

FINAL DECISION AusNet Services distribution determination 2016 to 2020

Attachment 6 – Capital expenditure

May 2016



and an entered

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Note

This attachment forms part of the AER's final decision on AusNet Services' distribution determination for 2016–20. It should be read with all 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
- Attachment 10 Capital expenditure sharing scheme
- Attachment 11 Service target performance incentive scheme
- Attachment 12 Demand management incentive scheme
- Attachment 13 Classification of services
- Attachment 14 Control mechanisms
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Shortened forms

Shortened form	Extended form
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AMI	Advanced metering infrastructure
augex	augmentation expenditure
capex	capital expenditure
ССР	Consumer Challenge Panel
CESS	capital expenditure sharing scheme
СРІ	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

Shortened form	Extended form
repex	replacement expenditure
RFM	roll forward model
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

6 Capital expenditure

Capital expenditure (capex) refers to the investment made in the network to provide standard control services. This investment mostly relates to assets with long lives (30– 50 years is typical) and these costs are recovered over several regulatory periods. On an annual basis, however, the financing cost and depreciation associated with these assets are recovered (return of and on capital) as part of the building blocks that form AusNet Services' total revenue requirement.¹

This attachment sets out our final decision on AusNet Services' total forecast capex. Further detailed analysis is in the following appendices:

- Appendix A Assessment techniques
- Appendix B Assessment of capex drivers
- Appendix C Demand
- Appendix D Bushfire mitigation contingent projects.

6.1 Final decision

We are not satisfied AusNet Services' proposed total forecast capex of \$1749.4 million (\$2015) reasonably reflects the capex criteria. This is 0.6 per cent lower than actual/estimated capex for the 2011–15 period (\$1759.2 million). We substituted our estimate of AusNet Services' total forecast capex for the 2016–20 regulatory control period. We are satisfied that our substitute estimate of \$1600.4 million (\$2015) reasonably reflects the capex criteria. Table 6.1 outlines our final decision.

Table 6.1Final decision on AusNet Services' total forecast capex(\$2015, million)

	2016	2017	2018	2019	2020	Total
AusNet Services' revised proposal	347.7	389.9	340.2	342.2	329.4	1749.4
AER final decision	316.2	348.6	316.6	318.1	300.9	1600.4
Difference	-31.5	-41.3	-23.7	-24.0	-28.5	149
Percentage difference (%)	-9.1	-10.6	-7.0	-7.0	-8.6	-8.5

Source: AusNet Services, Revised proposal: Distribution capex model (Public), January 2016; AER analysis.

Note: Numbers may not add up due to rounding.

Note: The figures above do not include equity raising costs and capital contributions. For our assessment of equity raising costs, see attachment 3.

NER, cl. 6.4.3(a).

Table 6.2 summarises our findings and the reasons for our final decision.

These reasons include our responses to stakeholders' submissions on AusNet Services' revised regulatory proposal. In the table we present our reasons by 'capex driver' (for example, augmentation, replacement, and connections). This reflects the way in which we tested AusNet Services' total forecast capex. Our testing used techniques tailored to the different capex drivers, taking into account the best available evidence. Through our techniques, we found some aspects of AusNet Services' proposal, such as customer connections, were consistent with the NER. We found AusNet Services' proposal associated with other capex drivers, particularly augex, repex and non-network capex are likely to be higher than an efficient level, inconsistent with the NER.² Consequently, our findings on augex, repex and non-network largely explain why we are not satisfied with AusNet Services' proposed total forecast capex.

Our findings on the capex drivers are part of our broader analysis and should not be considered in isolation. Our final decision concerns AusNet Services' total forecast capex for the 2016–20 period. We do not approve an amount of forecast expenditure for each capex driver. However, we use our findings on the different capex drivers to arrive at an alternative estimate for total capex. We test this total estimate of capex against the requirements of the NER (see section 6.3 for a detailed discussion). We are satisfied that our estimate represents the total forecast capex that as a whole reasonably reflects the capex criteria.

Issue	Reasons and findings
	AusNet Services proposed a total capex forecast of \$1749.4 million (\$2015) in its revised proposal. We are not satisfied this forecast reasonably reflects the capex criteria.
Total capex forecast	We are satisfied our substitute estimate of \$1600.4 million (\$2015) reasonably reflects the capex criteria. Our substitute estimate is 8.5 per cent lower than AusNet Services' revised proposal.
	The reasons for this decision are summarised in this table and detailed in the remainder of this attachment.
Forecasting methodology, key assumptions and past capex performance	We consider AusNet Services' key assumptions and forecasting methodology are generally reasonable. Where we identified specific areas of concern, we discuss these in the appendices to this capex attachment and section 6.4.2.
	We do not accept AusNet Services' forecast augex of \$325.5 million (\$2015). We have instead included an amount of \$306.2 million (\$2015) in our substitute estimate.
Augmentation capex	We accept that AusNet Services revised forecast of maximum demand is realistic and we accept the majority of its proposed capex to meet demand growth. However, we do not consider that AusNet Services' additional \$8.3 million capex to augment its Clyde North zone substation is required over the 2016-20 period.
	We also accept that AusNet Services has a need to augment power-lines due to overhanging vegetation that pose a bushfire safety risk. However, we consider that AusNet Services' proposed \$31 million to place these power-lines underground is

Table 6.2 Summary of AER reasons and findings

² NER, cll. 6.5.7(c) and (d).

	inefficient. We estimate an efficient cost of \$19.75 million will allow AusNet Services to meet its obligations using a combination of underground work and other prudent technologies.
Customer connections capex	We have included the amount AusNet Services forecast for connections capex of \$403.0 million (\$2015) in our capex decision. We note that this is an increase of \$34.8 million from our preliminary decision. AusNet Services' revised proposal retains its forecasting methodology and has updated its forecasts to reflect new forecasts of Victorian population growth which it uses to project connection activity. Consistent with our preliminary decision, we are satisfied that AusNet Services' forecast methodology produces a forecast of gross connections capex which is consistent with the capex criteria. Further, we are satisfied it is appropriate to use the latest available data to forecast connection activity.
Asset replacement capex (repex)	We do not accept AusNet Services' forecast repex of \$789.7 million. In particular we do not accept that a number of AusNet Services' proposed bushfire mitigation projects should be included in the forecast for the 2016–20 regulatory control period. These projects have been included as contingent projects. We have instead included in our substitute estimate of overall total capex an amount of \$698.3million (\$2015) for repex.
	We do not accept AusNet Services' forecast non-network capex of \$253.6 million (\$2015). We have instead included an amount of \$230.6 million (\$2015).
Non-network capex	We accept AusNet Services' forecasts for motor vehicles and buildings and property capex as reasonably reflecting required expenditure in these categories. We do not accept AusNet Services' forecast for IT capex. In our view, AusNet Services' IT forecast does not reflect the efficient costs of a prudent operator. We consider that some elements of the Power of Choice program have not been fully justified. We are satisfied our alternative estimate reasonably reflects the capex criteria.
Capitalised overheads	We do not accept AusNet Services' proposed forecast of capitalised overheads of \$174 million (\$2015). We have instead included in our substitute estimate of overall total capex an amount of \$170.8 million (\$2015) for capitalised overheads.
	We reduced AusNet Services' capitalised overheads to reflect the reductions we made to their total capex forecast, particularly those components with overheads.
	AusNet Services accepted the AER's application of CPI indexation as a proxy for forecasts of escalation of materials costs in real terms over the 2016–20 regulatory control period.
Real cost escalators	We are not satisfied AusNet Services' proposed real labour cost escalators which form part of its total forecast capex reasonably reflect a realistic expectation of the cost inputs required to achieve the capex objectives over the 2016–20 regulatory period. We discuss our assessment of forecast our labour price growth for AusNet Services in attachment 7.
	The difference between the impact of the real labour cost escalation proposed by AusNet Services and that accepted by the AER in its capex decision is \$12.1 million (\$2015).

Source: AER analysis.

We consider that our overall capex forecast addresses the revenue and pricing principles. In particular, we consider our overall capex forecast provides AusNet Services a reasonable opportunity to recover at least the efficient costs it incurs in:³

• providing direct control network services; and

³ NEL, s. 7A.

• complying with its regulatory obligations and requirements.

As set out in appendix B we are satisfied that our overall capex forecast is consistent with the national electricity objective (NEO). We consider our decision promotes efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity.

We also consider that overall our capex forecast addresses the capital expenditure objectives.⁴ In making our final decision, we specifically considered the impact our decision will have on the safety and reliability of AusNet Services' network. We consider this capex forecast should be sufficient for a prudent and efficient service provider in AusNet Services' circumstances to be able to maintain the safety, service quality, security and reliability of its network consistent with its current obligations.

6.2 AusNet Services' revised proposal

AusNet Services' revised proposal included a total forecast capex of \$1749.4 million (\$2015) for the 2016–20 regulatory control period.⁵ This is 18.9 per cent higher than our preliminary decision and 3.5 per cent higher than AusNet Services' initial regulatory proposal.

Figure 6.1 shows the difference between AusNet Services' initial proposal, its revised proposal and our preliminary decision for the 2016–20 regulatory control period. Figure 6.1 also shows the actual capex AusNet Services spent during the 2011–15 regulatory control period.

⁴ NER, cl. 6.5.7(a).

⁵ This is net capex, which does not include customer contributions.

Figure 6.1 AusNet Services' total actual and forecast capex 2011–2020



Source: AER analysis.

AusNet Services submitted its revised proposal was higher than our preliminary decision because it:⁶

- re-proposed its 56M overhang removals project and used updated demand forecasts for its augex forecast
- inputted revised connections forecasts for its connections expenditure
- re-proposed safety-related capex in its repex forecast and proposed new repex associated with VBRC Declared Areas
- proposed new non-network capex related to the Power of Choice rule changes
- adjusted capitalised overheads based on the revised proposal capex forecast (using the same method as our preliminary decision)
- amended the escalation adjustment using updated labour forecasts and the revised proposal capex forecast
- amended capital contributions using revised connections forecasts, and the adoption of chapter 5A for customer connections in Victoria.

⁶ AusNet Services, *Revised Regulatory Proposal 2016-20*, 6 January 2016, p. 3-4.

6.3 Assessment approach

This section outlines our approach to capex assessments. It sets out the relevant legislative and rule requirements, and outlines our assessment techniques. It also explains how we derive an alternative estimate of total forecast capex against which we compare the distributor's total forecast capex. The information AusNet Services provided in its revised regulatory proposal, including its response to our RIN, is a vital part of our assessment. We also took into account information that AusNet Services provided in response to our information requests, and submissions from other stakeholders.

Our assessment approach involves the following steps:

- Our starting point for building an alternative estimate is the distributor's revised regulatory proposal.⁷ We apply our various assessment techniques, both qualitative and quantitative, to assess the different elements of the distributor's proposal. This analysis informs our view on whether the distributor's proposal reasonably reflects the capex criteria in the NER at the total capex level.⁸ It also provides us with an alternative forecast that we consider meets the criteria. In arriving at our alternative estimate, we weight the various techniques we used in our assessment. We give more weight to techniques we consider are more robust in the particular circumstances of the assessment.
- Having established our alternative estimate of the *total* forecast capex, we can test
 the distributor's total forecast capex. This includes comparing our alternative
 estimate total with the distributor's total forecast capex and what the reasons for
 any differences are. If there is a difference between the two, we may need to
 exercise our judgement as to what is a reasonable margin of difference.

If we are satisfied the distributor's proposal reasonably reflects the capex criteria in meeting the capex objectives, we will accept it. The capital expenditure objectives (capex objectives) referred to in the capex criteria, are to:⁹

- meet or manage the expected demand for standard control services over the period
- comply with all regulatory obligations or requirements associated with the provision of standard control services
- to the extent that there are no such obligations or requirements, maintain service quality, reliability and security of supply of standard control services and maintain the reliability and security of the distribution system
- maintain the safety of the distribution system through the supply of standard control services.

⁷ AER, Better regulation: Explanatory statement: Expenditure forecast assessment guideline, November 2013, p. 7; see also AEMC, Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012, 29 November 2012, pp. 111 and 112.

⁸ NER, cl. 6.5.7(c).

⁹ NER, cl. 6.5.7(a).

If we are not satisfied, the NER requires us to put in place a substitute estimate that we are satisfied reasonably reflects the capex criteria.¹⁰ Where we have done this, our substitute estimate is based on our alternative estimate.

The capex criteria are: ¹¹

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

The AEMC noted '[t]hese criteria broadly reflect the NEO [National Electricity Objective]'.¹²

Importantly, we approve a total capex forecast and not particular categories, projects or programs in the capex forecast. Our review of particular categories or projects informs our assessment of the total capex forecast. The AEMC stated:¹³

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

In deciding whether we are satisfied that AusNet Services' proposed total forecast capex reasonably reflects the capex criteria, we have regard to the capex factors.¹⁴ In taking the capex factors into account, the AEMC noted.¹⁵

...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.

Table 6.5 summarises how we took the capex factors into consideration.

More broadly, we note that in exercising our discretion, we take into account the revenue and pricing principles set out in the NEL.¹⁶ In particular, we take into account whether our overall capex forecast provides AusNet Services a reasonable opportunity to recover at least the efficient costs it incurs in:¹⁷

• providing direct control network services; and

¹⁰ NER, cl. 6.12.1(3)(ii).

¹¹ NER, cl. 6.5.7(c).

¹² AEMC, Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012, 29 November 2012, p. 113.

¹³ AEMC, *Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012*, 29 November 2012, p. vii.

¹⁴ NER, cl. 6.5.7(e).

¹⁵ AEMC, Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012, 29 November 2012, p. 115.

¹⁶ NEL, ss. 7A and 16(2).

¹⁷ NEL, s. 7A.

• complying with its regulatory obligations and requirements.

6.3.1 Expenditure assessment guideline

The rule changes the AEMC made in November 2012 required us to make and publish an Expenditure Forecast Assessment Guideline for electricity distribution (Guideline).¹⁸ We released our Guideline in November 2013.¹⁹ The Guideline sets out our proposed general approach to assessing capex (and opex) forecasts. The rule changes also require us to set out our approach to assessing capex in the relevant framework and approach paper. For AusNet Services, our framework and approach paper stated that we would apply the Guideline, including the assessment techniques outlined in it.²⁰ We may depart from our Guideline approach and if we do so, we need to provide reasons. In this determination, we have not departed from the approach set out in our Guideline.

We note that RIN data forms part of a distributor's regulatory proposal.²¹ In our Guideline we stated we would "require all the data that facilitate the application of our assessment approach and assessment techniques". We also stated that the RIN we issue in advance of a distributor lodging its regulatory proposal would specify the exact information we require.²² Our Guideline made clear our intention to rely upon RIN data during distribution determinations.

6.3.2 Building an alternative estimate of total forecast capex

The following section sets out the approach we apply to arrive at an alternative estimate of total forecast capex.

Our starting point for building an alternative estimate is the distributor's proposal.²³ We review the proposed forecast methodology and the key assumptions that underlie the distributor's forecast. We also consider the distributor's performance in the previous regulatory control period to inform our alternative estimate.

We then apply our specific assessment techniques to develop an estimate and assess the economic justifications that the distributor puts forward. Many of our techniques encompass the capex factors that we are required to take into account. Appendix A and appendix B contain further details on each of these techniques.

¹⁸ AEMC, Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012, 29 November 2012, p. 114.

¹⁹ AER, Better regulation: Expenditure forecast assessment guideline for electricity distribution, November 2013.

²⁰ AER, Final Framework and approach for the Victorian Electricity Distributors: Regulatory control period commencing 1 January 2016, 24 October 2014, pp. 119–120.

²¹ NER, cll. 6.8.2(c2) and (d).

AER, Better regulation: Expenditure forecast assessment guideline for electricity distribution, November 2013, p. 25.

²³ AER, Better regulation: Explanatory statement: 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, pp. 111 and 112.

Some of these techniques focus on total capex; others focus on high level, standardised sub-categories of capex. Importantly, while we may consider certain projects and programs in forming a view on the total capex forecast, we do not determine which projects or programs the distributor should or should not undertake. This is consistent with the regulatory framework and the AEMC's statement that the AER does not approve specific projects. Rather, we approve an overall revenue requirement that includes an assessment of what we find to be an efficient total capex forecast.²⁴

We determine total revenue by reference to our analysis of the proposed capex and the various building blocks. Once we approve total revenue, the distributor is able to prioritise its capex program given its circumstances over the course of the regulatory control period. The distributor may need to undertake projects or programs it did not anticipate during the distribution determination. The distributor may also not require some of the projects or programs it proposed for the regulatory control period. We consider a prudent and efficient distributor would consider the changing environment throughout the regulatory control period in its decision-making.

As we explained in our Guideline:²⁵

Our assessment techniques may complement each other in terms of the information they provide. This holistic approach gives us the ability to use all of these techniques, and refine them over time. The extent to which we use each technique will vary depending on the expenditure proposal we are assessing, but we intend to consider the inter-connections between our assessment techniques when determining total capex ... forecasts. We typically would not infer the findings of an assessment technique in isolation from other techniques.

In arriving at our estimate, we weight the various techniques we used in our assessment. We weight these techniques on a case by case basis using our judgement. Broadly, we give more weight to techniques we consider are more robust in the particular circumstances of the assessment. By relying on a number of techniques, we ensure we consider a wide variety of information and can take a holistic approach to assessing the distributor's capex forecast.

Where our techniques involve the use of a consultant, we consider their reports as one of the inputs to arriving at our final decision on overall capex. Our final decision clearly sets out the extent to which we accept our consultants' findings. Where we apply our consultants' findings, we do so only after carefully reviewing their analysis and conclusions, and evaluating these against outcomes of our other techniques and our examination of AusNet Services' revised proposal.

²⁴ AEMC, Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012, 29 November 2012, p. vii.

 ²⁵ AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, p.
 12.

We also take into account the various interrelationships between the total forecast capex and other components of a distributor's distribution determination. The other components that directly affect the total forecast capex include:

- forecast opex
- forecast demand
- the service target performance incentive scheme
- the capital expenditure sharing scheme
- real cost escalation
- contingent projects.

We discuss how these components impact the total forecast capex in Table 6.4.

Underlying our approach are two general assumptions:

- The capex criteria relating to a prudent operator and efficient costs are complementary. Prudent and efficient expenditure reflects the lowest long-term cost to consumers for the most appropriate investment or activity required to achieve the expenditure objectives.²⁶
- Past expenditure was sufficient for the distributor to manage and operate its network in past periods, in a manner that achieved the capex objectives.²⁷

6.3.3 Comparing the distributor's proposal with our alternative estimate

Having established our estimate of the total forecast capex, we can test the distributor's proposed total forecast capex. This includes comparing our alternative estimate of forecast total capex with the distributor's proposal. The distributor's forecast methodology and its key assumptions may explain any differences between our alternative estimate and its proposal.

As the AEMC foreshadowed, we may need to exercise our judgment in determining whether any 'margin of difference' is reasonable:²⁸

²⁶ AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, pp. 8 and 9. The Australian Competition Tribunal has previously endorsed this approach: see : Application by Ergon Energy Corporation Limited (Non-system property capital expenditure) (No 4) [2010] ACompT 12; Application by Energy Australia 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).

²⁷ AER, Better regulation: Expenditure forecast assessment guideline for electricity distribution, November 2013, p. 9.

²⁸ AEMC, Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012, 29 November 2012, p. 112.

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.

As noted above, we draw on a range of techniques, as well as our assessment of elements that impact upon capex such as demand and real cost escalators.

Our decision on the total forecast capex does not strictly limit a distributor's actual spending. A distributor might spend more on capex than the total forecast capex amount specified in our decision in response to unanticipated expenditure needs.

The regulatory framework has a number of mechanisms to deal with such circumstances. Importantly, a distributor does not bear the full cost where unexpected events lead to an overspend of the approved capex forecast. Rather, the distributor bears 30 per cent of this cost if the expenditure is subsequently found to be prudent and efficient. Further, the pass through provisions provide a means for a distributor to pass on significant, unexpected capex to customers, where appropriate.²⁹ Similarly, a distributor may spend less than the capex forecast because they have been more efficient than expected. In this case the distributor will keep on average 30 per cent of this reduction over time.

We set our alternative estimate at the level where the distributor has a reasonable opportunity to recover efficient costs. The regulatory framework allows the distributor to respond to any unanticipated issues that arise during the regulatory control period. In the event that this leads to the approved total revenue underestimating the total capex required, the distributor should have sufficient flexibility to allow it to meet its safety and reliability obligations by reallocating its budget. Conversely, if there is an overestimation, the stronger incentives the AEMC put in place in 2012 should result in the distributor only spending what is efficient. As noted, the distributor and consumers share the benefits of the underspend and the costs of an overspend under the regulatory regime.

6.4 Reasons for final decision

We applied the assessment approach set out in section 6.3 to AusNet Services. In this final decision, we are not satisfied AusNet Services' total forecast capex reasonably reflects the capex criteria. We compared AusNet Services' capex forecast to the alternative capex forecast we constructed using the approach and techniques outlined in appendices A and B. AusNet Services' proposal is materially higher than ours. We are satisfied that our alternative estimate reasonably reflects the capex criteria.

²⁹ NER, r. 6.6.

Table 6.3 sets out the capex amounts by driver that we included in our alternative estimate of AusNet Services' total forecast capex for the 2016–20 regulatory control period.

Category	2016	2017	2018	2019	2020	Total
Augmentation	63.6	75.4	60.9	54.7	51.5	306.2
Connections	80.7	80.1	83.1	79.4	79.7	403.0
Replacement	134.2	140.7	141.0	144.5	137.9	698.3
Non-Network	44.6	58.7	40.5	47.1	39.7	230.6
Capitalised overheads	33.4	35.1	34.2	34.1	34.1	170.8
Labour escalation adjustment	-1.0	-2.4	-2.6	-3.0	-3.0	-12.1
Gross Capex (includes capital contributions)	355.5	387.6	357.1	356.8	339.9	1796.8
Capital Contributions	39.3	39.0	40.5	38.7	38.9	196.4
Net Capex (excluding capital contributions)	316.2	348.6	316.6	318.1	300.9	1600.4

Table 6.3	Assessment of required capex by capex driver 2016–20
(\$2015, mill	on)

Source: AER analysis.

Note: Numbers may not add up due to rounding.

Our approved capex of \$1600.4 million is \$129.2 million higher than our preliminary decision of \$1471.2 million. The key components of our capex decision that have changed include:

- increased augex (\$38.7 million) reflecting our acceptance of AusNet Services' revised maximum demand forecasts, and our review of AusNet Services bushfire safety augex proposal
- increased net connections capex (\$112.4 million), driven by updated forecasts of Victorian population growth and a change to the estimation method for customer contributions
- reduced repex (\$60.1 million) as the powerline replacement fund is entirely funded by the State Government and sits outside the regulatory determination; and
- increased information, communications technology capex (\$24 million) due to new regulatory obligations introduced following our preliminary decision related to the 'Power of Choice reforms'.

We discuss our assessment of AusNet Services' forecasting methodology, key assumptions and past capex performance in the sections below.

Our assessment of capex drivers are in appendices A and B. These set out the application of our assessment techniques to the capex drivers, and the weighting we gave to particular techniques. We used our reasoning in the appendices to form our alternative estimate.

6.4.1 Key assumptions

The NER requires AusNet Services to include in its regulatory proposal the key assumptions that underlie its proposed forecast capex. AusNet Services must also provide a certification by its Directors that those key assumptions are reasonable.³⁰

AusNet Services set out its key assumptions in its revised regulatory proposal.³¹

We assessed AusNet Services' key assumptions in the appendices to this capex attachment.

6.4.2 Forecasting methodology

The NER requires AusNet Services to inform us about the methodology it proposes to use to prepare its forecast capex allowance before it submitted its regulatory proposal.³² AusNet Services must include this information in its regulatory proposal.³³ The main points of AusNet Services' forecasting methodology are set out in its regulatory proposal.³⁴

In our preliminary decision we considered AusNet Services' forecasting methodology was generally reasonable.³⁵ We maintain this position in this final decision. Where we identified specific areas of concern regarding its revised proposal, we discuss these in the appendices to this capex attachment.

Origin and VECUA maintained their support for applying a combination of top-down and bottom-up assessment techniques. They considered this is necessary to ensure that forecast costs, including unit rates, are not overstated. A combined approach ensures inter-relationships and synergies between projects or areas of work, which are more readily identified at a portfolio level, are adequately accounted for.³⁶ AGL also supported our use of benchmarking as an input into determining total capex (and opex) forecasts.³⁷

³⁰ NER, cll S6.1.1(2), (4) and (5).

³¹ AusNet Services, *Revised regulatory proposal*, 6 January 2016, p. 45.

³² NER, cll. 6.8.1A and 11.60.3(c).

³³ NER, cl. S6.1.1(2).

³⁴ AusNet Services, *Regulatory proposal 2016–20*, 30 April 2015, pp. 114–117 and 125–126.

³⁵ AER, *Preliminary decision: AusNet Services distribution determination 2016–20: Attachment 6 – Capital expenditure*, October 2015, p. 20.

³⁶ Origin, Submission to AER preliminary decision Victorian networks, 6 January 2016, p. 2; VECUA, Submission: AER preliminary 2016–20 revenue determinations for the Victorian DNSPs, 6 January 2016, p. 27.

³⁷ AGL, Submission: AER preliminary decision on the Victorian electricity distribution network regulatory proposals, 7 January 2016, p. 1.

As we noted in previous determinations, the drawback of deriving a capex forecast through a bottom-up assessment is it does not of itself provide sufficient evidence that the estimate is efficient. Bottom up approaches tend to overstate required allowances as they do not adequately account for inter-relationships and synergies between projects or areas of work. In contrast, reviewing aggregated areas of expenditure or the total expenditure, allows for an overall assessment of efficiency.³⁸

Importantly, we do not limit our capex assessment to top-down methods. We utilise a holistic assessment approach that include techniques such as predictive modelling and detailed technical reviews (see section 6.3 and appendix A).

6.4.3 Interaction with the STPIS

We consider our approved capital expenditure forecast is consistent with the setting of targets under the STPIS. In particular, we should not set the capex allowance such that it would lead to AusNet Services systematically under or over performing against its STPIS targets. We consider our approved capex forecast is sufficient to allow a prudent and efficient service provider in AusNet Services' circumstances to maintain performance at the targets set under the STPIS. As such, it is appropriate to apply the STPIS as set out in attachment 11.

In making our final decision, we specifically considered the impact our decision will have on the safety and reliability of AusNet Services' network.

In its submission, the Consumer Challenge Panel (CCP) noted the following explanation from the AEMC:³⁹

...operating and capital expenditure allowances for NSPs should be no more than the level considered necessary to comply with the relevant regulatory obligation or requirement, where these have been set by the body allocated to that role. Expenditure by NSPs to achieve standards above these levels should be unnecessary, as they are only required to deliver to the standards set. It would also amount to the AER substituting a regulatory obligation or requirement with its own views on the appropriate level of reliability, which would undermine the role of the standard setting body, and create uncertainty and duplication of roles.

NSPs are still free to make incremental improvements over and above the regulatory requirements at their own discretion. Such additional expenditure will not generally be recoverable, through forecast capital and operating expenditure. However, DNSPs are also provided with annual financial incentives to improve reliability performance under the STPIS.

³⁸ For example, see AER, Final decision: Ergon Energy determination 2015–16 to 2019–20: Attachment 6 – Capital expenditure, October 2015, p. 21; AER, Final decision: SA Power Networks determination 2015–16 to 2019–20: Attachment 6 – Capital expenditure, October 2015, pp. 20–21.

³⁹ CCP, Advice to the AER: AER's Preliminary Decision for SA Power Networks for 2015–20 and SA Power Networks' revised regulatory proposal, August 2015, p. 27.

We consider our substitute estimate is sufficient for AusNet Services to maintain the safety, service quality and reliability of its network consistent with its obligations. Our provision of a total capex forecast does not constrain a distributor's actual spending either as a cap or as a requirement that the forecast be spent on specific projects or activities. It is conceivable that a distributor might wish to spend particular capital expenditure differently or in excess of the total capex forecast in our decision. However, such additional expenditure is not included in our assessment of expenditure forecasts as it is not required to meet the capex objectives. We consider the STPIS is the appropriate mechanism to provide distributors with the incentive to improve reliability performance where such improvements reflect value to the energy customer.

Under our analysis of specific capex drivers, we explained how our analysis and certain assessment techniques factor in safety and reliability obligations and requirements.

6.4.4 AusNet Services' capex performance

We have looked at a number of historical metrics of AusNet Services' capex performance against that of other distributors in the NEM. We also compare AusNet Services' proposed forecast capex allowance against historical trends. These metrics are largely based on outputs of the annual benchmarking report and other analysis undertaken using data provided by the distributors for the annual benchmarking report. The report includes AusNet Services' relative partial and multilateral total factor productivity (MTFP) performance, capex per customer and maximum demand, and AusNet Services' historic capex trend.

The NER sets out that we must have regard to our annual benchmarking report.⁴⁰ This section shows how we have taken it into account. We consider that this high level benchmarking at the overall capex level is suitable to gain an overall understanding of AusNet Services' proposal in a broader context. However, in our capex assessment we have not relied on our high level benchmarking metrics set out below other than to gain a high level insight into AusNet Services' proposal. We have not used this analysis deterministically in our capex assessment.

6.4.4.1 Partial factor productivity of capital and multilateral total factor productivity

Figure 6.2 shows a measure of partial factor productivity of capital taken from our benchmarking report. It simultaneously considers the productivity of each DNSP's use of overhead lines and underground cables (split into distribution and sub-transmission voltages) and transformers and other capital. AusNet Services was a median performer in this metric for much of the nine years from 2006 to 2014.

⁴⁰ NER, cl. 6.5.7(e).



Figure 6.2 Capital partial factor productivity for 2006–14



Figure 6.3 shows that AusNet Services ranks similarly on MTFP. MTFP measures how efficient a business is in terms of its inputs (costs) and outputs (energy delivered, customer numbers, ratcheted maximum demand, reliability and circuit line length).



Figure 6.3 Multilateral total factor productivity for 2006–14

Source: AER, Annual benchmarking report: Electricity distribution network service providers, November 2015, p. 8.

VECUA considered we should have greater regard to capex benchmarking results, such as those in Figure 6.2 and Figure 6.3, when determining total capex forecasts.⁴¹ As we noted previously, we take a holistic approach and use various techniques in our assessments of capex forecasts. Depending on the circumstances of the particular determination, we may place more or less weight on different techniques in meeting our obligations under the NER.⁴² We detail our assessment approach in section 6.3 and appendix A.

6.4.4.2 Relative capex efficiency metrics

Figure 6.4 and Figure 6.5 show capex per customer and per maximum demand, against customer density. Unless otherwise indicated as a forecast, the figures represent the five year average of each distributor's actual capex for the years 2008–12. We considered capex per customer as it reflects the amount consumers are charged for additional capital investments.

Figure 6.4 and Figure 6.5 show the Victorian distributors generally performed well in these metrics compared to other distributors in the NEM in the 2008–12 years. For completeness, we also included the other Victorian distributors' revised proposal capex for the 2016–20 regulatory control period in the figures. However, we do not use comparisons of AusNet Services total forecast capex with the total forecast capex of the other Victorian distributors as inputs to our assessment. We consider it is appropriate to compare AusNet Services forecast only with actual capex. This is because actual capex are 'revealed costs' and would have occurred under the incentives of a regulatory regime.

Figure 6.4 shows AusNet Services was the median performer in the capex per customer metric among the lower density networks in the 2008–12 years. AusNet Services' capex per customer will increase slightly in the 2016–20 regulatory control period based on their proposed forecast capex.

⁴¹ VECUA, Submission: AER preliminary 2016–20 revenue determinations for the Victorian DNSPs, 6 January 2016, p. 22.

⁴² NER, cl. 6.12.1(3).



Figure 6.4 Capex per customer (000's, \$2013–14), against customer density

Source: AER analysis.

