. 37.

	Description	Output	Calculation
	Economic Insights' opex partial factor productivity growth model. It estimates the growth in efficient opex based on growth in customer numbers, line length, ratcheted maximum demand and share of undergrounding. It estimated the growth in efficient opex based on Ausgrid's growth in these inputs in this period to be 8.48 per cent.		
Step 7—Adjust our estimate of 2012–13 base year opex for CPI	The output in step 6 is in real 2013 dollars. We need to convert it to real 2013–14 dollars for the purposes of forming our substitute estimate of base opex. This reflects one and a half years of inflation. This is our estimate of base opex.	374.2 million ($2013–14)	= 359.0 × (1 + 0.042)

Source: AER analysis

Table A.17 Steps for making the adjustment to base opex – Essential Energy

	Description	Output	Calculation
Step 1 – Start with Essential Energy's average opex over the 2006 to 2013 period	Essential Energy's network services opex was, on average, $352.5 million ($2013) over the 2006 to 2013 period.	$352.5 million ($2013)	
Step 2 —Calculate the raw efficiency scores using our preferred economic benchmarking model	Our preferred economic benchmarking model is Economic Insights' Cobb Douglas SFA model. We use it to determine all service providers' raw efficiency scores. Based on Essential Energy's customer numbers, line length, and ratcheted maximum demand over the 2006 to 2013 period Essential Energy's raw efficiency score is 54.9 per cent.	54.9 per cent[921]	
Step 3—Choose the comparison point	For the purposes of determining our alternative estimate of base opex, we did not base our estimate on the efficient opex estimated by the model. The comparison point we used was lowest of the efficiency scores in the top quartile of possible scores (represented by AusNet Services). According to this model AusNet Services' opex is 76.8 per cent efficient based on its performance over the 2006 to 2013 period. Therefore to determine our substitute base we have assumed a prudent and efficient Essential Energy would be operating at an equivalent level of efficiency to AusNet Services.	76.8 per cent[922]	
Step 3— Adjust Essential Energy's raw efficiency score for operating environment factors	The economic benchmarking model does not capture all operating environment factors likely to affect opex incurred by a prudent and efficient Essential Energy. We have estimated the effect of these factors and made a further reduction to our estimate where required. We have determined a 10.7 per cent reduction to Essential Energy's comparison point based on our assessment of these factors. A material operating environment factor we considered was not accounted for in the model is the different subtransmission configurations in NSW.	69.4 per cent	= 0.768 / (1 + 0.107)
Step 4—Calculate the percentage reduction in opex	We then calculate the opex reduction by comparing Essential Energy's efficiency score with the adjusted comparison point score.	20.9 per cent	= 1 – (0.549 / 0.694)

921 Economic Insights, *Economic Benchmarking Assessment of Operating Expenditure for NSW and ACT Electricity DNSPs*, November 2014, p. 37.

922 Economic Insights, *Economic Benchmarking Assessment of Operating Expenditure for NSW and ACT Electricity DNSPs*, November 2014, p. 37.

	Description	Output	Calculation
Step 5—Calculate the midpoint efficient opex	We estimate efficient opex at the midpoint of the 2006 to 2013 period by applying the percentage reduction in opex to Essential Energy's average opex over the period. This represents our estimate of efficient opex at the midpoint of the 2006 to 2013 period.	278.8 million ($2013)	= (1 – 0.209)* 352.5 million
Step 6— Trend midpoint efficient opex forward to 2012–13	Our forecasting approach is to use a 2012–13 base year. We have trended the midpoint efficient opex forward to a 2012–13 base year based on Economic Insights' opex partial factor productivity growth model. It estimates the growth in efficient opex based on growth in customer numbers, line length, ratcheted maximum demand and share of undergrounding. It estimated the growth in efficient opex based on Essential Energy's growth in these inputs in this period to be 6.04 per cent.	295.7 million ($2013)	= 278.8 × (1+ 0.0604)
Step 7— Adjust our estimate of 2012–13 base year opex for CPI	The output in step 6 is in real 2013 dollars. We need to convert it to real 2013–14 dollars. This reflects one and a half years of inflation.	308.2 million ($2013–14)	= 295.7 × (1 + 0.042)
Step 8 - Convert to final year estimate	The guideline specifies that we will convert our estimate of base year opex into a final year estimate. We used the formula in the guideline to determine our unadjusted estimate of opex for 2013–14. We used the 2012–13 efficient opex value in step 7 to determine what the efficiency adjustment would be for 2012–13 (–26.3%), taking into account changes to Essential Energy's service classification. To arrive at our adjusted final year estimate, we applied the efficiency adjustment to our unadjusted estimate of 2013–14 opex.	311.9 million ($2013–14)	

B Rate of change

Our forecast of total opex includes an allowance to account for efficient changes in opex over time.

There are several reasons why opex that reflects the opex criteria for each year of a regulatory control period might differ from expenditure in the base year.

As set out in our Expenditure forecast assessment guideline (our Guideline), we have developed an opex forecast incorporating the rate of change to account for the following factors:[923]

- price growth
- output growth
- productivity growth.

This appendix contains our assessment of the opex rate of change for use in developing our forecast estimate of total opex.

B.1 Position

We have applied the same rate of change methodology to derive our alternative estimate of opex as we used for our draft decision, with one exception. For this final decision we have applied the rate of change from the base year (2012–13) rather than from the final year (2013–14). Table B.1 shows our final position on each rate of change component and the overall rate of change in annual percentage terms. We do not agree with Ausgrid's criticisms of our economic benchmarking and we consider our economic benchmarking analysis produces a robust basis to forecast output growth and productivity. We consider that applying our methodology to derive an alternative estimate of opex will result in a forecast that reasonably reflects the efficient, prudent costs faced by Ausgrid given a realistic expectation of demand forecasts and costs inputs.

Table B.1 Rate of change (per cent)

	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19
Price growth	0.38[924]	0.67	0.76	0.83	0.87	0.84
Output growth	0.68	0.67	0.76	0.83	0.87	0.84
Productivity growth	–	–	–	–	–	–

923 AER. *Better Regulation explanatory statement expenditure forecast assessment guideline*, November 2013, p. 61.

924 To forecast the price change for 2013–14 we have used actual data provided by Independent Economics and Deloitte Access Economics.

	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19
Overall	1.05	1.51	1.40	1.50	1.57	1.53

Source: AER analysis.

B.2 Draft position

In our draft decision, we did not adopt Ausgrid's forecast change in price, output and productivity in our forecast rate of change and thus our alternative estimate of opex. Our draft position for each rate of change component was:

- **Price growth:** for labour price growth we adopted an average of Deloitte Access Economics' (DAE) and Independent Economics' forecast change in the wage price index (WPI) for the electricity, gas, water and waste services (EGWWS) industry. For non-labour we adopted the forecast change in the CPI. We applied Economic Insights' benchmark weightings for labour and non-labour.
- **Output growth**: we applied the weighted average forecast change in customer numbers, circuit length and ratcheted maximum demand. We based the weights on Economic Insights' opex cost function analysis.
- **Productivity growth**: we applied a zero per cent productivity growth. We based this on our considerations of recent productivity trends and whether this would be applicable to the forecast period. This was also consistent with Economic Insights' recommendations.

Refer to section B.4 of attachment 7 in our draft decision for a detailed explanation of our assessment methodology and how we have applied the rate of change.

B.3 Our estimate of the rate of change for 2013–14

We have amended our alternative opex forecast to apply the rate of change to 2013–14 because we will not apply the EBSS for the 2014–19 period.

Under our guideline forecasting method, we estimate final year opex as the determined opex allowance for the final year minus the cumulative efficiency gain made up to the base year (which is the underspend in that year). In other words, we take the reported opex in the base year and add the difference between the opex allowance for the final year and the allowance for the base year. This will include price growth included in the allowance for 2013–14.

Thus the opex forecast assumes the distributor makes no efficiency gains after the base year. This allows the distributor to retain the efficiency gains it makes in the final year for five years through the opex forecast.[925] However, because the EBSS will not apply in the 2014–19 period, there is no need to estimate final year opex this way.

[925] AER, *Better regulation expenditure forecast assessment guidelines for electricity distribution*, November 2013, pp. 22–23

Consequently we have adjusted our opex model to apply the forecast rate of change from the base year (that is 2012–13) not the final year. This increases our forecast of Ausgrid's total opex by $16.9 million ($2013–14).

