Ausgrid Submission

AER review of repex modelling assumptions

October 2019

570 George Street
Sydney NSW 2000
All mail to GPO Box 4009
Sydney NSW 2001
T +61 2 131 525
F +61 2 9269 2830
www.ausgrid.com.au

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Attn: Chris Pattas
Australian Energy Regulator
GPO Box 520
MELBOURNE VIC 3001

Lodged by email: repexdevelopment@aer.gov.au

Dear Mr Pattas

Please find attached Ausgrid's submission to the Australian Energy Regulator's (AER*) Issues Paper: AER review of repex modelling assumptions.*

The Repex Model can have a significant impact on how much customers pay for the replacement of network assets and the level of expenditure available to fund safe and reliable services.

Ausgrid therefore welcomes the opportunity to comment on the AER's Issues Paper and looks forward to working collaboratively with the AER on ways to strengthen the Repex Model. Please find our submission attached to this cover letter.

We committed to working more collaboratively with customers in industry consultations as part of our Revised Proposal for 2019-24. In line with this commitment, we have sought feedback from stakeholders including customer advocacy groups on draft versions of this submission and have incorporated the feedback we received into this final submission. Going forward we believe this collaboration will strengthen the quality of our submissions and help us on our journey to becoming a more customer focused organisation.

If you would like to discuss our submission in more detail please contact Shannon Moffitt, Ausgrid Senior Regulatory Analyst, on (02) 9269 2280 or shannon.moffitt@ausgrid.com.au.

Yours sincerely

Iftekhar Omar
Head of Regulation

Submission

We have divided our submission into two parts. The first provides background information while the second sets out our response to each of the questions in the AER's Issues Paper.

As noted in the cover letter, we shared a draft version of this submission with stakeholders. The feedback we received has been incorporated below.

Part 1: Background

The AER recently used the Repex Model, among other forecasting techniques, when assessing the prudence and efficiency of our replacement capex program for the 2019-24 period. The following briefly outlines our experience of the Repex Model during that process.

2019-24 determination

We used several forecasting techniques to test the efficiency of our 2019-24 replacement program. This included subjecting more of our forecast to cost-benefit analysis using risk quantification. We also tested our forecast against the AER's Repex Model.

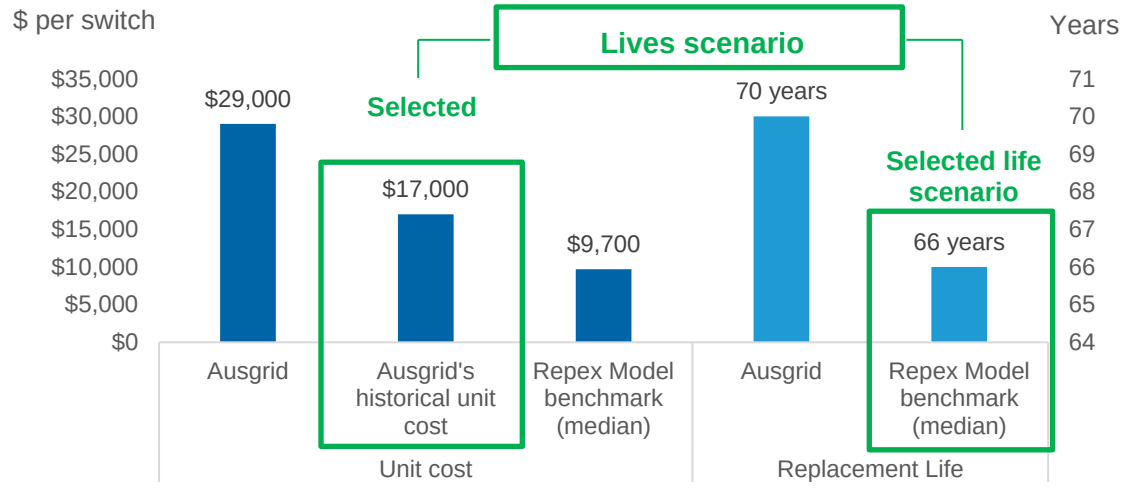
Our experience of the Repex Model is that it is a useful tool for applying a "top down" check of our replacement capex requirement. Issues, however, arise where the standard asset categorisations used by the model do not capture the unique circumstances of an electricity distributor or a specialised program. An example of this is set out in the case study below.

Case study 1: <=11 kV switches

Our Revised Proposal for the 2019-24 period included $84 million for replacing <=11 kV switches.