Similar to Figure 6.4, Figure 6.5 shows AusNet Services was the median performer in the capex per maximum demand metric among the lower density networks in the 2008—12 years. AusNet Services' capex per maximum demand will increase slightly in the 2016–20 regulatory control period based on their proposed forecast capex.

Figure 6.5 Capex per maximum demand (000's, \$2013–14), against customer density



Source: AER analysis.

6.4.4.3 AusNet Services' historical capex trends

We compared AusNet Services' capex proposal for the 2016–20 regulatory control period against the long term historical trend in capex levels.

Figure 6.6 shows actual historical capex and proposed capex between 2001 and 2020. This figure shows AusNet Services forecasted slightly lower capex in the 2016–20 regulatory control period compared to actual capex in the 2011–15 regulatory control period. However, AusNet Services' capex forecast for the 2016–20 regulatory control period is still significantly higher than historical levels.



Figure 6.6 AusNet Services total capex—historical and forecast for 2001–2020

Source: AER analysis.

VECCUA noted the Victorian distributors' initial capex proposals, including AusNet Services', are significantly higher than historical levels.⁴³ As we noted in section 6.2, AusNet Services' revised proposal is 3.5 per cent higher than its initial proposal.

The CCP was concerned the Victorian distributors' capex in recent years has been excessive. The CCP noted capex has been reasonably constant historically and stated the total capex forecasts for the 2011–15 regulatory control period were 'aberrations'.⁴⁴

The CCP further noted the Victorian distributors rejected our preliminary decisions, and as a group only marginally reduced their forecast capex from actual levels of the 2011–15 period.⁴⁵ We note AusNet Services' revised total capex forecast for the 2016–20 regulatory control period is approximately \$9.8 million, or 0.6 per cent, lower than actual capex in the 2011–15 regulatory control period.⁴⁶ The CCP provided analysis

⁴³ VECUA, Submission: AER preliminary 2016–20 revenue determinations for the Victorian DNSPs, 6 January 2016, pp 23–24.

⁴⁴ CCP, Response to AER preliminary decisions and revised proposals from Victorian electricity distribution network service providers for a revenue reset for the 2016-2020 regulatory period, 22 February 2016 p. 19.

⁴⁵ CCP, Response to AER preliminary decisions and revised proposals from Victorian electricity distribution network service providers for a revenue reset for the 2016-2020 regulatory period, 22 February 2016 p. 19.

⁴⁶ AER analysis; AusNet Services, *Distribution capex model - Revised proposal Public*, January 2016.

showing the capex for the 2011–15 regulatory control period has resulted in a more expensive asset base, even when controlling for demand and customer numbers.⁴⁷

We note Origin largely agreed with our reductions to the Victorian distributors' capex forecasts in the preliminary decisions.⁴⁸ On the other hand, VECUA stated our preliminary decisions provided excessive capex allowances to the Victorian distributors. VECUA considered the preliminary decisions predominantly based the allowances on expenditure in the 2011–15 regulatory control period.⁴⁹ VECUA noted several drivers that are putting downward pressure on the Victorian distributors' capex requirement in the 2016–20 regulatory control period, including:

- the downturn in electricity demand and consumption
- excess system capacity, declining asset utilisation and reducing network ages
- lower network reliability expectations

Hence, VECUA stated the Victorian distributors' capex forecasts should revert to historical levels.⁵⁰

Our detailed assessment in appendix B takes into account points made in these submissions where relevant, for example, network utilisation levels and its likely impact on network augmentation requirements. In appendix B we fully examine whether AusNet Services revised proposal reflects its expected operating environment.

6.4.5 Interrelationships

There are a number of interrelationships between AusNet Services' total forecast capex for the 2016–20 regulatory control period and other components of its distribution determination (see Table 6.4). We considered these interrelationships in coming to our final decision on total forecast capex.

Table 6.4Interrelationships between total forecast capex and othercomponents

Other component	Interrelationships with total forecast capex
Total forecast opex	There are elements of AusNet Services' total forecast opex that are specifically related to its total forecast capex. These include the forecast labour price growth that we included in our opex forecast in Attachment 7. This is because the price of labour affects both total forecast capex and total forecast opex. More generally, we note our total opex and capex forecast is expected to provide AusNet

⁴⁷ CCP, Response to AER preliminary decisions and revised proposals from Victorian electricity distribution network service providers for a revenue reset for the 2016-2020 regulatory period, 22 February 2016 pp. 19–20.

⁴⁸ Origin, *Submission: Victorian networks revised proposals*, 4 February 2016, p. 1.

 ⁴⁹ VECUA, Submission: AER preliminary 2016–20 revenue determinations for the Victorian DNSPs, 6 January 2016, p. 8.

⁵⁰ VECUA, Submission: AER preliminary 2016–20 revenue determinations for the Victorian DNSPs, 6 January 2016, p. 20.

	Services with sufficient opex to maintain the reliability of its network.
Forecast demand	Forecast demand is related to AusNet Services' total forecast capex. Specifically, augmentation capex is triggered by a need to build or upgrade a network to address changes in demand (or to comply with quality, reliability and security of supply requirements). Hence, the main driver of augmentation capex is maximum demand and its effect on network utilisation and reliability.
Capital Expenditure Sharing Scheme (CESS)	The CESS is related to AusNet Services' total forecast capex. In particular, the effective application of the CESS is contingent on the approved total forecast capex being efficient, and that it reasonably reflects the capex criteria. As we note in the capex criteria table below, this is because any efficiency gains or losses are measured against the approved total forecast capex. In addition, in future distribution determinations we will be required to undertake an ex post review of the efficiency and prudency of capex, with the option to exclude any inefficient capex in excess of the approved total forecast capex from AusNet Services' regulatory asset base. In particular, the CESS will ensure that AusNet Services bears at least 30 per cent of any overspend against the capex allowance. Similarly, if AusNet Services can fulfil their objectives without spending the full capex allowance, it will be able to retain 30 per cent of the benefit of this. In addition, if an overspend is found to be inefficient through the ex post review, AusNet Services risks having to bear the entire overspend.
Service Target Performance Incentive Scheme (STPIS)	The STPIS is related to AusNet Services' total forecast capex, in so far as it is important that it does not include any expenditure for the purposes of improving supply reliability during the 2016–20 regulatory control period. This is because such expenditure should be offset by rewards provided through the application of the STPIS. We discuss this further in attachment 11. Further, the forecast capex should be sufficient to allow AusNet Services to maintain performance at the targets set under the STPIS. The capex allowance should not be set such that there is an expectation that it will lead to AusNet Services systematically under or over performing against its targets.
Contingent project	A contingent project is related to AusNet Services' total forecast capex. This is because an amount of expenditure that should be included as a contingent project should not be included as part of AusNet Services' total forecast capex for the 2016–20 regulatory control period. We identified three contingent projects for AusNet Services during the 2016–20 regulatory control period.

Source: AER analysis.

6.4.6 Consideration of capex factors

As we discussed in section 6.3, we took the capex factors into consideration when assessing AusNet Services' total capex forecast.⁵¹ Table 6.5 summarises how we have taken into account the capex factors.

Where relevant, we also had regard to the capex factors in assessing the forecast capex associated with capex drivers such as repex, augex and so on (see appendix B).

⁵¹ NER, cll. 6.5.7(c), (d) and (e).

Table 6.5 AER consideration of the capex factors

Capex factor	AER consideration
The most recent annual benchmarking report and benchmarking capex that would be incurred by an efficient distributor over the relevant regulatory control period	We had regard to our most recent benchmarking report in assessing AusNet Services' proposed total forecast capex and in determining our alternative estimate for the 2016–20 regulatory control period. This can be seen in the metrics we used in our assessment of AusNet Services' capex performance.
The actual and expected capex of AusNet Services during any preceding regulatory control periods	We had regard to AusNet Services' actual and expected capex during the 2011–15 and preceding regulatory control periods in assessing its proposed total forecast.
	This can be seen in our assessment of AusNet Services' capex performance. It can also be seen in our assessment of the forecast capex associated with the capex drivers that underlie AusNet Services' total forecast capex.
	For some elements of non-network capex, we rely on trend analysis to arrive at an estimate that meets the capex criteria.
The extent to which the capex forecast includes expenditure to address concerns of electricity consumers as identified by AusNet Services in the course of its engagement with electricity consumers	We had regard to the extent to which AusNet Services' proposed total forecast capex includes expenditure to address consumer concerns that AusNet Services identified. AusNet Services has undertaken engagement with its customers and presented high level findings regarding its customer preferences.
The relative prices of operating and capital inputs	We had regard to the relative prices of operating and capital inputs in assessing AusNet Services' proposed real cost escalation factors. In particular, we have not accepted AusNet Services cost escalation rates for labour.
The substitution possibilities between operating and capital expenditure	We had regard to the substitution possibilities between opex and capex. We considered whether there are more efficient and prudent trade-offs in investing more or less in capital in place of ongoing operations. See our discussion about the interrelationships between AusNet Services' total forecast capex and total forecast opex in Table 6.4 above.
Whether the capex forecast is consistent with any incentive scheme or schemes that apply to AusNet Services	We had regard to whether AusNet Services' proposed total forecast capex is consistent with the CESS and the STPIS. See our discussion about the interrelationships between AusNet Services' total forecast capex and the application of the CESS and the STPIS in Table 6.4 above.
The extent to which the capex forecast is referable to arrangements with a person other than the distributor that do not reflect arm's length terms	We had regard to whether any part of AusNet Services' proposed total forecast capex or our alternative estimate is referable to arrangements with a person other than AusNet Services that do not reflect arm's length terms. We do not have evidence to indicate that any of AusNet Services' arrangements do not reflect arm's length terms.
Whether the capex forecast includes an amount relating to a project that should more appropriately be included as a contingent project	We had regard to whether any amount of AusNet Services' proposed total forecast capex or our alternative estimate relates to a project that should more appropriately be included as a contingent project. We have included projects relating to Bushfire Mitigation as contingent projects (see appendix D).
The extent to which AusNet Services has considered and made provision for efficient and prudent non-network alternatives	We had regard to the extent to which AusNet Services made provision for efficient and prudent non-network alternatives as part of our assessment. In particular, we considered this within our review of AusNet Services' augex proposal.

Any other factor the AER considers relevant and which the AER has notified AusNet Services in writing, prior to the submission of its revised regulatory proposal, is a capex factor

We did not identify any other capex factor that we consider relevant.

Source: AER analysis.

A Assessment techniques

This appendix describes the assessment approaches we applied in assessing AusNet Services' total forecast capex. We used a variety of techniques to determine whether the AusNet Services total forecast capex reasonably reflects the capex criteria. Appendix B sets out in greater detail the extent to which we relied on each of the assessment techniques.

The assessment techniques that we apply in capex are necessarily different from those we apply in the assessment of opex. This is reflective of differences in the nature of the expenditure we are assessing. As such, we use some assessment techniques in our capex assessment that are not suitable for assessing opex and vice versa. We set this out in our expenditure assessment guideline, where we stated:⁵²

Past actual expenditure may not be an appropriate starting point for capex given it is largely non-recurrent or 'lumpy', and so past expenditures or work volumes may not be indicative of future volumes. For non-recurrent expenditure, we will attempt to normalise for work volumes and examine per unit costs (including through benchmarking across distributors) when forming a view on forecast unit costs.

Other drivers of capex (such as replacement expenditure and connections works) may be recurrent. For such expenditure, we will attempt to identify trends in revealed volumes and costs as an indicator of forecast requirements.

Below we set out the assessment techniques we used to asses AusNet Services' capex.

A.1 Economic benchmarking

Economic benchmarking is one of the key outputs of our annual benchmarking report. The NER requires us to consider the annual benchmarking report as it is one of the capex factors.⁵³ Economic benchmarking applies economic theory to measure the efficiency of a distributor's use of inputs to produce outputs, having regard to environmental factors.⁵⁴ It allows us to compare the performance of a distributor against its own past performance, and the performance of other distributors. Economic benchmarking helps us to assess whether a distributor's capex forecast represents efficient costs.⁵⁵ As the AEMC stated, 'benchmarking is a critical exercise in assessing the efficiency of a NSP'.⁵⁶

⁵² AER, Better regulation: Expenditure forecast assessment guideline for electricity distribution, November 2013, p. 8.

⁵³ NER, cl. 6.5.7(e)(4).

⁵⁴ AER, Better regulation: Explanatory statement: Expenditure forecasting assessment guidelines, November 2013, p. 78.

⁵⁵ NER, cl. 6.5.7(c).

⁵⁶ AEMC, Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012, 29 November 2012, p. 25.

A number of economic benchmarks from the annual benchmarking report are relevant to our assessment of capex. These include measures of total cost efficiency and overall capex efficiency. In general, these measures calculate a distributor's efficiency with consideration given to its inputs, outputs and its operating environment. We considered each distributor's operating environment in so far as there are factors outside of a distributor's control that affect its ability to convert inputs into outputs.⁵⁷ Once such exogenous factors are taken into account, we expect distributors to operate at similar levels of efficiency. One example of an exogenous factor we took into account is customer density. For more on how we derived these measures, see our annual benchmarking report.⁵⁸

In addition to the measures in the annual benchmarking report, we considered how distributors performed on a number of overall capex metrics, including capex per customer, and capex per maximum demand. We calculated these economic benchmarks using actual data from the previous regulatory control period.

The results from economic benchmarking give an indication of the relative efficiency of each of the distributors, and how this has changed over time.

A.2 Trend analysis

We considered past trends in actual and forecast capex as this is one of the capex factors under the NER. $^{\rm 59}$

Trend analysis involves comparing a distributor's forecast capex and work volumes against historical levels. Where forecast capex and volumes are materially different to historical levels, we seek to understand the reasons for these differences. In doing so, we consider the reasons the distributor provides in its revised proposal, as well as changes in the circumstances of the distributor.

In considering whether the total forecast capex reasonably reflects the capex criteria, we need to consider whether the forecast will allow the distributor to meet expected demand, and comply with relevant regulatory obligations.⁶⁰ Demand and regulatory obligations (specifically, service standards) are key drivers of capex. More onerous standards will increase capex, as will growth in maximum demand. Conversely, reduced service obligations or a decline in demand will likely cause a reduction in the amount of capex the distributor requires.

Maximum demand is a key driver of augmentation or demand driven expenditure. Augmentation often needs to occur prior to demand growth being realised. Hence, forecast rather than actual demand is relevant when a business is deciding the

⁵⁷ AEMC, Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012, 29 November 2012, p. 113. Exogenous factors could include geographic factors, customer factors, network factors and jurisdictional factors.

⁵⁸ AER, Annual benchmarking report: Electricity distribution network service providers, November 2015.

⁵⁹ NER, cl. 6.5.7(e)(5).

⁶⁰ NER, cl. 6.5.7(a)(3).

augmentation projects it will require in an upcoming regulatory control period. To the extent actual demand differs from forecast, however, a business should reassess the need for the projects. Growth in a business' network will also drive connections related capex. For these reasons it is important to consider how trends in capex (in particular, augex and connections) compare with trends in demand (and customer numbers).

For service standards, there is generally a lag between when capex is undertaken (or not) and when the service improves (or declines). This is important when considering the expected impact of an increase or decrease in capex on service levels. It is also relevant to consider when service standards have changed and how this has affected the distributor's capex requirements.

We looked at trends in capex across a range of levels including at the total capex level, and the category level (such as growth related capex, and repex) as relevant. We also compared these with trends in demand and changes in service standards over time.

A.3 Category analysis

Expenditure category analysis allows us to compare expenditure across NSPs, and over time, for various levels of capex. The comparisons we perform include:

- overall costs within each category of capex
- unit costs, across a range of activities
- volumes, across a range of activities
- asset lives, across a range of asset classes which we use in assessing repex.

Using standardised reporting templates, we collected data on augex, repex, connections, non-network capex, overheads and demand forecasts for all distributors in the NEM. The use of standardised category data allows us to make direct comparisons across distributors. Standardised category data also allows us to identify and scrutinise different operating and environmental factors that affect the amount and cost of works performed by distributors, and how these factors may change over time.

A.4 Predictive modelling

Predictive modelling uses statistical analysis to determine the expected efficient costs over the regulatory control period associated with the demand for electricity services for different categories of works. We have two predictive models:

- the repex model
- the augex model (used in a qualitative sense).

The use of the repex and augex models is directly relevant to assessing whether a distributor's capex forecast reasonably reflects the capex criteria.⁶¹ The models draw

⁶¹ NER, cl. 6.5.7(c).

on actual capex the distributor incurred during the preceding regulatory control period. This past capex is a factor that we must take into account.⁶²

The repex model is a high-level probability based model that forecasts asset replacement capex (repex) for various asset categories based on their condition (using age as a proxy), and unit costs. If we consider a distributor's proposed repex does not conform to the capex criteria, we use the repex model (in combination with other techniques where appropriate) to generate a substitute forecast.

The augex model compares utilisation thresholds with forecasts of maximum demand to identify the parts of a network segment that may require augmentation.⁶³ The model then uses capacity factors to calculate required augmentation, and unit costs to derive an augex forecast for the distributor over a given period.⁶⁴ In this way, the augex model accounts for the main internal drivers of augex that may differ between distributors, namely peak demand growth and its impact on asset utilisation. We can use the augex model to identify general trends in asset utilisation over time as well as to identify outliers in a distributor's augex forecast.⁶⁵

For our final decision we have relied on input data for the augex model to review forecast utilisation of individual zone substations to assess whether augmentation may be necessary to alleviate capacity constraints. We use this analysis both as a starting point for our further detailed evaluation, and as a cross-check on our overall augex estimate. We have not otherwise used the augex model in our assessment of AusNet Services' augex forecast.

A.5 Engineering review

We drew on technical and other technical expertise within the AER to assist with our review of AusNet Services' capex proposals.⁶⁶ These involved reviewing AusNet Services' processes, and specific projects and programs of work.

⁶² NER, cl. 6.5.7(e)(5).

⁶³ Asset utilisation is the proportion of the asset's capability under use during peak demand conditions.

⁶⁴ For more information, see: AER, *Guidance document: AER augmentation model handbook*, November 2013.

AER, 'Meeting summary – distributor replacement and augmentation capex', Workshop 4: Category analysis workstream – Replacement and demand driven augmentation (Distribution), 8 March 2013, p. 1.

⁶⁶ AER, Better regulation: Explanatory statement: Expenditure forecast assessment guideline, November 2013, p. 86.
B Assessment of capex drivers

We present our detailed analysis of the sub-categories of AusNet Services' forecast capex for the 2016–20 regulatory control period in this appendix. These sub-categories reflect the drivers of forecast capex over the 2016–20 period. These drivers are augmentation capex (augex), customer connections capex, replacement capex (repex), reliability improvement capex, capitalised overheads and non-network capex.

As we discuss in the capex attachment, we are not satisfied that AusNet Services' proposed total forecast capex reasonably reflects the capex criteria. In this appendix we set out further analysis in support of this view. This further analysis also explains the basis for our alternative estimate of AusNet Services' total forecast capex that we are satisfied reasonably reflects the capex criteria. In coming to our views and our alternative estimate we applied the assessment techniques that we discuss in appendix A.

This appendix sets out our findings and views on each sub-category of capex. The structure of this appendix is:

- Section B.1: alternative estimate
- Section B.2: forecast augex
- Section B.3: forecast customer connections capex, including capital contributions
- Section B.4: forecast repex
- Section B.5: forecast capitalised overheads
- Section B.6: forecast non-network capex.

In each of these sections, we examine sub-categories of capex which we include in our alternative estimate. For each such sub-category, we explain why we are satisfied the amount of capex that we include in our alternative estimate reasonably reflects the capex criteria.

B.1 Alternative estimate

Having examined AusNet Services' proposal, we formed a view on our alternative estimate of the capex required to reasonably reflect the capex criteria. Our alternative estimate is based on our assessment techniques, explained in section 6.3 and appendix A. Our weighting of each of these techniques, and our response to AusNet Services' submissions on the weighting that should be given to particular techniques, is set out under the capex drivers in appendix B.

We are satisfied that our alternative estimate reasonably reflects the capex criteria.

B.2 Forecast augex

Augmentation capex (augex) is driven by a service provider's need to build or augment its network. The main driver of augex is maximum demand and its effect on the utilisation of network capacity. It can also be triggered by the need to upgrade the network to comply with quality, safety, reliability and security of supply requirements. This section deals with an assessment of AusNet's augex revised proposal.

B.2.1 Position

We accept the vast majority (approximately 94 per cent) of AusNet Services revised augex forecast of \$328.8 million (\$2015) reasonably reflects the capex criteria, including capex to meet forecast maximum demand and its network safety obligations. However, we do not accept AusNet Services' total augex revised forecast because:

- AusNet Services can prudently defer its demand-related capex to augment Clyde North zone substation (which it did not include in its initial regulatory proposal)
- AusNet Services' proposes an inefficient cost to place underground power-lines that are adversely affected by overhanging vegetation.

Our alternative estimate of required augex for AusNet Services for the 2016–20 regulatory control period is \$309.3 million (\$2015). Our estimate takes into account the above issues with AusNet Services' revised augex forecast. We are satisfied that our estimate of required augex reasonably reflects the capex criteria and will enable AusNet Services to achieve the capex objectives.

Table 6.6 sets out our overall alternative estimate of AusNet Services' augex forecast, including the differences between our alternative estimate for demand and safety related augex.

	2016	2017	2018	2019	2020	Total
Revised augex proposal	70.1	81.1	61.6	57.0	59.1	328.8
Adjustment to demand-augex	0.0	0.0	0.0	-1.5	-6.8	-8.3
Adjustment to safety-augex	-6.2	-5.1	0.0	0.0	0.0	-11.2
AER alternative estimate	63.9	76.0	61.6	55.5	52.3	309.3
Difference	-8.8%	-6.3%	0.0%	-2.7%	-11.4%	-5.9%

Table 6.6 AER's alternative estimate of augex (\$2015, million)

Source: AER analysis.

Note: These figures are calculated based on AusNet Services' revised regulatory proposal and supporting documentation. To determine a total capex forecast, AusNet Services' also makes an adjustment to the total augex forecast to account for changes to its proposed labour and material cost escalators. Our alternative estimate in the AER's capex model is based on AusNet Services' total augex forecast (after taking into account changes in escalations) and a proportional adjustment to this forecast using the percentage differences calculated in this table.

Numbers may not add up due to rounding.

Table 6.7 compares forecasts across the decision making process between the initial proposal and our final decision.

Table 6.7AusNet Services augex forecasts comparisons (\$2015 million,excluding overheads)

	2016	2017	2018	2019	2020	Total
Initial augex forecast	82.5	64.7	60.8	53.0	52.8	313.8
AER preliminary decision	48.4	61.6	57.7	49.9	49.7	267.4
Revised proposal	70.1	81.1	61.6	57.0	59.1	328.8
AER final forecast	63.9	76.0	61.6	55.5	52.3	309.3

Source: AER analysis.

Our reasons for our final decision on AusNet Services' revised augex proposal are set out in sections B.2.4 and B.2.5.

B.2.2 AusNet Services' revised proposal

AusNet Services' revised augex proposal is \$328.8 million (\$2015). As set out in Table 6.8, AusNet Services' revised augex forecast is comprised of capex to meet forecast maximum demand, capex related to the Victorian Bushfire Royal Commission (VBRC) recommendations, and other safety augex.

Table 6.8AusNet Services' proposed augex (\$2015, million, excluding
overheads)

Category	2016	2017	2018	2019	2020	Total
VBRC	28.6	27.9	28.1	28.3	28.5	141.4
Safety	31.4	30.3	15.1	13.6	13.3	103.8
Demand	10.0	22.8	18.4	15.1	17.2	83.6
Total augex proposal	70.1	81.1	61.6	57.0	59.1	328.8

Source: AusNet Services revised regulatory proposal

AusNet Services' revised augex forecast is \$15 million (\$2015), or 4.8 per cent, higher than its initial proposal. In developing its revised forecast, AusNet Services':

- revised its demand-related capex upwards by 23 percent, to reflect revised maximum demand forecasts
- provided additional supporting information about its proposed safety programs.

B.2.3 AER approach

In our preliminary decision on AusNet Services' augex forecast, we used a combination of top-down and bottom-up assessment techniques to estimate the efficient and prudent capex that AusNet Services will require to meet its obligations given expected demand growth and other augmentation drivers.⁶⁷

First, we considered AusNet Services' proposed expenditure in the context of past expenditure, demand and current network utilisation. We found that AusNet Services' initial forecasts of maximum demand were not a realistic expectation of demand over the 2016–20 period. We concluded that the available evidence at the time suggested that maximum demand would remain generally flat over the 2016–20 period.

On the basis of our analysis, and information provided by AusNet Services, we reached a preliminary decision that a forecast of \$52 million reflected the prudent and efficient amount to meet a realistic expectation of demand over the 2016–20 period. This was 22.8 per cent less than AusNet Services' initial proposal, which is primarily within its forecast augex for distribution substations and its low voltage network.

Second, we reviewed AusNet Services key safety-related augex programs (both VBRC and other safety), worth \$246 million (\$2015) over the 2016–20 period. On the basis of our review, we included AusNet Services' proposed augex relating to the VBRC and for additional animal/bird proofing in our preliminary decision because we were satisfied that this capex reasonably reflects the capex criteria. However, we did not include AusNet Services' proposed \$31 million augex to place underground power-line spans that are currently adversely affected by overhanging vegetation.

For our final decision on AusNet Services' augex proposal, we adopt the same assessment approach as for our preliminary decision. The remainder of this appendix is structured as followed:

- Section B.2.4 updates our analysis of AusNet Services' demand-driven augex
- Section B.2.5 updates our analysis of AusNet Services' safety-driven augex.

We received submissions from the Victorian Energy Consumer and User Alliance (VECUA) and the Consumer Challenge Panel (CCP) on our preliminary decision and AusNet Services' revised proposal. We discuss these submissions below.

B.2.4 Demand augex

AusNet Services' revised proposal included \$82.6 million in augex to respond to forecast maximum demand over the 2016–20 period. As shown in Figure 6.7, AusNet Services has increased its proposed demand-driven augex by 23 per cent from its initial regulatory proposal. However, this capex remains significantly below AusNet Services' actual demand-driven augex over the 2011–15 regulatory control period.

⁶⁷ AER, Preliminary Decision AusNet Services 2016-20, Attachment 6, October 2015, pp. 37-47



Figure 6.7 AusNet Services' demand-driven capex historic actual and proposed for 2016–20 period (\$2015, million, excluding overheads)

Source: AER analysis, AusNet Services' revised regulatory proposal, AusNet Services' response to AER AusNet 002 and 013.

AusNet Services' has increased its demand-augex proposal due to increases in maximum demand forecasts. As set out in Appendix B, AusNet Services has increased its maximum demand forecast by 5 per cent from its initial regulatory proposal. This increase is driven by updated population forecasts for parts of AusNet Services' network (e.g. the municipal area of Casey).⁶⁸

The primary impact of updated maximum demand forecasts is that AusNet Services has maintained its initial demand-augex forecast and included an additional:⁶⁹

- \$8.3 million capex to augment capacity at the Clyde North zone substation.
- \$7.9 million capex for new high-voltage feeders to supply an expected increase demand from new customer connections.

In our preliminary decision, we found that AusNet Services' initial maximum demand forecasts were likely overstated when compared to a more realistic expectation of demand over the 2016–20 period.⁷⁰ While AusNet Services had significantly decreased its proposed augex compared to the 2011–15 period, we considered that the available evidence pointed to lower peak demand growth over 2016–20 than forecast by AusNet

⁶⁸ AusNet Services, *Revised Regulatory Proposal 2016-20*, 6 January 2016, p. 3-8

⁶⁹ AusNet Services, *Revised Regulatory Proposal 2016-20*, 6 January 2016, p. 3-8

⁷⁰ AER, *Preliminary Decision AusNet Services 2016-20, Attachment 6*, October 2015, pp. 41–42 and Appendix C

Services. We considered that the Australian Energy Market Operator's (AEMO) 2014 connection point forecasts for AusNet Services reflected a realistic expectation of demand over the 2016–20 period.

We concluded that reducing AusNet Services' proposed augex by \$15.4 million would likely result in a prudent and efficient amount to meet a realistic expectation of demand over the 2016–20 period. However, we would consider updated demand forecasts and other information (such as updated demand forecasts from the AEMO) in our final decision to reflect the most up to date data. More detail about our assessment is set out in our preliminary decision.⁷¹

As set out in Appendix C, we are satisfied that AusNet Services' revised maximum demand forecasts reflect a realistic expectation of demand over the 2016–20 period. While these maximum demand forecasts are higher than its initial forecasts, they are generally consistent with updated forecasts from AEMO and the trend in maximum demand between 2010 and 2015. An error in the data originally submitted by AusNet Services resulted in its initial demand forecast appearing higher than was actually the case.⁷² Correcting for this error, there was a large degree of consistency between the 2014 forecasts from AEMO and AusNet Services. This consistency has been maintained in the 2015 updates from both AEMO and AusNet Services.

On the basis of AusNet Services revised demand forecast, we accept the majority of AusNet Services' revised augex forecast is required to meet a realistic expectation of demand over the 2016-20 period. In particular, we now accept AusNet Services' initial augex forecast and the additional augex for high-voltage feeders within its revised proposal. We have included this augex within our alternative estimate of total capex.

However, we are not satisfied that AusNet Services' proposed additional \$8.3 million (\$2015) capex to augment the Clyde North zone substation is prudent and efficient. We have not included this additional capex in our augex estimate and therefore our alternative estimate of total capex. This is for the following reasons.

Clyde North zone substation augmentation

AusNet Services proposes to augment capacity at the Clyde North zone substation in 2020 due to higher maximum demand forecasts. AusNet Services forecasts that maximum demand at Clyde North will increase by 40 per cent over the 2016–20 period, and its forecast for 2020 is now 20 per cent higher than the previous forecast.⁷³

While we accept that AusNet Services will likely experience a significant increase in maximum demand at the Clyde North, we are not satisfied that the cost and timing of AusNet Services' proposed augmentation is prudent and efficient.

AER, Preliminary Decision AusNet Services 2016-20, Attachment 6, October 2015, pp. 41–43 and Appendix C.

⁷² See AusNet Services, *Response to AER information request 029* [email to AER], 29 January 2016.

⁷³ AusNet Services, *Response to AER information request 029*, [email to AER], 29 January 2016, pp. 4–6.

First, AusNet Services' has only completed initial project planning, and does not appear to have performed cost-benefit analysis to demonstrate that the proposed capital costs outweigh the economic benefits to consumers. A lack of cost-benefit analysis raises concerns about whether the level of proposed capex is efficient and whether the timing of the augmentation is prudent.

With the assistance of AER technical staff, we conducted a cost-benefit analysis to further test the robustness of AusNet Services' proposal.⁷⁴ We estimate that the value of unserved energy that AusNet Services will avoid by augmenting the Clyde North zone substation will be \$144,000 in 2020.⁷⁵ This is outweighed by the annual cost of capital (financing cost) of the project, which is \$622,500.⁷⁶ While this cost-benefit analysis is necessarily high-level, it suggests that the benefits from the Clyde North zone substation are currently outweighed by the augex costs.

Second, AusNet Services states that its formal business case will examine alternative options to augmenting the Clyde North Zone substation, including demand management.⁷⁷ Option development is essential to identify the most economically efficient solution to address forecast capacity constraints. We would expect that AusNet Services would subject this project to a regulatory investment test for distribution (RIT-D) in due course.

Nonetheless, information from AusNet Services suggests that a small incremental amount of demand management and/or a small decline in maximum demand will allow it to prudently defer this project. This is because AusNet Services estimates that the planned augmentation of Clyde North zone substation can be deferred if 4MW of forecast load does not eventuate.⁷⁸ AusNet Services currently plans to manage 3.7 MW of forecast load through demand management and embedded generation while it prepares to augment the zone substation, which is relatively close to 4MW.⁷⁹ An additional 0.3 MW of demand management, and/or an equivalent reduction in maximum demand, will allow AusNet Services to prudently defer the augmentation of Clyde North zone substation.

