2020–21 to 2024–25
Distribution determinations

AER capital expenditure assessment outline

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AUSTRALIAN ENERGY REGULATOR

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Contents

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
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).[1] 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)
- the replacement expenditure (repex) modelling approach in terms of data requirements, assumptions and modelling scenario outcomes (see appendix B).

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.[2] The NEO is:[3]

> …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.[4] 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.[5]

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 involve:[6]

- meeting or managing the expected demand
- complying with applicable regulations

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1 AER, *Better Regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013.
2 NEL, s. 16(1)(a).
3 NEL, s. 7.
4 NEL, s.7A.
5 NEL, s. 16(2)(a)(i).
6 NER, cl. 6.5.7(a).

- maintaining the reliability, quality, security of supply and the reliability, security and safety of the network.

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:[7]

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 forecasts reasonably reflect the expenditure criteria, we must have regard to the capex factors.[8]

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). Firms will also need to demonstrate that any benefits are fully accounted for in 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.[9]

We must accept a distributor's capex forecast if we are satisfied that it reasonably reflects the capex criteria.[10] If we are not satisfied, we cannot accept the forecast,[11] and must estimate a total forecast that we are satisfied reasonably reflects the capex

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7 NER, cl. 6.5.7(c).

8 NER, cl. 6.5.7(e).

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

10 NER, cll. 6.5.7(c), 6.12.1(3)(i).

11 NER, cl. 6.5.7(d).

criteria.[12] Whether we accept or do not accept a forecast, we must provide reasons for our decision.[13]

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.[14] 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.

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12 NER, cl. 6.12.1(3)(ii).

13 NER, cl. 6.12.2.

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

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.

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.

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.

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.[15]

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:[16]

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15 NEL, s. 16(1)(c).

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

- 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
- 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 prudency 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[17]
- past expenditure was sufficient for a distributor to manage and operate its network in previous periods, in a manner that achieved the capex objectives.[18]

[17] AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, pp. 8–9.

[18] 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.[19] We also consider trends at the asset category level to inform our view on the prudency 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.[20] 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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19 NER, cl. 6.5.7(e)(5).

20 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 capex forecast, including augex, connections, repex, non-network capex and capitalised overheads. Non-network capex is further divided into ICT, property, fleet and other non-network capex.

We are currently reviewing our ICT assessment methodology and released a consultation paper in May 2019.[21] We expect to release the final paper in late 2019.

Expenditure 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

Bottom-up assessments are an informative way to establish whether forecast capex at the program or project level is prudent and efficient. Many of the techniques we apply at this level encompass the capex factors that we are required to consider. The Regulatory Investment Test for Distribution sets out the guidance and worked examples to promote efficient investment in distribution networks by promoting greater consistency, transparency and predictability in distribution investment decision making.[22]

In summary, to assess whether a distributor's capex forecast is prudent and efficient, we examine the forecasting methodology and underlying assumptions used to derive

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[21] AER, *AER consultation paper - ICT expenditure assessment approach,* May 2019.

[22] AER, *Application guidelines: Regulatory investment test for distribution*, December 2018.

its forecast. In particular, some of the evidence we use to assess the prudency 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.

Our industry practice application note, which relates to asset replacement planning, aims to assist network businesses with this bottom-up forecast.[23] We are also 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.

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.[24]

A top-down challenge would give us confidence that:

- 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.

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[23] 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.

[24] NEL, s. 16(1)(c).

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 prudency 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. Appendix B outlines our repex modelling approach and the underlying assumptions.

A.5 Economic benchmarking

Economic benchmarking is one of the key outputs of our annual benchmarking report.[25] The NER requires us to have regard to the most regard annual benchmarking report, as it is one of the capex factors.[26] 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.[27]

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 assess whether a distributor's capex forecast represents efficient costs.[28] 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.

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[25] AER, *Annual benchmarking report: Electricity distribution network service providers*, November 2018.

[26] NER, cl. 6.5.7(e)(4).

[27] AER, *Better regulation: Expenditure forecast assessment guidelines for electricity distribution – explanatory statement*, November 2013, p. 78.

[28] NER, cl. 6.5.7(c).

A.6 Other assessment factors

We consider several other factors as provided for in the NER[29] 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.[30] 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.

[29] NER, cl. 6.5.7(e).

[30] NER, cll. S6.2.1(g), S6.2.2A.

B Repex modelling approach

This appendix provides a guide to our repex modelling process and sets out:

- relevant background information
- the data we use in the repex model
- the key assumptions underpinning our repex modelling approach
- the repex model outcomes under different scenarios.

B.1 Background to predictive modelling

In 2012 the AEMC published changes to the NER and NGR.[31] Following these rule changes, the AER undertook a "Better Regulation" work program, which included publishing a series of guidelines setting out our approach to regulation under the new rules.