B.4 Revised proposal and submissions

We consider our methodology for setting output growth and productivity growth to represent the best forecast of the rate of change components for an efficient, prudent service provider given realistic expectations of demand forecasts and cost inputs.

In its revised proposal Ausgrid adopted our draft decision approach to setting price growth component of the rate of change. However, Ausgrid did not adopt our draft decision approach to output growth and productivity growth.[926]

Ausgrid raised concerns about our benchmarking techniques and noted that we based our output growth measure on economic benchmarking so the same concerns that apply to our benchmarking techniques apply to our output growth measure.[927]

We have considered Ausgrid's criticisms of our economic benchmarking approach in our base opex assessment in appendix A. We note Ausgrid did not raise any other issues regarding our forecast output growth. As discussed in appendix A , our economic benchmarking and output specification is robust for the following reasons:

- The output specification reflects the services a distributor's customers require.
- These outputs are consistent with other model specifications in the benchmarking literature.
- Economic Insights undertook rigorous econometric modelling to estimate opex cost function that relates opex with outputs and other relevant cost drivers.

Since we consider our economic benchmarking analysis to be robust we consider the approach we adopted to setting output growth and productivity in our draft decision to be reasonable. We adopt the same output specification in the rate of change as opex modelling to setting base opex because both our historical and forecast assessment should be consistent and output growth should account for the change in the distributor's key functional outputs valued by customers.

We also note our rate of change approach is less reliant on the economic benchmarking techniques than our base opex assessment. Output growth only relies on the output specification, which we consider to be reasonable, and the change in these outputs.

Origin also supported our method to establish a trend that ensures the approach to derive the efficient rate of change is consistent with the approach to derive the efficient base opex.[928]

926 AusGrid, *Revised regulatory proposal and preliminary submission*, 20 January 2015, p. 163
927 AusGrid, *Revised regulatory proposal and preliminary submission*, 20 January 2015, p. 163

Ausgrid considered there was no need to revise its productivity forecast because it captured its efficiency programs. Ausgrid noted we did not take into account the time and resources it takes to deliver transformation in NSW distributors. Ausgrid also considered that we have mechanically applied a productivity adjustment and did not engage with the information provided in its proposal or considered the time and resources it takes to deliver transformation in the NSW distributors.[929]

We note Ausgrid's efficiency programs in the forecast period are relative to its proposed base year. As noted in our draft decision, our forecast rate of change is applied to base year expenditure that reflects the opex criteria.

We consider Ausgrid's efficiency programs represent 'catch up' productivity, so efficient distributors would not be implementing these same productivity improvements. We consider it would not be reasonable to adjust Ausgrid's base opex to the benchmark frontier and then to also apply a 'catch up' productivity adjustment this is because 'catch up' productivity is not required if a service provider is on the benchmark frontier.

We note we have not mechanically included a productivity adjustment to our rate of change. We have considered the recent productivity trends for the electricity distribution industry, the likely causes of the recent decline in productivity and whether these causes will impact on forecast productivity. Based on these factors we concluded that a zero productivity adjustment is reasonable for a distributor on the efficient frontier.

In regards to the timeframe for delivering transformation, we have addressed the issue of a transition period in section 7.5.2.

Other submissions

This section discusses other submissions we received in response to our draft decision and Ausgrid's revised proposal.

AusNet Services submitted that the labour and non-labour proportions should reflect a distributors' actual opex unless there is evidence that the firm is not responding to incentives.[930]

We note AusNet Services' submission is not relevant to Ausgrid's opex weightings as it is not on the efficient frontier. Further, we consider price weightings should reflect benchmark proportions. Distributors will still have an incentive to beat the benchmark.

The Energy Users Association of Australia (EUAA) noted that our use of the electricity, gas, water and waste services (EGWWS) industry is not appropriate and that we must ensure that the NSW distributors are not allowed to continue with their previous

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[928] Origin, *Submission to AER draft determination for NSW electricity distributors*, 13 February 2015, p. 7.

[929] AusGrid, *Revised regulatory proposal and preliminary submission*, 20 January 2015, p. 163.

[930] AusNet Services, Draft decisions NSW/ACT electricity distribution determination 2015–19, 12 February 2015, p. 7.

approach of using Enterprise Agreement (EA) outcomes as a "pass through".[931] The EUAA also raised the following issues regarding the rate of change:

- the CPI was not appropriate for non-labour price growth because commodities prices were trending downwards
- it does not accept that there is a direct proportional change in opex for output growth but disagrees with the NSW distributors approach of applying installed capacity, and
- it noted other asset intensive industries delivered positive productivity growth and does not accept that there is any justification for why the electricity distribution sector should be lower than these industries.

We note an electricity industry labour price would be preferable to our EGWWS measure. However, there is no suitable robust measure of electricity workers only so this is why we have adopted the Australian Bureau of Statistics (ABS) measure of the EGWWS sector. We note both our draft decision and Ausgrid's revised proposal do not directly include EA outcomes.

For non-labour price growth, we consider materials are not a significant driver of opex prices. As discussed in our draft decision the non-labour component of price growth is made up of various producer price indices (PPIs) which are expected to move in line with the CPI.

For our output growth measure, the proportional change in opex for changes in outputs is used as a starting point to account for an increase or decrease in the quantity of outputs. We consider an increase in opex is reasonable when a distributor is required to provide more services. We then adjust for this in our overall productivity adjustment which includes economies of scale and technical change.

We note the EUAA did not provide further information on industries that have experienced positive productivity from 2006–13. In determining our productivity adjustment we have accounted for recent trends and likely future trends amongst distributors in the NEM. We do not have robust information to compare the electricity distribution industry with other industries.

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931 Energy Users Association of Australia, *Submission to NSW DNSP revised revenue proposal to AER draft determination (2014 to 2019)*, 13 February 2015, p. 44

C Step changes

In developing our alternative opex forecast, we recognise that there may be changed circumstances in the forecast period that may impact on the expenditure requirements of a service provider. We consider those changed circumstances as potential 'step changes'.

We typically allow step changes for changes to ongoing costs associated with new regulatory obligations and for efficient capex/opex trade-offs. Step changes may be positive or negative. We typically consider that the opex that would otherwise be incurred to reasonably reflect the opex criteria is covered through our estimate of base opex or the rate of change in base opex.

This appendix sets out our consideration of step changes in determining our opex forecast for Ausgrid for the 2014–19 period.

C.1 Final position

We have included a $16.3 million ($2013–14) step change for the leaseback of Ausgrid's head office building in our alternative opex forecast. This is consistent with the position we outlined in our draft decision.

C.2 Draft position

In its initial proposal, Ausgrid proposed change factors where it considered its historical opex would not be representative of its future opex. The amount it proposed and a brief description of each proposed change factor is outlined in Table C.1 below.[932]

[932] Ausgrid also labelled proposed increases in input prices as a change factor. We considered its proposal in relation to input prices in the rate of change appendix

Table C.1 Ausgrid proposed change factors in initial proposal

Proposed change factor	Description	Proposed amount	AER draft decision amount
Cessation of Transitional Services Agreement	Forecast loss of economies of scale and scope associated with change in provision of retail services.	26.4[933]	-
Compliance with regulatory obligations	A routine program of regular inspection of privately owned assets and a new asbestos inspection program in substations commissioned prior to 2000.	25.0	-
Leaseback cost of head office building	The leaseback is associated with the decision to sell Ausgrid's head office building. Ausgrid staff will eventually relocate from this building to an existing building in the Sydney CBD. However, as some time is needed to refurbish this building, Ausgrid intends to leaseback its existing head office for up to three years.	16.3	16.3
Impact of complying with cost allocation method	Forecast increase in costs of standard control services associated with a change in Ausgrid's cost allocation method	5.9[934]	-
Cost base restructure	Ausgrid has outlined that it is facing a pool of excess resources and other stranded costs due to a reduced capital investment program. Restructuring costs (including redundancies) aim to transition Ausgrid's opex to a sustainable level	39.8	-
Efficiency program	Reflects forecast reduction in costs as a result of NSW government initiated network reforms	–112.1	
Broad based demand management	Eight new initiatives aimed at reducing peak demand	22.1	-

Source: Ausgrid, *Regulatory proposal*, pp. 56-60, 64.

Ausgrid preferred to use the phrase 'change factor' to describe the cost drivers affecting its opex forecast for the 2014–19 regulatory control period. Ausgrid considered the use of the term step change has the effect of precluding costs that may satisfy the criteria and factors in the National Electricity Rules.[935] Ausgrid considered that incorporating 'change factors' into its forecasts enable it to develop a precise forecast of opex that meets the National Electricity Rules criteria.