⁷⁴ We conducted some high-level probabilistic cost-benefit analysis by calculating the cost to consumers from losing energy supply that may be avoided by augmentation expenditure (e.g. the economic value of expected unserved energy) against the proposed capital cost to augment capacity. This economic cost-benefit analysis is consistent with AusNet Services' planning guidelines (see AMS 20-16 – Distribution Network Planning Standards & Guidelines, p. 46).

⁷⁵ To calculate the cost to consumers, we used AusNet Services' estimate of the energy at risk at Clyde North zone substation in 2020 (1659MW/h, which is from AusNet Services, *Distribution Annual Planning Report 2016-20*, p. 55) and applied assumptions about zone substation transformer failure rates (1%), outage periods (2.6 months in a year) and VCR (\$40.03/MWh). The formula we used is: 1659MW/h x 1% x (2.6/12) x \$40.03/MWh = \$144,000.

⁷⁶ We calculated this annual cost of capital through a simplified approach of multiplying the cost of the augmentation by the WACC. We used AusNet's Services proposed cost of \$8.3 million (\$2015) and 7.3% WACC that AusNet Services adopts within its augmentation planning guideline (see AMS 20-16 – Distribution Network Planning Standards & Guidelines, p. 43).

⁷⁷ AusNet Services, Response to AER information request 029 [email to AER], 29 January 2016, pp. 4-5; AusNet Services, Distribution Annual Planning Report 2016-20, p. 54.

⁷⁸ AusNet Services, *Distribution Annual Planning Report 2016-20*, p. 55.

⁷⁹ AusNet Services, *Response to AER information request 029* [email to AER], 29 January 2016, p. 5.

Submissions

We received submissions from the VECUA and the CCP on our preliminary decision and AusNet Services' revised proposal. The CCP submits that it is not convinced that the AER's augex preliminary decisions are efficient based on the long term historical data or the high level assessment of need and the low utilisation of the existing assets. In particular, the amount of augex in the DNSP's proposals and preliminary decisions were excessive when assessed over the longer term and trend in maximum demand. It also considers that the only augmentation capex that is required is to strengthen the existing networks to accommodate the new developments that are forecast to be developed during the 2016/20 regulatory period.⁸⁰

The VECUA submit that:81

- We have been over-reliant on bottom-up forecasting methodologies. Bottom up assessments have tendency to overstate expenditure requirements, as they do not adequately account for interrelationships/synergies between projects.
- Augex allowances should be made by utilising credible demand forecasts at the substation level, together with a detailed analysis of local capacity constraints, taking into account local system utilisation and excess capacity levels. They are unclear about the level of detail our analysis covers in respect to this issue.
- Despite acknowledging our acceptance of the unsustainable trends in DNSPs' growing excess capacity levels, we did not quantify the impact of this excess capacity, nor did we demonstrate that it has been appropriately considered in augex assessments.
- It is concerned about how we treated the significant reduction in asset utilisation, labelling it a "major omission" in our preliminary determinations. VECUA asserts that system utilisation is much more material to the determination of the networks' efficient augex needs than what we have determined.

As we discussed previously, AusNet Services' demand-driven augex is 54.6 per cent lower than its actual demand-driven augex over 2011–15. The CCP recognises that AusNet's augex forecast has significant reduced from the last regulatory period, and therefore the majority of the CCP concerns do not apply to AusNet Services.

Similarly, we consider that the VECUA's concerns do not necessarily apply to our assessment of AusNet Services' proposal. As we state in section B.2.3, we use a combination of top-down and bottom-up assessment techniques to estimate the efficient and prudent capex that AusNet Services' will require to meet its obligations

⁸⁰ Consumer Challenge Panel (sub-panel 3), Response to AER Preliminary Decisions and revised proposals from Victorian electricity distribution network service providers for a revenue reset for the 2016-2020 regulatory period, 25 February 2016), pp. 48–55

⁸¹ The Victorian Energy Consumer and User Alliance (VECUA), submission to the AER on AER preliminary 2016-20 revenue determinations for the Victorian DNSPs (Developed by Hugh Grant, Executive Director, ResponseAbility), 6 January 2016, pp.25–28, 30–34

given expected demand growth and other augmentation drivers. Top-down and bottom-up techniques are both valuable.

In our top down techniques, maximum demand trends to give us a helpful high-level indicator of the need for augmentation. In some cases, our high-level assessment of demand forecasts and trends in network utilisation may be sufficient to inform our estimate of augex. In other regulatory decisions, we also conducted bottom-up reviews by examining more localised network constraints and engaging in more detailed economic and engineering reviews augex forecast (e.g. Jemena and Powercor).

In AusNet Services' initial proposal, it did not propose major demand-driven augex projects such as major zone substation augmentations. Therefore we did not engage in more detailed bottom-up analysis. Instead, we determined the likely overestimation of AusNet Services' demand-augex based on comparing AusNet Services' demand forecasts to realistic demand forecasts and applied a top-down adjustment to AusNet Services' demand-augex proposal. We considered that this top-down analysis was sufficient for us to determine an alternative estimate of augex.

In AusNet Services' revised proposal, it proposes augmentation of the Clyde North zone substation. For this final decision, we have examined local capacity constraints at Clyde North as part of our assessment of this new capex.

B.2.5 Safety augex

AusNet Services proposes \$245.3 million in augmentation to maintain network safety and comply with bushfire safety obligations. Table 6.9 sets out the components of AusNet Services' safety augex forecast.

	2016	2017	2018	2019	2020	Total
VBRC related expenditure	28.6	27.9	28.1	28.3	28.5	141.4
Overhang Vegetation	17.0	14.0	0.0	0.0	0.0	31.0
Animal / Bird Proofing	11.2	11.3	11.4	11.4	11.5	56.8
Other safety augex	3.3	5.1	3.8	2.1	1.8	16.0
Total safety augex	60.1	58.2	43.2	41.9	41.9	245.3

Table 6.9AusNet Services' safety augmentation expenditure forecast(\$2015, million, excluding overheads)

Source: AER analysis; AusNet Services revised regulatory proposal.

We accept the vast majority of AusNet Services' safety-augex proposal of \$245.3 million. However, we consider that AusNet Services' proposed \$31 million to place underground power-lines that are adversely affected by overhanging vegetation is inefficient. We have instead included \$19.75 million (\$2015) within our alternative augex estimate.

Our assessment and reasoning for AusNet Services' proposed capex for VBRC, animal and bird proofing, and powerline undergrounding is set out below.

Overhanging Vegetation

AusNet Services proposes \$31 million (\$2015) to place underground power-line spans that are currently adversely affected by overhanging vegetation (referred to as 'overhanging removal' in this section). This capex program is unchanged from the initial regulatory proposal for the 2016-20 period.

Under *Electricity Safety (Electric Line Clearance) Regulations 2015*, AusNet Services is required to maintain a prescribed clearance space above power-line spans in high bushfire risk areas.⁸² AusNet Services typically manages this through pruning or cutting trees, as an operating expense. Where removing overhanging vegetation is impractical or unacceptable (such as for OH&S, environmental risks and heritage reasons), AusNet Services increases the safety of the relevant power-lines through insulation (e.g. aerial bundled cable) or placing the cables underground.⁸³

AusNet Services' proposal is the continuation of a \$41 million (\$2015) overhanging removal program to augment 2000 power-line spans over 2011–15, which we accepted in our final determination for AusNet Services' 2011–15 regulatory period.⁸⁴ However, during the 2011–15 period, AusNet Services had to redirect some of the capex that it originally intended to spend on the overhang removal program to replace some defective high-voltage aerial bundled cables.⁸⁵ These defective cables were discovered subsequent to our final determination for 2011–15 period and posed a much higher safety risk than the spans identified in its overhang removal program. The higher risk project was acknowledge and approved by Energy Safe Victoria.⁸⁶

As a result of redirecting its efforts and costs, AusNet Services deferred the replacement of 380 spans in its overhang removal program into the 2016–20 period. It also identified a further 275 spans following a review of the program. AusNet now proposes to address 655 spans by 2017.⁸⁷

Throughout 2011–15, AusNet Services proposed to meet its clearance obligations primarily through insulating power-lines with a combination of high-voltage and low-

⁸² Note that *Electricity Safety (Electric Line Clearance) Regulations 2010* was recently repealed and replaced by *Electricity Safety (Electric Line Clearance) Regulations 2015*. The clearance obligations under the new regulations are largely the same as that in the 2010 regulations (with the exception that clearance responsibilities now relate to the clearance space for 'a span of an electric line' rather than a 'powerline). The new regulations have transitional arrangements for the period between 28 June 2015 to 30 June 2016 which allows AusNet Services and its existing bushfire safety and vegetation management plans to comply with the 2010 regulations.

⁸³ AusNet Services, *Response to AER information request 41* [email to AER], 3 March 2016, pp. 3–4.

⁸⁴ AER, *Victorian Distribution Determinations 2011-15 Final Decision*, Appendix P, 29 October 2010, pp. 674–675. We originally accepted \$36.5 (\$2010) for this program, which is \$41 million when escalated to \$2015 dollars.

⁸⁵ AusNet Services, *Regulatory Proposal 2016-20*, Appendix 7A, 30 April 2015, pp. 45–46.

⁸⁶ AusNet Services, *Revised Regulatory Proposal 2016-20*, 6 January 2016, p. 3-10.

⁸⁷ AusNet Services, *Regulatory Proposal 2016-20*, Appendix 7A, 30 April 2015, pp. 65–66.

voltage aerial bundled cable, or by undergrounding the power-line.⁸⁸ In its current proposal AusNet Services proposes to complete its overhang removal program by placing all of these cables underground at a cost of \$751,000 (\$2015) per kilometre (km), or \$47,000 (\$2015) per span. The proposed cost per span is more than double the proposed cost set out in the original 2011–15 overhang removal program (as outlined below).

AusNet Services proposed this \$31 million in its original regulatory proposal. While we accepted that AusNet Services has obligations to maintain minimum clearance from power-lines, we considered there may be some overlap with the recently introduced Victorian Powerline Replacement Fund that has been introduced by the Victorian Government. In particular and as set out in our preliminary determination, we considered that the Victorian Powerline Replacement Fund appears to be providing funds for AusNet Services to perform similar functions to insulate or underground power-lines to reduce the risk of bushfires. This suggested to us that the additional \$31 million in capex was not required to comply with its clearance obligations under *Electricity Safety (Electric Line Clearance) Regulations 2015.* We therefore did not include the capex in our preliminary decision.

AusNet Services' revised proposal has clarified the interaction between the funding for power-line undergrounding under the Victorian Powerline Replacement Fund and its own overhanging removal program. AusNet Services states that:

- the power-lines that are identified for undergrounding or insulation through the Powerline Replacement Fund largely do not overlap with those required due to overhanging vegetation (and AusNet Services provided network diagrams showing the relevant power-lines)⁸⁹
- if there is any overlap, the proposed cost of removing and undergrounding the power-line is excluded from any funds received from the Victorian Powerline Replacement Fund program through an evaluation process with the Victorian Government Department of Economic Development, Jobs, Transport and Resources.⁹⁰

We are satisfied, based on the information in AusNet Services' revised proposal, that there is minimal overlap between the Powerline Replacement Fund and the proposed overhanging removal program. In particular, the evaluation process with the Victorian Government ensures that AusNet Services does not receive external funding to place power-lines underground to comply with *Electricity Safety (Electric Line Clearance) Regulations 2015.*⁹¹ On this basis, we accept that AusNet Services needs to replace 655 power-lines to comply with its clearance obligations.

⁸⁸ AusNet Services, response to information request 041 [email to AER], 3 March 2016, p. 3; SP AusNet, *Revised Regulatory Proposal 2011-15*, July 2010, p. 109.

⁸⁹ AusNet Services, *Revised Regulatory Proposal 2016-20*, Appendix 3A, 6 January 2016, pp. 9–11.

⁹⁰ AusNet Services, *Revised Regulatory Proposal 2016-20*, Appendix 3A, 6 January 2016, pp. 11–12.

⁹¹ Note that the Victorian Government's powerline replacement fund program is aimed at funding additional undergrounding of power lines that are over and above the requirements of the line clearance regulations.

Because AusNet Services' overhanging removal program in the last regulatory period was planned based on aerial bundled cabling and placing cables underground, we have also considered whether AusNet Services' proposal to place all of the remaining power-lines underground reflects the prudent and efficient cost. As part of our assessment of the revised proposal, we sought further information from AusNet Services through several information requests about:

- its process and reasoning that led AusNet Services make the decision to underground the relevant powerlines, as opposed to insulation (aerial bundling) or trimming vegetation, and how the timing was determined⁹²
- details of the performance of aerial bundled cables and causes of the failures of existing aerial bundled cables in the Dandenong Ranges,⁹³ and
- the unit costs of addressing the 655 spans through undergrounding or aerial bundled cables.⁹⁴

On the basis of our review, we are not satisfied that AusNet Services' proposed \$31 million capex reflects a prudent and efficient amount for AusNet Services to comply with its obligations under *Electricity Safety (Electric Line Clearance) Regulations 2015.* This is because AusNet Services has not satisfied us that placing underground all the 655 spans is the prudent technical solution. We also consider that its proposed unit cost is inefficiently high.

Our alternative estimate is \$19.75 million (\$2015), which we consider is the efficient cost for AusNet Services to meet its clearance obligations using a combination of underground work and modern aerial bundled cable insulation. This is shown in Table 6.10, which includes the difference between our alternative estimate and AusNet Services' proposal.

	2016	2017	2018	2019	2020	Total
AusNet Services proposal	17.0	14.0	0.0	0.0	0.0	31.0
Alternative estimate	10.8	8.9	0.0	0.0	0.0	19.7
Difference	-6.2	-5.1	0.0	0.0	0.0	-11.2

Table 6.10AER's alternative estimate of overhanging vegetation augex(\$2015, million)

Source: AER analysis.

Note: Numbers may not add up due to rounding.

⁹² See AER, *information request 041* [email to AusNet], 24 February 2016.

⁹³ See AER, *information request 052* [email to AusNet], 17 March 2016.

⁹⁴ See AER, information request 052 [email to AusNet], 17 March 2016, and AER, information request 056 [email to AusNet], 4 April 2016.

In reaching this view we considered AusNet Services' initial and revised proposal, the information in its responses to our information requests, and relevant additional information about the costs and benefits of undergrounding and insulation from the Victorian Government. Our reasoning is set out below.

The choice of technology — underground or insulation

The *Electricity Safety (Electric Line Clearance) Regulations 2015* do not specify how AusNet Services is required to meet its clearance obligations; whether through insulating power-lines, placing them underground or re-routing spans away from trees. Additionally, these regulations and AusNet Services' vegetation management plan (agreed to by Energy Safe Victoria) do not specify the types of capital works required to address the clearance of these power-line spans. Rather, AusNet Services' most recent vegetation management plan only sets out the volume of spans to be addressed between 2015 and 2017.⁹⁵ The choice of technical solution is determined separately by AusNet Services, without direct approval from Energy Safe Victoria.

Throughout 2011–15, AusNet Services implemented its overhanging removal program primarily through insulating power-lines with a combination of high-voltage and low-voltage aerial bundled cable.⁹⁶ AusNet Services has proposed to complete 655 spans over 2016–17 by placing them all underground using a 'hybrid undergrounding' approach that involves undergrounding the high-voltage conductors and retaining overground low-voltage conductors and distribution transformers, fuses and switchgear.⁹⁷ This is because:

- AusNet Services recently experienced premature failures on existing high-voltage aerial bundled cables in the Dandenong Ranges, which led to some fires.⁹⁸
- The primary cause of these failures was mechanical failure from trees and branches falling on the cables over time. This experience has led AusNet Services to prioritise placing the remaining overhanging spans underground, as opposed to insulation with aerial bundled cable, which was its previous practice.⁹⁹
- The remaining spans contain "the most difficult projects" based on considerations such as heavy density vegetation, trees prone to falling, and customer density.¹⁰⁰ According to AusNet Services, this suggests that there are greater benefits, and reduced risks, by placing the remaining spans underground.

We recognise that aerial bundled cable insulation is more susceptible to damage from falling trees and branches in heavily vegetated areas (which is also recognised by the

⁹⁵ AusNet Services, *Vegetation Management Plan 2015*, 11 November 2015, p. 23.

⁹⁶ AusNet Services, *Revised Regulatory Proposal 2016-20*, Appendix 3A, 6 January 2016, p. 7.

⁹⁷ AusNet Services, Response to AER information request 56 [email to AER], 11 April 2016, p. 1.

⁹⁸ AusNet Services, *Revised Regulatory Proposal 2016-20*, Appendix 3A, 6 January 2016, p. 8; AusNet Services, *response to AER information request 41*, pp. 3–5.

⁹⁹ AusNet Services, Response to AER information request 52 [email to AER], 23 March 2016, p. 2.

¹⁰⁰ AusNet Services, *Response to AER information request 41*[email to AER], 3 March 2016, p. 4.

Powerline Bushfire Safety Taskforce).¹⁰¹ However, this does not mean that aerial bundled cable technology cannot be an effective and prudent solution to maintaining clearance obligations in some high bushfire risk areas. The Victorian Government has recently stated that insulating overhead powerlines reduces the likelihood of powerlines starting bushfires by between 96 and 99 per cent, based on recent CSIRO analysis.¹⁰² This is a similar result to placing power-lines underground.¹⁰³

AusNet Services has stated that it considers the risks, benefit and costs of various options and it will only place power-lines underground where it achieves greatest benefits in terms of reduced safety risks. AusNet Services appears to have relied primarily on the recent failures to aerial bundles cables in the Dandenong Ranges to justify placing all 655 spans underground. This analysis appears to be largely qualitative in nature, rather than a more thorough cost-benefit analysis which explicitly considers the option that will achieve greatest benefits at the efficient cost.

AusNet Services' own network planning approach suggests that aerial bundles cable remains an effective technology. As part of AusNet Services' program to replace the aerial bundled cables that failed in the Dandenong Ranges, it began introducing new modern aerial bundled cable technology in 2012 (rather than placing these power-lines underground).¹⁰⁴ While AusNet Services only has a few years of data on these new insulated lines, its analysis shows there has been no deterioration related failures on these cables.¹⁰⁵ This suggests that replacing at least some of the 655 spans with new modern aerial bundles cables could be a viable solution.

Furthermore, in its revised proposal, AusNet Services appears to indicate that the use of new high voltage aerial bundled cable is an effective means of complying with its overhanging vegetation requirements in its asset replacement programs:

There is no overlap between the overhang removal project (1) and the HV ABC program (3) as locations which have HV ABC installed are already compliant with the regulation to remove overhanging trees. i.e. trees are allowed to overhang the HV conductors where the conductor is insulated such as in the case of HV ABC.¹⁰⁶

AusNet Services' change of aerial bundled cable technology for its high-voltage aerial bundled cable replacement program indicates that it expects this new technology will not suffer from the same failures of the older technology (at all or to the same degree). We consider that this means that adopting new modern aerial bundled cable technology may be an effective means to comply with its clearance obligations under *Electricity Safety (Electric Line Clearance) Regulations 2015*.

¹⁰¹ Powerline Bushfire Safety Taskforce, Final Report, 30 September 2011, p. 65.

¹⁰² Victorian Government, *Regulatory Impact Statement: Bushfire Mitigation Regulations Amendment*, 17 November 2015, p. 12.

¹⁰³ Victorian Government, *Regulatory Impact Statement: Bushfire Mitigation Regulations Amendment*, 17 November 2015, p. 11.

¹⁰⁴ AusNet Services, *Revised Regulatory Proposal 2016-20*, Appendix 3A, 6 January 2016, p. 8, footnote 3.

¹⁰⁵ AusNet Services, AMS 20-65 – Insulated Cable Systems, p. 29.

¹⁰⁶ AusNet Services, *Revised Regulatory Proposal 2016-20*, Appendix 3A, 6 January 2016, p. 8.

We are not in a position to determine the precise scope of works for AusNet Services — i.e. which particular spans should use aerial bundled cable or undergrounding. The specific works will likely be a function of a range of factors such as remoteness of the location, terrains and accessibility, ground conditions, availability of alternative line route, design standard, cable costs, contractor cost, and AusNet's work method. This is a technical and economic decision for AusNet Services. However, we have determined an estimate of the efficient costs of adopting a combination of aerial bundled cable and undergrounding works in the following section.

Proposed costs

Table 6.11 sets out different unit cost estimates proposed by AusNet Services, and include the 2011–15 unit costs for comparison.

Table 6.11 AusNet Services unit cost estimates (\$2015)

Technical solution	Unit cost (per km)	Unit cost (per span)
Underground polyphase powerlines	\$751,000	\$47,298
Insulate polyphase powerlines with aerial bundled cable ¹⁰⁷	\$654,000	\$41,221
Replace failed aerial bundled cable in Dandenong Ranges ¹⁰⁸	\$478,000	\$30,153
2011-15 program unit costs	N/A	\$20,528

Source: AusNet Services, *Response to AER information request 56;* AusNet Services, *Regulatory Proposal 2016-20,* Appendix 7A; SP AusNet, *Revised Regulatory Proposal 2011-15.*

AusNet Services states that the cost for undergrounding has "similarities to the work carried out in the Dandenong Ranges such as short lengths of overhead in heavily treed areas and is therefore considered to be an appropriate method of forecasting the cost of the [overhanging removal] project."¹⁰⁹ AusNet Services explains that the proposed cost differential between undergrounding and insulation is small because:

- replacing bare overhead with aerial bundled cable is not simple as it includes the replacement of existing poles and installation of additional poles and stays, and
- labour costs for installing aerial bundled cable are high due the requirement for the planning and coordination of multiple customer interruptions whilst aerial bundled

¹⁰⁷ In a response to an information request, AusNet Service stated that it would cost \$27 million to augment its 655 power-lines with aerial bundled cable (see AusNet, *response to AER information request 56* [email to AER], 11 April 2016, , p. 2) This is an implied cost of \$654,000 per km, based on the same amount of km as the undergrounding solution (41.25 km).

¹⁰⁸ This estimate comes from AusNet Services' proposed unit costs for replacing its failed aerial bundled cable in the Dandenong Ranges with new modern insulation technology. See AusNet Services, *Regulatory Proposal 2016-20*, Appendix 7A, 30 April 2015, pp. 45–46 and AusNet Services, *Regulatory Proposal 2016-20*, AST Distribution Capex Model. We have escalated these costs to \$2015 dollars.

¹⁰⁹ AusNet Services, Response to AER information request 56 [email to AER], 11 April 2016, p. 2.

cable is constructed alongside existing bare wire before a cut over to the aerial bundled cable system can be achieved.¹¹⁰

Table 6.12 sets out the Victorian Government estimates of the unit costs for placing polyphase power-lines underground in Victoria, insulating them, or a combination of the two. These are taken from the regulatory impact statement for the recent Bushfire Mitigation Regulations Amendment, which reflect independent estimates of the efficient costs across Victoria calculated by the Powerline Bushfire Safety Taskforce and Powerline Replacement Fund.¹¹¹

Table 6.12 Victorian Government unit cost estimates, per km (\$2015)

842 005
.0.12,000
406,350
\$400,000

Source: Victorian Government, Regulatory Impact Statement: Bushfire Mitigation Regulations Amendment, 17 November 2015, Table 3, 4 and 33.

Note: The Victorian Government estimates of a mix of insulation and underground work do not describe the assumed proportions of underground versus insulation, or the unit costs adopted.

As shown in Table 6.11, AusNet Services has given us its cost estimates to complete its overhanging removal program using undergrounding or aerial bundled cable (plus its forecasts costs to replace failed aerial bundled cable in Dandenong Ranges). While AusNet Services has given us an estimate for aerial bundled cable, its capex proposal is based on undergrounding only. We are not satisfied that AusNet Services' estimated unit costs for both undergrounding and aerial bundled cable reflect efficient costs, and as previously noted, we are not satisfied that undergrounding all 655 spans reflects the prudent technical solution. Our reasons for not accepting AusNet Services' unit costs are set out below.

We then determine an alternative efficient estimate that will allow AusNet Services to implement a mix of the lower cost insulation and higher cost undergrounding that will allow AusNet Services to comply with *(Electric Line Clearance) Regulations 2015.* As set out further below, we consider that a unit cost of \$478,000 per km reflects a reasonably efficient estimate.

¹¹⁰ AusNet Services, *Response to AER information request 56*, p. 2

¹¹¹ Victorian Government, *Regulatory Impact Statement: Bushfire Mitigation Regulations Amendment*, 17 November 2015

AER position on AusNet Services' unit costs estimates

As shown in Tables 6.11 and 6.12, AusNet Services' estimate for undergrounding is at the very upper bound of the Victorian Government estimates for undergrounding polyphase powerlines. Its estimate for aerial bundled cable significantly exceeds the Victorian Government estimates for aerial bundled cable insulation.

The Victorian Government's estimates differ based on differences in the type of terrain (e.g. rocky), soil consistency (for undergrounding) and dwelling density. We sought information from AusNet Services about how the locations, conditions and standards of the undergrounding for their overhanging removal program compare to other estimates of undergrounding work, such as the estimates used by the Victorian Government.¹¹² We asked for this information to determine whether AusNet Services' high unit cost estimate would be justified because it involves works in environmentally difficult conditions (e.g. rocky terrain, inaccessible).

In response to our information request, AusNet Services states that:

The unit rates from the Taskforce and Powerline Replacement Fund provide relevant comparators for the underground works to be completed in declared areas, and for overhang removals, in that the rates relate to undergrounding powerlines in areas of high bushfire risk. However, as described above, there are differences between overhang removals and other projects.

The proposed cost of overhang removals is greater than the taskforce forecast (\$285K-706K per km vs \$751K per km) and less than the Powerline Replacement Fund (\$842K per km vs \$751K per km). Given the differences between the nature of the undergrounding anticipated in the [regulatory impact statement] and the overhang removals, notably the scale of each undergrounding project, the proposed cost of overhang removals (\$751K per km) is within the expected range.¹¹³

Similarly, in AusNet Services' response to another information request, it states:

The estimates in the [regulatory impact statement] are based on a state-wide average, and as such do not consider the specific condition of each span to be replaced or the circumstances of AusNet Services' network and terrain that may affect the replacement costs.¹¹⁴

We accept that the Victorian Government estimates do not necessarily consider the specific condition of each span. However, they reflect the range of reasonable estimates across Victoria, with the upper range likely reflecting the more environmentally difficult (e.g. rocky terrain, inaccessible). Following requests for further information,¹¹⁵ AusNet Services has been unable to demonstrate that the 655 spans are all in similar environmental conditions as the Dandenong Ranges (the cost for

¹¹² See AER, *information request 56* [email to AusNet], 4 April 2016..

¹¹³ AusNet Services, Response to AER information request 56 [email to AER], 11 April 2016, p. 3.

¹¹⁴ AusNet Services, *Response to AER information request 41*[email to AER], 3 March 2016, p. 6.

¹¹⁵ See AER, *information request 052* [email to AusNet], 17 March 2016, and AER, *information request 056* [email to AusNet], 4 April 2016.

which are used as a basis of their unit cost estimates) or that the conditions are such that placing the powerlines underground will cost more than most other areas of Victoria.

Furthermore, AusNet Services appears to imply that the adoption of a 'hybrid underground' approach, which retains some assets above ground, would is lower than the unit cost of complete undergrounding. This is because it states that the hybrid approach leaves much of the existing infrastructure in place, rather than relocating it underground.¹¹⁶ This suggests that the unit cost should be lower than the cost for fully underground assets, as estimated by the Victorian Government.

Because AusNet Services has been unable to demonstrate why its estimate reflects the upper bound of the Victorian Government estimates, and its hybrid approach should be cheaper than full underground, we are not satisfied that AusNet Services' proposed cost for undergrounding reflects an efficient estimate.

We also do not accept that AusNet Services' \$652,000 per km estimate for insulation reflects an efficient estimate for this work. AusNet Services has not provided a justification for why its estimate is significantly higher than the independent estimates used by the Victorian Government. It is also significantly above AusNet Services' \$478,000 per km cost estimates to replace aerial bundled cable in the Dandenong Ranges with new modern insulation technology.

AER alternative estimate of AusNet Services' unit costs

We have sought to determine an efficient estimate that will allow AusNet Services to implement a mix of the lower cost insulation and higher cost undergrounding. In the absence of information about the specific environmental conditions for all the 655 spans, we consider that an estimate that is within the lower and upper range of the Victorian Government estimates for aerial bundled cable and undergrounding reflects a reasonably efficient estimate. This will allow AusNet Services to save on the full undergrounding costs, while providing sufficient funds to adopt aerial bundled cables.

We consider that AusNet Services' \$478,000 unit cost to replace aerial bundled cables in the Dandenong Ranges can be used as a reasonable estimate to adopt a mix of insulation and undergrounding work across its 655 spans. This is because:

 It reflects the average of the Victorian Government estimates for undergrounding polyphase power-lines. In the absence of more detailed evidence about the geographic conditions of where the individual spans are located, we consider it is reasonable to assume that the spans are located through a more diverse range of geographical conditions and that a range of technical solutions are available to AusNet Services. This estimate provides for an average of the costs for undergrounding as estimated by the Victorian Government.

¹¹⁶ AusNet Services, Response to AER information request 56 [email to AER], 11 April 2016, p. 2.

- It exceeds the Victorian Government estimates for insulating polyphase power-lines with aerial bundled cables. This should provide sufficient funds for AusNet Services to adopt a mix of the lower cost insulation and higher cost undergrounding.
- It exceeds the Victorian Government estimates for a mix of insulation and underground solutions. The Victorian Government estimates of a mix of insulation and underground work do not describe the assumed proportions of underground versus insulation. Therefore, a higher than average cost may be reasonable to allow for the prospect that some of the affected areas in AusNet Services' network may be more costly.

We calculate that applying the unit cost of \$478,000 per km (or \$30,152 per span) to the 655 spans will result in a total cost of \$19.75 million. While this is less than what AusNet has estimated, we are unable to accept the businesses' high unit cost and the assumption that all spans will need to be placed underground.

This unit cost estimate we provide for does not prescribe the type of technology for each of the 655 spans. Rather, it provides AusNet Services with an efficient funding that can be recovered from its customers to meet its obligations using prudent approaches and the efficient costs for this work. AusNet will be best placed to determine how to execute its overhand removal program.

Animal and bird proofing

AusNet Services proposes \$57.1 million to increase insulation on high voltage pole-top structures in hazardous bushfire risk areas to proof against bird and animal contact. This is to help prevent bird and animal 'electricity flashovers' (e.g. arc ignition) which have been identified as a bushfire ignition risk. This program is contained within AusNet Services' Bushfire Mitigation Plan and Electricity Safety Management Scheme.

In our preliminary decision, we were satisfied that AusNet Services has demonstrated the need for animal and bird proofing of high voltage pole stop structures. This is based on the relatively high rate of fire starts due to animal and bird contact with these assets (in particular ground fires),¹¹⁷ and some demonstration of expected synergies with asset replacement capex. However, we considered that AusNet Services had not demonstrated how is has prioritised its animal and bird proofing and whether they are located in the highest bushfire risk areas. We encouraged AusNet Services to provide additional information in its revised proposal about how it has targeted the poles for additional animal proofing.

In its revised proposal, AusNet Services provides additional information about how it targets and prioritises the poles for additional animal and bird proofing.

¹¹⁷ AusNet Services proposed to proof another 18 per cent of existing poles over the 2016–20 period, and another 21 per cent of poles that will be replaced over the 2016–20 period.

AusNet Services states that all high-voltage pole-top structures that are located in high bushfire risk areas are prone to bird and animal related faults.¹¹⁸ In support of this claim, AusNet Services provides evidence which shows that the location of assets and ground fires caused by bird and animals over the past four years are primarily located in areas of high and very high bushfire risk, and are widely distributed across its entire network.¹¹⁹ This lent additional support to the evidence which suggested that bird and animal contact is a significant contributor to fires in the network.

