



# **AER capital expenditure assessment outline for electricity distribution determinations**

February 2020

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## Shortened forms

Shortened form	Extended form
AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
augex	augmentation expenditure
capex	capital expenditure
CESS	capital expenditure sharing scheme
DER	distributed energy resources
distributor	electricity distribution network service provider
Guideline	Expenditure forecast assessment guideline for electricity distribution
ICT	information and communications technology
NEL	National Electricity Law
NEM	National Electricity Market
NEO	National Electricity Objective
NER	National Electricity Rules
NGR	National Gas Rules
repex	replacement expenditure
SAIDI	system average interruption duration index
SAIFI	system average interruption frequency index
SCADA	supervisory control and data acquisition

# Capital expenditure assessment overview

This outline summarises the AER's assessment approach of a distributor's total capital expenditure forecasts, and complements the *Expenditure forecast assessment guideline for electricity distribution* (the Guideline).<sup>1</sup> This outline sets out:

- an overview of our obligations under the National Electricity Law (NEL) and the National Electricity Rules (NER) in assessing total capex forecasts
- a description of our general approach and techniques used to assess a proposal (see appendix A).

## Background

The NEL requires us to perform our economic regulatory functions in a manner that will, or is likely to, contribute to the achievement of the National Electricity Objective.<sup>2</sup> The NEO is:<sup>3</sup>

...to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to—

- (a) price, quality, safety, reliability and security of supply of electricity; and
- (b) the reliability, safety and security of the national electricity system.

The NEO places an overarching requirement on the AER to make distribution determinations that will deliver efficient outcomes that benefit consumers in the long term. The revenue and pricing principles support the NEO and ensure a framework for efficient network investment exists.<sup>4</sup> We must take the revenue and pricing principles into account whenever we exercise discretion in making those parts of a regulatory determination relating to direct control network services.<sup>5</sup>

## Capex objectives, criteria and factors

A distributor must include a total forecast capex that it considers is required to achieve the capital expenditure objectives, which involves:<sup>6</sup>

- meeting or managing the expected demand
- complying with applicable regulations
- maintaining: the reliability, quality and security of supply of *standard control services*; and the reliability, security and safety of the network.

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<sup>1</sup> AER, *Better Regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013.

<sup>2</sup> NEL, s. 16(1)(a).

<sup>3</sup> NEL, s. 7.

<sup>4</sup> NEL, s.7A.

<sup>5</sup> NEL, s. 16(2)(a)(i).

<sup>6</sup> NER, cl. 6.5.7(a).

The NER set out specific requirements to ensure we assess and determine expenditure proposals in accordance with the NEL, and hence give effect to the NEO. When we make a distribution determination, we must decide whether or not we are satisfied that a distributor's proposed total capex forecast reasonably reflects the capex criteria. These criteria are:<sup>7</sup>

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

When considering whether the forecast reasonably reflects the expenditure criteria, we must have regard to the capex factors.<sup>8</sup>

### ***Making a decision***

When making a decision, we require a range of data to support our assessment of total forecast capex. We expect distributors to submit regulatory proposals that include:

- economic analysis demonstrating the forecast expenditure is prudent and efficient. This should include documentation and underlying data sufficient to support the economic analysis
- reasons for new programs or higher costs compared with historical expenditure
- explanations of trade-offs between capex and opex to demonstrate that the preferred option is prudent and efficient (e.g. a capex ICT program to reduce opex). A distributor will also need to demonstrate that it has fully accounted for any benefits in its capex and opex forecasts (e.g. a negative step-change).

Without adequate economic justification, we may conclude that the distributor's forecast expenditure is not prudent and efficient. A distributor must demonstrate that it is making expenditure decisions under a quantitatively-based economic framework, consistent with minimising the long-run cost of achieving the expenditure objectives.<sup>9</sup>

We must accept a distributor's capex forecast if we are satisfied that it reasonably reflects the capex criteria.<sup>10</sup> If we are not satisfied, we cannot accept the forecast,<sup>11</sup> and must estimate a total forecast that we are satisfied reasonably reflects the capex criteria.<sup>12</sup> Whether we accept or do not accept a forecast, we must provide reasons for our decision.<sup>13</sup>

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<sup>7</sup> NER, cl. 6.5.7(c).

<sup>8</sup> NER, cl. 6.5.7(e).

<sup>9</sup> AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, p. 9.

<sup>10</sup> NER, cl. 6.5.7(c), 6.12.1(3)(i).

<sup>11</sup> NER, cl. 6.5.7(d).