Figure 1 below shows that our forecast was based on a unit cost ($29,000) that was higher than our historical ($17,000) and the Repex Model benchmark ($9,700). Our replacement lives (70 years) was also above the Repex Model benchmark (66 years). The AER's current approach is to set the Repex Model threshold equal to the higher of the 'costs scenario' and the 'lives scenario'. In the case of <=11 kV switches, this was the lives scenario (highlighted below).

Figure 1 Repex Model scenarios: 11kV switches

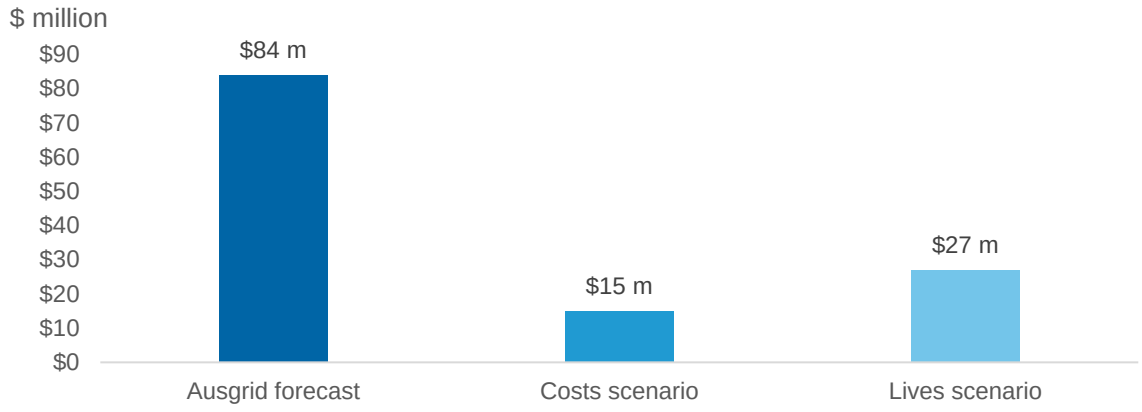


The unit rates above are determined as the weighted average cost of replacement for all <=11kV switches. This approach presents no material issues when an asset group is relatively homogenous. However, where there is a high degree of asset type variability, as with <=11kV switches, issues can arise in calculating unit costs based on a weighted average.

For example, both 'ground' switches and 'overhead' switches fit within the <=11kV switches asset group. As ground switches are more expensive, an electricity distributor with a greater percentage of them will look inefficient under a weighted average approach to calculating its unit costs. This can be misleading because asset type decisions are often driven by existing network characteristics or other exogenous factors. In the case of <=11kV switches, high customer densities in CBD and urban terrains can constrain the ability of a distributor to use lower cost overhead switches because there is a high degree of network undergrounding which means that only ground switches can be used.

The Repex Model outcomes for <=11kV switches is set out in Figure 2 below. This includes our forecast, the 'costs scenario' (benchmark unit costs but Ausgrid historical replacement lives) and the 'lives scenario' (Ausgrid historical unit costs but benchmark replacement lives). The cost scenario in this instance benchmarked Ausgrid against distributors which do not share the same CBD and urban network characteristics that can drive greater use of more expensive ground switches.

Figure 2 Repex Model outcome: <=11 kV switches



Nuttall Consulting Advice

We approached Nuttall Consulting about the results of the Repex Model for <=11 kV switches. This was prior to lodging our Revised Proposal in January 2019.

In considering the Repex Model results, Nuttall stated:

> 'I do not disagree with the AER's use of median to set the benchmark parameters… However, particularly in the case of switchgear, I have concerns similar to Ausgrid that how a DNSP compares to the median is likely to be as much a factor of how its switch types compare as to its relative efficiencies. In this regard, I consider that it is likely that DNSPs such as Ausgrid with much higher portions of underground and chamber substations, are likely to benchmark poorly' (Nuttall Report, 2019, p. 9).

In putting together this submission, Ausgrid has looked to extend this analysis by comparing the unit costs and replacement lives of <=11kV switches for all businesses across the NEM.

Figure 3 below sets out this comparison. It shows that there is considerable variability in the historical unit costs of <=11kV switches. They range from $2,000 to $75,000, with the highest unit cost 37.5 times greater than the lowest. Likewise, the range of replacement lives for <=11kV switches, as shown in Figure 4, is significant.