Consistent with the breadth and locations of historical fires caused by bird and animal contact, AusNet Services proposes to fit all of its high-voltage pole structures in high bushfire risk areas with bird and animal proofing over time.¹²⁰ AusNet Services currently has 37,000 of its 53,000 high-voltage pole structures in high bushfire risk areas which are currently without bird or animal proofing.¹²¹ In the 2016-20 period, AusNet Services will fit 9500 of these structures with bird and animal proofing, with the remainder to be fitted in future periods.¹²²

AusNet Services proposes to align its capex work with its asset maintenance and asset replacement cycles. In particular, it will primarily install bird and animal proofing on poles during routine maintenance activities that involves replacing assets.¹²³ However, AusNet Services will also install bird and animal proofing proactively on poles in high bushfire areas that have a history of bird or animal strikes and present bushfire risk.¹²⁴ This proactive work will also be carried out in conjunction with maintenance activity.¹²⁵

We are satisfied, based on the additional information provided by AusNet Services in its revised proposal, that AusNet Services is appropriately prioritising its animal and bird proofing in the highest bushfire risk areas. High bushfire risk areas comprise a significant proportion of AusNet Services' network, and bird and animal contact have historically contributed to high rate of fire start. We consider that it AusNet Services' proposal to install a large number of bird and animal proofing is prudent option to maintain safety on its network.

VBRC

AusNet Services proposes \$141.4 million in augex to comply with existing mandatory bushfire safety obligations set by Energy Safe Victoria, resulting from the Victorian Bushfire Royal Commission (VBRC). This primarily relates to the installation or

¹¹⁸ AusNet Services, *Revised Regulatory Proposal 2016-20*, Appendix 3A, 6 January 2016, p. 13.

¹¹⁹ AusNet Services, *Revised Regulatory Proposal 2016-20*, Appendix 3A, 6 January 2016, pp. 13–14.

¹²⁰ AusNet Services, *Revised Regulatory Proposal 2016-20*, Appendix 3A, 6 January 2016, p. 14.

¹²¹ AusNet Services, *Revised Regulatory Proposal 2016-20*, Appendix 3A, 6 January 2016, p. 14.

¹²² AusNet Services, *Regulatory Proposal 2016–20*, 30 April 2015, Appendix 7B, p. 21.

¹²³ AusNet Services, *Revised Regulatory Proposal 2016-20*, Appendix 3A, 6 January 2016, pp. 14–15.

¹²⁴ AusNet Services, *Revised Regulatory Proposal 2016-20*, Appendix 3A, 6 January 2016, p. 15.

¹²⁵ AusNet Services, *Revised Regulatory Proposal 2016-20*, Appendix 3A, 6 January 2016, p. 15.

upgrade of vibration dampers and armour rods. We accepted this capex in our preliminary decision and maintain this position in our final decision.¹²⁶

AER, Preliminary Decision AusNet Services 2016-20, Attachment 6, October 2015, p. 45 and Appendix B.5

B.3 Forecast customer connections capex, including capital contributions

Connections capex is incurred by AusNet Services to connect new customers to its network and where necessary augment the shared network to ensure there is sufficient capacity to meet the new demand.

New connection works can be undertaken by AusNet Services or a third party. The new customer may be required to provide a contribution towards the cost of the new connection assets. This contribution can be monetary or in contributed assets. In calculating the customer contribution, AusNet Services is required to take into account the forecast revenue anticipated from the new connection. These contributions are subtracted from total gross capex and as such decrease the revenue that is recoverable from all consumers. Customer contributions are sometimes referred to as capital contributions or capcons.

The mix between net capex and capcons is important as it determines from whom and when AusNet Services recovers revenue associated with the capex investment. For works involving a customer contribution, AusNet Services recovers revenue directly from the customer who initiates the work at the time the work is undertaken. This is different from net capex where AusNet Services recovers revenue for this expenditure through both the return on capital and return of capital building blocks that form part of the calculation of AusNet Services' annual revenue requirement. That is, AusNet Services recovers net capex investment across the life of the asset through revenue received for the provision of standard control services.

B.3.1 AER Position

We are satisfied AusNet Services' revised proposal for connections capex of \$403.0 million (\$2015) reasonably reflects the capex criteria.¹²⁷ We have included this amount in our substitute estimate of forecast capex as shown in Table 6.13. Further, we accept AusNet Services' revised proposal for customer contributions of \$196.4 million (\$2015).

2016 2017 2018 2019 2020 Total 80.7 80.1 83.1 79.4 79.7 403.0 Connections capex 39.3 39.0 40.5 38.7 38.9 196.4 Customer contributions

Table 6.13 AER final decision connections capex (\$2015 millionexcluding overheads)

Source: AER analysis.

¹²⁷ NER 6.5.7(c)

Table 6.14 provides a comparison of the forecasts expenditure on connection components.

Table 6.14 Connections capex forecast comparison (\$2015) million,excluding overheads)

	Initial Regulatory Proposal	Preliminary Determination	 Revised regulatory proposal 	Final decision
Gross connections capex	368.2	368.2	403.0	403.0
Capital contributions	274.0	274.0	196.4	196.4
Net connections capex	94.2	94.2	206.6	206.6

Source: AER analysis.

In determining our position we considered:

- AusNet Services' forecast methodology
- the trends in AusNet Services' connections capex across time.

B.3.2 Revised proposal

As Table 6.14 above shows, AusNet Services' revised proposal includes a forecast of connections capex of \$403.0 million (\$2015) for 2016–20 regulatory control period. While AusNet Services has retained its forecasting methodology, its revised proposal represents an increase in its gross connections forecast compared to its initial proposal.¹²⁸ AusNet Services notes that its updated connection forecasts reflect the latest available forecasts of Victorian population.¹²⁹ AusNet Services further noted customer connections are forecast to be higher, on average, across its distribution area as a result of the updated population forecast.¹³⁰ Further, AusNet Services has reduced its forecast customer contributions to \$196.4 million (\$2015) in its revised proposal.¹³¹

In its initial proposal AusNet Services calculated its forecast of customer contributions to accord with the Victorian Essential Services Commission's Guideline 14.¹³² In its revised proposal AusNet Services has adapted its forecast to calculate the incremental cost and incremental revenue of forecast contributions as per the AER's Connection

¹²⁸ AusNet Services, Revised Proposal - Distribution Capex Model , "Capex by Purpose" , RIN Template - Exp Summary Table 2.1

¹²⁹ Victoria Department of Environment, Land, Water and Planning 2015, Victoria in Future 2015 Population and household projections to 2051.

¹³⁰ AusNet Services, Revised regulatory proposal, January 2016, p. 3-29.

¹³¹ AusNet Services, Revised regulatory proposal, January 2016, p.3-31.

¹³² Essential Services Commission, Guideline No. 14 Provision of Services by Electricity Distributors.

Charge Guideline.¹³³ AusNet Services has done so on the basis that the Victorian Government has confirmed its intent to legislate to adopt Chapter 5A of the National Electricity Rules.

B.3.3 Reasons for AER Position

Consistent with our preliminary decision, we are satisfied that AusNet Services forecast methodology produces a forecast of gross connections capex which reflects the capex criteria. AusNet Services categorises its connections capex into a series of connection types and produces a forecast for each connection activity.¹³⁴ For each of these connection activities AusNet Services has relied on a unit rate and volume forecast to generate its gross connections forecast.¹³⁵ This method is consistent with the approach AusNet Services used in its initial proposal.

Unit rates

In its revised proposal, AusNet Services has maintained the unit rates we included in the preliminary decision.¹³⁶ That is, consistent with its initial proposal AusNet Services has relied on forecast unit rates based on historical information to develop its revised connections capex forecast.¹³⁷

In its submission, CCP3 supports the use of historical data as the basis for the cost of high volume connections. CCP3 considers that just as opex and capex trends provide powerful arguments for assessing realistic future cost allowances, so too do the historic costs for providing new connections. ¹³⁸

Consistent with our preliminary decision, we are satisfied that AusNet Services' forecast unit rates are reasonable given that they are based on verifiable actual historical data. We are satisfied that AusNet Services' unit rates reflect the efficient costs of meeting its obligations to connect customers to the network. Further, we note that the use of historical expenditure works in step with the regulatory framework to reveal efficient costs over time.

Volumes

AusNet Services has revised its forecast volumes to reflect updated customer numbers forecasts. AusNet Services has revised its connections capex estimate for the 2016-20 regulatory period, increasing the forecast total customer numbers by 6,764.¹³⁹ The change to forecast customer numbers follows updated projections of Victorian

¹³³ AusNet Services, *Revised regulatory proposal*, January 2016, p. 3-30.

¹³⁴ AusNet Services, *Revised regulatory proposal*, January 2016, p. 3-29.

¹³⁵ AusNet Services, *Revised regulatory proposal*, January 2016, p. 3-29.

¹³⁶ AER, AusNet Services preliminary decision 2016–20, Attachment 6 Capital expenditure, p. 6-51.

¹³⁷ AusNet Services, *Revised regulatory proposal*, January 2016, p. 3-29.

¹³⁸ CCP3 report on AER Preliminary Decisions and DNSPs' Revised Proposals from Victorian electricity distribution network service providers for a revenue reset for the 2016-2020 regulatory period, 25 February 2016, p. 56.

¹³⁹ AusNet Services, *Revised regulatory proposal*, January 2016, p. 3-29.

population growth produced by the Victorian Government.¹⁴⁰ In its revised proposal, AusNet Services notes that connections growth is forecast to be higher (on an average basis) across AusNet Services' area, equal to 1.7 per cent growth in connections, as opposed to the 1.5 per cent in its initial proposal. We consider it is appropriate to use the latest available information when forecasting connection volumes

CCP3 notes the increases in the DNSPs' revised forecasts of new connections and considers that any variations to future growth need to be based on fully independent assessments. Consistent with our preliminary decision we have compared this growth rate to other available data on the rate of residential construction and found they follow a similar trend. Figure 1 below compares the update in AusNet Services connection forecasts with the updates to forecast new dwelling data for Victoria published by the Housing Institute of Australia (HIA).



Figure 6.8 Changes in HIA dwelling and connection forecasts

Source: HIA.

AusNet Services Initial and Revised proposal connections models.

We consider the HIA is a reasonably well accepted industry standard indicator of commercial and industrial connection activity. HIA is a private-sector industry association comprising mainly house construction contractors. HIA forecasts have been used by the industry since 1984.¹⁴¹ We note that electricity is an essential service and we consider that increases in dwellings would result in a near equal increase in

¹⁴⁰ Victoria Department of Environment, Land, Water and Planning 2015, Victoria in Future 2015 Population and household projections to 2051.

¹⁴¹ Mills, Anthony and Harris, David and Skitmore, Martin R., The Accuracy of Housing Forecasting in Australia, Engineering Construction and Architectural, Management 10(4), 2003, pp. 245–253. Accessed from: http://eprints.qut.edu.au/archive/00004441/.

connections. We note that since the time of our preliminary decision, HIA has upwardly revised its dwelling forecasts for Victoria, Figure 6.8 compares the upward revisions to AusNet Services connection forecasts. Given AusNet Services is one of five Victorian distributors, we would expect that its connections would increase(decrease) in a magnitude commensurate its distribution area's share of the dwelling growth. On this basis, we are satisfied that AusNet Services has demonstrated that the increase in forecast new connections is justified by increases in the forecast of new dwellings for Victoria.

As such we are satisfied that AusNet Services' combination of unit rates and volume forecasts represents a reasonable forecast of gross connections capex and have included the revised proposal amount in our alternative capex forecast.

Customer contributions

When a new customer connects to the network, it may be required to provide a contribution towards the cost of the connection assets. This contribution can be monetary or in the form of contributed or gifted assets.

In this section we consider AusNet Services' forecast of customer contributions. We then assess:

- whether the forecast was prepared in accordance with the relevant connection charge guideline, and
- the reasonableness of AusNet Services forecasting methodology.

Connection Charge Guideline

We noted in our preliminary decision:

At the time of making this preliminary decision, AusNet Services was required to follow the Essential Services Commission's (ESCV) Guidelines 14 and Guideline 15 to determine the customer connection charges. In September 2015, we were advised that the Victorian Government intended to implement Chapter 5A of the NER for the 2016–20 regulatory control period. This change will impact on how the customer contribution is calculated.

This preliminary decision sets out our views on the methodology used by AusNet Services to determine its customer contribution under the old framework. We intend to work with the Victorian Government and AusNet Services to fully implement the change to the AER's connection charging guideline under Chapter 5A of the rules. We expect that AusNet Services will base its revised proposal on the new charging framework and also consider, where relevant, our consideration of their existing methodology.

CCP3 considers that although there is forecast legislative change to alter the capital contribution assessment process, the basis of the calculations should continue on

current rules (ESCV guidelines) until the change comes into effect and there should be a pass through change triggered to reflect the difference in approach.¹⁴²

Comparing ESC Guideline 14 with the AER's Connection charge guidelines we note that both these guidelines prescribe similar methods for calculating customer contributions. In simple terms, both guidelines calculate the contribution as the difference between the cost to the distributor of connecting the customer to the distribution network and the revenue the distributor will receive from that connection.

Therefore we consider any differences between the two guidelines must relate to the assumed future incremental revenue or the assumed incremental cost for each forecast connection.

Incremental revenue

Both the ESC and AER guidelines rely on assumptions on the revenue that the distributors will receive for each connection. Under ESC guideline 14 the calculation of the revenue the distributor will earn from each connection relies on assuming that the price path for the last year of the price determination continues over the 30 years for domestic customers and 15 years for all other customers.¹⁴³ The AER's connection policy uses a flat real price path after the end of the relevant distribution determination, for the remaining life of the connection, when estimating the incremental revenue.¹⁴⁴

AusNet Services in its revised proposal notes:

AusNet Services has revised its forecast incremental revenue related to connections capex. This is driven by the inclusion of:

- Setting the X-factor to 0 in the contribution model to reflect the AER's Connection Charge Guideline;
- Updated modelling to reflect the Revised Proposal WACC; and
- Updated energy consumption profiles for typical customers to reflect more recent empirical information regarding customer consumption behaviour. This reduces the volumes assumed to be consumed by different customer classes over the current regulatory control period, which reduces Incremental Revenue.

We note that under AusNet Services revised proposal has an X-factor of zero for the last year of the revenue cap calculation.¹⁴⁵ We are satisfied this demonstrates that AusNet Services proposed price path under ESC Guideline 14 or the AER connection charge guideline is the same. Further, we are satisfied that updating the modelling to

¹⁴² CCP3 report on AER Preliminary Decisions and DNSPs' Revised Proposals from Victorian electricity distribution network service providers for a revenue reset for the 2016-2020 regulatory period, 25 February 2016, p.55.

¹⁴³ Essential Services Commission, Guideline No. 14 Provision of Services by Electricity Distributors.

¹⁴⁴ AER, Connection charge guidelines for electricity retail customers Under chapter 5A of the National Electricity Rules.

¹⁴⁵ AusNet Services, *Revised Regulatory Proposal*, PTRM.

reflect the latest available information is appropriate when forecasting incremental revenue under either guideline. As we note in our augex assessment above (section B.2), we agree with AusNet Services that improving energy efficiency continues to subdue customer consumption. We are satisfied that AusNet Services' updated forecast of incremental revenue should incorporate the latest available information. We have assessed the material supporting AusNet Services' revised proposal and we are satisfied that it incorporates the latest available information.¹⁴⁶

Incremental cost

Similar to incremental revenue discussed above, both the ESC and AER guidelines rely on assumptions on the costs of the connection requiring a customer contribution. These costs, or incremental costs, represent the expenditure that the distributors will incur as part of the connection. We view the method to calculate the incremental cost of connections to be similar under both guidelines. That is both factor in the impact the connection has on the network and downstream augmentation in determining incremental cost. We do consider a difference exists between the two guidelines regarding the treatment of operating, maintenance and other costs. That is the ESC Guideline 14 includes opex in its calculation of incremental cost whereas the AER's connection policy does not include these costs.

AusNet Services forecasting methodology

We note that AusNet Services updated forecast customer contributions in its revised proposal was limited to revising the calculation of incremental cost (IC) and incremental revenue (IR) to apply the AER's Connection Charge Guideline and updating the WACC and other relevant information such as energy consumption profiles and unit costs. We maintain for the reasons set out in our preliminary decision that methodology AusNet Services used to determine its connections volume forecasts are reasonable and appropriate.¹⁴⁷

AusNet Services in its revised proposal considered that the changes made to its forecast incremental cost and incremental revenue are consistent with the new AER connection policy framework. AusNet Services revised proposal has reduced the level of customer contribution forecast for the 2016-20 regulatory period. We consider that accounting for the differences between the ESC Guideline 14 and the AER connection policy would be immaterial to the forecast of customer contributions. Further we consider it is likely that Chapter 5A will be adopted in Victoria over the course of the 2016-20 regulatory control period. On this basis, we are satisfied that AusNet Services' forecast reflects a realistic expectation of customer contributions it will receive over the 2016-20 regulatory control period.

¹⁴⁶ AST Distribution Connections Capex Forecast model - Revised Proposal (Public).

¹⁴⁷ AER, AusNet Services preliminary decision 2016–20, Attachment 6 Capital expenditure, p. 6-51.

B.4 Forecast repex

Replacement capital expenditure (repex) must be set at a level that allows a distributor to meet the capex criteria.

Replacement can occur for a variety of reasons, including when:

- an asset fails while in service, or presents a real risk of imminent failure
- a condition assessment of the asset¹⁴⁸ determines that it is likely to fail soon (or degrade in performance, such that it does not meet its service requirement) and replacement is the most economic option
- the asset does not meet the relevant jurisdictional safety regulations, and can no longer be safely operated on the network
- the risk of using the asset exceeds the benefit of continuing to operate it on the network.

The majority of network assets will remain in efficient use for far longer than a single five year regulatory control period (many network assets have economic lives of 50 years or more). As a consequence, a distributor will only need to replace a portion of its network assets in each regulatory control period. Our assessment of repex seeks to establish the portion of AusNet Services' assets that will likely require replacement over the 2016–20 regulatory control period and the associated capital expenditure.

Our assessment of repex seeks to establish the portion of AusNet Services' assets that will likely require replacement over the 2016–20 regulatory control period, and the associated expenditure. AusNet Services' forecast of repex includes estimates of the capex it considers necessary to comply with safety obligations implemented in response to the 2009 Victorian Bushfire Royal Commission (VBRC). AusNet Services also included estimates in its augex forecast for VBRC.

B.4.1 Position

We are not satisfied that AusNet Services' proposed repex of \$790 million, excluding overheads, reasonably reflects the capex criteria and therefore we do not accept AusNet Services' proposed amount. We have instead included in our alternative estimate of overall total capex, an amount of \$698 million for repex, excluding overheads. This is 12 per cent lower than AusNet Services' revised proposal. We are satisfied that this amount reasonably reflects the capex criteria.

Table 6.15 summarises the AusNet Services' proposals and our alternative amounts for repex at each stage of the assessment period.

¹⁴⁸ A condition assessment may relate to assessment of a single asset or a population of similar assets. High value/low volume assets are more likely to be monitored on an individual basis, while low value/high volume assets are more likely to be considered from an asset category wide perspective.

Table 6.15Final decision on AusNet Services' total forecast repex(\$2015, million)

	2016	2017	2018	2019	2020	Total
Initial regulatory proposal	191	179	177	181	173	901
AER preliminary decision	161	151	149	152	145	758
Revised regulatory proposal	152	159	159	163	156	790
AER final decision	134	141	141	145	138	698
Total difference b/w final and revised	-18	-18	-18	-19	-18	-92
Percentage difference b/w final and revised (%)	-12	-12	-12	-12	-12	-12

Source: AER analysis.

Note: Numbers may not add up due to rounding.

B.4.2 AusNet Services' revised proposal

AusNet Services accepted our Preliminary Decision on repex apart from \$105 million of works related to bushfire repex:¹⁴⁹

- Downed Conductor Sectionalisation project (\$15.7 million). A new safety program AusNet Services considers cannot be assessed using the repex model which relies on historical expenditure and volumes as inputs.
- Surge Arresters project (\$23.1 million). A new safety program that AusNet Services also considers cannot be assessed using the repex model.
- VBRC Declared Areas project (\$67.0 million). Additional capex associated with the undergrounding of powerlines or insulating of conductors. This expenditure is associated with Victorian Government's proposed amendments to the Electricity Safety (Bushfire Mitigation) Regulations 2013.

We have considered these programs of work in appendix D.

In May 2015 an ATO ruling altered AusNet Services' tax liability associated with its powerline replacement works which were funded by the Victorian Government's Powerline Replacement Fund (PRF).¹⁵⁰ In our preliminary decision we acknowledged that AusNet Services had informed us that the ruling would affect its capex and revenue forecasts for the 2016–20 regulatory control period. We expected to address

¹⁴⁹ AusNet Services, *Revised Regulatory Proposal 2016-20*, January 2016, p. 3-13.

¹⁵⁰ AusNet Services, *Revised Regulatory Proposal 2016-20*, January 2016, p. 3-20.

this in our final decision once AusNet Services provided all relevant information.¹⁵¹ In its revised proposal, AusNet Services excluded PRF capex for the purposes of gross capex, and the matching contribution has been excluded from the total contributions forecast included in the PTRM. As a result AusNet Services submitted that \$60.1 million was removed from its revised forecast repex for the PRF.¹⁵²

B.4.3 AER approach

We have applied several assessment techniques consistent with our preliminary decision to assess AusNet Services' forecast of repex against the capex criteria. These techniques include:

- analysis of AusNet Services' long term total repex trends
- consideration of relevant supporting material such as business cases
- predictive modelling of repex based on AusNet Services' assets in commission; and
- consideration of various asset health indicators.

We have primarily used our predictive modelling to assess approximately 50 per cent of AusNet Services' proposed repex. For those aspects of our assessment where we have not used predictive modelling, we have relied on the assessment of expenditure trends, the consideration of asset health indicators, and assessment of supporting material such as business cases to assess AusNet Services' revised proposal. Our findings from these assessment techniques are consistent with our overall conclusion.

Trend analysis

We have used trend analysis (historical expenditure) to draw general observations from historical expenditure trends in relation to repex. We recognise the limitations of expenditure trends, especially in circumstances where replacement needs may change over time (e.g. a distributor may have a lumpy asset age profile or legislative obligations may change over time). However, for some aspects of our assessment where we have not relied on predictive modelling, we have used historical levels of expenditure to reject AusNet Services' forecast of repex or to determine our alternative estimate. In particular, where past expenditure was sufficient to meet the capex criteria, we are satisfied that it can be a reasonable indicator of whether forecast repex is likely to reflect the capex criteria.¹⁵³

¹⁵¹ AER, Preliminary Decision, AusNet Services distribution determination, 2016 to 2020, Attachment 6 – Capital expenditure, October 2015, p. 6-8

¹⁵² AusNet Services, *Revised Regulatory Proposal 2016-20*, January 2016, p. 3-20

¹⁵³ AER, Expenditure Forecast Assessment Guideline for Electricity Distribution, November 2013, pp. 7–9.

Predictive modelling

Our predictive model, known as the 'repex model', can predict a reasonable amount of repex AusNet Services would require if it maintains its current risk profile for conditionbased replacement into the next regulatory control period. Using what we refer to as calibrated replacement lives in the repex model gives an estimate that reflects AusNet Services' 'business as usual' asset replacement practices. The rationale for using calibrated replacement lives is detailed in our preliminary decision.

As part of the 'Better Regulation' process we undertook extensive consultation with service providers on the repex model and its inputs.¹⁵⁴ The repex model we developed through this consultation process is well-established and was implemented in a number of revenue determination processes including the recent NSW/ACT and QLD/SA decisions. This assessment technique builds on repex modelling we undertook in previous Victorian and Tasmanian distribution pricing determinations.¹⁵⁵

The repex model has the advantage of providing both a bottom up assessment, as it is based on detailed sub-categories of assets using data provided by the service providers, and once aggregated it provides a well-founded high level assessment using that data. The model can also be calibrated using data on AusNet Services' entire stock of network assets, along with AusNet Services' recent actual replacement practices, to estimate the repex required to maintain its current risk profile.

We recognise that predictive modelling cannot perfectly predict AusNet Services' necessary replacement volumes and expenditure over the next regulatory control period, in the same way that no prediction of future needs will be absolutely precise. However, we consider the repex model is suitable for providing a reasonable statistical estimate of replacement volumes and expenditure for certain types of assets, where we are satisfied we have the necessary data. We explain our reasons for this in Appendix F of our preliminary decision.

We use predictive modelling to estimate a value of 'business as usual' repex for the modelled expenditure categories to assist in our assessment. Any material difference from the 'business as usual' estimate could be explained by evidence of a non-age related increase in asset risk in the network (such as a change in jurisdictional safety or environmental legislation) or evidence of significant asset degradation that could not be explained by asset age. We use our qualitative techniques to assess whether there

¹⁵⁴ Replacement expenditure and repex model workshops at http://www.aer.gov.au/networks-pipelines/guidelinesschemes-models-reviews/expenditure-forecast-assessment-guideline/expenditure-forecast-assessmentguidelines-working-group-schedule.

¹⁵⁵ We first used the predictive model to inform our assessment of the Victorian distributors' repex proposals in 2010. We undertook extensive consultation on this technique in developing the Expenditure Forecasting Assessment Guideline. We have since used the repex model to inform our assessment of repex proposals for Tasmanian, NSW, ACT, QLD and SA distributors.

is any such evidence. In this way, we consider that the repex model serves as a 'first pass' test, as set out in our Expenditure Guideline.¹⁵⁶

We recognise there are reasons why some assets may be better assessed outside of the repex model. Where we considered it was justified, we separately assessed expenditure for such assets outside the model using techniques other than predictive modelling.

Network health indicators

We have used a number of asset health indicators with a view to observing asset health. Asset utilisation is one such indicator. We have had regard to changes in asset utilisation to provide an indication as to whether AusNet Services' assets are likely to deteriorate more or less than would be expected given the age of its assets. Asset utilisation in some circumstances is a useful check on the outcomes of our predictive modelling in that unlike the other indicators, and the predictive modelling itself, it is not age based.

The remaining indicators we have used are aged based. We acknowledge that these are less useful for providing a check on the outcomes of our predictive modelling because the model also assumes age is a reasonable proxy for asset condition. While providing some context for our decision, we have not relied on these age-based indicators to any extent to inform our alternative estimate. However, these indicators have provided context for our decision and the findings are consistent with our overall conclusion.

B.4.4 AER repex findings

Trends in historical and forecast repex

We have conducted a trend analysis of repex. The NER requires that we consider the actual and expected capital expenditure during any preceding regulatory control period.¹⁵⁷.Our use of trend analysis is to gauge how AusNet Services' historical actual repex compares to its expected repex for the 2016–20 regulatory control period. Figure 6.9 shows AusNet Services' repex spend has been variable across time. AusNet Services a significant increase in the amount of repex for the 2016–20 period compared to that which it spent in the 2011–15 period.

¹⁵⁶ AER, Expenditure Forecast Assessment Guideline for Electricity Distribution, November 2013, p. 11

¹⁵⁷ NER, cl. 6.5.7(e)(5).



Figure 6.9 AusNet Services—Actual and forecast repex (\$ million, 2015

AusNet Services in its proposal notes about the increase repex:

The proportion of capex for replacement of assets is forecast to increase from approximately 28% (2011-15) to 44% (2016-20) of total network capex. The high level drivers of this increase include: deterioration in asset condition associated with increasing asset age; reduced opportunity to replace poor condition assets as part of augmentation related projects; improved condition data; risk analysis and application of more advanced asset management techniques and analysis. The specific asset categories driving increased expenditure include: poles; cross-arms; Overhead lines (conductor); and Zone Substation major rebuild projects.¹⁵⁸

When assessing the repex AusNet Services requires for the 2016–20 period, we have been mindful of the above trend and the reasons AusNet Services has provided for the increase.

An increasing or decreasing trend does not, in and of itself, indicate that proposed repex is or is not likely to reflect the capex criteria. In the case of AusNet Services, which has proposed an increase in repex from the last regulatory period, we must consider whether the increased amount reasonably reflects the capex criteria. We use our predictive modelling, the advice of our consultants, the views of stakeholders, the material put forward by AusNet Services' in support of its forecast, and our

Source: Reset RIN 2016-20 - Consolidated Information, 2009-2013 Category Analysis RIN and 2014 Category Analysis RIN.

¹⁵⁸ AusNet Services, Regulatory Proposal 2016–20, Appendix 7A: Network Capital Expenditure Overview 2016–2020, April 2015, p. 5.

consideration of any repex required to meet the new safety obligations arising from the recommendations of the VBRC, to help us form a view on whether AusNet Services has sufficiently justified its increase in repex from the last period.

The CCP was concerned that the amount of repex sought in the revised proposals was only marginally lower than that initially sought. The CCP noted actual repex in the 2011–15 period was far greater than the previous 2006–10 period. It considered longer term trends in repex show that historic, lower, levels of repex maintained the Victorian distributor's reliability levels. CCP questioned why higher levels of repex are required now to provide the same level of reliability sought by consumers.¹⁵⁹ The Victorian Energy Consumer and User Alliance (VECUA) also submitted it was concerned with repex increasing significantly from the 2006–10 period to now.¹⁶⁰ Although repex is to some extent predictable it can be lumpy depending on the age of the distributor's population of assets. Our repex forecast takes into account the age profile of the network assets. As such, increases in forecast repex that may not be in line with trend analysis may reflect AusNet Services' aging assets.

Predictive modelling

In our preliminary decision, we used predictive modelling to estimate how much repex AusNet Services is expected to need in the future, given how old its existing assets are, and based on when it is likely to replace the assets. We modelled six asset groups using the repex model. These were poles, overhead conductors, underground cables, service lines, transformers and switchgear.

In our preliminary decision we were satisfied that an amount of \$593 million of proposed repex for these six categories of assets was a reasonable estimate for the categories of repex that were subject to our predictive modelling. In its revised proposal, AusNet Services accepted our preliminary determination for the six categories of expenditure modelled using the repex model.¹⁶¹

VECUA noted that the distributors' asset life estimates in the RINs appeared to understate the asset lives achieved in practice compared to the calibrated asset lives which reflect the distributors' actual replacement practices. VECUA was of the view we should move to standardising asset lives across distributors.¹⁶² VECUA also considered that the repex model relied too heavily on asset age and that we gave insufficient consideration to asset condition information.¹⁶³ We consider our use of calibrated asset lives addresses this concern as the asset lives are derived from a

¹⁵⁹ Consumer Challenge Panel Sub Panel 3 (CCP3), Response to AER Preliminary Decisions and revised proposals from Victorian electricity distribution network service providers for a revenue reset for the 2016–2020 regulatory period, February 2016, pp. 19–20.

¹⁶⁰ Victorian Energy Consumer and User Alliance (VEUCA), Submission on AER preliminary decision VIC EDPR 2016-2020, 6 January 2016, pp. 38–40.

¹⁶¹ AusNet Services, *Revised Regulatory Proposal 2016-20*, January 2016, p. 205.

¹⁶² VEUCA, *Submission on AER preliminary decision VIC EDPR 2016-2020*, 6 January 2016, p. 41.

¹⁶³ VECUA, Submission on AER preliminary decision VIC EDPR 2016-2020, 6 January 2016, pp. 46–47.

distributor's revealed replacement approach. A distributor's replacement approach will reflect several considerations including the age of the asset, but also how it manages risk on its network. It may be prudent for one distributor to replace an asset at a certain time on its network, but this same timing may not be prudent for the same asset on a different distributor's network. This may be because there may differences in operating environments and as such the nature of the risk may differ. The use of calibrated replacement lives captures both a distributor's recent replacement practices and the age of all its assets in commission. This is expected to reflect the relevant factors the distributor considers when replacing its assets.