In our draft decision we did not consider that how a cost driver is labelled should affect how we assess it. We considered our framework for assessing step changes is equally applicable to a cost driver defined as a change factor. We considered that how a cost

933 Net of proposed efficiency improvements.

934 Net of proposed efficiency improvements.

935 Ausgrid, *Response to RIN*, p. 32.

driver is labelled should not lead to a different conclusion of the total opex that would reasonably reflect the opex criteria.[936]

In our draft decision we included one step change above our estimate of base opex that we were satisfied reasonably reflected the opex criteria. This is related to the leaseback of Ausgrid's head office building. Ausgrid's head office building was sold by the NSW Government. While, for the period of the leaseback, Ausgrid's forecast opex is higher, its RAB is permanently lower as a result of the sale. We considered this to be an efficient trade-off.

We did not consider there were other reasons to provide step changes above our estimate of base opex (adjusted for our estimate of the rate of change in base opex).

C.3 Ausgrid’s revised proposal and submissions

In its revised proposal, Ausgrid agreed with our draft decision position to include a step change in our draft decision opex forecast for the leaseback cost of its head office building. We did not receive any further submissions on this position so we have also included this step change in our alternative opex forecast for the final decision.

Ausgrid did not agree with the position in our draft decision relating to:

- loss of synergies associated with the cessation of its Transitional Service Agreement
- private pole inspections and asbestos inspection management
- impact of transitioning to its new cost allocation program
- redundancy costs[937]
- broad-based demand management.
- Ausgrid revised its proposal in relation to redundancy costs.

In response to our draft decision, the EUAA agreed with our position that the NSW distributors' proposed step changes were already accounted for in our assessment of base year opex.[938]

We first outline the assessment approach we applied to assessing Ausgrid's proposed change factors. We then consider each of the issues raised in Ausgrid's revised proposal and in submissions below.

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[936] AER, *Draft decision - Ausgrid distribution determination attachment 7 - Operating expenditure*, November 2014, p. 158.

[937] Included in cost base restructure step change

[938] EUAA, *Submission to NSW DNSP revised revenue proposal to AER draft determination (2014 to 2019)*, 13 February 2015, p. 48.

C.4 Assessment approach

When assessing a service provider's proposed step changes, we consider whether they are needed for the total opex forecast to reasonably reflect the opex criteria.[939] Our assessment approach is consistent with the approach specified in our *Expenditure forecast assessment guideline* (Guideline).[940]

As a starting point, we consider whether the proposed step changes in opex are already compensated through other elements of our alternative opex forecast, such as our base opex or our 'rate of change' component. Step changes should not double count costs included in other elements of the opex forecast.

We generally consider an efficient base level of opex is sufficient for a prudent and efficient service provider to meet all existing regulatory obligations. This is the same regardless of whether we forecast an efficient base level of opex based on the service provider's own costs or the efficient costs of comparable benchmark providers. We only include a step change in our alternative opex forecast if we are satisfied a prudent and efficient service provider would need an increase in its opex to reasonably reflect the opex criteria.

We forecast opex by applying an annual 'rate of change' to the base year for each year of the forecast regulatory control period. The annual rate of change accounts for efficient changes in opex over time. It incorporates adjustments for forecast changes in output, price and productivity. Therefore, when we assess the proposed step changes we need to ensure that the cost of the step change is not already accounted for in any of those three elements included in the annual rate of change. The following explains this principle in more detail.

For example, a step change should not double count the costs of increased volume or scale compensated through the forecast change in output. We account for output growth by applying a forecast output growth factor to the opex base year. If the output growth measure used captures all changes in output then step changes that relate to forecast changes in output will not be required. For example, a step change is not required for the maintenance costs of new office space required due to the service provider's expanding network. The opex forecast has already been increased (from the base year) to account for forecast network growth.[941]

By applying the rate of change to the base year opex, we also adjust our opex forecast to account for real price increases. A step change should not double count price increases already compensated through this adjustment. Applying a step change for costs that are forecast to increase faster than CPI is likely to yield a biased forecast if

[939] NER, clause 6.6.5(c).

[940] AER, *Expenditure assessment forecast guideline*, November 2013, pp.11, 24.

[941] AER, *Explanatory guide: Expenditure assessment forecast guideline*, November 2013, p.73. See, for example, our decision in the Powerlink determination; AER, *Final decision: Powerlink transmission determination 2012–17*, April 2012, pp, 164-5.

we do not also apply a negative step change for costs that are increasing by less than CPI. A good example is insurance premiums. A step change is not required if insurance premiums are forecast to increase faster than CPI because within total opex there will be other categories whose price is forecast to increase by less than CPI. If we add a step change to account for higher insurance premiums we might provide a more accurate forecast for the insurance category in isolation; however, our forecast for total opex as a whole will be too high.

Further to assessing whether step changes are captured in other elements of our opex forecast, we will assess the reasons for, and the efficient level of, the incremental costs (relative to that funded by base opex and the rate of change) that the service provider has proposed. In particular we have regard to:[942]

- whether there is a change in circumstances that affects the service provider's efficient forecast expenditure
- what options were considered to respond to the change in circumstances
- whether the option selected was the most efficient option—that is, whether the service provider took appropriate steps to minimise its expected cost of compliance
- the efficient costs associated with making the step change and whether the proposal appropriately quantified all costs savings and benefits
- when this change event occurs and when it is efficient to incur expenditure, including whether it can be completed over the regulatory period
- whether the costs can be met from existing regulatory allowances or from other elements of the expenditure forecasts.

One important consideration is whether each proposed step change is driven by an external obligation (such as new legislation or regulations) or an internal management decision (such as a decision to increase maintenance opex). Step changes should generally relate to a new obligation or some change in the service provider's operating environment beyond its control in order to be expenditure that reasonably reflects the opex criteria. It is not enough to simply demonstrate an efficient cost will be incurred for an activity that was not previously undertaken. As noted above, the opex forecasting approach may capture these costs elsewhere.

Usually increases in costs are not required for discretionary changes in inputs.[943] Efficient discretionary changes in inputs (not required to increase output) should normally have a net negative impact on expenditure. For example, a service provider may choose to invest capex and opex in a new IT solution. The service provider should not be provided with an increase in its total opex to finance the new IT since the outlay should be at least offset by a reduction in other costs if it is efficient. This means we will not allow step changes for any short-term cost to a service provider of

[942] AER, *Expenditure assessment forecast guideline*, November 2013, p.11.

[943] AER, *Expenditure assessment forecast guideline*, November 2013, p. 24.

implementing efficiency improvements. We expect the service provider to bear such costs and thereby make efficient trade-offs between bearing these costs and achieving future efficiencies.

One situation where a step change to total opex may be required is when a service provider chooses an operating solution to replace a capital one.[944] For example, it may choose to lease vehicles when it previously purchased them. For these capex/opex trade-off step changes, we will assess whether it is prudent and efficient to substitute capex for opex or vice versa. In doing so we will assess whether the forecast opex over the life of the alternative capital solution is less than the capex in NPV terms.

In its revised proposal, Ausgrid repeated its concerns with the approach we had taken to step changes. It considered such an approach simplistically ignores legitimate costs that reasonably reflect the opex criteria.[945]

We do not agree with Ausgrid that our approach to assessing step changes is inconsistent with the opex criteria. As outlined in our draft decision and above, step changes are provided in our assessment approach for any additional costs that are needed for the total opex forecast to reasonably reflect the opex criteria. This is consistent with the NER.

We are open to considering all step changes that have not already been accounted for in our opex forecast through our estimate of base opex or the estimate of the rate of change. If we are presented with persuasive evidence that a service provider would incur additional opex to meet the opex criteria that is not accounted for elsewhere in our alternative opex forecast, then we will include a step change in our forecast.

C.4.1 Cessation of Transitional Agreement

We have not included a step change for the cessation of Ausgrid's transitional services agreement with TRUenergy (now EnergyAustralia) in our opex forecast for the final decision. We are satisfied the alternative opex forecast we have developed already provides sufficient funding for a prudent Ausgrid to efficiently deliver standard control distribution services to its consumers in the 2014–19 period. We are not satisfied that a further increase in opex is required for this cost driver.