The Guideline lists predictive modelling as one of the assessment techniques we may employ when assessing a distributor's repex.[32] We have used the repex model since 2009–10 and have refined the model over time.

The repex model is a statistical tool used to conduct a top-down assessment of a distributor's repex forecast. Discrete asset categories within six broader asset groups are analysed using the repex model. These six asset groups are: poles, overhead conductors, underground cables, service lines, transformers and switchgear.

The repex model forecasts the volume of assets in each category that a distributor will replace over a 20-year period. The model analyses the age of assets already in commission and calculates the time at which a distributor will replace them, based on historical replacement practices. The model derives the total replacement expenditure forecast by multiplying the forecast replacement volumes for each asset category by an indicative unit cost.

The repex model advises and informs us where to target a more detailed bottom-up review, and to define a substitute repex forecast if necessary.

Unmodelled repex

The repex model is most suitable for asset groups and categories where there is a moderate to large asset population of relatively homogenous assets. It is less suitable for assets with small populations or those that are relatively heterogeneous. For this reason, we exclude SCADA and 'other' asset groups from the modelling process and

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

32 AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution,* November 2013, p. 14.

do not use predictive modelling to directly assess the asset categories within these groups.

We also exclude pole-top structures because many distributors do not have the asset age profile data needed to model these asset categories.

Excluded asset categories

We do not model asset categories reported by three distributors or less. This is because the model cannot make a meaningful comparison on unit costs or expected replacement lives with other distributors. Examples include 132kV underground cables and Stobie poles.

Similarly, we may also exclude unique assets or repex projects on a case-by-case basis, where we determine that they will adversely affect the modelling results. These assets or projects will generally be very high value compared with similar assets in the same asset group.

B.2 Data collection

The repex model requires the following input data:

- the age profile of network assets currently in commission
- expenditure and replacement volume data of network assets
- the mean and standard deviation of each asset's expected replacement life.

These data are derived from distributors' annual regulatory information notice (RIN) responses, reset RINs and from the outcomes of the unit cost and expected replacement life benchmarking across all distribution businesses in the NEM.[33]

Category analysis RINs include historical asset data and reset RINs provide data corresponding to distributors' proposed forecast repex over the upcoming regulatory control period. Adopting a standardised approach to network asset categories allows us to compare and assess the relative prices of cost inputs as required by the capex criteria.

B.3 Calibration

The calibration process estimates the average age at replacement for each asset category using the observed historical replacement practices of a distributor. We call the length of the historical period analysed during this process the 'calibration period'. We select the calibration period that best reflects a distributor's future repex requirements. In doing so, we have regard to changes in legislative obligations or other factors.

[33] In both RINs, the templates relevant to repex are sheets 2.2 and 5.2.

The calibrated expected replacement lives is different to the replacement lives that distributors report. This is because we assume the following during the calibration process:

- The calibration period is a historical period where a distributor's replacement practices are largely representative of its expected future replacement needs.[34]
- We do not estimate a calibrated expected replacement life where a distributor did not replace any assets during the calibration period, because the calibration process relies on actual historical replacement volumes to derive a mean and standard deviation.
- Where a calibrated replacement life is not available, we substitute the value of a similar asset category.

B.4 Scenario analysis

The repex model will produce forecasts for each of the following scenarios:

1. Historical unit costs and calibrated expected replacement lives
2. Comparative unit costs and calibrated expected replacement lives
3. Historical unit costs and comparative expected replacement lives
4. Comparative unit costs and comparative expected replacement lives

where:

- comparative unit costs are the minimum of a distributor's historical unit costs, its forecast unit costs and the median unit costs across the NEM
- comparative replacement lives are the maximum of a distributor's calibrated expected replacement life and the median expected replacement life across the NEM.

The 'cost scenario' analyses the level of repex a distributor could achieve if it improves its historical unit costs to comparative unit costs. The 'lives scenario' analyses the level of repex a distributor could achieve if improves its calibrated expected replacement lives to comparative expected replacement lives. The 'combined scenario' analyses the level of repex a distributor could achieve if it improves both its historical unit costs and calibrated expected replacement lives to comparative costs and lives.

The repex model results set a threshold against which we compare the distributor's forecast repex. Where a distributor's forecast exceeds the threshold, we will seek further information to understand this difference. In some cases, we use the threshold as the starting point for our substitute estimate.

Our current approach sets the repex model threshold equal to the higher of the 'cost scenario' and the 'lives scenario'. This approach considers the inherent

[34] Each distributors' specific repex modelling workbook outlines more detailed information on the calibration period chosen.

interrelationship between the unit cost and expected replacement life of network assets. For example, a distributor may have higher unit costs than other distributors for particular assets, but these assets may in turn have longer expected replacement lives. In contrast, a distributor may have lower unit costs than other distributors for particular assets, but these assets may have shorter expected replacement lives.

Unit costs

This scenario compares a distributor's historical unit costs, forecast unit costs and median unit costs across the NEM.