For the reasons set out in our preliminary decision, we accept AusNet Services' proposed amount of \$593 million for the six asset categories that have been assessed by our predictive modelling.¹⁶⁴

Un-modelled repex

In our preliminary decision we did not include the following asset categories in our repex modelling:

- supervisory control and data acquisition (SCADA), network control and protection (collectively referred to as SCADA)
- pole top structures; and
- assets identified in the "other" category.

These categories of assets account for around 34 per cent of AusNet Services' initial regulatory proposal, and around 20 per cent of its revised proposal. These asset categories have not generally been considered suitable for repex modelling either because of lack of commonality, or because we did not possess sufficient data to include them in the model (see appendix E of our preliminary determination).

The Victorian Government considered there was limited assessment of the distributor's proposed expenditure on SCADA systems, noting that where forecast repex was lower than historic that we had accepted the forecast. It considered this approach may incentivise distributors' to achieve a more consistent level of spending, rather than incur lumpy expenditure that would be expected for these expenditure categories.¹⁶⁵ VECUA considered we had not justified our decision to on repex forecasts for unmodelled repex categories on the basis of the distributors' 2011–15 historic repex.¹⁶⁶

We recognise there will be period-on-period changes to repex requirements that reflect the lumpiness of the installation of assets in the past. Using predictive tools such as the repex model allows us to take this lumpiness into account in our assessment. For repex categories we do not model, historical expenditure is one of our key high level

¹⁶⁴ AER, Preliminary decision, AusNet Services distribution determination 2016 to 2020, Attachment 6: Capital expenditure, October 2015, pp. 6-74–79.

¹⁶⁵ Victorian Government, Submission on AER preliminary decision VIC EDPR 2016-2020, 14 January 2016 p. 6.

¹⁶⁶ VECUA, Submission on AER preliminary decision VIC EDPR 2016-2020, 6 January 2016, p. 45.
indicators of the prudency and efficiency of the proposed expenditure. Where appropriate, we also look at individual items in more detail by reviewing business and engineering cases, such as where significant departures from trend are apparent. In the case of pole top structures, SCADA and other repex, there were no indications that this was a concern. Also, where past expenditure was sufficient to meet the capex criteria, we are satisfied that it can be a reasonable indicator of whether forecast repex is likely to reflect the capex criteria.¹⁶⁷

AusNet Services accepted our preliminary decision for pole top structures and SCADA. For the reasons set out in our preliminary decision, we accepted AusNet Services' proposed amount for pole top structures, but not for SCADA or 'other' repex:¹⁶⁸

- For pole top structures we considered repex was likely to be relatively recurrent between periods, and that historical repex can be used as a good guide when assessing AusNet Services' forecast. Given AusNet Services' forecast was significantly lower than its expenditure in the last period, we were satisfied that AusNet Services' forecast repex for pole top structures reasonably reflected the capex criteria and included this amount in our alternative estimate of total forecast capex.
- For SCADA we considered the information explaining the reasons for the proposed increase were not sufficient. Further, AusNet Services had provided sufficient data allowing us to use predictive modelling to test the estimate. This supported AusNet Services' historical level of repex continuing. Therefore we did not consider the step increase was sufficiently justified and included an amount reflecting AusNet Services' historic repex in our alternative estimate of total forecast capex.
- For 'other' repex AusNet Services also provided sufficient data allowing the use of
 predictive modelling on these assets. The repex model did not identify the need for
 a significant increase from historical expenditure on "other" repex. Given the
 absence of information explaining the proposed increase and the outcomes from
 predictive modelling, we did not consider the step increase was sufficiently justified.
 We included an amount for 'other' repex reflecting the predictive modelling outcome
 in our alternative estimate of total forecast capex. This was lower than AusNet
 Services' proposed forecast repex, but higher than its historic repex for this
 category.

Bushfire mitigation expenditure

Forecast bushfire mitigation repex - overview

In our preliminary decision we considered that future regulatory obligations should be treated as a contingent project. We have not accepted AusNet Services proposed

¹⁶⁷ AER, Expenditure Forecast Assessment Guideline for Electricity Distribution, November 2013, pp. 7–9.

¹⁶⁸ AER, preliminary decision, AusNet Services distribution determination 2016 to 2020, Attachment 6: Capital expenditure, October 2015, pp. 6-68–74.

repex of \$105.8 million and have instead accepted that the proposed repex projects as a result of future regulatory obligations be treated as a part of contingent project.

AusNet Services' revised proposal forecast of repex included \$105.8 million of additional capex it considered necessary to comply with new or changed safety obligations implemented in response to the 2009 Victorian Bushfires Royal Commission (VBRC).

AusNet Services also proposed a contingent project, which is an amount added to the total repex forecast at a future date but only if a predefined trigger event occurs and subject to meeting the relevant provisions under clause 6.5.7 of the NER for such projects.

In particular, AusNet Services accepted our preliminary decision on bushfire mitigation repex, but with three exceptions:¹⁶⁹

- Downed Conductor Sectionalisation project (SCADA category), \$15.7 million.
- Surge Arresters project ('Other' category), \$23.1 million
- VBRC Declared Areas project (new expenditure), \$67.0 million.¹⁷⁰

AusNet Services also proposed a contingent project for Rapid Earth Fault Current Limiting (REFCL) devices at a cost of approximately \$214 million.¹⁷¹ We have considered this proposal in appendix D.1.

In summary, we do not accept AusNet Services' proposed additional repex of \$105.8 million, excluding overheads.

In relation to the proposed downed conductors and surge diverter programs we note that these programs have two major components. The first component of each program will apply to areas of the AusNet Services' network which are subject to new requirements being introduced through a change of Victorian regulations. We consider this component of each program should form part of the contingent project forecast which we discuss in appendix D.1.

The second component of the downed conductors and surge diverter programs is work that is proposed to be undertaken in areas of the AusNet Services network that are outside the scope of the new requirements of the Victorian regulations. We consider this component should be considered as part of the overall replacement capex. However, we are not satisfied that additional capital expenditure is required for these components.

¹⁶⁹ Direct costs, excluding real cost escalation and overheads.

¹⁷⁰ AusNet Services, *Revised Regulatory Proposal 2016–2020*, January 2016, p. 3-13.

¹⁷¹ AusNet Services, *Revised Regulatory Proposal 2016–2020*, p. 3-24, Including overhead rate of 12.6 per cent as per AER's Preliminary Determination.

In addition, we consider the declared areas project and the REFCL project should be treated as a contingent project. We have considered this in appendix D.1.

Contingent projects

Rule 6.6A.1of the NER concerns the acceptance of a contingent project in a distribution determination. The rule applies to any proposed capital expenditure that is probable in a regulatory control period but either the cost, or the timing of the expenditure is uncertain, subject to a materiality threshold.

To ensure consumers do not pay for an uncertain event until the trigger event has occurred, the forecast associated with a contingent project is not included in the exante capex forecast determined in a determination. The function of the contingent project forecast is as a placeholder; the forecast is the best current estimate of the costs likely to arise if the event trigger occurs. However, when the event occurs the distributor has a further opportunity to propose the forecast costs that are estimated to arise as a consequence of the event. It is not until the trigger event occurs that we undertake a detailed examination of the efficient costs required to satisfy the capex criteria set out in rule 6.5.7. The proposed forecast, if a contingent project is triggered during the regulatory control period, may differ from the initial forecast as set out in a determination. Any additional expenditure will only be added to the capex allowance if the associated trigger event occurs and we determine the forecast is reasonable or we determine an alternative amount.

Contingent projects are also subject to a materiality test. The materiality test requires the cost exceed either \$30 million or 5 per cent of the value of the annual revenue requirement for the relevant distributor for the first year of the relevant regulatory control period, whichever is the larger amount.

Further, a trigger event must be specified for a contingent project. The trigger event is subject to the requirements set out in clause 6.6A.1(c) of the NER.

As we set out later in our final decision, we have determined that the AusNet Services Declared Areas repex project is subject to uncertainty as to the timing and the scope of the project. The uncertainty as to the scope of the project also means the cost is uncertain. For these reasons we have not approved repex under rule 6.5.7 for this project. However, we have determined the project should be a contingent project. AusNet Services also proposed a contingent project for its Rapid Earth Fault Current Limiting devices project. We discuss these projects later in this decision.

Regulatory obligations

In this section we discuss the nature of amended safety regulations planned by the Victorian Government and the general safety framework which applies to electricity distributors in Victoria. These are significant factors in our determination for the expenditure proposals discussed below and D.1 in this attachment.

New regulations

The planned new Victorian Government regulations are intended to give effect to recommendation 27 of the Victorian Bushfires Royal Commission. They will apply in High Bushfire Risk Areas (HBRA) of the State. The recommendation was:

The State amend the Regulations under Victoria's Electricity Safety Act 1998 and otherwise take such steps as may be required to give effect to the following:

- the progressive replacement of all SWER (single-wire earth return) power lines in Victoria with aerial bundled cable, underground cabling or other technology that delivers greatly reduced bushfire risk. The replacement program should be completed in the areas of highest bushfire risk within 10 years and should continue in areas of lower bushfire risk as the lines reach the end of their engineering lives
- the progressive replacement of all 22-kilovolt distribution feeders with aerial bundled cable, underground cabling or other technology that delivers greatly reduced bushfire risk as the feeders reach the end of their engineering lives. Priority should be given to distribution feeders in the areas of highest bushfire risk.

In particular, the Victorian Government has developed new regulatory standards for the use of Rapid Earth Fault Current Limiting (REFCL) devices and changes to the design standards that apply to new line construction and the reconstruction of assets in certain areas (Declared Areas).¹⁷² The Victorian Government published a Regulatory Impact Statement - Bushfire Mitigation Regulations Amendment (RIS) on 17 November 2015. The Victorian Government expect the regulations will be made later in 2016.

The contingent project mechanism was added to the NER to assist distribution networks faced with large but uncertain capital requirements to manage the risk of being required to fund major investments at short notice. We consider the impact of the Victorian regulations is a clear example of uncertain capital requirements that AusNet Services will face in the next regulatory control period. As we explained above, in specifying a contingent project, an indicative amount (a forecast) is required to be set out in the determination. Ultimately, the approved costs may be higher or lower than this forecast, depending on our consideration of the application at the time a contingent project is lodged.

This uncertainty is evidenced by the RIS which stated the average cost per installation to be \$9.2 million (\$2015) if all existing surge diverters require replacement or \$6.6 million (\$2015) on average, if only one-third of the surge diverters require replacement.¹⁷³ The RIS also noted that individual project costs may vary widely

¹⁷² The draft regulations do not mandate the use of a REFCL device. However, it is currently the only known technology capable of meeting the performance standard defined in the regulations.

 ¹⁷³ ACIL Allen Consulting, *Regulatory Impact Statement - Bushfire Mitigation Regulations Amendment (RIS)*,
 17 November 2015, p. 70.

depending on the individual circumstances of each substation.¹⁷⁴ We note there is considerable variability in current project estimates by distributors, from around \$2.1 million (\$2015) to \$22.1 million (\$2015).¹⁷⁵

Victorian electrical safety framework

In Victoria, the safety obligations of major electricity companies are contained in the Electricity Safety Act 1998 (Vic). Section 99 of this Act mandates that major electricity companies must submit an approved Electricity Safety Management Scheme (ESMS) to Energy Safe Victoria (ESV) for acceptance.¹⁷⁶ These schemes are regulated by ESV. Each of the five Victorian distributors is classed as a 'major electricity company' under this Act.

It is compulsory for AusNet Services to comply with the accepted ESMS for its network.¹⁷⁷ Further, the Act requires that each major electricity company must submit a Bushfire Mitigation Plan for its network to ESV and must comply with that plan.¹⁷⁸ The Bushfire Mitigation Plan forms part of an accepted ESMS.¹⁷⁹

The new regulations require each distributor to:

- include details in their Bushfire Mitigation Plan of how it will enhance network protection capabilities for polyphase powerlines originating from prescribed zone substations; and,
- how powerlines in Declared Areas will be placed and underground or insulated.

We note these provisions because they are material to the task of defining trigger events for the contingent projects. A challenge imposed by the new regulations is determining a trigger event which is capable of identifying the location of a project and of objective verification.¹⁸⁰

The requirements of the new regulations mean that the location of every earth fault standards project will be known to the safety regulator, ESV, before work commences. We also note that the regulations exclude large areas of AusNet Services' network but focus on specific zone substations and well defined high risk, high fire loss consequence areas of the State. The requirements of the new regulations also mean that the location of every new construction standards project will be known to the safety regulator, ESV, before work commences. The distributor will be required to submit formal remediation plans to ESV for their acceptance.

¹⁷⁴ Victorian Government, Submission on the Victorian electricity distribution network service providers' revised regulatory proposals for 2016-20, Second submission, p. 2.

¹⁷⁵ ACIL Allen Consulting, *Regulatory Impact Statement - Bushfire Mitigation Regulations Amendment (RIS)*, 17 November 2015, p. 68.

¹⁷⁶ Electricity Safety Act 1998 (Vic), s. 99.

¹⁷⁷ Electricity Safety Act 1998 (Vic), s. 106.

¹⁷⁸ See, Electricity Safety Act 1998 s113A, 113B and 113C.

¹⁷⁹ Electricity Safety Act 1998 (Vic), s. 113D.

¹⁸⁰ NER cl. 6.6A.1(c).

We consider these requirements of the regulations mean the occurrence of a trigger event which includes reference to the Bushfire Mitigation Plan of a distributor will be reasonably specific and capable of objective verification¹⁸¹ and be a condition or event that generates increased costs or categories of costs that relate to a specific location rather than a condition or event that affects the distribution network as a whole¹⁸².

What is Rapid Earth Fault Current Limiting (REFCL) technology?

Currently, the best available technology for complying with the proposed earth fault standards obligation is by installing a REFCL at the zone substation. The REFCL is a relatively new technology which can substantially reduce the risk of a fallen powerline igniting a bushfire. It is an extension of resonant earth system technology, which is commonly used in Europe and elsewhere. The REFCL device is capable of detecting when a power line has fallen to the ground and almost instantaneously shuts off power on the fallen line.

Installation of a REFCL requires significant investment in additional measures to prepare the network to operate safely with the device. This is because when a fault occurs the network which normally operates at 12.7 kV line voltage is subjected to 22 kV line voltage. This voltage can damage other components if they are not upgraded to withstand the higher voltage. Another major requirement is to balance the capacitance of the network. Capacitance is a technical parameter. On longer feeders it can involve significant line work and cost to achieve this requirement.

Line hardening costs

The REFCL device when operating will introduce temporary line voltages that exceed the common ratings of current equipment. This necessitates a survey of every affected line to identify assets which do not have a sufficiently high voltage rating. Some assets will be sufficiently rated such that they do not require replacement or modification. However, a considerable number of assets will require replacement or modification to operate safely with a REFCL installed. This adds significant project costs. This uncertainty is generally referred to as 'hardening cost uncertainty' within the industry. Our task for this determination is asses the forecast for the REFCLs contingent projects. It should be noted that all costs will be examined in detail when a contingent project is triggered at a future date.

In this consideration of hardening costs the focus is on surge diverter replacement costs. This is because the replacement need of surge diverters is a major cost element which has attracted disagreement in the Victorian Government RIS consultation process. This element may also be subject to a significant degree of distributor discretion or exercise of judgement when planning and implementing projects. However, the total hardening costs necessarily involve many other elements including, for example, capacitance balancing, cable insulation and joints, pole top insulators,

¹⁸¹ NER, cl. 6.6A.1(c)(1).

¹⁸² NER, cl. 6.6A.1(c)(3).

voltage regulators and automatic circuit reclosers. These latter elements and possibly other network components may be incompatible with a REFCL resonant earth neutral system. Upgrading these elements can also add considerably to hardening costs. They are not discussed further because there is general agreement that these elements are essential to a REFCL project and are readily identifiable.

Although all the Victorian distributors operate detailed Geographical Information Systems, data on maximum voltage ratings of individual surge diverters and for many of the other affected assets is not held or is missing or incomplete. AusNet Services had not foreseen that assets which operate at a nominal line to earth voltage of 12.7 kV would be operated at a line to earth voltage of 22 kV, even if only for short periods.¹⁸³ The ability of a surge diverter to withstand the higher voltage is dependent on a number of factors including age, condition, technology and time duration of the event. However, operation at 22 kV is a standard operating mode for a REFCL. A surge diverter rated for 12.7 kV operation is unlikely to survive extended operation at 22 kV and may create additional hazards in some failure modes.

We have considered the view expressed in the Consumer Challenge Panel (CCP) submission that we should not fund surge diverter replacements on the grounds a reduction in reliability is acceptable.¹⁸⁴ However, we consider that some cost must be incurred to address the preceding surge diverter safety issues. This cost will arise where a surge diverter is still required for safety reasons or where redundant units are to be removed but not replaced. Until a contingent project is triggered and a detailed application made for funding, we will not have sufficient information to address this matter in any detail.

To assist in assessing the likely cost of these contingent projects for the purpose of establishing the size of the contingent project amount, at least on an indicative basis, we asked AusNet Services to provide costed alternative options to minimise the cost of upgrading surge diverters.¹⁸⁵ AusNet Services advised that it had calculated there was only a marginal cost difference compared to direct replacement of under-rated surge diverters.¹⁸⁶ We reviewed the options as costed by AusNet Services. Based on those costings we accept replacement is a reasonable option. This does not mean we endorse full replacement as being necessary - all options should be explored before settling on full replacement on any given feeder.

It is plausible that on some 12.7 kV lines, some surge diverters may already be rated for 22 kV line to earth operation. In some instances a hazard assessment may determine that the number of surge diverters may be rationalised. Until detailed line

¹⁸³ In three phase 22 kV systems the line to line voltage is 22 kV but the line to earth voltage is 12.7 kV. The time period is also important. If a high voltage is sustained, the possibility of failure increases.

 ¹⁸⁴ Consumer Challenge Panel, CCP3, Victorian DNSPs revenue reset - Comments on AER Preliminary Decisions,
 25 February 2016, p. 65

¹⁸⁵ AER, Information Request AER IR034 (AusNet Services) [email to AusNet], 5 February 2016.

¹⁸⁶ AusNet Services, Response to information request AER IR034 (AusNet Services) [email to AER], 16 February 2016: VBRC capex, 12/2/2016, p. 1

surveys are completed there will remain considerable uncertainty as to the true cost of the installation of each REFCL at a specific location. These surveys are labour intensive and thus it is not realistic to expect them to be undertaken until a specific need arises. This matter has been taken into account below which discusses the formulation of the contingent project trigger.

What are Declared Areas?

The term "Declared Areas" (in our preliminary decision these were referred to as "Codified Areas") is a reference to 'declared' high bushfire risk areas of Victoria. In the draft bushfire mitigation regulations, areas which are the subject of a Declaration by the Emergency Management Commissioner are to be subject to new, higher powerline construction standards.

AER Assessment

Downed conductor sectionalisation

AusNet Services proposed a Downed Conductor Sectionalisation project. This project involves two technologies – Master Earth Fault relays (MEF) and Neutral Earth Resistor installations. AusNet Services proposed this program for the whole of its network and not just areas designated under the Bushfire Safety Regulations. AusNet Services accepted that the program is not as a result of a mandated safety requirement. However, AusNet Services submitted that the project is required for improved safety. In support of the project AusNet stated:

This project is required to maintain or improve the safety of the distribution system. It aims to reduce the potential for a bushfire ignition by isolating a section of a high voltage overhead feeder when a fault results in a conductor touching the ground. Conductors can be brought to the ground by a number of means such as impact from a falling tree, vehicles hitting poles or asset failure. The safety risks of downed conductors include:

- Fire ignition;
- Electrocution of individuals (members of the public or AusNet Services employees or contractors) coming into contact with the live conductor;
- Loss of livestock; and
- Damage to customer equipment due to brownout and voltage variation.

And:

A method of enhancing the protection system to detect these faults where a conductor falls to the ground is to utilise a Master Earth Fault (MEF) protection relay. A MEF protection relay detects any current flowing from a conductor to the ground and operates either the circuit breaker to make the feeder safe, or operates the distribution feeder automation system to isolate the faulted

section. (Using the distribution feeder automation system to isolate the faulted section means that fewer customers are affected by the fault.) 187

We accept that the use of MEF protection relays and fitting of Neutral Earth Resistors can improve the safety and reliability of an electricity distribution network. However, we do not agree for the whole of the AusNet Services' distribution network that the project is ... required to maintain or improve the safety of the distribution system.

The risk of a conductor falling to the ground has long existed for all distributors. Many techniques are employed to address that risk. The standard approach includes a variety of techniques to manage risk including applying suitable design and construction standards, regular line patrols and inspection and pre-emptive replacement of assets that may lead to failure. The risk of a downed conductor was a significant factor in the recommendations of the VBRC. Substantial expenditure has already been undertaken in responding to those recommendations of the VBRC which generally concerned operating practices and basic design and installation standards for equipment including crossarms, armour rods, vibration dampers and spacers.

To the extent that additional work is justified by a reduction in bushfire risk, this is the subject of recommendation 27 of the VBRC which is to be addressed by the Bushfire Mitigation Regulations Amendment, which we discussed above. In response to this risk, AusNet Services has proposed and as we discuss in appendix D.1, we accept a number of contingent projects are an appropriate response to this amendment.

We have examined the Bushfire Mitigation Plan (BMP) and current ESMS which apply to AusNet Services. Neither contains a requirement to deploy the MEF technology or to install Neutral Earth Resistors at Foster and Kinglake. The safety regulator, ESV, has not required AusNet Services to amend its approach to deploy the technologies. The Bushfire Mitigation Regulations Amendment does not require AusNet Services to deploy the technologies.

AusNet Services explain that they came to the decision to deploy the MEF technology following a trial of MEF technology which was expanded to include REFCL technology.

After the trial project had commenced, a decision was made to trial Rapid Earth Fault Current Limiters (REFCLs) and the project was modified to ensure that both MEFs and REFCLs could be implemented together. From the trial, it was concluded that this technology can be introduced onto the distribution network.¹⁸⁸

And

Following detection of a downed conductor, further automated action can be taken such as opening circuit breakers or ACRs to isolate the fault and using Distribution Feeder Automation (DFA) to restore customers outside the faulted

¹⁸⁷ AusNet Services, *Revised Regulatory Proposal 2016–2020*, p. 3-14.

¹⁸⁸ AusNet Services, *Revised Regulatory Proposal 2016–2020*, p. 3-15.

section. MEF protection relays will be replaced at 31 sites (with work commencing in 2015) and automatic sectionalisation of downed conductors will be implemented at stations where new MEF protection relays and DFA has been installed. These new MEF relays are also necessary to enable REFCLs to be installed and operated at zone substations.¹⁸⁹

In appendix D.1 we consider three contingent projects, all of which concern the deployment of REFCLs. To the extent that AusNet Services believe that a MEF relay is a necessary component of a REFCL deployment project, we consider that a separate program is unnecessary. The MEF relay installation should be included in the capital works required to give effect to the REFCL deployment.

The AusNet Services' Neutral Earth Resistor proposal applies to areas that do not fall within the scope of the Bushfire Mitigation Regulations Amendment.

The second program involves the installation of fault level reducing systems (Neutral Earthing Resistors) at two zone substations, Foster and Kinglake. Neutral Earthing Resistors are already installed at most zone substations. The installations at Foster and Kinglake will add to the safety of the network by targeting two zone substations which present some bushfire risk and do not currently have Neutral Earthing Resistors installed.¹⁹⁰

As we have discussed above, there is no mandated requirement to deploy the Neutral Earth Resistor technology at these substations identified in the ESMS or BMP.

We next examined the benefits of the project. In its supporting documentation AusNet Services set out the benefits as:

The primary benefit resulting from this project is a reduction in the risk of ground fire ignition when a live conductor falls to the ground. A live conductor can fall to the ground as a result of several incidents or initiating events including:

- Tree branch falling onto conductor
- Vehicle hitting pole
- Failure of a crossarm or insulator or tie
- Failure of a conductor due to deterioration or lightning strike
- Failure of a connector

The secondary benefits arising from this project include:

- Neutral Earth Resistors (NER) reduces fault current to a safe level which is sufficient enough to operate protective relays
- NER reduces consequential station equipment damage at FTR and KLK

¹⁸⁹ AusNet Services, *Revised Regulatory Proposal 2016–2020*, p. 3-15.

¹⁹⁰ AusNet Services, *Revised Regulatory Proposal 2016–2020*, p. 3-15.

- NER provides station back-up protection
- NER reduces consequential damage to the network (leading to less customer impact) at FTR and KLK
- NER has the ability to detect high impedance faults such as a branch remaining in contact with a live conductor
- Online monitoring of NERs ensures the NER is fit for purpose by identifying any malfunctions.¹⁹¹

These benefits all relate to safety. We consider that the Victorian Government has, in its RIS process, examined the economic case for the wider application of safety measures in all areas in the State. It is apparent in the RIS that the costs of treating areas of low bushfire risk and/or low bushfire consequence are excessive relative to the community benefits that will result from the mandated implementation of new measures to address risk in these areas. In developing their proposed regulations the Victorian Government has been careful to consider whether the cost of reducing risk to the standard of as 'as low as reasonably practicable' is justified by a commensurate reduction in risk.¹⁹² For additional measures to be justified in areas that fall outside the scope of the amended regulations, there should be a supporting business case that clearly establishes the specific benefits that will flow from investment in other areas of the network.

As the supporting information did not address the relative costs and benefits of the project, we sought additional information from AusNet Services.¹⁹³ In response, AusNet Services provided the business case for stage 1 of the project.¹⁹⁴ We note that this document does not discuss stage 2 of the project, which is the subject of the revised regulatory proposal. AusNet Services stated the business case for stage 2 has not yet been prepared.¹⁹⁵

For stage 1 the business case lists the primary financial benefit of the technology as a reduction in payouts due to brownout claims.¹⁹⁶ We consider the stated annual benefit amount (\$43k) to be small, relative to the cost of the technology. Table 10d, which is headed 'Non-financial benefits', lists a major benefit as 'Bushfire Mitigation'. The table suggests a 15 year lifetime figure of \$8.5 million. However, no basis is stated for the numbers contained in this table. Although this calculation addresses the risk reduction that that would arise from deploying the MEF technology this calculation is specific to

¹⁹¹ AusNet Services, AMS – Electricity Distribution Network Capital Expenditure, Supporting Information, EDPR 2016-20, Revised Regulatory Proposal, p. 17

¹⁹² This is the standard applicable under the Electrical Safety Act (Victoria).

¹⁹³ AER, information request – AusNet Services - #040 – Conductor and surge diverter projects [email to AER], 19 February 2016.

¹⁹⁴ AusNet Services, *Business Case, Project:*74399684 - DFA Sectionalisation of Downed Conductors Stage 1, 14/11/2014.

¹⁹⁵ AusNet Services, Information Request #040 – Conductor and surge diverter projects – AusNet Response [email to AER], 26 February 2016, p. 1.

¹⁹⁶ AusNet Services, Business Case, Project:74399684 - DFA Sectionalisation of Downed Conductors Stage 1, 14/11/2014, section 9.2, p. 10–11.

the Belgrave substation and does not address the incremental benefit of the installation of a Neutral Earth Resistor. This is not a satisfactory basis for assessing the wider deployment of MEF technology or the likely impact of Neutral Earth Resistor installations at Foster or Kinglake. Also, in the absence of supporting calculations explaining this benefit, we do not consider the claimed benefit amount is proven. The stage 1 business case also states the reliability benefits which can arise under applicable incentive schemes are negligible.

Based on the material provided to us we are not satisfied that this expenditure is required to maintain or improve the safety of the network. Although the technology does offer improved safety benefits, the supporting information does not demonstrate a compelling case that the benefits to customers will justify the costs. No business case exists for stage 2 of the project. The supporting information for stage 1 does not give a satisfactory basis for assessing the likely cost benefits that may result if the stage 2 expenditure were to proceed. In the absence of a regulatory obligation to deploy the technology, we consider this expenditure has not been sufficiently justified.

Surge diverters

In its revised regulatory proposal AusNet Services provided additional details of the program of activity concerning surge diverters. AusNet Services considered that our alternative forecast of repex did not take account of the need for a step increase in funding. To explain its proposal AusNet Services said:

A new program of pre-emptive surge arrester replacements specifically targeting porcelain-housed silicon carbide surge arresters in high bushfire risk areas is proposed. This program will replace an average of 2,800 surge arresters or 1,400 installations per annum and will be completed in 2025. Such replacements provide community benefits primarily in the form of wildfire avoidance, and protection of costly electrical plant.

Line surge arresters have traditionally been replaced if they are identified as being unfit for service during routine inspection or if the installation (transformer, switch, regulator, cable head) they are protecting is replaced. Surge arrester risk assessments have shown that a step increase in replacement volumes is required to promptly address the risks in an accelerated manner.¹⁹⁷

We asked AusNet Services to provide details of their replacement activity for surge diverters over the last ten years.

AusNet Services has incomplete historical data for surge diverters in its asset management systems. The exact number of units installed each year is not known. Units are installed when:

¹⁹⁷ AusNet Services, *Revised Regulatory Proposal 2016–2020*, p. 3-16.

- a new item of plant is installed such as a distribution transformer, ACR or cable transition, and
- an inspection finds that diverters are not installed in situations where current standards require diverters to be installed.¹⁹⁸

From AusNet Services' response we calculated the average number of surge diverter installation work orders in the period 2004–2010 to be 443 and for the period 2011–2015 to be 1234.¹⁹⁹ The trend evident in this calculation is of a step increase in surge diverter activity by AusNet Services in the recent regulatory control period. This activity was taken into account in our trend analysis reported in the preliminary decision. We note that because of the lack of detailed records, it is not possible to distinguish those installations that occur because of condition from those installations that arise for other reasons.

The AusNet Services' surge diverter asset management strategy was considered in further assessing the overall need for repex.²⁰⁰ Although it may be more usual to assess volumes in terms of units replaced, AusNet Services has preferred to discuss surge diverter replacement on the basis of the number of installations, assuming on average that two surge diverters are replaced per installation.²⁰¹ Based on our assessment of the AusNet Services' surge diverter asset management strategy, we have accepted that an average installation is two surge diverters. To avoid confusion, we have adopted the approach of discussing the volume of surge diverter replacements as 'installations'. The AusNet Services strategy for this work is:

Overall strategy is to progressively replace porcelain-housed silicon carbide surge arresters in Tolhurst fire risk areas by 2025 at an average rate of 2700 surge arresters or 1,350 installations per annum.

- In conjunction with other maintenance works replace [brand name] surge arresters in Tolhurst fire risk areas by 2020; at approximately 1300 surge arresters or 650 installations per annum.
- In conjunction with other maintenance works replace [brand name] 1982 to 1988 [brand name] surge arresters in Tolhurst fire risk areas by 2020; at approximately 1400 surge arresters or 700 installations per annum.²⁰²

We note a small increase in the number of installations per annum between the revised regulatory proposal (1400) and the AMS (1350). We have adopted the higher number as the basis of our analysis. Compared to the recent average of 1234 installations, this is a 13.5 per cent increase.

¹⁹⁸ AusNet Services, Response to AER Information Request #034 [email to AER], 26 February 2016, p. 4.

¹⁹⁹ AusNet Services, *Response to AER Information Request #034* [email to AER], 26 February 2016, p. 4. We also note that activity peaked in 2012 and declined in 2013 and 2014.

²⁰⁰ AusNet Services, AMS 20-67 – Line Surge Arresters – PUBLIC.pdf, 18 November 2014.

²⁰¹ AusNet Services, *Response to AER Information Request #034* [email to AER], 26 February 2016, pp. 3-4.

²⁰² AusNet Services, AMS 20-67 – Line Surge Arresters – PUBLIC.pdf, 118 November 2014, p. 23.