Prior to 1 March 2011, Ausgrid (formerly known as EnergyAustralia) was an integrated business that provided both network and retail services. EnergyAustralia's retail business was sold to TRUenergy on 1 March 2011. The profit on the sale of Ausgrid's retail business and a development site at Marulan was $1.2 billion.[946]

Under the terms of the sale, Ausgrid and TRUenergy agreed to a transitional services agreement (TSA) whereby Ausgrid would continue to provide retail services to

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[944] AER, *Expenditure assessment forecast guideline*, November 2013, p. 24; AER, *Explanatory guide: Expenditure assessment forecast guideline*, November 2013, pp.51-52.

[945] Ausgrid, *Revised regulatory proposal*, January 2015, p. 171.

[946] NSW Auditor-General, *NSW Auditor General's Report - Volume Four 2011*, 2 November 2011, p. 24.

TRUenergy. At the time of submitting its regulatory proposal, Ausgrid anticipated it would continue to provide retail services until November 2014. When the agreement ended, Ausgrid considered the operational and support costs of providing standard control services would increase due to lost economies of scale and scope of being an integrated retail/network business. Ausgrid claimed this would impact on its data operations and emergency contact centre, as well as other corporate functions. It outlined it would find productivity savings to reduce the impact of the cost increases but these savings would not take full effect until 2017–18.[947] As a result, it forecast an increase in opex from 2014–15 to 2016–17.

In our draft decision, we outlined the following points in support of our decision:[948]

- When considering a step change we typically consider whether the cost driver is a new regulatory obligation or is a capex/opex trade-off. We noted that the sale of Ausgrid's retail business did not fit within either of these categories.
- None of the Victorian and South Australian distribution network service providers provide retail services. Based on economic benchmarking we demonstrated that, on a like for like basis, all Victorian and South Australian service providers deliver standard control services at a lower cost than Ausgrid. We considered that if we did include a step change for this cost driver, Ausgrid's electricity network consumers would pay a higher price to receive a comparable distribution network service than consumers of Victorian and South Australian service providers.
- We agreed with submissions from PIAC and the TEC that we would normally expect that the profit from the sale of unrelated business would cover the incremental costs affecting the network business. We considered that where the costs facing a network business increases after a decision made by the network owners, we would expect that the owners would either directly cover those costs, or accept a lower return in transitioning to a new structure. We saw no reason why electricity network consumers should face increased costs as a result of a decision that is unrelated to the service they receive.

In response to our draft decision, Ausgrid considered we had made a generalisation by assuming away the existence of these costs. It did not consider opex incurred by the Victorian and South Australian businesses were relevant in assessing this step change. It instead considered that we needed to have regard to Ausgrid's individual circumstances.[949]

We have not assumed away these costs. Ausgrid may well experience increased costs as a result of the end of the TSA. However, one of our tasks in assessing opex is to consider the efficient costs of achieving the operating expenditure objectives.[950] We also have regard to the opex factors. One opex factor we have regard to is the

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947 Ausgrid, *Regulatory Proposal*, June 2014, p. 56.

948 AER, *Draft decision Ausgrid distribution determination 2015–19 - Attachment 7*, November 2014, pp. 238-239.

949 Ausgrid, *Revised regulatory proposal*, January 2015, p. 171.

950 NER, s.6.5.6(c)(1).

benchmark operating expenditure that would be incurred by an efficient distribution network service provider over the relevant regulatory control period.[951] Our benchmarking shows that when comparing the opex incurred in providing network services, Ausgrid benchmarks poorly compared to service providers in Victoria and South Australia. During the benchmarking period, Ausgrid benefitted from apparent synergies between its retail and distribution business. Victorian and South Australian service providers did not. It would be inconsistent with the opex criteria and opex factors to compensate Ausgrid where it has lost synergies that more efficient network service providers do not benefit from. It would only increase the cost that Ausgrid's consumers face to receive a comparable level of service as electricity network consumers in those states. A higher cost in providing a service without a commensurate increase in the quantity or quality or services is, by definition, less efficient. Therefore, to provide a step change for this cost driver would not reasonably reflect the opex criteria.

We have considered Ausgrid's individual circumstances in developing an alternative forecast. This includes, for instance, the cost of meeting Ausgrid's regulatory obligations, the cost impacts due to its particular network characteristics and the costs that flow from servicing a large number of customers. However, the sale of part of a business is a different matter. It is a discretionary decision made by the owners of the business. We would expect that the profit on the sale of part of a business would be used to offset any related opex increases. If there is any residual cost increase associated with a discretionary decision made by network owners, in our view, it is a cost the owners, rather than consumers, should bear.

We note that Ausgrid considered that our views on the recovery of these costs had changed since our determination for the 2009–14 period.[952] Ausgrid was not clear why this was the case. We acknowledge this is a change in position from the previous regulatory control period. As with many issues, our assessment approach for the 2014–19 period is based on the evidence available to us for this particular determination and our assessment against the opex criteria at this point in time.

C.4.2 Private pole inspections and asbestos inspection management

We have not included an increase in forecast opex associated with private pole inspections and asbestos inspection management in our alternative opex forecast. We are satisfied the alternative opex forecast we have developed already provides sufficient funding for a prudent Ausgrid to efficiently achieve its regulatory obligations in the 2014–19 period.

At the time of submitting its regulatory proposal, Ausgrid was subject to obligations under the *Electricity Supply (Network Safety and Management) Regulation 2008* for

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951 NER, s. 6.5.6(e)(4).

952 Ausgrid, *Revised regulatory proposal*, January 2015, p. 171.

the inspection, testing and maintenance of privately owned overhead mains. Ausgrid considered it is at risk of breaching the regulatory and statutory obligations imposed on it. In particular Ausgrid stated it is at risk of breaching clauses 10(2c) and 12(2e) of this regulation.[953]

Ausgrid noted that while the regulation does not directly oblige it to provide an inspection service it must ensure that such inspection, testing and maintenance does occur. It proposed a routine program of regular inspection of privately owned assets to ensure that owners of these assets are aware of the condition of these assets, and their requirements under the relevant legislation. It stated it has not previously undertaken a regular inspection of private assets.

In relation to asbestos management, Ausgrid planned to introduce an audit and inspection regime over the 2014–19 period of 'asbestos containing materials'.[954] It proposed inspecting commissioned substations constructed prior to 2000.[955]

In our draft decision we provided the following reasons for our position:

- The *Electricity Supply (Network Safety and Management) Regulation 2008* that Ausgrid considered it may be in breach of was repealed and replaced with the *Electricity Supply (Network Safety and Management) Regulation 2014.* The regulations relating to privately owned overhead mains Ausgrid considered it was at risk of breaching were not contained in the repealed legislation. We noted that the new regulations do not contain specific provisions relating to privately owned overheads mains.
- We recognised a service provider may at different times need to spend relatively less or more opex to meet some existing regulatory obligations. However, we considered it is a service provider's role to manage compliance with all of its existing regulatory obligations and that these costs are provided for through our estimate of base opex.

In response to our draft decision Ausgrid did not address the point we raised about the change in its regulations. It restated that a number of incidents over the period have led to a greater focus on the risks of private networks and asbestos exposure. It considered tolerance for these issues across the community and the industry has resulted in a greater need to ensure these risks are managed to an acceptable level. It considered this is further supported by the Victorian Bushfire Royal Commission which highlighted the importance of incorporating emerging risks into a distributor's opex and capex plans.

Ausgrid agreed in principle that a business could reprioritise its opex budget to meet emerging compliance priorities. However, it considered this was not relevant in this

[953] Ausgrid, *Attachment 6.03 - System Operating Expenditure Maintenance Plan for the 2014–19 period*, p. 8.
[954] Ausgrid, *Attachment 6.03, System Operating Expenditure Maintenance Plan for the 2014–19 period*, p. 34.
[955] Ausgrid, *Attachment 6.03, System Operating Expenditure Maintenance Plan for the 2014–19 period*, p. 45.

particular circumstance as Ausgrid's bottom-up forecast of its maintenance costs already provides an appropriate balance between risk and cost.

We do not see any reason to change our position not to include a step change for these programs in our alternative opex forecast.

We agree with Ausgrid that it may need to change the programs it undertakes from year to year to respond to emerging risks. However, the annual opex a service provider undertakes is never exactly the same from year to year. At the same time as some priorities emerge, others will fall away. In arriving at our view of our total opex forecast, we assess whether there is sufficient funding for a business to be able to efficiently carry out all of its regulatory obligations or requirements. The efficient amount of opex a business needs to perform all of its regulatory obligations in a year is generally a good indicator of the forecast efficient amount of opex it will need in the next year. We have determined the base amount of opex we consider would reasonably reflect the opex criteria in appendix A.