<sup>12</sup> NER, cl. 6.12.1(3)(ii).

<sup>13</sup> NER, cl. 6.12.2.

## ***We make a decision on total capex***

While we consider certain programs and projects in forming a view on the total capex forecast, we do not determine which programs or projects a distributor should or should not undertake.

This is consistent with our ex-ante incentive based regulatory framework. We base our approach on approving an overall ex-ante revenue requirement that includes an assessment of what we find to be a prudent and efficient total capex forecast.<sup>14</sup> Once the ex-ante allowance is established, there is an incentive for distributors to provide services at the lowest possible cost because the actual costs of providing services will determine their returns in the short term. If distributors reduce their costs to below the estimate of efficient costs, the savings are shared with consumers in future regulatory periods.

This ex-ante incentive-based regulatory framework recognises that the distributor should have the flexibility to prioritise its capex program given its circumstances over the course of the regulatory control period. The distributor may need to undertake programs or projects that it did not anticipate during the distribution determination process. The distributor also may not need to complete some of the programs or projects it proposed during the forecast regulatory control period if circumstances change. We consider a prudent and efficient distributor would consider the changing environment throughout the regulatory control period and make decisions accordingly.

Importantly, our decision on the total capex forecast does not limit a distributor's actual spending. We set the forecast at the level where the distributor has a reasonable opportunity to recover its efficient costs. As noted previously, a distributor may spend more or less on capex than the total forecast amount specified in our decision in response to unanticipated expenditure needs or changes.

## **Considerations in applying our assessment techniques**

In assessing the capex forecasts, we consider:

- the capital expenditure sharing scheme
- a variety of information and use several techniques to take a holistic approach
- interrelationships between constituent decisions
- the assessment principles.

### ***Capital expenditure sharing scheme (CESS)***

The CESS provides a distributor with incentives to pursue efficiency improvements to the benefit of both the distributor and its customers. It provides a mechanism by which distributor and customers share efficiency gains or losses.

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<sup>14</sup> AEMC, *Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012*, 29 November 2012, p. vii.

When a distributor underspends relative to its revenue allowance, it keeps 30 per cent of the benefits and shares the remainder with consumers. When a distributor overspends, consumers will only share in these costs if we are satisfied that the expenditure was prudent and efficient in our ex post assessment.

### ***Holistic approach***

We give greater weight to techniques that we consider are more robust in the particular circumstances of the assessment (e.g. for recurrent expenditure, we may give greater weight to trend analysis). However, by relying on several techniques we ensure we consider a variety of information and take a holistic approach to assessing the distributor's capex forecast. Where our approach involves the use of a consultant, their reports are considered when we form our position on total forecast capex.

### ***Interrelationships***

In forming our position on a distributor's capex proposal, we must have regard to the constituent components in a determination. This means we must specify how the constituent components relate to each other, and how we take into account those interrelationships.<sup>15</sup>

For some elements, such as capitalised overheads, we consider the proposed capex in the context of total expenditure. For other elements, such as growth capex, we may consider any opex-capex trade-offs to determine whether the capex will result in a net benefit to electricity consumers.

For example, an opex-capex trade-off could involve choosing between replacing an ageing asset, compared with undertaking ongoing maintenance, repairs and accounting for fault costs over the remaining life of the asset.

### ***Assessment principles***

The assessment principles we have regard to include:<sup>16</sup>

- validity: the technique must be appropriate for what is being assessed in terms of accounting for the appropriate factors and using reliable data
- accuracy and reliability: the technique should produce unbiased and consistent results under similar conditions
- robustness: robust techniques demonstrate completeness and remain valid under different assumptions, parameters and initial conditions
- transparency: techniques should be able to be tested to assess the results in the context of the underlying assumptions, parameters and conditions

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<sup>15</sup> NEL, s. 16(1)(c).

<sup>16</sup> AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, pp. 15–16.



- parsimony: techniques with fewer free parameters that measure equally against other principles are typically preferred
- fitness for purpose: the technique should be appropriate for the task and reasonably reflect the expenditure criteria.

When assessing capex forecasts, we also consider that:

- the prudence and efficiency criteria in the NER 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<sup>17</sup>
- past expenditure was sufficient for a distributor to manage and operate its network in previous periods, in a manner that achieved the capex objectives.<sup>18</sup>

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<sup>17</sup> AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, pp. 8–9.

<sup>18</sup> AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, p. 9.