To assess the risk cost associated with surge diverters we reviewed Section 5 of AMS 20-67 – Line Surge Arresters – PUBLIC.pdf.²⁰³ This is an analysis of the number of surge diverters estimated to be in a condition category of confidence level 1 (very good) to confidence level 5 (very poor) for each of ten Tolhurst Fire Loss Consequence categories. This analysis is summarized by AusNet Services as follows:

According to the results of the FLCM model more than 46% of line surge arrester failures have no house loss consequence at all. This includes 44% of condition 5 line surge arresters. About 9% of the line surge diverter population pose the highest risk. All of these surge arresters are very poor condition being surge arresters with porcelain housing and more than 40 years of service life.²⁰⁴

We consider the analysis to be a useful tool to identify the highest priority surge diverters for replacement. However, it is an incomplete analysis of risk. It does not address the probability of an adverse event occurring, nor does it directly quantify the financial consequence of an event. We consider AMS 20-67 demonstrates there is significant risk associated with surge diverters in poor condition but does not provide a clear financial quantification of the risk sufficient to warrant separate funding of a remediation program.

However, having regard to the established level of activity and the established trend, we consider that the proposed increase from 1234 installations per annum to 1400 installations per annum is generally consistent with the longer term trend of increased attention to surge diverter replacements.

AusNet Services estimated 17.3 per cent of surge diverters are in areas which are to be subject to REFCL installations.²⁰⁵ This corresponds to an additional 242 installations per annum.²⁰⁶ In reply to an AER inquiry AusNet Services said:

Where surge diverters are replaced as part of a REFCL project, it will not be necessary to replace them in the Surge Arrester project. 207

We are concerned that there is scope for double counting if a separate surge diverter replacement program is created. Under the REFCL program AusNet Services will be required to replace surge diverters. The baseline repex for AusNet Services already factors in the historic activity. The increase in activity sought by AusNet Services under this program is 166 installations per annum. However, under the REFCL program, which is the subject of the contingent projects discussed in appendix D.1, AusNet Services will undertake an estimated 242 installations per annum.

²⁰⁶ Calculated over 5 years we estimate 17.3% would equal 1211 total installations.

²⁰³ AusNet Services, Information Request #040 – Conductor and surge diverter projects – AusNet Response [email to AER], 26 February 2016, p.1. Note that AusNet Services referred to the Confidential version of AMS 20-67. However, the Public version of section 5 is identical in all material respects. We have used that version.

²⁰⁴ AusNet Services, AMS 20-67 – Line Surge Arresters – PUBLIC.pdf, 18/11/2014, p. 22.

²⁰⁵ AusNet Services, *Response to AER Information Request #034* [email to AER], 26 February 2016, pp. 3-4.

²⁰⁷ AusNet Services, Response to AER Information Request #034 [email to AER], 26 February 2016, p. 3.

Therefore, by redirecting its program of general replacement activity to those areas which are not to be subject to a REFCL, we consider an increase in activity to greater than the 1400 installations per annum proposed by AusNet Services will be achieved (1234 plus 242).

As our preliminary decision has factored in historic activity (1234) and as the contingent projects will allow an increase in surge diverter replacements, we consider that the need for a separate program has not been established.

Declared Areas

AusNet Services has proposed \$77.1 million (\$2015) replacement capital expenditure for Declared Areas.²⁰⁸ In support of this proposal AusNet Services said:

The Victorian Government intends to amend the Electricity Safety (Bushfire Mitigation) Regulations 2013 to introduce a new regulatory obligation which requires a distributor to include in its Bushfire Mitigation Plan details about how it will ensure electric lines within a 'declared area' will be insulated or placed underground. According to the Regulatory Impact Statement (RIS) released by the Victorian Government, the new obligation will impose heightened powerline construction standards which require new electric lines and electric lines being replaced or subject to significant maintenance, to be insulated or placed underground.

These amendments to the regulations, and subsequently to AusNet Services' Bushfire Mitigation Plan, will require AusNet Services to incur additional capital expenditure during the 2016–20 regulatory control period.

preliminary decision

In its preliminary decision for Powercor, the AER approved a contingent project for the new powerline construction standards which will apply in high bushfire risk areas of the State (codified or declared areas).

Due to the level of uncertainty regarding the detail of this new requirement, AusNet Services did not propose any capital expenditure in the Initial Proposal relation to projects necessary to comply with the new regulatory obligation. However, since then, the Government has provided AusNet Services with each codified area to which the new minimum design standards will apply. AusNet Services can therefore now provide a firm capital expenditure forecast as part of this Revised Proposal.

Within declared areas, specific powerline design and maintenance standards will apply to AusNet Services via its Bushfire Mitigation Plan (and, in turn, its ESMS). These standards will set out requirements in relation to, among other things, the replacement of bare electric lines with a voltage of between 1 kV

²⁰⁸ AusNet Services, *Revised Regulatory Proposal 2016–2020*, p. 3-19. This amount includes project management and overhead costs.

and 22 kV powerlines with insulated technologies that offer reduced risk of bushfire ignition, including underground cable, aerial bundled cable or spacer cable. As these technologies are substantially more costly than bare powerlines, AusNet Services will require additional capital expenditure in order to comply with the new standards.²⁰⁹

AusNet Services considered that the release of the draft regulations has created sufficient certainty for it to provide a firm forecast of its changed capital expenditure requirements as part of its revised regulatory proposal. However, we note that in relation to the draft regulations Powercor stated in its revised proposal that the scope of works required to meet the requirements of the draft regulations in Declared Areas remains uncertain.²¹⁰ The Victorian Government submission to the AER questions whether the projects proposed by the Victorian distributors in Declared Areas have correctly interpreted the scope and intent of the new regulations and if they are costed correctly.²¹¹ Taking into account the submissions of the Victorian Government and Powercor and our review of the RIS and the draft regulations, we consider that there remains significant uncertainty as to how the new regulations should be interpreted in relation to Declared Areas.

In appendix D.1.2 we discuss the planned review and approval process for identifying the works to be undertaken in Declared Areas. We are concerned that that process has not been fully developed as yet. The regulations upon which AusNet Services has prepared its forecast are in draft format and subject to change. The actual areas to be subject to the regulations cannot be confirmed until a declaration is made by the Emergency Management Commissioner, after the regulations are promulgated. Until the declaration is made there is no requirement for this expenditure. Also, the Commissioner may make more than one declaration. We further discuss these matters in appendix D.1.7. In its submission to us on the revised regulatory proposals the Victorian Government noted concerns with the costings proposed by AusNet Services for this requirement.²¹²Taken together, we consider these factors mean that the capital costs of this work are subject to an elevated degree of uncertainty. We therefore also consider that the project should not be incorporated in the capex forecast but treated as a contingent project.

As we have concluded the costs of the Declared Areas project are too uncertain for it to be included in capex under rule 6.5.7, we have determined it should also be a contingent project.²¹³ We discuss this further in appendix D.1.

²⁰⁹ AusNet Services, Revised Regulatory Proposal 2016–2020, p. 3-17

²¹⁰ Powercor, *Revised Regulatory Proposal 2016–2020*, p. 435.

²¹¹ Victorian Government, Submission on the Victorian electricity distribution network service providers' revised regulatory proposals for 2016-20.

²¹² Victorian Government, Submission on the Victorian electricity distribution network service providers' revised regulatory proposals for 2016-20.

²¹³ NER cl. 6.5.7 & NER, cl.6.6A.1.

Network health indicators

As noted above, we have looked at network health indicators and benchmarks to form high level observations about whether AusNet Services' past replacement practices have allowed it to meet the capex objectives. While this has not been used directly either to reject AusNet Services' repex proposal, or in arriving at an alternative estimate, the findings are consistent with our overall findings on repex. In summary we observed that:

- The measures of reliability and asset failures show that outages on AusNet Services' network have been stable across time.
- Measures of AusNet Services' network assets residual service lives and age show that the overall age of the network is being maintained. Using age as a high level proxy for condition, this suggests that historical replacement expenditures have been sufficient to maintain the condition of the network.
- Asset utilisation has reduced in recent years which means assets are more lightly loaded, this is likely to have a positive impact on overall asset condition.

Further, the value of customer reliability has recently fallen. Other things being equal, this fall should result in the deferral of repex as the value customers place on reliability for replacement projects has fallen.

The above indicators generally suggest that replacement expenditure in the past period has been sufficient to allow AusNet Services to meet the capex objectives. This is consistent with our overall findings on repex from our other assessment techniques.

The asset health indicators are discussed in more detail in our preliminary decision.

B.5 Forecast capitalised overheads

Capitalised overheads are costs associated with capital works that have been capitalised in accordance with AusNet Services' capitalisation policy. They are generally costs shared across different assets and cost centres.

B.5.1 Position

We do not accept AusNet Services' proposed capitalised overheads. We instead included in our alternative estimate of overall total capex an amount of \$170.8 million (\$2015) for capitalised overheads. This is 1.8 per cent lower than AusNet Services' proposal of \$174 million (\$2015).²¹⁴ We are satisfied that this amount reasonably reflects the capex criteria.

B.5.2 Our assessment

Our adjustment to AusNet Services' overheads has adopted the approach from our preliminary decision.

We consider that reductions in AusNet Services' forecast expenditure should see some reduction in the size of its total overheads. Our assessment of AusNet Services' proposed direct capex demonstrates that a prudent and efficient distributor would not undertake the full range of direct expenditure contained in AusNet Services' regulatory proposal. It follows that we would expect some reduction in the size of AusNet Services' capitalised overheads. We do accept that some of these costs are relatively fixed in the short term and so are not correlated to the size of the expenditure program. However, we maintain that a portion of the overheads should vary in relation to the size of the expenditure.

As we noted in our preliminary decision, our assessment in the Queensland distribution determinations found Energex's overheads comprised 75 per cent fixed and 25 per cent variable components.²¹⁵ We considered this split of fixed and variable overheads components was also reasonable for AusNet Services. We invited AusNet Services to provide a more appropriate split, with evidence, in its revised regulatory proposal if it did not consider this split is reasonable for its circumstance.²¹⁶

AusNet Services referred to its initial proposal which showed overheads have been relatively flat despite increasing capex levels in the regulatory years 2009 to 2014.

 ²¹⁴ AusNet Services, *Electricity distribution price review 2016–20: Revised regulatory proposal*, 6 January 2016, p. 3-39.

²¹⁵ AER, Preliminary decision: AusNet Services distribution determination 2016 to 2020: Attachment 6 – Capital expenditure, October 2015, p. 87.

²¹⁶ AER, Preliminary decision: AusNet Services distribution determination 2016–20: Attachment 6 – Capital expenditure, October 2015, p. 128.

AusNet Services stated this suggests its overheads levels are fixed.²¹⁷ However, AusNet Services accepted the method we used in our preliminary decision, stating it would not result in a material difference to its capex forecast.²¹⁸

Origin agreed that reductions in forecast expenditure should see a reduction in the size of both the total overheads and the level of capitalised overheads.²¹⁹ On the other hand, Origin also considered the proposed overheads required further examination.²²⁰ Similarly, VECUA did not agree with the preliminary decisions' method of adjusting overheads on the basis of the distributor's capex forecast. Rather, VECUA recommended we determine efficient capitalised overheads based on benchmark efficient costs.²²¹

We undertook a detailed investigation on the relationship between overheads and capex during the NSW and ACT distribution determinations. We accepted that a portion of overheads are relatively fixed in the short term and so does not vary with the level of expenditure. Our analysis also suggested a portion of overheads should vary in relation to the size of the expenditure. Due to data and other issues, however, we considered our proposed method was not sufficiently robust to enable a mechanistic adjustment to a distributor's capitalised overheads.²²² Without evidence to the contrary, we consider our assessment approach from the Queensland distribution determinations results in capitalised overheads that reasonable reflect the capex criteria. We will review our approach to assessing overheads as an on-going process.

We have also considered the relationship between opex and capex, specifically whether it is necessary to account for the way the CAM allocates overheads between capex and opex in making this decision. We considered this was not necessary in order to satisfy the capex criteria. This is because our opex assessment sets the efficient level of opex inclusive of overheads. It has accounted for the efficient level of overheads required to deliver the opex program by applying techniques which utilise the best available data and information for opex.

The starting point of our capitalised overheads assessment is AusNet Services' proposal, which is based on their CAM. As such, AusNet Services' forecast application

 ²¹⁷ AusNet Services, *Electricity distribution price review 2016–20: Revised regulatory proposal*, 6 January 2016, pp. 3 37 to 3-38; AusNet Services, *Electricity distribution price review 2016–20*, 30 April 2015, pp. 121–122.

 ²¹⁸ AusNet Services, *Electricity distribution price review 2016–20: Revised regulatory proposal*, 6 January 2016, p. 3-37.

²¹⁹ Origin, Submission to AER preliminary decision Victorian networks, 6 January 2016, p. 2.

²²⁰ Origin, *Submission: Victorian networks revised proposals*, 4 February 2016, p. 1.

²²¹ VECUA, Submission: AER preliminary 2016–20 revenue determinations for the Victorian DNSPs, 6 January 2016, pp. 4, 55–56.

 ²²² AER, Final decision: Ausgrid distribution determination 2015–16 to 2018–19: Attachment 6 – Capital expenditure, April 2015, pp. 83–84; AER, Final decision: Essential Energy distribution determination 2015–16 to 2018–19: Attachment 6 – Capital expenditure, April 2015, pp. 90–91; AER, Final decision: Endeavour Energy distribution determination 2015–16 to 2018–19: Attachment 6 – Capital expenditure, April 2015, pp. 61–62; AER, Final decision: ActewAGL distribution determination 2015–16 to 2018–19: Attachment 6 – Capital expenditure, April 2015, pp. 73–74.

of the CAM underlies our estimate. We have only reduced the capitalised overheads to account for the reduced scale of AusNet Services' approved capex based on assessment techniques best suited to each of the capex drivers. In doing so we have accounted for there being a fixed proportion of capitalised overheads.

As a result of a 7.6 per cent reduction in AusNet Services' direct capex that attract overheads, we consider a reduction of \$3.2 million (\$2015) reasonably reflect the capex criteria.²²³

²²³ AusNet Services pointed to computational errors in the preliminary decision's calculation of the overheads component of its total capex forecast (see AusNet Services, *Electricity distribution price review 2016–20: Revised regulatory proposal*, 6 January 2016, p. 3-36). We have corrected these errors in our calculations of AusNet Services' overheads for this final decision.

B.6 Forecast non-network capex

Non-network capex for AusNet Services includes expenditure on information and communications technology (ICT), buildings and property (including furniture and equipment), and motor vehicles. AusNet Services' revised proposal includes forecast non-network capex of \$253.6 million (\$2015, excluding overheads). This is an increase of \$45 million from AusNet Services' initial proposal of \$208.6 million, which we accepted in our preliminary decision for non-network capex.²²⁴

B.6.1 Position

We do not accept AusNet Services' revised proposal for non-network capex. We have instead included an amount of \$230.6 million (\$2015) for forecast non-network capex. As discussed below, we are not satisfied that AusNet Services' forecast non-network ICT capex for 'Power of Choice' related projects reasonably reflects the efficient costs a prudent operator would require to achieve the capex objectives.²²⁵

In coming to this view:

- we are not satisfied that AusNet Services' forecast ICT capex of \$47.3 million for the Power of Choice related projects reasonably reflects the prudent and efficient costs required to meet the identified regulatory obligations. We consider that forecast capex of \$194.8 million (\$2015), including \$24 million for Power of Choice projects, reasonably reflects a prudent and efficient level of ICT capex for the 2016–20 regulatory control period.
- we are satisfied that AusNet Services' forecast capex for the motor vehicles and buildings and property categories of non-network capex, consistent with our preliminary decision, reasonably reflects the efficient costs of a prudent operator.

B.6.2 Revised proposal

In its revised proposal, AusNet Services accepted our preliminary decision on forecast non-network capex for motor vehicles, buildings and property, and tools and equipment. However, AusNet Services sought additional ICT capex to comply with the AEMC's rule changes relating to the Power of Choice review.²²⁶ This additional non-network ICT capex is discussed below.

We received one submission on ICT capex from the Consumer Challenge Panel. The CCP submitted that it is concerned about the high level of ICT capex being sought by all the Victorian distributors. It noted that while AusNet Services' forecast ICT capex is

²²⁴ AusNet Services, *Revised regulatory proposal*, 6 January 2016, p. 3-36.

²²⁵ NER, cl. 6.5.7(c).

²²⁶ AusNet Services, *Revised regulatory proposal*, 6 January 2016, p. 3-36.

less than in the previous period, it is still higher than in the period from 2001 to 2010.²²⁷ We note the CCP's general concern about the high levels of ICT capex sought but take the view that the historic spending from 2001–2010 is not necessarily the best guide to the prudent and efficient level of ICT spending for the 2016–20 regulatory control period. In our assessment, we recognise that ICT expenditure is typically lumpy in nature and its timing is dependent on necessary system upgrades, technology obsolescence, as well as other requirements such as new regulatory obligations.

B.6.3 Information and communications technology capex

In our preliminary decision, we accepted AusNet Services' proposed \$172.1 million (\$2015) for ICT capex. In its revised proposal, AusNet services accepted this decision. However, AusNet Services also sought an additional \$47.3 million to comply with the AEMC's rule changes relating to the Power of Choice review. We do not accept this proposed forecast for additional ICT capex and instead substitute an amount of \$24 million (\$2015).

Since 2014 the AEMC has made several rule changes relating to its Power of Choice review, including, in November 2015, rules for the introduction of metering contestability. These various rule changes give rise to new regulatory obligations for distributors. Following assessment of the various projects proposed by AusNet Services, we accept that there is evidence that some capex will be required to ensure compliance with certain of these regulatory obligations. Under the capital expenditure objectives, we must allow sufficient capex to allow a distributor to comply with regulatory obligations or requirements.²²⁸

As noted above, the CCP submitted that it was not convinced that there is a need to increase ICT costs to accommodate the Power of Choice rule changes, noting that the AEMC did not explicitly identify any costs that it expected to be incurred as a result of the changes.²²⁹ However, following our assessment, we are satisfied the distributors, including AusNet Services, have demonstrated that they will need to modify their ICT systems to address certain new obligations. We note the CCP is concerned also by the difference in costs proposed by each distributor in relation to the Power of Choice rule changes.²³⁰ We address these differences in our assessment below.

²²⁷ Consumer Challenge Panel CCP3, Response to the AER Preliminary Decisions and revised proposed for Victorian electricity distribution network service providers for a revenue reset for the 2016–2020 regulatory period, 25 February 2016, p. 61.

²²⁸ NER, cl. 6.5.7(a)(2).

²²⁹ Consumer Challenge Panel CCP3, Response to the AER Preliminary Decisions and revised proposed for Victorian electricity distribution network service providers for a revenue reset for the 2016–2020 regulatory period, 25 February 2016, p. 63.

²³⁰ Consumer Challenge Panel CCP3, Response to the AER Preliminary Decisions and revised proposed for Victorian electricity distribution network service providers for a revenue reset for the 2016–2020 regulatory period, 25 February 2016, p. 63.

Assessment approach

In assessing AusNet Services' Power of Choice program, we have examined the proposed projects and identified which of these are in response to regulatory obligations.

We evaluated the projects proposed by each distributor as set out in its proposal. Where a distributor's project costs were not fully supported by a detailed business case with sufficiently supported cost estimation, we also sought further information from the distributor in relation to how the capex forecast was derived. We recognise that the Victorian distributors for the most part have not been able to provide detailed assessment of the capex required or completed a detailed business case for these projects. This is understandable given that these rule changes are recent and there is still time to complete more detailed project plans before implementation is required.

As part of our assessment, we also had regard to information provided by all of the Victorian distributors given that each must meet the same regulatory obligations and are subject to the same operating environment. The fact that the obligations and the operating environment apply to all the Victorian distributors allows for a degree of comparability in assessing proposed costs. Accordingly, where the distributor's justification for forecast costs did not justify the capex proposed, we considered the distributor's proposed capex compared to what other Victorian distributors proposed to address that particular regulatory obligation. We then examined the distributor's proposal in order to assess any factors that might explain the need for different capex requirements.

AusNet Services' Power of Choice program

The ICT capex costs for Power of Choice were not included in AusNet Services' initial proposal. Instead, in the initial proposal, AusNet Services proposed a nominated pass through event for Power of Choice projects.²³¹ In our preliminary decision, we rejected this proposed pass through event because it would be covered under the prescribed regulatory change and/or service standard events set out in the NER.²³²

In its revised proposal, AusNet Services proposed this additional ICT capex in its forecast both because of our rejection of the proposed pass through event and because it had new information regarding the certainty and cost impact of the Power of Choice reforms.²³³

AusNet Services proposed additional ICT capex of \$47.3 million for projects to address the following initiatives from the Power of Choice review:

• Distribution network pricing arrangements (\$5.86 million)

²³¹ AusNet Services, *Revised regulatory proposal*, 6 January 2016, p. 3-33.

²³² AER, Preliminary Decision: AusNet Services distribution determination 2016 to 2020, Attachment 15, October 2015, pp. 15-6, 15-13 to 15-14.

²³³ AusNet Services, *Revised regulatory proposal*, 6 January 2016, p. 3-33.

- Metering contestability (\$27.8 million)
- Shared market protocol (SMP)/Business to Business (B2B) integration (\$6.57 million)
- Embedded networks (\$4.63 million)
- Demand response mechanism (\$2.08 million).

Our assessment of these projects is detailed below.

Distribution network pricing arrangements

The AEMC made a final rule change for distribution network pricing arrangements in November 2014. The proposed distribution network pricing arrangements project is to address the requirement that network prices reflect the efficient costs of providing network services to individual consumers so that they can make informed decisions about their electricity usage.²³⁴ This rule change introduces new regulatory obligations for distributors from 2017.

We also note the Victorian Minister for Resources and Energy issued a Ministerial direction specifying changes to the proposed tariff structure statements of the Victorian network businesses to ensure customers can opt in to new network tariffs from their current tariffs, rather than opt out as specified in the businesses' initially proposed tariff structure statements.²³⁵ While this is likely to reduce the volume of transactions and may result in lower ongoing costs during the 2016–20 regulatory control period as customer take up may be less than initially estimated, we are satisfied that these obligations will still require AusNet Services to make changes to its ICT systems and processes.

Metering contestability and shared market protocol (SMP)

The metering contestability rule change has introduced competition in metering and facilitated a market led deployment of advanced (smart) meters. The SMP/B2B project will provide a standard form of communication for energy companies seeking access to services enabled by advanced meters. The B2B integration rule change seeks to update the B2B framework to provide for the new services that will be available through advanced meters.²³⁶

The relevant AEMC rule change for the metering contestability project places new regulatory obligations on AusNet Services. AusNet Services submitted that these obligations will require it to make changes to its ICT systems to comply with the new rules. For SMP/B2B integration, the AEMC released a final advice (SMP) and a

²³⁴ National Electricity Amendment (Distribution Network Pricing Arrangements) Rule 2014 No. 9.

²³⁵ Advanced Metering Infrastructure (AMI Tariffs) Amendment Order 2016, Victorian Government Gazette G15, 14 April 2016.

²³⁶ Benefits available due to advanced meters include: more detailed information about electricity consumption, network charges that better reflect the cost of supplying electricity, more innovative pricing options, faster processes to switch retailers, and remote meter reading.

consultation paper in December 2015 (B2B integration), so the final form of these changes is not entirely known.²³⁷ However, these obligations are intended to have the same implementation date as metering contestability (1 December 2017) and AusNet Services (and other distributors) submitted that they are inextricably linked to the metering contestability changes and that implementing them together will provide efficiencies.²³⁸ Given the SMP/B2B integration is closely linked to the metering requirements we are satisfied that AusNet Services will need to meet these regulatory obligations.

Assessment of distribution pricing, metering, and SMP estimate

In relation to the metering/SMP and pricing projects, AusNet Services did provide a cost breakdown between each of its Power of Choice projects but in general we note that the information provided was very high level because AusNet Services' advised that its cost estimation of its projects is only at the preliminary stage.²³⁹ As can be seen in Table 6.16, we observed that AusNet Services' proposed costs for these projects are substantially higher than those proposed by other Victorian distributors which included similar projects in their revised proposals.

Table 6.16 Range of forecast costs for metering contestability, SMP/B2B integration and distribution pricing projects

Project	AusNet Services	Range of other distributors	
Network pricing	\$5.86 million	\$2.71-2.79 million	
Metering contestability	\$27.80 million	\$14.25-17.50 million	
SMP/B2B integration	\$6.57 million	\$2.08-3.69 million	
Total	\$40.23 million	\$19.04-\$23.98 million	

Source: AER analysis.

In AusNet Services' revised proposal, it made some general comments about its process for ascertaining capex required for the Power of Choice reforms. AusNet Services submitted that DB Results had provided it with a report and recommendations that "uncovered significant impacts to core ICT systems arising from the Power of Choice reforms". It noted that DB Results recommended developing a fit for purpose metering solution with a cost range of \$71–\$83 million but AusNet Services has

²³⁷ AEMC, Final advice: Implementation advice on the shared market protocol, 8 October 2015. AEMC, Consultation paper: National Electricity Amendment (Updating the electricity B2B framework) Rule 2015, 17 December 2015.

²³⁸ AusNet Services, AER information request - AusNet Services - #036 - IT capex for Power of Choice [email to AER], 17 February 2016, pp. 5–6.

²³⁹ AusNet Services, Electricity Distribution Price Review 2016–20: Revised Regulatory Proposal: Power of Choice program, 6 January 2016, pp. 23–31. AusNet Services, AER information request - AusNet Services - #042- IT capex and opex for Power of Choice [email to AER], 3 March 2016, p. 2.

instead opted for a different approach, to extend or customise its existing metering solution. It further submitted that it had used a "bottom up" costing model and the cost models represent the most current view of the capex required. However, as AusNet Services acknowledged, its bottom up forecasting approach would typically apply both internal and external resource bands to benchmark costs, with the latter based on quotes from external vendors.²⁴⁰ It has not yet obtained those external quotes and therefore its bottom up forecasting is incomplete and not market tested.

Given the lack of substantiation for its costs, we requested further information from AusNet about the preliminary nature of its cost models noting that its costs were higher than those proposed by all other Victorian distributors to meet the same Power of Choice reforms. We sought further information from AusNet Services on the details and justification for its Power of Choice expenditure on three occasions.²⁴¹ We sought AusNet Services' comment on whether the average cost of the other four Victorian distributors would reasonably reflect the capex requirements to meet these regulatory obligations.

In response, AusNet Services did not agree that the average of the other distributors' costs would reasonably reflect its costs. It acknowledged that there may be some similarities across distributors with respect to Power of Choice software and hardware related to metering and billing solutions. However, AusNet Services submitted that its systems are different to other distributors and therefore that the basis of its Power of Choice costs are very different to those distributors.

It submitted that as part of its Power of Choice program, it is updating systems that other distributors have already updated or will update in the coming period, but not as part of their Power of Choice programs.²⁴² By way of example, AusNet Services stated that some distributors have already completed or have obtained funding in our preliminary decision for changes to enterprise solutions to support Power of Choice capabilities. For example, CitiPower and Powercor's ICT includes an amount to introduce a customer relationship management system.

AusNet Services further submitted that the extension of customers and billing systems account for a significant proportion of AusNet Services' proposed capex allocated under its Power of Choice capex (\$22.3 million). Its proposed costs include changes to its billing system to integrate to SAP and by contrast, other distributors with mature SAP based systems would presumably face lower Power of Choice implementation costs.

²⁴⁰ AusNet Services, AER information request - AusNet Services - #042 - IT capex and opex for Power of Choice [email to AER], 8 March 2016, pp. 1–2.

²⁴¹ AusNet Services, AER information request - AusNet Services - #036 - IT capex for Power of Choice [email to AER], 17 February 2016. AusNet Services, AER information request - AusNet Services - #042 - IT capex and opex for Power of Choice [email to AER], 8 March 2016. AusNet Services, AER information request - AusNet Services - #057 - capex - Power of Choice [email to AER], 13 April 2016.

²⁴² AusNet Services, AER information request - AusNet Services - #057 - capex - Power of Choice [email to AER], 13 April 2016, pp. 2–4.

We acknowledge that in assessing AusNet Services proposal, we should take into account any expenditure that we have approved for ICT expenditure in total. We note that CitiPower and Powercor's proposed Power of Choice capex is lower than AusNet Services'. AusNet's view is that this may reflect an upgrade to CitiPower/Powercor's customer/billing system that has been included in our assessment of ICT capex (excluding Power of Choice capex).

However, we note that in contrast to AusNet Services, improving the customer/billing system is one of many reasons for CitiPower/Powercor's upgrade. Further, CitiPower/Powercor's upgrade of these systems is supported by detailed cost benefit analysis. AusNet Services' proposal does not appear to be directly comparable to what CitiPower/Powercor and those of the other four distributors proposed as part of its general ICT upgrade, as distinct from what is required to address the Power of Choice reforms. Therefore, based on the information available to us, we consider that AusNet Services has not established that that this is a key distinction between its circumstances and those of CitiPower/Powercor or any of the other distributors As such we have given little weight to AusNet Services' submission in that it does not provide support for AusNet's higher costs. However, to the extent that it may point to some variation between the distributors, we have considered this in our alternative estimate.

AusNet Services submitted that "Other DNSPs which already have mature SAP-based billing systems would presumably face lower Power of Choice implementation costs."²⁴³ AusNet Services did not submit any evidence to justify this presumption, or detail the additional specific costs it will incur due to this difference. As with the above point, we consider that we cannot give this submission much weight because of the absence of more detailed costing from AusNet Services to support the assertion that its system requires a significant level of capex to bring it into line with the systems of other distributors and/or that an upgraded system will lead to lower implementation costs. However, we have taken AusNet's submission on this point into account in our consideration of an alternative estimate.

By contrast, we consider that there is sufficient information to conclude that the majority of AusNet Services costs are capitalised labour costs to amend existing systems and processes. This is similar to the nature of the costs that the other Victorian distributors expect to incur.²⁴⁴ This provides for a degree of comparability for assessing the proposals submitted by all of the Victorian distributors. As noted above, AusNet Services' approach to forecasting also uses benchmarking to derive its forecast. AusNet Services engaged a consultant to provide an estimate of preliminary costs associated with the implementation of the Power of Choice program. AusNet Services submitted that industry benchmark experience for similar projects in relation

²⁴³ AusNet Services, AER information request - AusNet Services - #057 - capex - Power of Choice [email to AER], 13 April 2016, p. 4.

²⁴⁴ Jemena, JEN AER IR#036, 18 February 2016, pp. 3–4. United Energy, AER United Energy info request #43 - IT capex for Power of Choice, 18 February 2016, p. 1. Accenture Strategy on behalf of CitiPower and Powercor, Metering Contestability - Process and System Impacts, 23 October 2015, pp. 11–12.

to labour rates will be used to develop these estimates. AusNet Services advised that it expects its consultant's report to be available by June 2016.²⁴⁵

Overall, in the absence of fully supported costings, and without other evidence to justify AusNet Services' significantly higher costs, we are not satisfied that AusNet Services' proposed costs meet the capex criteria.

In determining our alternative estimate for these projects we have adopted an estimate that:

- has regard to the proposed capex of all other Victorian distributors where they
 proposed capex for a comparable project to address the same regulatory
 obligation²⁴⁶
- excludes AusNet Services' proposed capex because our assessment has revealed that AusNet Services' proposed capex for its projects was significantly higher than that proposed by all other distributors, without justification.

We consider that, on balance, the forecast capex at the top of the range proposed by the other distributors at this stage represents the best available information for estimating the capex required to meet the same regulatory obligations.

We are satisfied this reasonably reflects prudent and efficient costs because the forecasts of all distributors, with the exception of AusNet Services, are closely aligned and sit within a narrow band for each of these same projects and this may be expected given capitalised labour is the major cost component for all Victorian distributors forecasts.

We consider an estimate at the top end of the range is justified as we recognise that there is likely to be some degree of difference between AusNet Services and the other distributors. AusNet has not been able to quantify or fully substantiate these differences, but they have broadly established that there are some differences that may impact on costs.