The model derives historical unit costs from a distributor's category analysis RIN and derives forecast unit costs from a distributor's reset RIN.

The median unit costs across the NEM are based on each distributor's historical unit cost for each asset category. The model uses the median unit cost instead of the mean for comparative analysis purposes to remove the impact of outliers caused by unique network characteristics or data reporting anomalies.

Expected replacement lives

This scenario compares a distributor's calibrated replacement lives and the median expected replacement lives across the NEM, both of which the model calculates in the calibration process described in section B.3. Median expected replacement lives are based on each distributor's calibrated replacement lives for each asset category. Once again, using the median value effectively accounts for any outliers.

The expected replacement life input used in the 'lives' and 'combined' scenarios is the maximum of a distributor's calibrated replacement life and the median replacement life across the NEM.

B.5 Non-like-for-like replacement

The staking of a wooden pole is the practice of attaching a metal support structure (a stake, nail or bracket) to reinforce an aged wooden pole.[35] Distributors have adopted this practice as a low-cost option to extend the life of a wooden pole. These assets require special consideration in the repex model because, unlike most other asset types, distributors do not install or replace them on a like-for-like basis.

The repex model mainly assumes that a distributor incurs repex on a like-for-like basis.[36] The repex model forecasts the volume of old assets to be replaced and not the volume of new assets that need to be installed. This is simple to deal with for assets replaced on a like-for-like basis—a distributor simply replaces the old asset is simply replaced by its modern equivalent.

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[35] The equivalent practice for Stobie poles is "plating", which similarly provides a low-cost life extension. SA Power Networks carries out this process. For simplicity, this section only refers to the staking process.

[36] For example, a distributor will replace a conductor rated to carry low-voltage with conductor of the same rating, not conductor rated for high-voltage purposes.

However, where old assets are commonly replaced with a different asset, the cost or expected life of the new asset may not match that of the modern equivalent. As the repex model forecasts the number of old assets that require replacement, it is necessary to make adjustments for the asset's unit cost and calibrated replacement life. The only asset group where this has a significant impact on the model results is wooden poles.

Staked and unstaked wooden poles

Our repex model treats staked wooden poles differently to unstaked poles. This is because staked and unstaked poles have substantially different expected replacement lives and different unit costs.

There are two asset replacements options and two associated unit costs that a distributor may make: replace the old pole with a new pole, or stake the old pole to extend its life.[37]

Staking is typically a one-off process. When a staked pole requires replacement, a distributor will install a new pole. The repex model assumes that the cost of replacing an in-commission staked pole is the same as the cost of a new pole.

Unit cost blending

For unstaked wooden poles that require replacement, there are two appropriate unit costs: the cost of installing a new pole; and the cost of staking an old pole. We use weighted average unit costs of staking or replacing unstaked poles to arrive at a blended unit cost.[38]

For staked wooden poles, we ask distributors for additional historical data on the proportion of staked wooden poles that are replaced. The unit cost of replacing a staked wooden pole is a weighted average based on the historical proportion of staked pole types that are replaced. Where historical data are not available, we use the asset age data to determine what proportion of the network each pole category represented and use this information to weight the unit costs.

Calibrating staked wooden poles

We give special consideration to staked wooden poles when determining their calibrated replacement lives. This is because the model uses historical replacement volumes in the calibration process. The RIN responses provide us with information on

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[37] When a wooden pole needs to be replaced, it will either be staked or replaced with a new pole. The decision on which replacement type will be carried out is made by determining whether the stake will be effective in extending the pole's life and is usually based on the condition of the pole base. If the wood at the base has deteriorated significantly, staking will not be effective and the pole will need to be replaced. If there is enough sound wood to hold the stake, the life of the pole can be extended and the pole can be staked, which is a more economically efficient outcome.

[38] For example, if a distributor replaces a category of pole with a new pole 50 per cent of the time and stakes this category of the pole the other 50 per cent of the time, the blended unit cost would be a straight average of the two unit costs. If the mix was 60:40, the unit cost would be weighted accordingly.

the volume of new assets installed over the calibration period. However, the repex model forecasts the volume of old assets that require replacement. Since the replacement of staked poles is not on a like-for-like basis, we make an adjustment during the calibration process.

We ask distributors to provide the number of staked poles that reach the end of their economic life and are replaced over the calibration period, so an expected replacement life can be calibrated. Where this information is not available, we estimate the number of staked wooden poles replaced over the calibration period based on the data we have available.

B.6 Consultation

We are consulting with industry on a number of assumptions made in our repex modelling. In August 2019 we released an issues paper inviting stakeholder submissions.[39] After reviewing all written submissions, we intend to release an explanatory note in late November that will set out our position on the repex modelling assumptions discussed in the issues paper. Our final determinations will be consistent with this position.

[39] AER, *Issues paper: AER review of repex modelling assumptions*, August 2019.