Under our opex forecasting approach, even if the need or cost of individual programs changes from year to year, this is not a reason to change the total level of funding. From one regulatory control period to the next, opex generally remains largely stable and recurrent. We would expect that as drivers of total opex might change slightly from year to year, changes for individual programs or categories of expenditure would be met through adjustments in other programs. Ausgrid did not provide any compelling reasons why we should change our forecasting approach for these particular programs.

C.4.3 Impact of transitioning to new cost allocation method

We have not included a step change in opex for Ausgrid's new cost allocation method (CAM) in our alternative opex forecast. We are satisfied the alternative opex forecast we have developed already provides sufficient funding for a prudent Ausgrid to efficiently deliver standard control distribution services to its consumers in the 2014–19 period. We are not satisfied that a further increase in opex is required for this cost driver.

Ausgrid's new CAM applies alternate allocators for a number of shared costs to better reflect the underlying cost drivers. Ausgrid stated that the main change for opex is to allocate costs according to weighted average revenue rather than weighted average operating expenditure.[956] Ausgrid proposed an increase in standard control services opex in 2014–15 and 2015–16 to accommodate this change. From 2016–17 it considered it would fully offset these costs increases through productivity improvements.

In our draft decision we stated that a change in how costs are allocated to different services is not a reason for approving an increase in forecast opex. We have

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[956] AER, *Draft decision Ausgrid distribution determination 2015–19 - Attachment 7*, November 2014, pp. 240-241.

compared Ausgrid's efficiency in delivering opex to the efficiency of benchmark service providers. From this we have determined the base level of opex needed to reasonably reflect the opex criteria. Based on this assessment, we consider Ausgrid's base level of opex is materially inefficient. We considered it would be inconsistent for us to add additional costs to our forecast because Ausgrid has changed the way it allocates costs between the 2009–14 regulatory control period and the 2014–19 period. By doing this, Ausgrid appears even more inefficient when compared to most other service providers in the NEM.

Ausgrid noted that:

- it was required by the rules to submit a new cost allocation method (CAM) to the AER for approval. The AER and its consultant assessed its proposed CAM and found no significant issues with it; particularly in comparison with the allocation basis used by other distributors
- it was required by the rules to apply the CAM to the 2014–19 period
- it sought to offset the majority of these costs.[957]

It also questioned whether we would apply this approach symmetrically in cases where compliance with the approved CAM will result in a reduction to forecast opex. That is, the AER will reject such reduction on the basis that such rejection would result in a ‘base year costs’ that would not be sufficient to deliver standard control services.

We do not consider there is any reason to change our position on this issue.

The fact that Ausgrid is required by the NER to apply the CAM for the 2014–19 period is not an important factor in assessing this proposal. Ausgrid is required to submit a proposal that complies with its CAM. However, in assessing forecast opex we consider whether this proposal reasonably reflects the opex criteria in the NER. A proposal that is compliant with the CAM does not mean it reasonably reflects the opex criteria.

For instance, the fact that we did not find any issues with Ausgrid's revised CAM is not relevant in deciding whether to include a step change for this cost driver. We determine a forecast of total opex we consider is necessary to efficiently deliver standard control services. We concluded that Ausgrid is not operating as efficiently as it could. We set a base opex amount we consider is necessary to efficiently deliver standard control services. It would be inconsistent for us to then add a step change to this base for costs re-allocated from other parts of Ausgrid's business. This would lead to a higher forecast cost to deliver standard control services with no additional benefit for consumers.

[957] Ausgrid, *Revised regulatory proposal*, January 2015, p. 172.

C.4.4 Redundancy costs

We have not included an increase in opex associated with redundancy costs in our alternative forecast of total opex. Our alternative opex forecast is based on the funding a prudent Ausgrid would need to efficiently deliver standard control distribution services to its consumers in the 2014–19 period. We do not consider this should include an additional allowance for Ausgrid's forecast redundancy costs.

Ausgrid has outlined that it is facing a pool of excess resources and other stranded costs due to a reduced capital investment program.[958] While Ausgrid states that it has not included stranded resources in its opex forecast, it has included the costs of a program that it considers transitions its labour workforce to a sustainable level.

Based on our assessment of Ausgrid's historical expenditure, we considered Ausgrid's cost base restructure was only needed because it is not currently operating as efficiently as it could. To do so, would mean Ausgrid's consumers would pay for the cost of a network service in the 2014–19 period that is greater than the benchmark costs that could be achieved by an efficient service provider.

Ausgrid did not agree with our draft decision not to include redundancy costs in its alternative opex forecast. It considered that:

- its labour costs (including voluntary redundancy costs) are required to be paid by an enterprise agreement certified under the Commonwealth Fair Work Act.[959]
- these resources were needed to deliver its capex program in the 2009–14 period. As it now considers them surplus to requirements, it considers it is a prudent course of action to exit these resources.
- we have not sufficiently considered Ausgrid's circumstances.
- it did not consider the issue should be posed as one that is about whether consumers or shareholders should bear costs. In the context of voluntary redundancy costs, it considers the question should be whether this reasonably reflects the costs that a prudent operator would need to achieve the opex objectives.
- the benefits resulting from the exiting of excess resources will be eventually enjoyed by consumers rather than by the shareholders because the expected lower labour costs will accrue to consumers in subsequent regulatory periods.[960]
- not allowing a business to transform itself (hence implementation costs) will hinder the incentives to drive efficiencies when effective to do so

We have not changed our position on this issue.

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[958] Ausgrid, *Regulatory proposal*, June 2014, p. 59.

[959] Ausgrid, *Revised regulatory proposal*, January 2015, p. 12.

[960] Ausgrid, *Revised regulatory proposal*, January 2015, p. 162.

Consistent with our approach in our draft decision, we do not agree with Ausgrid's submission. We are not denying Ausgrid the ability to transform its businesses and pay staff their entitlements. Recruitment and removal of staff are both legitimate costs that Ausgrid would need to incur. However, we do not 'fund' Ausgrid for these (or any specific) activities. We assess Ausgrid's opex forecast in order to form a view on whether it reasonably reflects the opex a prudent and efficient (objective) service provider would require in the future to comply with its obligations. Ausgrid has broad discretion about all contractual arrangements and the manner in which it carries out those obligations.

If we estimated a forecast by reference to a provider in all the same circumstances as the service provider in question we would potentially need to make a decision that incorporated matters as specific as the service provider's staffing levels or car leasing arrangements, and other matters that are completely within the discretionary control of management. If a service provider entered into a long term inefficient contract, we do not include the associated costs in our forecast. These decisions are not part of our role. Such an approach would be contrary to the incentive basis for the regulatory regime. Rather our role is to determine a forecast that we are satisfied reasonably reflects the opex criteria.

Deloitte's independent review of labour and workforce practices found that the NSW service providers relied predominantly on hiring permanent staff employed under EBAs rather than contractors.[961] Many of these staff were hired on a full time basis to complete the service providers' large, but temporary, capex programs in the 2009–14 period.[962] This is due to EBA restrictions which make it difficult for the service providers to change their resourcing arrangements quickly and flexibly. Now, due to EBA restrictions that do not allow for forced redundancies, the service providers have stranded resources.

Our view is that an efficient and prudent service provider would not have placed itself in this position and that the resultant redundancy costs are neither prudent nor efficient. Accordingly, redundancy costs should not be included in our estimate of ongoing efficient and prudent opex.

Rather, the need to incur redundancy costs is the outcome of Ausgrid's earlier decisions. In line with the incentive regime, it is for Ausgrid to determine the appropriate response to its excess labour needs and to bear the costs associated with those earlier decisions. It could do this either within its regulated forecast by prioritising expenditure programs or with alternative sources of funding not recovered from customers.

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961 Deloitte Access Economics, *NSW Distribution Network Service Providers Labour Analysis–Addendum*, April 2015, p. 31.

962 Deloitte Access Economics, *NSW Distribution Network Service Providers Labour Analysis–Addendum*, April 2015, p. 31.

C.4.5 Broad-based demand management

We have not included any opex associated with eight proposed broad-based demand management initiatives in our alternative opex forecast. For six of the eight proposed initiatives, we are not satisfied that the benefits of the initiatives will outweigh the costs.