This results in an alternative estimate for AusNet Services of \$24 million for ICT capex to address AusNet Services' Power of Choice changes. This value is composed of \$2.79 million for distribution network pricing arrangements, \$17.50 million for metering contestability, and \$3.69 million for SMP/B2B integration.

Embedded networks

The embedded networks rule change will reduce the barriers to embedded network customers (for example, tenants in shopping centres) accessing offers from electricity retailers. While the AEMC did make a final rule change on embedded networks in

²⁴⁵ AusNet Services, AER information request - AusNet Services - #042 - IT capex and opex for Power of Choice, 8 March 2016, p. 2.

²⁴⁶ All the Victorian distributors proposed comparable projects for metering contestability and SMP/B2B projects; all distributors excepting Powercor/CitiPower proposed comparable projects for network pricing arrangements.

December 2015, the market procedures have not yet been made.²⁴⁷ AusNet Services submitted that:

- the draft market procedures must be available before the design phase can commence; and
- the final market procedures, which are not expected until August 2016 must be available before the design phase can be completed and implementation can commence.²⁴⁸

Therefore, as the market procedures have not been finalised we consider that any costs related to this regulatory obligation are not reasonably likely to satisfy the capex criteria. Once the market procedures are finalised, AusNet Services may be able to apply for a pass through for these costs during the regulatory control period, subject to the cost materiality threshold.

Demand response mechanism

The demand response mechanism project is in response to a rule change request by the COAG Energy Council to create a mechanism that would allow the demand side to participate in the wholesale market. The AEMC issued a consultation paper on this in November 2015.²⁴⁹ This proposed rule change is therefore at an early stage and as such there are no regulatory obligations on the distributors. Therefore we have not included an amount for this proposed rule change in our alternative estimate. AusNet Services may be able to apply for a pass through for the costs of any regulatory obligations that may arise during the regulatory control period, subject to the cost materiality threshold.

²⁴⁷ National Electricity Amendment (Embedded Networks) Rule 2015 No. 15.

²⁴⁸ AusNet Services, *Electricity Distribution Price Review 2016–20: Revised Regulatory Proposal: Power of Choice program*, 6 January 2016, p. 47.

²⁴⁹ AEMC, Consultation Paper: National Electricity Amendment (Demand Response Mechanism and Ancillary Services Unbundling), 5 November 2015.

C Demand

The expected maximum demand is a key input into a distributor's forecast capex and opex and to our assessment of that forecast expenditure.²⁵⁰ This attachment sets out our decision on AusNet Services' forecast maximum demand for 2016–20.²⁵¹

Forecast system maximum demand provides a high level indication of the need for expenditure on the network. Forecasts of increasing system demand generally signal an increased requirement for growth capex, and the converse for forecasts of stagnant or falling system demand.²⁵² Accurate, or at least unbiased, demand forecasts are important inputs to ensuring efficient levels of investment in the network. For example, overestimates of expected demand may lead to inefficient expenditure as distributors install unnecessary capacity in the network.

C.1 AER position

We are satisfied that the maximum demand forecast for the 2016–20 period proposed by AusNet Services, in its revised proposal (January 2016), is a realistic expectation of demand.²⁵³ In coming to this view, we take into account the following:

- AusNet Services' revised maximum demand forecast is generally consistent with growth in maximum demand between 2010 and 2015, using weather adjusted historical demand. We discuss this in in section C.4.
- Recent revisions to the maximum demand forecast from the Australian Energy Market Operator (AEMO) give support to AusNet Services' revised maximum demand forecast. While AusNet Services forecasts slightly higher maximum demand than AEMO, this is likely driven by updated population forecast data and some differences in methodology. We discuss this in sections C.4 and C.6.
- AusNet Services' demand forecasting methodology has several strengths and is capable of producing realistic demand forecasts. We identify a potential flaw within AusNet Services' methodology such that it may potentially over-estimate its maximum demand forecasts. However, we do not consider this leads led to any material overestimation for the 2016–20 period. We discuss this in section C.5.

This decision is made for AusNet Services' total system maximum demand forecast and does not specifically consider localised demand growth (spatial demand) that may drive the need for specific growth projects or programs. We consider the relevant capex growth projects that are driven by localised maximum demand in section B.2.

²⁵⁰ NER, cll. 6.5.6(c)(3) and 6.5.7(c)(3).

²⁵¹ In this appendix, demand refers to summer peak demand (MW), unless otherwise indicated. The demand data reviewed in this section are non-coincident summer peak demand data with probability of exceedance (POE) of 10 percent and has been weather adjusted and summated at the transmission connection point level.

²⁵² Other factors, such as network utilisation, are also important high level indicators of growth capex requirements.

²⁵³ NER, cll. 6.5.6(c)(3) and 6.5.7(c)(3).

C.2 AER approach

Our consideration of AusNet Services' revised maximum demand forecast draws upon:

- AusNet Services' revised proposal
- AEMO's recently released demand forecasts²⁵⁴
- a report by our internal economic consultant, Dr Darryl Biggar, on AusNet Services' revised demand forecast²⁵⁵
- stakeholder submissions in response to AusNet Services' revised proposal (as well as submissions made in relation to the Victorian distribution determinations)

In our preliminary decision, we were not satisfied that AusNet Services' initial maximum demand forecast was a realistic expectation of demand over 2016–20.²⁵⁶

Our analysis considered AusNet Services' initial maximum demand forecast did not appear to account for observed changes in the electricity market such as the strong uptake of solar PV, changing behaviour in consumers' use of electricity and energy efficiency measures, which suggest that electricity demand will not grow at a strong level last seen prior to 2009.

AusNet Services' demand forecasting methodology in effect estimates maximum demand using data and input assumptions from very different market conditions (in 2009). We were not satisfied that this was a realistic expectation of future demand over the 2016–20 period since we were not confident that the drivers used in AusNet Services' model are able to fully capture the changes in demand in recent years.

We considered independent forecasts from AEMO better explained the actual demand pattern seen on all distributors' networks. This was because it did not assume a fixed structural relationship between demand and demand drivers over a long period and, instead, placed greater reliance on industry knowledge and judgement.

At the time of our preliminary decision, AusNet Services (and the other Victorian electricity businesses) were in the process of updating their demand forecasts as part of the 2015 distribution annual planning report (DAPR). In addition, AEMO updated their most recent Victorian maximum demand forecast, which was too late to be considered as part of our preliminary decision. Hence, we stated that we would consider updated demand forecasts and other information (such as AEMO's most recent demand forecasts) in our final decision.

²⁵⁴ AEMO, 2015 AEMO Transmission Connection Point Forecasting Report, September 2015.

²⁵⁵ Dr Darryl Biggar, *Maximum demand forecasts: response to AusNet Electricity Services revised regulatory proposal*, February 2016.

²⁵⁶ AER, Preliminary decision AusNet Services distribution determination – Attachment 6 – Capital Expenditure, October 2015, p. 6-93.

C.3 AusNet Services' revised proposal

AusNet Services' revised maximum demand forecast is higher than the maximum demand forecast provided in its initial regulatory proposal. AusNet Services attributes this to updated population and household forecasts from the Victorian Department of Environment, Land, Water and Planning (the DELWP forecasts), which were released after our preliminary decision.²⁵⁷ The maximum demand is now forecasted to start at a higher level than was forecasted initially. However, AusNet Services has maintained the same demand growth rate as it initially forecasted.

Figure 6.10 and Table 6.17 shows AusNet Services' revised maximum demand forecast for each year of the 2016–20 regulatory control period. AusNet Services' revised forecast is generally consistent with growth in maximum demand between 2006 and 2015, using weather adjusted historical demand. Figure 6.10 and Table 6.17 also provides AEMO's latest system demand forecast for its network, which shows that AusNet Services forecasts maximum demand to grow at a similar rate to AEMO.

AusNet Services also submitted that the data provided in its initial regulatory proposal contained incorrect demand forecasts, which were considerably higher than the correct forecasts.²⁵⁸ Figure 6.10 shows the corrected forecast from the initial regulatory proposal. This corrected forecast shows there was a large degree of consistency between the 2014 forecasts from AEMO and AusNet Services. This consistency has been maintained in the 2015 updates from both AEMO and AusNet Services.

²⁵⁷ AusNet Services, *Revised regulatory proposal 2016–20*, January 2016, pp. 1-3 to 1-4, and 1-13.

²⁵⁸ AusNet Services, *Response to AER information request – VIC EDPR – IR#029* [email to AER], 20 Jan 2016, pp. 1–3.

Figure 6.10 Maximum system demand (Non-coincident, 10% PoE, MW)



Source: AER analysis, AusNet Services, Reset RIN 2016–20, April 2015; AusNet Services, revised Reset RIN 2016–20, January 2016; AusNet Services response to AER information request 029, 20 January 2016; AEMO, Dynamic interface for connection points in Victoria, September 2014; AEMO, Dynamic interface for connection points in Victoria, 22 December 2015; AusNet Services, Economic Benchmarking RIN (Actual) for 2006–13; AusNet Services, Economic Benchmarking RIN (Actual) for 2014.

Table 6.17 Maximum system demand (Non-coincident, 10% PoE, MW)

	2016	2017	2018	2019	2020	Average annual growth (2016–20)
Regulatory Proposal	2005	2032	2059	2084	2109	1.27%
Revised Regulatory Proposal	2111	2142	2170	2196	2222	1.29%
AEMO connection point forecast (2014)	2043	2032	2021	2013	2034	-0.12%
AEMO connection point forecast (2015)	2087	2076	2088	2115	2149	0.74%

Source: AER analysis, AusNet Services, Reset RIN 2016–20, April 2015; AusNet Services, revised Reset RIN 2016–20, January 2016; AusNet Services response to AER information request 029, 20 January 2016; AEMO, Dynamic interface for connection points in Victoria, September 2014; AEMO, Dynamic interface for connection points in Victoria, 22 December 2015.

AusNet Services has developed its own demand forecasting methodology. AusNet Services' regulatory proposal provided a brief summary of its approaches to:

• demand drivers

Note: The actual demand for 2015 is not yet available from AusNet Services.

- use of smart meter data
- accounting for economic conditions such as incomes and electricity prices
- projections of customer numbers by tariff class and customer growth rates per feeder (block loads are accounted for in these forecasts)
- and post model adjustments for changes in demand efficiency of new dwellings.²⁵⁹

In its revised proposal, AusNet services incorporated into its maximum demand forecasts updated population and household forecasts from the Victorian Government released in August 2015.²⁶⁰ Once incorporated, the maximum demand growth rate in the initial proposal increases from 1.1 per cent per annum to 1.3 per cent per annum for the 2016–20 regulatory period.²⁶¹

AusNet did not accept our preliminary decision on its demand forecasts. In particular, AusNet: ²⁶²

- disagreed with our preliminary decision that its forecast is not reasonable
- considered we used outdated AEMO demand growth forecasts
- considered AEMO's latest forecasts are aligned to its forecasts
- disputed some of our views on its demand forecasting methodology.

C.4 Demand trend analysis

Our first step in examining AusNet Services' forecast of maximum demand is to look at whether the forecast is consistent with, or explained by, long term demand trends and changes in the electricity markets. As set out below, we consider that AusNet Services' revised demand forecast is consistent with the underlying historical demand trend since 2011.

We have examined AusNet Services' actual demand trend using weather adjusted historical demand.²⁶³ As shown in Figure 6.10, using AEMO's actual weather adjusted demand data for AusNet Services, it can be seen that the actual underlying demand trend grew fairly strongly until 2011 and then flattened until 2015. AusNet Services' revised forecast for the 2016–20 period is generally consistent with the underlying historical demand trend since 2011.

As we explained in our preliminary decision, we consider that changes observed in the electricity market and the way energy is consumed in recent years (for example, the strong uptake of solar PV, changing customer behaviours and energy efficiency

²⁵⁹ AusNet Services, *Regulatory Proposal 2016–20*, 30 April 2015, pp. 73–81.

²⁶⁰ AusNet Services, *Revised Regulatory Proposal 2016–20*, January 2016, p. 1-2.

²⁶¹ AusNet Services, *Revised Regulatory Proposal 2016–20*, January 2016, p. 1-2.

AusNet Services, *Revised Regulatory Proposal 2016–20*, January 2016, pp. 1-2, 1-8 to 1-13.

²⁶³ Weather adjustment of actual demand data removes the effect of random weather factors on observed electricity demand.

measures) suggests that the strong positive demand growth seen in AusNet Services' network prior to 2009 is unlikely to return in the short to medium term. AusNet Services' revised demand forecast is consistent with this analysis because it forecasts similar levels of demand growth as experienced since 2011.

As noted previously, AusNet Services' revised forecast is slightly higher than its original forecast. AusNet Services attributes its forecast of strong demand growth to the DELWP forecasts of population and household growth in specific areas of its network. These regions of forecast growth include the local government areas of Whittlesea, Casey and Cardinia, along with the Baw Baw Shire which is outside of metropolitan Melbourne. We consider forecasts from the Victorian Department of Environment, Land, Water and Planning to be reliable.

Consistent with our preliminary decision, we have also compared AusNet Services' revised maximum demand forecast with AEMO's connection point forecast for AusNet Services' network in this determination.²⁶⁴ AEMO's 2015 connection point forecast show a slightly higher starting demand and a slightly higher demand growth rate for AusNet Services' network than it previously forecasted. AEMO attributes the higher demand growth forecast to population and economic growth in Victoria, and some changes in forecasting methodology.²⁶⁵ AEMO's 2015 connection point forecast also exhibits an upward sloping pattern similar to AusNet Services' revised demand forecast.

AusNet Services considers that AEMO's 2015 connection point forecast supports its initial demand forecast because it forecasts similar levels of demand growth (there is only a 0.2 per cent per annum difference between the two forecasts).²⁶⁶ It also submits that the fact that AEMO's 2015 forecasts are closer to AusNet Services' forecasts than AEMO's 2014 forecast reinforces this position. We agree and consider that AEMO's 2014 forecasts lend considerable support to AusNet Services' initial demand forecasts because it forecasts almost identical levels and growth of maximum demand over 2016–20.

AEMO's 2015 updated demand forecast also estimates similar levels of demand growth to AusNet Services' revised demand forecast. This lends support to AusNet Services' revised forecast. The primary difference between AusNet Services' initial and revised forecasts is the inclusion of updated population forecasts. This may adequately explain the difference in the level of demand forecasts between AEMO and AusNet Services' revised forecasts because updated population forecast were not available to

²⁶⁴ We have used AEMO's 2015 connection point forecast. This forecast was not available to us and AusNet Services at the time we made our preliminary decision (for the preliminary decision, we compared AusNet Services' initial demand forecast with AEMO's 2014 connection point forecast). See AEMO, 2015 AEMO transmission connection point forecasting report for Victoria, September 2015.

AEMO, 2015 AEMO transmission connection point forecasting report for Victoria, September 2015, p. 8.

²⁶⁶ AusNet Services considers that the small difference AusNet Services' and AEMO may be attributed to the different industrial outlook for the region served by the Morwell Terminal Station. See AusNet, Revised regulatory proposal 2016–20, January 2016, p. 1-6.

AEMO at the time of preparing its 2015 updated forecasts). However, as set out in section C.6, we consider that the difference may also be explained by the methodology adopted by AusNet Services.

Generally speaking, we consider that AEMO's 2015 connection point forecast lend support to AusNet Services' revised demand forecast. We consider AEMO's 2015 connection point forecast and its comparison to AusNet Services' revised demand forecast in more detail in section C.6.

In our preliminary decision, we compared AusNet Services' demand forecast with AusNet Services' actual demand during the 2006 to 2015 period. For our final decision we have enhanced this analysis by using weather adjusted demand data. This is because random weather factors have a strong impact on peak electricity demand (such as the peaks and troughs in demand between 2009 and 2014). This enables us to draw more robust inferences about changes in the underlying level of demand for electricity from the historic data.

Using non-weather adjusted actual demand, we observed that AusNet Services' actual demand grew steadily from 2006 to 2009, it then flattened and declined from 2009 to 2012. We noted that the decline in 2009 from historical demand growth has also been recorded for Victoria and for the NEM. While there was some growth in demand between 2013 and 2014, we concluded that this did not necessarily indicate a return to longer term growth in demand.²⁶⁷ Having re-evaluated historical demand trends using weather adjusted demand data, AusNet Services' historical demand trend did not show a significant decline in demand growth between 2009 and 2012.

In its submission on our preliminary decisions for the Victorian electricity distributors, the Victorian Government notes that the electricity distributors may seek additional expenditures through revised demand forecasts.²⁶⁸ We will review the impact of AusNet Services' revised demand forecast on augex in section B.2.

C.5 Forecasting methodology analysis

AusNet Services' demand forecasting methodology has produced a forecast for the 2016–20 period that is consistent with the trend in maximum demand over recent years, and closely aligns with independent demand forecasts prepared by AEMO. At a high-level, this suggests that AusNet Services' methodology is sound and capable of producing realistic forecasts. We have assessed AusNet Services' demand forecasting methodology in more detail to support this high-level analysis and examine any remaining differences between AusNet Services' and AEMO's forecasts.

²⁶⁷ AER, *Preliminary decision AusNet Services distribution determination*, Attachment 6 – Capital Expenditure, October 2015, pp. 6-96 to 6-97.

²⁶⁸ The Victorian Government, Submission to the AER on the Victorian electricity distribution network service providers' preliminary distribution determinations for 2016–20, January 2016, p.1.
In the preliminary decision, we engaged our internal economic consultant, Dr Darryl Biggar, to provide advice on AusNet Services' forecasting methodology.²⁶⁹ Dr Biggar acknowledged that AusNet Services' methodology is econometrically sophisticated, and has been prepared in good faith using tools which have proven robust and effective in the past.²⁷⁰ In particular, Dr Biggar considered AusNet Services' approach of using 'S-curves' should reduce the likelihood of over-estimating growth in regions that are approaching their natural growth limits. AusNet Services has also explicitly recognised that new customers tend to be more energy efficient than existing customers.²⁷¹

However, Dr Biggar's 2015 report identified the following flaws with AusNet Services' forecasting methodology:

- AusNet Services' methodology tends to over-estimate POE10 and POE50 forecasts because only the highest maximum demand at a given temperature is considered out of a pool of historical data.²⁷²
- AusNet Services' model implicitly forecasts a return to the temperature-demand relationship that occurred in 2009. This approach effectively locks in the relationship between maximum demand and temperature to past market conditions. If there are changes in the market which are not captured in the forecasting model, the model will not provide a reliable guide to future outcomes.²⁷³
- AusNet Services' approach to estimating the temperature-demand relationship combines data from many different years and may not reflect a stable, robust relationship, especially since other evidence suggests that this curve has been shifting down over time due to investment in solar PV and increasing energy efficiency.²⁷⁴

We concluded that AEMO's methodology was a better model for forecasting demand for AusNet Services' network for 2015–20 than AusNet Services' model.²⁷⁵ We considered that the key difference between the results from AusNet Services' and AEMO's forecasts is whether the relationship adopted between demand and temperature accurately reflects fundamental long term trends. We do not consider

²⁶⁹ Dr Darryl Biggar, 2015 Victorian Electricity Distribution Pricing Review: An Assessment of the Vic DNSP's Demand Forecasting Methodology, 25 September 2015.

AER, Preliminary decision AusNet Services distribution determination, Attachment 6 – Capital Expenditure, October 2015, p. 6-104.

²⁷¹ AER, Preliminary decision AusNet Services distribution determination, Attachment 6 – Capital Expenditure, October 2015, p. 6-104.

AER, Preliminary decision AusNet Services distribution determination, Attachment 6 – Capital Expenditure, October 2015, p. 6-103.

²⁷³ AER, *Preliminary decision AusNet Services distribution determination*, Attachment 6 – Capital Expenditure, October 2015, p. 6-103.

AER, Preliminary decision AusNet Services distribution determination, Attachment 6 – Capital Expenditure, October 2015, p. 6-104.

²⁷⁵ AER, *Preliminary decision AusNet Services distribution determination*, Attachment 6 – Capital Expenditure, October 2015, p. 6-105.

AusNet Services' model appropriately reflects the changes we have observed in the electricity market. As stated previously, we are open to AusNet Services submitting an alternative forecast that captures the changes that we are observing for the electricity market in Victoria and recent declines in demand.

It should be recognised that our conclusions drew upon AusNet Services' initial maximum demand forecast, which contained errors and was considerably higher than the correct forecast (as explained in section C.3). After correcting for this error, AusNet Services' initial demand forecast was more consistent with recent trend in demand changes and the changes in observed in the electricity market.

In its revised proposal, AusNet Services submits that:

- It disagrees with the AER's conclusion that AusNet Services had not reflected the changes in relationship between temperature and demand overtime. AusNet Services considers there is a misunderstanding of its forecasting method.²⁷⁶
- Its modelling does not assume that there are no further energy efficiency developments from 2020 onwards.²⁷⁷
- The AER has incorrectly used raw actual demand to detect a downward trend in maximum demand between 2009 and 2012.²⁷⁸
- It does not agree with the AER's view that the use of a ten-year period for estimating the impact of weather is inappropriate and a longer time series should be used. AusNet argues that due to the effect of climate change, it is more appropriate to use a recent period to estimate climate impacts rather than periods several decades in the past.²⁷⁹
- AEMO's 2015 forecasts included a significant reduction in the contribution of energy efficiency to maximum demand, which was much more in line with AusNet Services' modelling.²⁸⁰

We have again sought advice from internal economic consultant, Dr Darryl Biggar, on the technical aspects of this material. Dr Biggar examined the updated material provided in AusNet Services' revised proposal and took into account all elements of AusNet Services' methodology previously not considered. Dr Biggar also investigated into criticism of AusNet Services' forecasting methodology set out in our preliminary decision, which AusNet Services disagreed with.²⁸¹

Dr Biggar's 2016 report restated and updated his original conclusions that AusNet Services' forecasting methodology has several strengths, such as:

²⁷⁶ AusNet Services, *Revised regulatory proposal 2016–20*, January 2016, p. 1-8.

AusNet Services, *Revised regulatory proposal 2016–20*, January 2016, p. 1-9.

²⁷⁸ AusNet Services, *Revised regulatory proposal 2016–20*, January 2016, p. 1-10.

²⁷⁹ AusNet Services, *Revised regulatory proposal 2016–20*, January 2016, p. 1-12.

AusNet Services, *Revised regulatory proposal 2016–20*, January 2016, p. 1-12.

²⁸¹ Dr Darryl Biggar, Maximum demand forecasts: response to AusNet Electricity Services Pty Ltd Revised Regulatory Proposal, February 2016, pp. 7–8.

- it uses S-Curves to allow for "saturation" effects over time AusNet Services models the maximum demand and temperature to follow an S-shape rather than a straight line. This allows the possibility that the demand-temperature relationship may flatten out at extreme temperatures.²⁸²
- It explicitly models the effect of energy efficiency on new and existing customers by assuming that new customers are investing in more efficient technologies than existing customers.²⁸³

Dr Biggar also found that our primary criticisms of AusNet Services' methodology were valid. In our preliminary decision we were concerned that AusNet Services' forecasting methodology, which pooled ten-years of historical data to derive the temperature and maximum demand relationship, would over-estimate the maximum demand. Dr Biggar acknowledged that AusNet Services' approach allowed forecast peak demand to reduce over time. However, the approach of pooling demand data over several years in the context of generally declining demand could potentially result in a starting point for peak demand which is an over-estimate.²⁸⁴

In its revised proposal, AusNet Services disagreed with this. AusNet Services considered its forecast incorporates changing demand patterns overtime.²⁸⁵ AusNet Services considered that a sampling period over the past ten years is more likely to reflect future weather conditions, than a longer sampling period, because temperatures have been warming over the last 10 to 15 years.²⁸⁶

Dr Biggar found that the most recent 10 years data includes the summer of 2009 which experienced some very high temperatures. Taken over a longer time period, the summer of 2009 seems to be much hotter than a one-in-ten year event. As a result, using the temperatures from the summer of 2009 in the temperature-demand relationship will tend to over-estimate the POE10 demand. In his 2016 report, Dr Biggar showed that the use of ten-year sampling period may result in an over-estimate of the maximum demand of roughly five per cent.²⁸⁷

Dr Biggar's observations are similar to those drawn by ACIL Allen in their report comparing AusNet Services methodology (commissioned by AusNet Services). ACIL Allen stated:²⁸⁸

²⁸² For detailed discussion of this, see Dr Darryl Biggar, 2015 Victorian electricity distribution pricing review: An assessment of the Vic DNSP's Demand Forecasting Methodology, 25 September 2015, p. 7.

²⁸³ Dr Darryl Biggar, Maximum demand forecasts: response to AusNet Electricity Services Pty Ltd Revised Regulatory Proposal, February 2016, p. 7.

²⁸⁴ Dr Darryl Biggar, Maximum demand forecasts: response to AusNet Services Electricity Services Pty Ltd Revised Regulatory Proposal, February 2016, p. 2.

²⁸⁵ AusNet Services, *Revised regulatory proposal 2016–20*, January 2016, p. 1-8.

AusNet Services, Revised regulatory proposal 2016–20, January 2016, p. 1-11.

²⁸⁷ Dr Darryl Biggar, Maximum demand forecasts: response to AusNet Electricity Services Pty Ltd Revised Regulatory Proposal, February 2016, p. 6.

²⁸⁸ ACIL Allen, Report to AusNet Services, Distribution demand forecasting: Comparison of AusNet Services and ACIL Allen methodologies, 17 April 2015, pp. 15–23.

Temperatures that are unusually high are, by definition, observed infrequently. Therefore, in AusNet Services the S-curve is calibrated to data that are outdated. In practice, the very high temperature observations in the normalisation process are likely to have been observed in 2009, because temperatures that year were extremely high.

This means that AusNet Services methodology does not describe the relationship between very high temperatures and demand to the extent that there may have been changes since 2009. Those changes may be due to changing appliance efficiency or economic growth for example.

The ACIL Allen view was that AusNet Services' POE10 forecast is likely to be biased upwards and recommended that a longer time series of at least 30 years be used to estimate the 10 and 50 POE temperatures.²⁸⁹

We agree with Dr Biggar there remains a potential flaw within AusNet Services' forecasting methodology in the use of a sample of ten-year temperature data. However, as we have previously observed, AusNet Services' demand forecast for the 2016–20 period is consistent with the underlying trend in demand over AusNet Services' network between 2010 and 2014.²⁹⁰ This suggests that any structural flaws within AusNet Services' methodology may still produce realistic forecast over 2016-20.

We are generally satisfied that AusNet Services' methodology is sound and capable of producing realistic forecasts over the 2016–20 period, even in the context of potential overestimation as described above. However, AusNet Services' forecasting methodology should be reviewed over time to ensure that it accurately captures changing patterns in the market over time.

C.6 AEMO forecasts

We have used AEMO's connection level demand forecast as an independent point of comparison to assess AusNet Services' proposed demand forecast. As such AEMO's independent forecast forms a valuable part of our assessment approach.

The Standing Council on Energy and Resources (SCER) first identified the need for AEMO to provide independent demand forecast information to us to facilitate our regulatory process. The SCER recognised this need against the backdrop of declining electricity demand in many regions of the NEM since 2009. As a result, SCER proposed a rule change that would task AEMO with providing demand forecasts to us in a manner which would facilitate our ability to interrogate demand forecasts submitted by network businesses to regulatory processes.

In its rule change determination, the Australian Energy Market Commission (AEMC) noted the need for AEMO's demand forecasts due to potentially significant changes in

²⁸⁹ ACIL Allen, Report to AusNet Services, Distribution demand forecasting: Comparison of AusNet Services and ACIL Allen methodologies, 17 April 2015, pp. 15–23.

²⁹⁰ Consistent with AusNet Services' suggestion, we enhanced our analysis with the use of weather adjusted actual demand data for the 2006 to 2014 period. See AusNet, Revised regulatory proposal 2016–20, January 2016, pp. 1-10 to 1-11.

the types and location of electricity generation, technology development and patterns of demand which will lead to uncertainty for network investment. The AEMC concluded that AEMO's connection level demand forecasts will reduce these investment risks borne by consumers by providing an alternative forecast for comparison.²⁹¹

Consistent with policy intention of the development of AEMO's demand forecasting function, we have compared an NSP's demand forecast with AEMO's independent forecast. We have applied this approach in all determinations since the rule change came into effect, starting with the NSW, ACT and Queensland electricity distribution businesses.

We used AEMO's 2015 connection point forecast in our comparison with AusNet Services' forecast in sections C.3 and C.4. As we explained in these sections, AEMO's 2015 updated connection point forecast lends support to AusNet Services' revised demand forecast.²⁹²

In two separate submissions, Origin Energy and AGL express support for our use of the latest AEMO connection point forecast in our assessment process.²⁹³

AusNet Services supports AEMO's developments of its forecasting methodology and notes AEMO has been consulting with industry stakeholders on improving its demand forecasting methodology, which it has found to be very useful.²⁹⁴ In particular, AusNet Services notes that AEMO has made the following improvements to its forecasting methodology through its 2015 connection point forecast:²⁹⁵

- AEMO's 2015 forecast includes a significant reduction in the contribution of energy efficiency on maximum demand. AusNet Services notes that while it continues to disagree with AEMO on the approach to modelling the impact of solar PV on maximum demand, AEMO's improvement is now more in line with its own modelling approach.
- AEMO's 2015 forecast includes a new feature of cubic models to forecast nonlinear trends. AusNet Services considers that its approach of using non-linear models to produce the "S-curves" for customer and temperature-demand relationships pre-dates AEMO's technique.

²⁹¹ COAG Energy Council Senior Committee of Officials, Australian Energy Market Operator access to information for developing demand forecasts, pp. 3–4.

²⁹² AEMO's 2015 forecast shows higher maximum demand and demand growth rate than the 2014 forecast. AEMO attributes the increased demand forecast to population and economic growth in Victoria, as well as improvements to its forecasting methodology through adjustments for historical rooftop PV and the reconciliation process. See AEMO, 2015 AEMO transmission connection point forecasting report for Victoria, September 2015, pp. 4, 8.

²⁹³ Origin Energy, submission to AER preliminary decision Victorian networks, 6 January 2016, p.2. AGL, submission to AER preliminary decision on the Victorian electricity distribution network regulatory proposals, 7 January 2016, p. 1.

²⁹⁴ AusNet Services, *Revised regulatory proposal 2016–20*, January 2016, p. 1-12.

²⁹⁵ AusNet Services, *Revised regulatory proposal 2016–20*, January 2016, p. 1-12.

AusNet Services also notes that the updated DELWP forecasts were not available to AEMO at the time of preparing its 2015 connection point forecast. AusNet Services considers that it is likely AEMO will incorporate the updated DELWP forecasts in its 2016 connection point forecast.²⁹⁶

The Victorian Energy Consumer and User Alliance (VECUA) submits that the Victorian distributors' maximum demand forecasts show much higher growth rates than AEMO's projections. The VECUA considers that AEMO has over-estimated its energy forecasts in recent years and considers that AEMO's latest forecasts may also be over-estimated. The VECUA considers that the AER should substitute the distributors' demand and energy forecasts with credible independent forecasts.²⁹⁷

While we note VECUA's observations, we consider that AEMO's connection point forecasts are different to energy forecasts provided in its National Electricity Forecasting Report (NEFR) because they are forecasted at the connection point level. The SCER also intended for us to use AEMO's connection point forecasts as an independent source for comparison against DNSPs' demand forecasts.

While this is a new forecast, we have found this to be a useful tool in our recent determinations for the NSW, ACT and Queensland electricity distribution businesses. As such, we will continue to use AEMO's connection point forecasts in this determination. We understand that AEMO will continue to update and improve its methodology over time, including in response to feedback from the businesses in the NEM and other stakeholders. Ultimately the test of accuracy of any forecast will be its performance overtime in predicting actual demand.

²⁹⁶ AusNet Services, *Revised regulatory proposal 2016–20*, January 2016, p. 1-13.

²⁹⁷ The Victorian Energy Consumer and User Alliance (VECUA), submission to the AER on AER preliminary 2016–20 revenue determinations for the Victorian DNSPs Developed by Hugh Grant, Excecutive Director, ResponseAbility, 6 January 2016, pp. 26–27.