## A Assessment techniques

This appendix describes the approaches we apply to assess a distributor's total capex forecast. We use various qualitative and quantitative assessment techniques to assess the different elements of a distributor's proposal. The assessment techniques are:

- trend analysis
- category analysis
- bottom-up analysis
- top-down analysis
- economic benchmarking.

### A.1 Trend analysis

We consider past trends in actual and expected capex as this is one of the capex factors under the NER.<sup>19</sup> We also consider trends at the asset category level to inform our view on the prudence and efficiency of a distributor's capex forecast.

Trend analysis is a top-down technique to compare a distributor's forecast capex and volumes against historical levels. Where forecast capex and volumes are materially different to historical trends, we seek to understand the reasons for these differences. We also assess whether the historical levels of expenditure are indicative of the required future expenditure. In doing so, we consider the reasons the distributor provides in its proposal, as well as any potential changing circumstances.

In considering whether the total capex forecast 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.<sup>20</sup> Demand and regulatory obligations (specifically, service standards) are key capex drivers. More onerous standards or growth in maximum demand will increase capex. 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 driver of augmentation or demand-driven expenditure. Augmentation expenditure (augex) often needs to occur prior to demand growth being realised. Forecast demand, rather than actual demand, is therefore most relevant when a distributor is deciding the augmentation projects it will require in the forecast regulatory control period. However, to the extent that actual demand differs from forecast demand during a regulatory control period, a distributor should reassess project needs. Growth in a distributor's network will also drive connections-related capex. For these reasons, it is important to consider how capex trends, particularly for augex and connections, compare with trends in demand and customer numbers. The

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<sup>19</sup> NER, cl. 6.5.7(e)(5).

<sup>20</sup> NER, cl. 6.5.7(a).

increasing penetration of distributed energy resources (DER) across some networks are increasingly driving voltage management efforts of some distributors. Understanding the underlying and forecast effects of DER on a distributor's low voltage network is another key trend we will consider.

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 effect 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 analyse capex trends for total capex level and at different category levels. We also look at demand trends and consider any relevant changes in service standards.

## **A.2 Category analysis**

We split capex into a number of categories to help us assess a distributor's total capex forecast, including augex, connections, repex, non-network capex and capitalised overheads. We divide the non-network capex category further into ICT, property, fleet and other non-network capex.

Category analysis allows us to compare expenditure across distributors, and over time, for various levels of capex. This includes:

- overall costs within each category of capex
- unit costs and volumes across a range of activities
- expected asset replacement lives across a range of repex asset categories.

We use standardised reporting templates for all distributors in the NEM. This allows us to make direct comparisons across distributors and observe changes over time.

## **A.3 Bottom-up analysis**

A bottom-up assessment of a distributor's forecast capex programs and projects is an informative way to establish whether the forecast is prudent and efficient. Many of the techniques we apply at this level encompass the capex factors that we are required to consider.

We do not approve individual projects for completion in the next regulatory control period. If we accept that a project's forecast is prudent and efficient—and therefore include the capex in our substitute capex estimate—a distributor is free to decide not to go ahead with the project in the regulatory control period. Conversely, if we do not accept a project's forecast capex on the basis that it is not prudent and efficient, a distributor is still free to undergo the project if it believes it is necessary investment.

We examine the forecasting methodology and underlying assumptions used by the distributor to determine whether the capex forecast is prudent and efficient. In particular, some of the evidence we use to assess the prudence and efficiency of a bottom-up forecast at the program or project level includes:

- addressing the identified need

- identifying and quantifying all credible options in a cost-benefit analysis, including deferral, 'do nothing' or counterfactual scenarios
- cost-benefit analysis that incorporates a quantified risk assessment, where the most beneficial program or project is selected, or clear and justified reasoning as to why another option is chosen
- reasons to support the expenditure timing for the forecast regulatory control period, particularly if the expenditure may have been deferred in previous regulatory control periods.

We are mindful that a narrow focus on only a bottom-up assessment may not provide sufficient evidence that the forecast is prudent and efficient. Bottom-up approaches tend to overstate expenditure requirements, as they do not adequately account for synergies and potential cost reductions between programs, projects or areas of work that address the same or similar risks.