For the two remaining initiatives (power factor correction and off peak summer scheduling) we are satisfied the programs are efficient, however we do not consider an increase in funding is required. Ausgrid can improve customers' poor power factors through enforcement of the NSW Service and Installation rules. The final initiative is a low cost project to change meter timers and its ripple control systems settings to manage off peak hot water controlled load, so as to not coincide with summer peak conditions. We consider this should be part of normal business so should be funded out of a base level of opex.

Ausgrid proposed eight initiatives that it considers will assist in reducing peak demand. These are:

- Direct load control for air conditioners, pool pumps and hot water systems - Ausgrid would pay for incentives to be offered to customers to either purchase or modify selected models of air conditioners, pool pumps and hot water systems. This would allow Ausgrid to better manage load during peak demand periods.
- Off peak 2 summer scheduling - Ausgrid have identified that the existing load can be switched off earlier during summer peak periods. However it considers it needs to replace, adjust or replace a small number of timers (for loads not on ripple control) and upgrade the control systems utilised in its distribution control centres to provide automated implementation of this change.
- Energy efficient pool pumps - Ausgrid would pay for incentives for customers to use energy efficient pool pumps.
- Power factor correction - Ausgrid would offer subsidies to larger customers to purchase power factor correction equipment for customers with poor power factor.
- Dynamic peak rebates for non-residential customers - Non-residential low voltage tariff customers would be incentivised to reduce or shift peak demand for electricity during approximately 20-30 hours a year where peak demand is highest.
- Energy efficiency program for non-residential customers - Ausgrid proposed a revised trial which would investigate cost sharing arrangements for investments in more energy efficient equipment.

In total, Ausgrid estimated the cost of all initiatives would lead to $22.1 million additional opex over the 2014–19 period.[963] Forecast opex costs included costs to establish each of the initiatives and incentive payments Ausgrid would make to

[963] Ausgrid, *Attachment 6.12 - Demand management operating expenditure plan*, May 2014.

customers to take up some of the initiatives. To support the programs, Ausgrid provided us with a benefit cost analysis.[964]

In our draft decision, we did not include the forecast cost of Ausgrid's program in our alternative opex forecast. We were not convinced the benefits of Ausgrid's program outweighed the costs. In particular we referred to the likely introduction of more cost-reflective network tariffs in the 2014–19 period driven by NER changes that may reduce the need for Ausgrid's demand management programs.

Ausgrid revised its benefit cost analysis in its revised proposal to take into account the estimated impact of tariff reform. We have considered its revised proposal but still do not consider an increase to our estimate is required.

Consideration of transmission and generation benefits

Overall, Ausgrid attributed between 58 per cent and 76 per cent net benefits to capex deferral benefits in the generation and transmission sector.[965] For six of the eight initiatives, the estimated benefits only outweighed the costs when assuming the programs will lead to increased capex deferral in the generation and transmission sectors. We do not consider these assumptions are reasonable.

For instance there is little evidence of required capex in the generation sector in the medium term. Therefore, there is little evidence that there is foreseeable capex that can be deferred. AEMO states in its 2014 Electricity Statement of Opportunities (ESOO) that no new capacity is required in any NEM region to maintain supply adequacy over the next 10 years.[966] In NSW alone it estimates that by 2023–24, there will be surplus generation capacity of between 1500MW and 3450MW.[967]

Ausgrid has interpreted the ESOO to require additional investment by 2023–24, which in turn requires an investment decision more than five years in advance of that need. As a result, Ausgrid assigns benefits from generation deferral from 2019–20.[968] This is an optimistic assumption, given that AEMO concludes that there is excess capacity in the generation sector beyond the ten year horizon of the ESOO for every region.

There is also no robust evidence to support Ausgrid's assumptions about transmission capex deferral. For instance, in the 2014–18 period, TransGrid forecast no augmentation capex in Sydney. From TransGrid's latest annual planning report there are very few augmentation capex projects planned for the medium term. Ausgrid acknowledges this but raises an alternative benefit for demand management in reducing replacement capex associated with the ‘Powering Sydney’ project.

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964 Ausgrid, *Re to Information Request AER Ausgrid 053 - ID71045 REF BBDM Expenditure Proposal - Cost benefit Summary v3.2 AER Submission 140509.xlsx*, 17 February 2015.

965 58 per cent when assuming a 15 year NPV analysis. 76 per cent when assuming a 10 year NPV analysis

966 AEMO, *Electricity Statement of Opportunities for the NEM,* August 2014, p. 2

967 AEMO, *Electricity Statement of Opportunities for the NEM*, August 2014, p. 10

968 Ausgrid, *Re to AER Information request AER Ausgrid 059*, 17 March 2015, p. 7

> And while TransGrid's 2014 Transmission Annual Planning Report does identify limited augmentation capex, retirement of aged assets and de-rating of cables has the potential to drive significant investment in transmission assets in the Ausgrid network area. TransGrid's 'Powering Sydney' project has been deferred under the most recent forecast from a need date of about 2018–19 to 2022–23. Note that this estimate is based upon Ausgrid's 2014 spatial demand forecast which includes the impacts from the proposed broad based demand management program. Any variation in the scale of the broad based program would influence the need date.[969]

However, there is no robust evidence that the estimated reduction in demand from Ausgrid's proposed broad based demand management initiatives will materially affect the timing for the 'Powering Sydney' project. For instance, we observed that the change in Ausgrid's demand forecasts by more than 300 MVA between 2013 and 2014 for the Sydney CBD delayed the expected timing of this project by about four years.[970] However, of the six broad based demand management initiatives which depend on transmission benefits for a positive benefit cost ratio, Ausgrid has only forecast a reduction in summer peak demand of 34 MVA in all of Ausgrid's distribution network area in the 2014–19 period. As only part of this reduction in demand will relate to demand in the Sydney CBD, we are not convinced that these initiatives will have a material effect on the timing of the 'Powering Sydney' Project.

TransGrid's assumption about when the 'Powering Sydney' project is needed is also based on Ausgrid's assumptions about 132 kV cable retirements. On the basis of systemic issues identified by EMCa, we consider that the timing of Ausgrid's proposed 132 kV cable retirements is likely to be earlier than reasonably required to economically manage the risk associated with these assets.[971.] We therefore consider that it is more likely that the timing of the 132 kV cable retirements will be later than the timing used by TransGrid. This would further affect the most likely start date for the 'Powering Sydney' Project beyond 2022–23. In turn, this would further reduce the estimated present value of any deferral benefits that may arise as a result of Ausgrid's demand management expenditure.

As a general observation, we also note that the Regulatory Investment Test for Distribution (and Transmission) does not currently extend to network replacements. This diminishes the public scrutiny of and potential third party involvement in addressing this aspect of network planning and capital investment (including demand management). We believe that requiring demand management options proposed by third parties, not just distributors, should be fully considered when replacing network assets. In this instance, TransGrid should explore all demand management options for the 'Powering Sydney' project.

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969 Ausgrid, *Re to AER Information request AER Ausgrid 059*, 17 March 2015, p. 8.

970 AER, *Draft decision: TransGrid transmission determination 2015-18* - Attachment 6, November 2014, p. 92.

971 EMCa, *Review of Proposed Replacement Capex in Ausgrid's Regulatory Proposal 2014 - 2019*, October 2014.

Assessment of power factor correction and off peak 2 summer scheduling

- When only considering the benefits and costs to Ausgrid and its consumers, the benefit-cost ratio was only positive for:
- power factor correction
- off peak 2 summer scheduling.
- We also do not consider Ausgrid requires an increase to its opex forecast for these initiatives for different reasons.

The power factor correction program is targeted to large customers. Ausgrid states:

> The program will generally reflect our current practice of offering a negotiated rate for power factor correction equipment to customers identified as benefiting financially from the retrofit. Customer payback typically ranges from 1 to 4 years for most customers with low power factor and supplied at low voltage. Modest subsidies will be offered where appropriate to improve take-up.[972]

There are already mandated minimum power factor requirements on large customers, as outlined in the NSW Service and Installation Rules.[973] Where customers do not maintain minimum power factor requirements Ausgrid can enforce the requirements outlined in these rules. It does not need to offer subsidies to incentivise customers to purchase power factor correction equipment.

The off peak 2 summer scheduling program addresses the peak demand impacts of controlled load domestic hot water systems, by ensuring that this load is not on during the peak demand period. This load is within the control of Ausgrid and should have been addressed already. The ripple control and time clock changes required are being rolled into larger control system changes for the Ausgrid distribution control centres and this is delaying implementation.