D Contingent projects

D.1 Bushfire Mitigation Contingent Projects

In its initial proposal AusNet Services noted that new regulations being developed by the Victorian Government would result in the need for additional capital expenditure in the 2016–20 regulatory control period. AusNet Services proposed to address this need through pass through events. We did not agree with AusNet Services' proposal. Instead, we considered the changed requirements should be treated as a contingent project.

In its revised regulatory proposal AusNet Services have sought to amend their approach as follows:

AusNet Services proposes a contingent project relating to an expenditure program to reduce the likelihood that powerlines forming part of its electricity distribution network start bushfires. The program is required both to comply with a new regulatory obligation or requirement, and will improve the reliability and security, and the safety, of the distribution system.²⁹⁸

Although AusNet Services entitle their project 'Installation of REFCLs', we prefer the title 'Bushfire Mitigation' for this contingent project. This maintains consistency with the regulatory event which will trigger this need, reflects the amendments we have made to incorporate 'Declared Areas' work in the contingent project and maintains consistency with the equivalent project to be undertaken by Powercor.

In its revised proposal AusNet Services has agreed the projects be treated as contingent rather than pass through but has not accepted the AER's draft trigger event. AusNet Services has proposed an alternative wording which AusNet Services considers will improve the interpretation of the trigger event for each contingent project. We have not accepted AusNet Services' proposed trigger event as proposed and have amended it as set out in a later section. We discussed this amendment with AusNet Services on 11 March 2016. AusNet Services accepted the proposed amendment.

D.1.1 Assessment of AusNet Services' proposal

Based on the evidence submitted by AusNet Services and other information before us, we are satisfied that the bushfire mitigation contingent projects are reasonably required to maintain the reliability and safety of the network and to comply with applicable regulatory obligations or requirements and would be a prudent and efficient investment in the network.

In summary, we consider that:

²⁹⁸ AusNet Services, *Revised Regulatory Proposal 2016–2020*, January 2016, pp. 3-18 to 28.

- Subject to the amendments noted in this determination, AusNet Services' bushfire mitigation project satisfies the requirements of clause 6.6A.1(b) of the NER
- We consider that the costs of meeting the requirements for Declared Areas are too uncertain for that obligation to be treated as capex under clause 6.5.7
- We consider that the Declared Areas obligation should also be treated as a contingent project
- AusNet Services' proposed bushfire mitigation contingent project is to address future obligations associated with the pending Bushfire Mitigation Regulations Amendment 2016 (Vic) which is intended to implement recommendation 27 of the Victorian Bushfires Royal Commission (VBRC). We consider this event is probable within the regulatory control period but the timing is uncertain
- After further discussion with AusNet Services we have agreed to implement three contingent projects in lieu of the tranches proposed by AusNet Services, each sized to meet the materiality criteria set in rule 6.6A.1(b)(2)(iii)
- AusNet Services' proposed contingent project capex will be required to maintain the reliability and safety of its network and to comply with applicable regulatory obligations or requirements when the regulations are made.

For these reasons, we accept AusNet Services' proposed capex for the bushfire mitigation program reasonably reflects the capex criteria, subject to the amendment made to divide the contingent project into three contingent projects. The total forecast set for this purpose is \$156.7 million (\$2016). These reasons are discussed further below.

D.1.2 Assessment of AusNet Services' proposed trigger event

We have considered AusNet Services' proposed trigger event as set out in their revised proposal.²⁹⁹ We have rejected AusNet Services' proposed trigger event and, after discussion with AusNet Services, substituted a suitable trigger event. This is because we were concerned the AusNet Services proposal did not satisfy the NER in a number of respects. The first was that it sought to be a trigger for a single contingent project but approval of the project was to be sought in tranches. In our view, each tranche is a contingent project and must have an associated trigger event.

The earth fault standards project limb of the regulations requires the distributor to undertake a point score assessment of a list of targeted zone substations, modify their Bushfire Mitigation Plan and seek acceptance of the amended plan from ESV. We consider this limb of the proposed trigger event will satisfy the NER requirements for a trigger event to relate to specific locations and not the network in general.³⁰⁰

²⁹⁹ AusNet Services, *Revised Regulatory Proposal 2016–2020*, January 2016, p. 3-26, 27.

³⁰⁰ NER, cl. 6.6A.1(c).

However, we have not accepted AusNet Services' approach to the Declared Areas component of the changed regulations. We therefore consider AusNet Services' trigger event does not adequately address how the location of a Declared Areas project will be established.³⁰¹

As we discuss further in a later section, in the draft regulations the identification mechanism is different from that of the earth fault standards project, but its approval process includes acceptance of an amended Bushfire Mitigation Plan by ESV. We consider this will make formulating an alternative trigger event for Declared Areas feasible. We also consider that the cost uncertainty for Declared Areas projects should be subject to more rigour in the trigger event.

D.1.3 AusNet Services contingent projects

In its initial proposal AusNet Services did not propose any contingent projects. In their revised proposal, AusNet Services proposed a single contingent project in two tranches of \$102.1 million (\$2016) and \$113.6 million (\$2016), respectively. Separately, AusNet Services proposed \$77.1 million (\$2015) replacement capital expenditure for Declared Areas.³⁰² However, as we find that the costs of the Declared Areas project are too uncertain for it to be included in capex under rule 6.5.7, we have determined it should also be part of a contingent project.

Installation of REFCLs - project to ensure polyphase electric line has the required capacity to reduce voltage in the event of a phase-to-ground fault. Approximately \$214 million.³⁰³

There remains substantial uncertainty as to the efficient cost of the Declared Areas program and in the final scope of the planned regulations. We consider a contingent project approach can better address this uncertainty than replacement capex. The need for this project is established by the planned regulations. The regulations will also impose a common governance framework. As discussed in this determination, we are satisfied that the activities can also be subject to a common trigger event.

We note that in support of their revised regulatory proposals, AusNet Services and Powercor each referred to their submission to the Victorian Government consultation on the Regulatory Impact Statement - Bushfire Mitigation Regulations Amendment, November 2015. We have considered these submissions. The submissions from AusNet Services and Powercor each challenge the RIS costings, particularly in relation to the assumptions concerning the cost and number of surge diverters (surge arresters or lightning arresters) that would require replacement when a REFCL is installed.³⁰⁴

³⁰¹ AusNet Services, *Revised Regulatory Proposal 2016–2020*, January 2016, p. 3-26, 27.; NER, cl. 6.6A.1(c)(3).

³⁰² AusNet Services, *Revised Regulatory Proposal 2016–2020*, January 2016, pp. 3-26 and 3-19. These amounts include project management and overhead costs.

³⁰³ AusNet Services, *Revised Regulatory Proposal 2016–2020*, Table 3.9, January 2016, p. 3-23.

We note the Powercor proposal to consolidate the two streams of work (i.e. earth fault standards and new construction standards) into a single contingent project. This approach was supported by the Victorian Government.³⁰⁵ We consider the Powercor approach is preferable because:

- the work all arises from a common obligation imposed by the planned amendment to the Bushfire Mitigation Regulations
- there will be less uncertainty whether a project will satisfy the materiality threshold when the projects are combined; and
- having fewer contingent projects to assess will reduce administration costs for AusNet Services.

In our preliminary determination we proposed to address the uncertainty in the capital requirements for this work progressively, across the regulatory control period. We said:

To minimise the risk that the appropriate capital amounts may be difficult to accurately identify our preference is deal with the capital need progressively across the next regulatory control period. This can be achieved by dealing with the contingent project program in tranches. By doing so, both the service providers and the AER, as well as stakeholders, can better identify costs as they arise in the initial tranche of projects and apply corrections based on actual outcomes to the second and any subsequent tranches of projects. Each tranche must be sized to meet the applicable materiality threshold.³⁰⁶

We note that our proposal to organise the contingent program into tranches has been interpreted differently to our intention, which was for AusNet Services to specify a number of contingent projects (i.e. tranches) spaced through the next regulatory control period, not a single contingent project approved in tranches. We note that the NER does not provide for approval of a single project in tranches. We discussed this issue with AusNet Services. AusNet Services acknowledged the AER's intention to divide the contingent project into up to three contingent projects.³⁰⁷ We consulted with AusNet Services in formulating the modified approach of dividing the capital works requirement into three contingent projects and developing the replacement trigger events.

Before we address the tasks of dividing the work into tranches and of determining the trigger events, we examine the overall forecasts for the affected work streams, which comprise the REFCL projects and the Declared Areas programs.

³⁰⁵ Victorian Government, Submission on the Victorian electricity distribution network service providers' revised regulatory proposals for 2016-20, p. 2–3

 ³⁰⁶ AER, *Preliminary decision, AusNet Services distribution determination 2016–2020*, October 2015, Attachment 6, p. 6-85.

³⁰⁷ Email from Tom Hallam, AusNet Services to Paul Dunn, AER, 25/2/2016.

D.1.4 REFCLs

AusNet Services estimated that to comply with this new obligation they will have to install REFCLs at 16 zone substations during the 2016–20 regulatory control period.³⁰⁸

AusNet Services proposes contingent capital expenditure for the installation of REFCLs at 16 zone substations and associated network hardening works in the 2016-20 regulatory period of approximately \$214 million (\$2016).³⁰⁹

We accept the AusNet Services estimate of 16 REFCLs is reasonable for the purpose of establishing a forecast. The actual number may vary depending on a point score assessment in accordance with the regulations. This assessment can only be undertaken after the regulations are promulgated and other supporting information gathered and assessed.

In preparing their cost estimate AusNet Services has arrived at an average cost per installation of \$13.48 million (\$2016). The Victorian Government RIS suggests that for full replacement of surge diverters the average cost is approximately \$9.2 million (\$2015), or, if one-third of the surge diverters are replaced an average cost of \$6.6 million (\$2015).³¹⁰

We note that the AusNet Services estimate is based on full replacement of surge diverters and the average cost is much greater than the RIS estimate. Compared to the RIS, we consider that the estimate is unreasonable. However, as set out earlier in this determination, there is considerable uncertainty as to the need to replace all the surge diverters. Until a better investigation of each affected line is undertaken, there is not sufficient evidence for us to determine whether full, partial, or any replacement is necessary.

A submission by the CCP stated:

What concerns CCP3 is the apparent dichotomy of views as to what is required to implement recommendation 27 (preventing falling lines from starting a fire). A low cost solution has been developed using rapid earth fault current limiting (REFCL) devices, yet the DNSPs propose to also implement replacement of all surge devices to maximise the benefit of the REFCL devices so that supply can continue even when a powerline has fallen, enhancing reliability. As noted in section 2, consumers do not want to pay more for enhanced reliability, so CCP3 considers that the proposed surge diverter replacement program is not needed.³¹¹

³⁰⁸ AusNet Services, *Revised Regulatory Proposal 2016–2020*, January 2016, p. 3-24.

³⁰⁹ AusNet Services, *Revised Regulatory Proposal 2016–2020*, January 2016, p. 3-24.

 ³¹⁰ ACIL Allen Consulting, *Regulatory Impact Statement - Bushfire Mitigation Regulations Amendment (RIS)*,
17 November 2015, p. 70.

We acknowledge that, to the extent the replacement of surge diverters affects reliability, consumers may not value the enhanced reliability. However, as set out above, the replacement of surge diverters is not driven solely by reliability considerations. There are also technical, safety and economic factors which must be taken into consideration. Therefore, we are not satisfied on the available evidence that the operation of REFCL devices without surge diverters is advisable.

We understand that at the trial installation at Frankston South, the replacement rate was around one-third. In our preliminary determination for Jemena, the proportion of surge diverter replacement for their REFCL projects was less than one-third, on the basis most existing units were already adequately rated. We also note the two REFCL units sought by United Energy have an average unit cost much lower than AusNet Services. Although the shorter length of the United Energy feeders is a factor, we do not consider that factor alone adequately explains the difference in average cost. A replacement rate of one-third is the basis of the Victorian Government RIS which was developed after extensive consultation with the Victorian distributors. For the purpose of setting a forecast for these contingent projects we prefer the RIS estimate of \$6.6 million (\$2015).

Therefore, our total forecast for REFCL projects is set at 16 times \$6.6 million, which equals \$105.6 million (\$2015). This amount will be distributed across three contingent projects as discussed later in this section. It is possible that a higher percentage of surge diverters will require replacement and AusNet Services may incur higher costs. Following the occurrence of a trigger event for a project it will be incumbent on AusNet Services to provide supporting evidence to demonstrate that a higher proportion should be replaced or that this will involve higher costs. This may result in the final cost of this work being higher than this forecast.

D.1.5 Declared Areas

AusNet Services has developed a forecast of Declared Area capital expenditure based on the per kilometre cost to underground the sections and /or spans of electric lines which may need replacing during the 2016–20 regulatory control period. This is for a forecast of \$77.53 million (\$2015). The forecast is based on maps supplied by the Victorian Government of the expected target areas which, under the draft regulations, must be declared by the Emergency Management Commissioner. AusNet Services expect that replacement works are likely to be the majority of works carried out during the 2016–20 regulatory control period.

Consistent with AusNet Services' forecast replacement program, AusNet Services expects to replace 146 kilometres of bare open wire conductor in the 2016-20 regulatory control period in accordance with the new standard.

The Victorian Government acknowledges that the costs associated with the proposed regulations for declared areas include the costs of putting powerlines underground or insulating conductors.³¹²

AusNet Services has estimated 146 km of bare open wire conductor would need to be replaced.³¹³ This forecast is based on preliminary information in the form of polygon maps supplied by the Victorian Department of Economic Development, Jobs, Transport and Resources in October 2015. The Victorian Government submission considered this estimate to be reasonable but queried if the associated cost was excessive.³¹⁴ In the absence of a declaration by the Emergency Management Commissioner and a more detailed investigation by AusNet Services but taking into account the Victorian Government submission, we accept this estimate as a reasonable basis to establish the forecast for this work. We note this estimate may later be found to be inaccurate and require adjustment based on the final form of the regulations and other work, which has yet to commence.

AusNet Services calculated the incremental average cost per kilometre for electric lines as \$531,000 per km. We have compared this estimate with the RIS and our RIN information and the rates proposed under AusNet Services' 56M' project proposal.

As the rate proposed by AusNet Services appears high compared to the RIS and to the equivalent rates for similar work by other distributors, we have not accepted this estimate. We note that AusNet Services has identified that the construction method in Declared Areas is not comparable with their 56M project.³¹⁵ As the replacement rate published in the Victorian Government RIS was developed after extensive consultation with the Victorian distributors, we prefer the RIS estimates. There is uncertainty in the RIS estimates. Both AusNet Services and Powercor have estimated higher rates than the RIS for this work. As the areas subject to these new requirements are likely to be in more remote areas we consider, on balance that the mid–point of the cost rates proposed in the RIS is appropriate, \$350,000 per km. Based on this rate, we consider the forecast for 146 km of polyphase line replacement should be set at \$51.1 million (\$2015).

This amount will be distributed across up to three contingent projects as discussed in the next section. Following the occurrence of a trigger event for a project it will be incumbent on AusNet Services to provide supporting evidence to demonstrate that a higher rate should apply. This may result in a different forecast for this work than the forecast which has been set here.

³¹² AusNet Services, *Revised Regulatory Proposal 2016–2020*, January 2016, pp. 3-18, 19.

³¹³ AusNet Services, *Revised Regulatory Proposal 2016–2020*, January 2016, p. 3-16.

³¹⁴ Victorian Government, Submission on the Victorian electricity distribution network service providers' revised regulatory proposals for 2016-20.

³¹⁵ AusNet Services, *Response to information request #056* [email to AER], 11 April 2016, p. 3.

D.1.6 Number of contingent projects

AusNet Services proposed two tranches of contingent projects. However, there is substantial uncertainty as to the cost impact that will result when the Bushfire Mitigation Regulations Amendment is enacted. The discussion here has highlighted that although the RIS has helped to reduce that uncertainty, significant issues remain to be addressed. This is a symmetrical risk in that any error in setting an ex–ante forecast may result in either the service provider or customers bearing excessive costs. This risk is higher than normal because the largest element of this cost will arise from the deployment on an unprecedented scale of the new REFCL technology. Neither we nor the businesses currently have sufficient experience of this technology to be able to forecast the efficient cost of deploying the new technology with confidence.

We therefore proposed that the work should proceed in tranches and AusNet Services has adopted that suggestion. The regulations impose a timetable for earth fault risk reduction which is assessed through a point score system. The construction standards risk reduction profile is managed through an inspection regime. Both limbs require that targeted locations be notified to the safety regulator, ESV and the target locations recorded through the applicable Bushfire Mitigation Plan (BMP) and actioned in accordance with the Plan. This is a dynamic process that extends across the regulatory control period and beyond.

The regulations do not require that the whole program be known at the outset nor is the sequencing of target locations known with certainty until the amended BMP is accepted by the ESV.³¹⁶ There is no limit on the number of times a BMP may be amended. However, in practice amendments are not frequent. Our approach to these contingent projects is intended to accommodate these factors.

We note that when we apply the materiality threshold set out in clause 6.6a.1(b)(2)(iii) for AusNet Services the relevant threshold amount for a contingent project is \$30 million.³¹⁷ This is the greater amount of five per cent of first year revenue and \$30 million.

Having regard to the BMP amendment process and the materiality threshold for contingent projects, based on the budget forecasts set in the preceding section which total \$156.7 million (\$2015), the maximum number is five tranches of contingent projects. However, taking into account the process for amending a BMP, the process for setting a Declared Area and the workload and time required to process a contingent project application, we consider that three tranches is manageable within the remainder of the current regulatory control period.

As we discuss in the next section, AusNet Services will be allowed flexibility to identify the projects that constitute a tranche within the limitations imposed by the need to

³¹⁶ For the sake of brevity we have said 'accepted'. A BMP may be 'accepted or accepted in part' by the ESV. All have the effect of requiring the distributor to undertake the associated work.

³¹⁷ NER, cl. 6.6A.1(b)(2)(iii).

satisfy the trigger event. In particular, a key requirement is to have obtained an acceptance or provisional acceptance from ESV of an amended BMP that requires works be undertaken at a nominated location. It will be incumbent on AusNet Services to manage its program of works according to the number of tranches available and the obligations imposed by the regulations. We consider three tranches to be a reasonable maximum number. It should be noted that AusNet Services is not obliged to utilize all three contingent projects. Also, the actual amounts of individual projects will be linked to the approval given by the ESV to a specific program of works and may not correspond to the amounts set out here.

We have determined that AusNet Services may divide its 'bushfire mitigation contingent project' program into three contingent projects as follows:

- Bushfire Mitigation contingent project 1 \$52.23 million (\$2015)
- Bushfire Mitigation contingent project 2 \$52.23 million (\$2015)
- Bushfire Mitigation contingent project 3 \$52.23 million (\$2015).³¹⁸

D.1.7 Trigger event for Bushfire Mitigation Contingent Projects

For a contingent project a trigger event must be defined. In our preliminary decision we proposed a trigger event that comprised three factors which, taken collectively, would form the trigger event. We said:

Each contingent project category is to contain one or more tranches. These contingent projects are each subject to the three part trigger:

1. Passage by the State of Victoria of a law or regulations or other regulatory instrument that gives effect to recommendation 27 of the Victorian Bushfires Royal Commission, whether in part or in full.

2. The formation of capital projects into tranches. All the projects which constitute a tranche must be listed in a regulatory instrument or a bushfire mitigation plan approved by Energy Safe Victoria for completion in the 2016–20 regulatory control period.

3. Every project incorporated in a tranche must be subject of a detailed design investigation which accurately identifies the scope of works and proposed costings.³¹⁹

In its revised regulatory proposal AusNet Services has not accepted our trigger event set out in our preliminary decision. However, AusNet Services has accepted our approach to the description of the trigger event in three limbs. AusNet Services proposed an alternative wording:

The imposition on AusNet Services of a new or changed regulatory obligation or requirement in respect of phase-to-ground fault standards. In this paragraph,

³¹⁸ The amounts shown here are notional budgets only. Actual amounts will vary as applications are received.

³¹⁹ AER, *Preliminary Decision, AusNet Services distribution determination 2016–2020, October 2015, Attachment 6,* p. 6-86.

'regulatory obligation or requirement' takes the meaning in section 2D of the law.

Energy Safe Victoria provisionally accepts, accepts or determines AusNet Services' bushfire mitigation plan for 2016/17, and that bushfire mitigation plan contains details of the capital program AusNet Services proposes to undertake during the 2016-20 regulatory control period in respect of phase-to-ground fault standards.

Completion of planning report by AusNet Services which accurately identifies the scope of works and provides cost estimates for the contingent project.³²⁰

As set out in the following paragraphs, we agree in principle with some of the drafting proposed by AusNet Services but, for the reasons stated, we do not accept this trigger event as drafted.

We consider the AusNet Services proposal to refer to the passage of Victorian legislation or regulations in the form set out in section 2D of the NEL has merit.³²¹ At the time of our preliminary decision the form of the impending regulations was unknown. Our drafting sought to address this uncertainty by referring to the intent of the impending regulations. AusNet Services drafting captures the effect of the change in regulations in terms that have a direct connection to the NEL. This drafting is also flexible if the Victorian Government were to adopt a different approach to these obligations or to change the scope of the regulations to consider matters other than the recommendations of the VBRC. Subject to the further amendments discussed in the following paragraphs, we have adopted this form of drafting.

With respect to the second limb of the AER's proposed trigger event AusNet Services suggests amendments to better reflect the requirements of the NER and the operation of the *Electricity Safety Act 1998 (Vic)*.³²²

Further, AusNet Services submitted that under the *Electricity Safety Act 1998*, ESV does not approve a BMP. Rather, ESV may accept or provisionally accept a plan or, if no plan is submitted, determine a plan. We agree with AusNet Services that the trigger event should be amended to better reflect the alternative terms as provided for in that Act for acceptance or determination by ESV of a Bushfire Mitigation Plan.

Our intention when we proposed that the program be organised into tranches was to allow AusNet Services the flexibility to adjust its program of work if the locations to be treated were subject to a change in priority over the course of the regulatory control period. We said:

Although the Victorian Government may nominate that specific installations must be delivered by a particular date, this will not prevent the businesses from

³²⁰ AusNet Services, *Revised Regulatory Proposal 2016–2020*, January 2016, p. 3-27.

³²¹ AusNet Services, *Revised Regulatory Proposal 2016–2020*, January 2016, p. 3-27.

³²² AusNet Services, *Revised Regulatory Proposal 2016–2020*, January 2016, p. 3-27.

organising their programs into a different program. To achieve operational efficiencies the AER will allow projects to be swapped between tranches so long as this does not result in double counting for the purposes of assessing whether the trigger for a tranche has occurred.³²³

The mechanism for determining a change in priority of the REFCL program is now proposed to be through amendment of the Bushfire Mitigation Plan in response to a points score assessment of particular zone substations located in the areas set out in the regulations. When our preliminary decision was made the mechanism for prioritisation of the work program was unknown. The draft regulations assist in removing some of the uncertainty but it remains clear that the order of projects cannot be settled until the distributor undertakes further work. This approach requires the flexibility inherent in our approach to be continued to ensure that the contingent projects match the obligation that is to be imposed on AusNet Services.

In the draft regulations the identification mechanism for defining a Declared Area is that the Emergency Management Commissioner will make a declaration that a specific region of AusNet Services' network is subject to the increased construction standards. In the Bushfire Mitigation Plan the distributor will describe how, in relation to the Declared Area they will undertake works to address the amended construction standards specified in the regulations. However, the final identification of locations will be by the distributor identifying specific projects in their work program and being subject to a declaration. These projects will then be reported to ESV as an amendment to the Bushfire Mitigation Plan and subject to acceptance by ESV. The Commissioner may make more than one declaration over the course of the 2016-20 regulatory control period.

We believe the same flexibility consideration applies to 'Declared Areas', although the mechanism that will result in a change of target locations differs. In the latter case, the target areas will be set by the Emergency Management Commissioner making a declaration that a specific region is a priority. This declaration in conjunction with AusNet Services' works program will identify the locations within the AusNet Services network where enhanced construction standards are to apply. AusNet Services will be required to report these locations to ESV. In practice, having regard to the lead times inherent in capital projects, we consider it probable that the number of declarations made by the Commissioner will be limited. However, as there is a distinct prospect of more than one tranche we consider a common approach should apply to both types of capital works (i.e. REFCLs and Declared Areas).

For us to approve the forecast for a contingent project we must be satisfied of the efficient cost faced by the service provider.³²⁴ AusNet Services queried our drafting when we required the project be subject to a detailed design investigation as part of the trigger event.

 ³²³ AER, Preliminary decision, AusNet Services distribution determination 2016–2020, October 2015, Attachment 6, p.
6-85.

³²⁴ NER, cl. 6.6A.1(b)(2)(ii).

AusNet Services agrees it is appropriate that the trigger event requires there to be sufficient clarity and certainty about the scope and timing of works and the costs of the contingent project before a distributor can seek to have its distribution determination amended. However, the AER's proposal to require a distributor to undertake 'detailed design investigation' is ambiguous and is not capable of objective verification.³²⁵

In their application AusNet Services stated that these projects are sufficiently certain to permit the expected cost to be estimated. As discussed in appendix section B.4.4, we do not agree. We are concerned that the initial set of Declared Areas is known but note that the Emergency Management Commissioner may vary the Declared Areas across the regulatory control period. Also, the extent of works is dependent on inspections which are yet to be completed and the costings are subject to further uncertainty as the terrain in which the lines are to replaced is subject to significant variability. The RIS, the Victorian Government and Powercor have all noted substantial variability in expected project costs. We consider this uncertainty supports a conclusion that the project should form part of the bushfire mitigation contingent project.³²⁶

We recognise that the decisions we make on ex-ante approval of capex will invariably incorporate a greater or lesser degree of uncertainty depending on the nature of the capital expenditure sought and the circumstances of the particular project. We have noted that under the draft regulations, significant uncertainty currently exists as to the efficient cost a prudent operator would require to undertake these works. At this stage of the Victorian Government process to introduce these new requirements this level of uncertainty is understandable.

The Contingent Project mechanism is intended to assist in addressing these uncertainties. The current task is to set an indicative forecast for these projects based on the available information. At the time of the occurrence of the trigger event the same level of information is unlikely to be an adequate basis to set the contingent project forecast which will eventually flow from these projects.

By the time the trigger event occurs we expect that the business will have taken active steps to properly resolve the key uncertainties to an acceptable standard, as is the case for any normal future capital expenditure. It will be incumbent on AusNet Services to lodge sufficient supporting information to us to support their contingent project application when the trigger event occurs for each tranche. For earth fault standards works, we expect that the business will prepare a reasonably detailed planning report or scope of works that identifies the key cost elements for each location in sufficient detail to be able to prepare a reliable forecast of expected costs. AusNet Services proposed that this take the form of a project scope of works and proposed costings. This is consistent with the normal approach to capital projects. We will assess the application and the supporting information in accordance with the NER when it is lodged. For new construction standards works, we expect that the business works, we expect that the business will

³²⁵ AusNet Services, *Revised Regulatory Proposal 2016–2020*, January 2016, p. 27.

³²⁶ NER, cl. 6.6A.1(c).

prepare a reasonably detailed estimate of works that identifies the key cost elements for each Declared Area in sufficient detail to be able to prepare a reliable forecast of expected costs.

We expect each tranche of these works to be discrete. It is not our intention that multiple applications should be considered concurrently for similar works. The assessment of a contingent project is a complex and resource intensive task. If concurrent applications were to arise for a business it would be appropriate for the business to delay its application to consolidate the applications into a single, larger tranche to minimise the risk of processing delays that would be likely to arise with multiple or concurrent applications.

D.1.8 AER trigger event

Bushfire Mitigation contingent project 1

In circumstances where a new or changed regulatory obligation or requirement (within the meaning given to that term by section 2D of the National Electricity Law) ("relevant regulatory obligation or requirement") in respect of earth fault standards and/or standards for asset construction and replacement in a prescribed area of the State is imposed on AusNet Services during the 2016–20 regulatory control period, the trigger event in respect of bushfire mitigation contingent project 1 occurs when all of the following occur:

- AusNet Services has identified the proposed capital works forming a part of the project, which must relate to earth fault standards and/or standards for asset construction and replacement in a prescribed area of the State and which are required for complying with the relevant regulatory obligation or requirement. The proposed capital works must be listed for commencement in the 2016–20 regulatory control period in regulations or legislation, or in a project plan or bushfire mitigation plan, accepted or provisionally accepted or determined by Energy Safe Victoria;
- For each of the proposed capital works forming a part of the project AusNet Services has completed a forecast of capital expenditure required for complying with the relevant regulatory obligation or requirement;
- 3. for each of the proposed capital works forming a part of the project that relate to earth fault standards, AusNet Services has completed a project scope which identifies the scope of the work and proposed costings.

Bushfire Mitigation contingent project 2

In circumstances where a new or changed regulatory obligation or requirement (within the meaning given to that term by section 2D of the National Electricity Law) ("relevant regulatory obligation or requirement") in respect of earth fault standards and/or standards for asset construction and replacement in a prescribed area of the State is imposed on AusNet Services during the 2016–20 regulatory control period, the trigger event in respect of bushfire mitigation contingent project 2 occurs when all of the following occur:

- AusNet Services has identified the proposed capital works forming a part of the project, which must relate to earth fault standards and/or standards for asset construction and replacement in a prescribed area of the State and which are required for complying with the relevant regulatory obligation or requirement. The proposed capital works must be listed for commencement in the 2016–20 regulatory control period in regulations or legislation, or in a project plan or bushfire mitigation plan, accepted or provisionally accepted or determined by Energy Safe Victoria;
- for each of the proposed capital works forming a part of the project AusNet Services has completed a forecast of capital expenditure required for complying with the relevant regulatory obligation or requirement;
- 3. for each of the proposed capital works forming a part of the project that relate to earth fault standards, AusNet Services has completed a project scope which identifies the scope of the work and proposed costings;
- 4. The AER has made a determination under clause 6.6A.2(e)(1) of the National Electricity Rules in respect of bushfire mitigation contingent project 1.

Bushfire Mitigation contingent project 3

In circumstances where a new or changed regulatory obligation or requirement (within the meaning given to that term by section 2D of the National Electricity Law) ("relevant regulatory obligation or requirement") in respect of earth fault standards and/or standards for asset construction and replacement in a prescribed area of the State is imposed on AusNet Services during the 2016–20 regulatory control period, the trigger event in respect of bushfire mitigation contingent project 3 occurs when all of the following occur:

- AusNet Services has identified the proposed capital works forming a part of the project, which must relate to earth fault standards and/or standards for asset construction and replacement in a prescribed area of the State and which are required for complying with the relevant regulatory obligation or requirement. The proposed capital works must be listed for commencement in the 2016–20 regulatory control period in regulations or legislation, or in a project plan or bushfire mitigation plan, accepted or provisionally accepted or determined by Energy Safe Victoria;
- for each of the proposed capital works forming a part of the project AusNet Services has completed a forecast of capital expenditure required for complying with the relevant regulatory obligation or requirement;
- 3. for each of the proposed capital works forming a part of the project that relate to earth fault standards, AusNet Services has completed a project scope which identifies the scope of the work and proposed costings;
- 4. The AER has made a determination under clause 6.6A.2(e)(1) of the National Electricity Rules in respect of bushfire mitigation contingent project 2.

D.1.9 Assessment of the trigger events

We consider these trigger events satisfy clause 6.6A.1(c) of the NER. The trigger events are:

- reasonably specific and capable of objective verification;
- if the event occurs, undertaking the contingent project is reasonably necessary to achieve the capital expenditure objectives;
- will generate increased costs that relate to a specific location;
- the occurrence of that event is all that is required for the distribution determination to be amended; and
- the event is probable during the regulatory control period, but the inclusion of capital expenditure in relation to it under clause 6.5.7 is not appropriate because the costs associated with the event are not sufficiently certain.