## Resources

The Regulatory Investment Test for Distribution outlines the principles of bottom-up cost benefit analysis and assessment. It aims to promote consistency, transparency and predictability in distribution investment decision making.<sup>21</sup>

Similarly, our industry practice application note—which relates to asset replacement planning—provides assistance to distributors for forecasting and determining prudent and efficient bottom-up capex forecasts.<sup>22</sup>

We have also put out a guidance note detailing our assessment approach to ICT capex.<sup>23</sup>

## A.4 Top-down analysis

Top-down analysis provides us with assurance that the entire expenditure program is prudent and efficient. We use a holistic assessment approach that includes a suite of techniques such as trend analysis, predictive modelling and detailed technical reviews. Consistent with our holistic approach, we take into account the various interrelationships between the total capex forecast and other components of a distributor's distribution determination, such as forecast opex and service target performance incentive scheme interactions.<sup>24</sup>

A top-down challenge would give us confidence that:

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<sup>21</sup> AER, *Application guidelines: Regulatory investment test for distribution*, December 2018.

<sup>22</sup> AER, *Industry practice application note: Asset replacement planning*, January 2019. This Application Note does not replace published guidelines. Rather, it supplements the guidelines by outlining principles and approaches that accord with good asset management and risk management practices.

<sup>23</sup> AER, *AER - Guidance Note - Non-network ICT capex assessment approach for electricity distributors - 28 November 2019*, November 2019.

<sup>24</sup> NEL, s. 16(1)(c).

- the bottom-up builds have been subject to overall checks against business governance and risk management arrangements
- synergies between programs or projects have been identified, which may reduce the need for, scope or cost of some programs or projects over the forecast regulatory control period by accounting for the same risks
- subjectivity from the bottom-up forecasts has been addressed
- the timing and prioritisation of capital programs and projects have been determined over both the short and long term, such that delivery strategy has been considered.

## Governance and methodology assessment

We review how a distributor has produced its capex forecast. This includes looking at its decision-making process that determines the scope and inclusion of each capex program and project that contributes to the forecast. We may compare a distributor's approach to its forecast against other distributors in the NEM and look further into those areas that do not align with industry best practice.

A distributor's governance approach may inform us on its risk appetite and how it determines the prudence of a capex project. It may also inform us how it has considered the capex objectives and criteria in arriving at its capex forecast.

Understanding a distributor's methodology helps us to understand its approach to its bottom-up forecasting, and whether it has applied a top-down challenge to account for synergies and interrelationships between each element of its overall capex program.

## Predictive modelling

We use predictive modelling as one tool to assess forecast repex. Our repex model is a statistical model that forecasts asset repex for various asset categories based on their condition (using age as a proxy) and unit costs.<sup>25</sup>

## A.5 Economic benchmarking

Economic benchmarking is one of the key outputs of our annual benchmarking report.<sup>26</sup> The NER requires us to have regard to the most recent annual benchmarking report, as it is one of the capex factors.<sup>27</sup> Economic benchmarking applies economic theory to measure the efficiency of a distributor's use of inputs to produce outputs, having regard to the operating environment and network characteristics.<sup>28</sup>

Economic benchmarking allows us to compare the performance of a distributor against its own past performance and the performance of other distributors. It also helps to

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<sup>25</sup> AER, *AER repex model outline for electricity distribution determinations*, February 2020.

<sup>26</sup> AER, *Annual benchmarking report: Electricity distribution network service providers*, November 2018.

<sup>27</sup> NER, cl. 6.5.7(e)(4).

<sup>28</sup> AER, *Better regulation: Expenditure forecast assessment guidelines for electricity distribution – explanatory statement*, November 2013, p. 78.

assess whether a distributor's capex forecast represents efficient costs.<sup>29</sup> Several economic benchmarks from the annual benchmarking report are relevant to our capex assessment. 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 take into account the differences between each distributor's operating environment and factors that are outside of a distributor's control that can affect its performance. This may include customer density or age of the network. After taking these factors into account, we expect distributors to operate at similar efficiency levels.

## **A.6 Other assessment factors**

We consider several other factors as provided for in the NER<sup>30</sup> when assessing a distributor's total capex forecast, including in particular:

- safety and reliability statistics (SAIDI and SAIFI)
- internal technical and engineering review
- external consultant review of a distributor's initial proposal
- stakeholder submissions
- other information provided by a distributor.

## **A.7 Other capex assessments – ex-post review**

In some circumstances, we must conduct an ex-post review of capex.<sup>31</sup> This includes a review of capex overspends when they occur. We will use the same techniques to conduct an ex-post assessment as we do to assess forecast capex. The Capital Expenditure Incentive Guideline discusses ex-post review in further detail.

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<sup>29</sup> NER, cl. 6.5.7(c).

<sup>30</sup> NER, cl. 6.5.7(e).

<sup>31</sup> NER, cl. S6.2.1(g), S6.2.2A.