The proposed step change in opex for these programs is relatively minor ($1.65 million for power factor correction and $0.64 million for off peak 2 summer scheduling). As we note above in considering Ausgrid's proposal for increased opex for private pole inspections and asbestos inspection, we typically consider efficient opex is relatively recurrent. While opex on programs and projects may change, this is not a reason to change the total level of funding. Small changes in the cost of programs can be met without increasing the total amount of funding a service provider needs. We are not convinced that Ausgrid requires increased funding for these programs. In any case, given the high benefit cost ratios of these programs, we would expect Ausgrid could realise the benefits of these programs without needing additional funding from consumers.

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[972] Ausgrid, *Attachment 6.12 to regulatory proposal - demand management operating expenditure plan*, May 2014, p. 37.

[973] NSW Service and Installation Rules, s. 1.10.11, p. 24.

Consideration of stakeholder submissions

In considering our final position on this proposal, we also considered submissions. Submissions largely commented on the inter-relationships between tariff structures and the need for demand management. We received comments questioning:

- the strength of the price signal through reformed tariffs[974]
- whether cost reflective tariffs will be able to change consumer behaviour[975]
- the impact of the likely delay in implementing smart meters[976] and cost-reflective tariffs across the network.[977]
- Origin Energy supports prudent investment that reduces peak demand where it is clearly demonstrated that the benefits outweigh the costs. However, it agreed with our decision not to allow these costs in light of the forthcoming NER changes that will affect how network tariffs are set.[978]

The comments in our draft decision about the interactions between changes in tariff structures and demand management expenditure were only related to Ausgrid's proposal and how it had not incorporated any estimated effects of changes in tariffs into its benefit cost analysis. As outlined above, Ausgrid has revised its benefit cost analysis in response to our comments. However even after considering its revised assumptions about the effects of tariff reform, we do not consider its proposed initiatives require an increase in funding. As outlined above, for most initiatives this is because we consider it has overestimated the benefits of its proposed initiatives.

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974 EnerNOC, *Submission on 2015-19 draft decisions and revised proposals for NSW DNSPs*, 13 February 2015, p. 4.

975 Ethnic Communities Council of NSW, *Submission concerning the NSW Distribution Networks Revised Revenue Proposal 2014-19*, January 2015, p. 5; PIAC, *Submission to the Australian Energy Regulator's Draft Determination for Ausgrid, Endeavour Energy and Essential Energy*, 13 February 2015, p. 51.

976 EnerNOC, *Submission on 2015-19 draft decisions and revised proposals for NSW DNSPs*, 13 February 2015, p. 4

977 PIAC, *Submission to the Australian Energy Regulator's Draft Determination for Ausgrid, Endeavour Energy and Essential Energy*, 13 February 2015, p. 51.

978 Origin Energy, *Submission to AER determination for NSW electricity distributors*, 13 February 2015, p. 7.

D Forecasting method

This appendix sets out our consideration of Ausgrid's forecasting methodology in determining our opex forecast for Ausgrid for the 2014–19 period.

Our estimate of total opex is unlikely to exactly match Ausgrid's forecast (see our assessment approach at the beginning of this opex attachment). Broadly, differences between the two forecasts can be explained by differences in the forecasting methods adopted and the inputs and assumptions used to apply the method. We have reviewed Ausgrid's forecast method to identify if and where Ausgrid's forecasting method departed from the method set out in our *Expenditure forecast assessment guideline* (our guideline forecasting method). Where Ausgrid's forecasting method did depart from our guideline forecasting method we considered whether this departure explained the difference between Ausgrid's forecast of total opex and our own. We also considered whether adopting Ausgrid's approach was required to produce an opex forecast that reasonably reflects the opex criteria, having regard to the opex factors.

Under our guideline forecasting method we start with the actual expenditure in a base year. If actual expenditure in the base year reasonably reflects the opex criteria we set base opex equal to actual expenditure. If not we apply an efficiency adjustment to ensure base opex reflects the opex criteria. We then apply a forecast rate of change to capture forecast changes in prices, output and productivity. We then add or subtract any step changes to account for any other expenditure that reflects the opex criteria and is not captured in base opex or the rate of change.

D.1 Position

We have used our guideline forecasting method to derive our alternative estimate of opex as we did for our draft decision.

D.2 Draft position

We did not use category specific forecasting methods to separately forecast any of Ausgrid's opex categories other than debt raising costs in our alternative total opex forecast. We formed our alternative forecast total opex using our guideline forecasting method with all opex categories other than debt raising costs included in base opex.[979]

D.3 Revised proposal and submissions

Ausgrid raised two issues with our forecasting method in its revised regulatory proposal. It considered:

1. we required it to use our forecasting method when there is no such obligation in the NER

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979 AER, *Expenditure Forecast Assessment Guideline for Electricity Distribution*, November 2013.

2. applying different forecasting methods to different categories of opex ensured its forecast was the most accurate possible.

We respond to these two issues below.

Our assessment approach

Ausgrid stated it was 'very concerned with the AER's implication that we are required to use its forecasting method. There is no such obligation imposed on us by the NER'.[980] It cited our draft decision to support this claim. In our draft decision we stated:[981]

> In assessing Ausgrid's forecasting method we sought to identify if and where Ausgrid's forecasting method departed from our guideline forecasting method. Where Ausgrid's forecasting method did depart from our guideline forecasting method we considered whether this departure explains the difference between Ausgrid's forecast of total opex and our own.

Ausgrid stated that we simply adopted our own forecasting estimate 'as the sole reference point for determining an efficient forecast of opex'.[982] It stated we did this in lieu of a proper assessment of Ausgrid's proposed forecast opex based on the opex criteria, opex factors and Ausgrid's individual circumstances.[983] It cited the AEMC to support its claim that such an approach would be contrary to rules under which we operate:[984]

> The NSP's proposal is necessarily the starting point for the AER to determine a capital expenditure or operating expenditure allowance, as the NSP has the most experience in how its network should be run. Under the NER the AER is not 'at large' in being able to reject the NSP's proposal and replace it with its own since it must accept a reasonable proposal. Nonetheless, the AER should determine what is reasonable based on all of the material and submissions before it.

However, Ausgrid's claims misrepresent our assessment approach and how we determined our alternative estimate of opex. We did not 'simply dismiss' Ausgrid's methodology in our draft decision. In fact the quote chosen by Ausgrid above shows how we used our alternative estimate to engage with Ausgrid's forecasting method and total opex forecast. We used our guideline forecasting method to derive our alternative estimate having regard to Ausgrid's regulatory proposal and all other material and submissions before us. We then compared our alternative estimate of opex with Ausgrid's proposed amount. We sought to identify all differences in both our

980 Ausgrid, *Revised regulatory proposal*, p. 130.

981 AER, *Draft decision: Ausgrid distribution determination 2014–19*, Attachment 7, November 2014, p. 7-171.

982 Ausgrid, *Revised regulatory proposal*, p. 130.

983 Ausgrid, *Revised regulatory proposal*, p. 131.

984 AEMC, *Rule Determination, National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012*, 29 November 2012, page. vii.

forecasting method and the inputs and assumptions used. We then considered whether adopting the methods and the inputs and assumptions used by Ausgrid would produce an opex forecast that better met the opex criteria, having regard to the opex factors. We provided reasons in our draft decision why adopting Ausgrid's forecasting method would not produce an opex forecast that better reflected the opex criteria.

Even when we do adopt a different forecasting method to a distributor this does not necessarily mean we will not be satisfied its forecast reasonably reflects the opex criteria. Difference in forecasting methods may not drive material differences in the opex forecasts. In this case, if all other inputs and assumptions adopted by the distributor are reasonable, then our alternative estimate will show the distributor's forecast to reasonably reflect the opex criteria.

For our draft decision, this assessment approach identified the efficiency of revealed expenditure and step changes as the key drivers of the difference between our alternative estimate and Ausgrid's opex proposal. Ausgrid's forecasting method was not a key driver of the difference.

Our assessment of Ausgrid's forecasting method

Under our guideline forecasting method we start with the actual expenditure in a base year. If actual expenditure in the base year reasonably reflects the opex criteria we set base opex equal to actual expenditure. If not we apply an efficiency adjustment to ensure base opex reflects the opex criteria. We then apply a forecast rate of change to capture forecasting changes in prices, output and productivity. We then add or subtract any step changes to account for any other expenditure that reflects the opex criteria and which is not captured in base opex or the rate of change.[985]

We outlined in our draft decision why it is best to use consistent forecasting methods for all cost categories of opex. This is because hybrid forecasting methods (that is, combining revealed cost and category specific methods) can produce biased opex forecasts inconsistent with the opex criteria. Using a category specific forecasting method for some opex categories may produce better forecasts of expenditure for those categories but this may not produce a better forecast of total opex. We discuss this in greater detail in our draft decision.[986]

Frontier Economics has expressed the same view:[987]

> We consider that it would be inappropriate for the AER to review each component of controllable opex individually to see whether it conformed to the same pattern as overall controllable opex. Such ‘cherry-picking’ would likely result in aggregate controllable opex being systematically and inefficiently over-forecast.

985 AER, *Expenditure forecast assessment guideline for electricity transmission*, November 2013, pp. 22–24.

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987 Frontier Economics, *Opex forecasting and EBSS advice for the SP AusNet final decision*, January 2014, p. iii.

Ausgrid responded that:[988]

> This quote by Frontier Economics does not state that the use of different forecasting methodologies where appropriate is not justified. It concludes that a forecasting methodology should not 'cherry-pick' to attempt to conform to the same pattern as overall controllable opex. In applying the appropriate forecasting methodology to the appropriate opex category, Ausgrid has not undertaken what Frontier Economics has referred to in a previous determination process.

Ausgrid considered that applying these different approaches ensured it presented the most accurate information possible.

Ausgrid considered our assessment of their hybrid forecasting approach showed 'a lack of understanding of the cost categories and their use'.[989] It sought to explain its different maintenance categories and the reasons why it adopted the category specific forecasting methods it applied to each category:[990]

- **Predictable maintenance:** This includes planned maintenance activities such as inspections (preventative maintenance). This methodology combines a top-down 'base year' method and adjusts for annual maintenance volumes based on known inspection cycles.
- **Semi-predictable maintenance:** This includes corrective and breakdown maintenance (repairs and restoration). Ausgrid considered asset wear-out and the associated repair cost were difficult to predict. It stated the most recent information on asset condition can approximate of the current condition of network assets. As such, Ausgrid used 'base year' forecasting from a single year for forecasting corrective and breakdown maintenance activities.
- **Unpredictable maintenance:** This includes maintenance activities that Ausgrid was unable to predict such as nature induced failures. It considered using a 'base year' method for unpredictable maintenance may overstate or understate expenditure depending on the number of nature induced incidents in that year. As such, Ausgrid used 'base year historical averaging' for forecasting unpredictable maintenance.

Ausgrid appears to have misunderstood the substance of our argument. We recognised in our draft decision that category specific forecasting methods may produce better forecasts of expenditure for those categories. However, if they are only used for some categories this may not produce a better forecast of total opex.[991] Hybrid forecasting methods run the risk of substituting increased accuracy for a subset of cost categories for reduced accuracy at the total opex level.

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[988] Ausgrid, *Revised regulatory proposal*, p. 170.

[989] Ausgrid, *Revised regulatory proposal*, p. 170.

[990] Ausgrid, *Revised regulatory proposal*, p. 170.

[991] AER, *Draft decision: Ausgrid distribution determination 2014–19*, Attachment 7, November 2014, p. 7-171.

Two reasons often given for applying a category specific forecasting method to given category of expenditure are that:

1. the absolute level of expenditure in the base year for that category is not reflective of expenditure going forward
2. the rate of change for that category is not the same as the rate of change of total opex.

Given we are not required to forecast opex at the category level we see no reason to adopt category specific forecasting methods in these circumstances.

On the first proposed reason, the critical question is whether total base year opex reflects the opex criteria. Under our forecasting method our forecast of opex is a function of reported expenditure in the base year (2012–13).[992] We use base opex to derive an estimate of final year (2013–14) opex. This estimate provides the level of total opex required in that year to reflect the opex criteria. At the category level opex will vary from year to year to some degree. The absolute level of expenditure in the base year for many categories may not reflect expenditure going forward. We could choose to apply a category specific forecasting method to an individual category of opex if the revealed level of opex does not reflect the opex criteria for that category. For example, base year expenditure may be low for a given category. However, if total opex does meet the opex criteria then opex for the remaining categories must be higher than that required to meet the opex criteria. Consequently, if we only apply a category specific forecasting method for a category with low expenditure in the base year then the total opex forecast will be greater than that required to meet the opex criteria. For this reason we focus on whether total opex in the base year reflects the opex criteria, not whether expenditure for individual categories do.

On the second proposed reason, the critical question is whether the rate of change of total opex reflects the opex criteria. The forecast rate of change captures the forecast change in output, prices and productivity.[993] The forecast rate of change is the rate of change of total opex (excluding debt raising costs, which we discuss in the rate of return attachment). We could choose to apply a category specific forecasting method to an individual category of opex because the total opex rate of change doesn't reflect the forecast change for that category. For example, expenditure for a given category may rise faster than total opex. However, if the rate of change of total opex meets the opex criteria then expenditure for the remaining categories must rise slower than total opex. Consequently, if we only apply a category specific forecasting method for the category with a higher rate of change then the total opex forecast will be greater than that required to meet the opex criteria. For this reason we focus on whether the rate of change of total opex reflects the opex criteria, not whether the rate of change for individual categories do.

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[992] AER, Expenditure Forecast Assessment Guideline for Electricity Distribution, November 2013, p. 22.

[993] AER, Expenditure Forecast Assessment Guideline for Electricity Distribution, November 2013, p. 23.

In our draft decision we noted that Ausgrid adopted its 'base year historical averaging' where there had been significant variation in year to year expenditure and the base year was not representative of the likely future. Specifically, Ausgrid adopted this approach to forecast nature induced breakdown maintenance. This is an example of the first reason for category specific forecast discussed above. We looked at the variation in expenditure for maintenance expenditure categories and noted other categories varied more, in dollar terms, than nature induced breakdown maintenance. These other categories included inspection, corrective, breakdown, damage by third party and engineering support expenditure.[994] As noted above, Ausgrid distinguished between predictable, semi-predictable an unpredictable maintenance in its revised regulatory proposal. However, even if applying different forecasting methods to different opex categories did produce a forecast that better reflected the opex criteria, Ausgrid provided no explanation as to why opex categories were allocation to each of these. For example why were corrective and breakdown deemed to be semi-predictable when they vary more than nature induced, which was deemed to be unpredictable.

By adopting different forecasting methods for different maintenance expenditure categories Ausgrid tried to account for year to year fluctuations in expenditure at the category level. However, Frontier Economics, in a report for TransGrid, considered year to year variability in expenditure is not a reason to forecast a given category of expenditure separately. It also clarified when it thought it was appropriate to forecast a given category of expenditure separately:[995]

> As explained in my previous report for the AER, I consider that all controllable opex should be forecast using a single base year-step-trend approach if total opex appears to be broadly stable from one RCP to the next. Conversely, a base-step-trend approach would not be appropriate if controllable opex exhibited a large degree of ‘lumpiness’ manifesting in secular shifts or long waves of increased expenditure. Therefore, I do not recommend—if a single year base-step-trend approach is used—examining the ‘recurrence’ of each category of controllable opex individually to determine whether it should be included in the base year for forecasting purposes or whether it should be forecast using a bottom-up approach.
>
> The case for utilising a bottom-up approach to forecasting a category of opex in conjunction with a base-step-trend approach for the remaining opex categories requires, at a minimum, evidence that the relevant category of expenditure is likely to follow a capex-style long wave path across multiple RCPs in the future. In addition, the party suggesting a bottom-up approach—whether the network business or the AER—needs to demonstrate that the future path of the expenditure category is of such a magnitude that the observed historical stability of total opex is likely to change as a result of expected changes to the relevant opex category. Only under these circumstances should a bottom-up

[994] AER, *Draft decision: Ausgrid distribution determination 2014–19*, Attachment 7, November 2014, p. 7-172.

[995] Frontier Economics, *Opex forecasting method*, December 2014, pp. 7–8.

forecasting approach be considered for a single category or limited number of categories of opex.

These are not Ausgrid's circumstances and we see no reason to adopt category specific forecasts for any individual category of opex to forecast total opex.

As we stated in our draft decision, we make our assessment about the total forecast opex and not about particular categories or projects in the opex forecast. This is consistent with our requirements under the NER and has been highlighted by The Australian Energy Market Commission (AEMC):[996]

> It should be noted here that what the AER approves in this context is expenditure allowances, not projects.

[996] AEMC, *Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012*, 29 November 2012, p. vii.