Figure 3 Repex Model outcomes across NEM: <=11 kV switches unit costs[1]

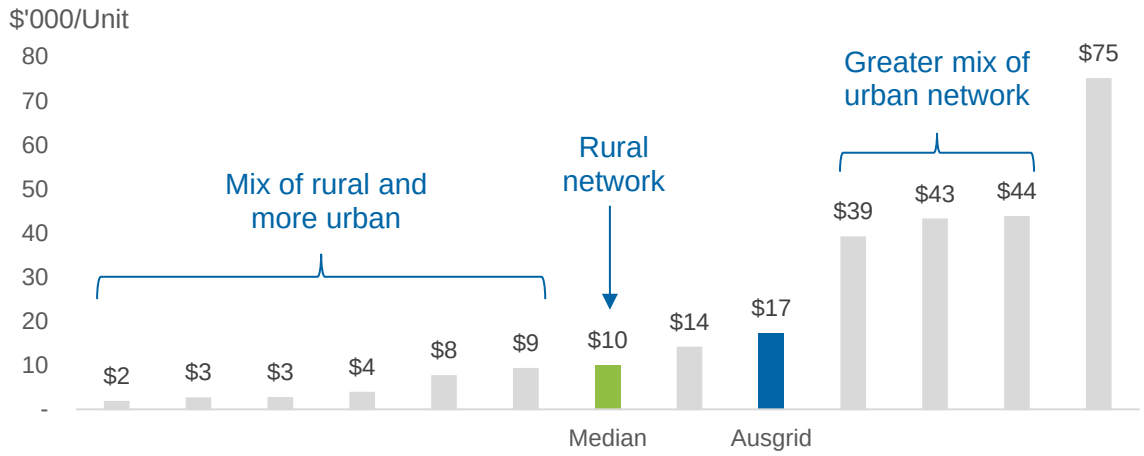
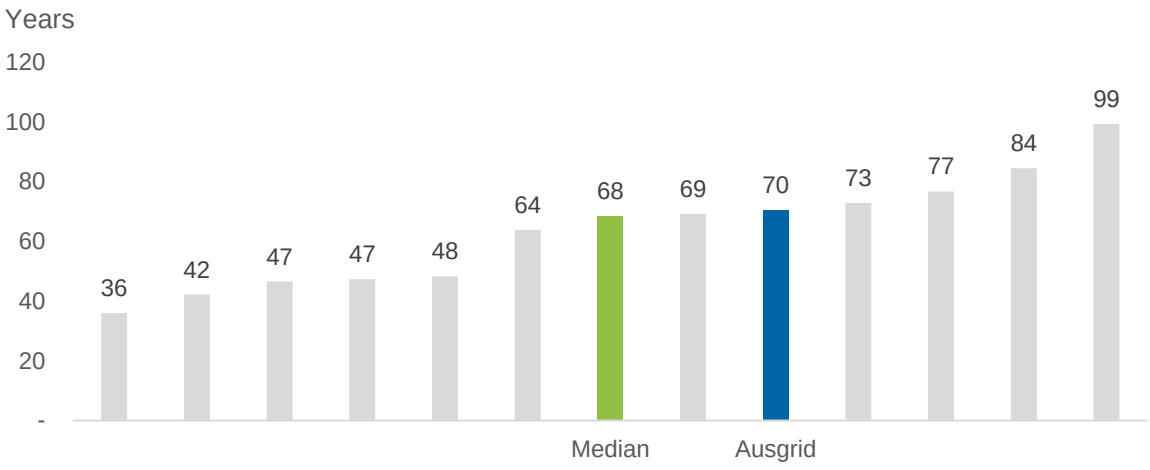


Figure 4 Repex Model outcomes across NEM: <=11 kV switches asset lives[2]



In our view the degree of variability in unit costs and replacement lives for <=11kV switches represents heterogeneity in switch type rather than grades of efficiency across distributors.

The AER's approach to date has been to use the median unit cost as its benchmark for the 'costs scenario'. In the case of <=11kV switches the median unit cost is that of a rural electricity distributor

1 Ausgrid analysis, based on AER RINs
2 Ausgrid analysis, based on AER RINs

(see Figure 3 above) which, by virtue of its regional location, is able to make use of open spaces to install overhead air break switches that are generally cheaper (about $10,000 per unit). Urban networks, by comparison, have a higher proportion of ground based switches, which have a higher unit cost (about $45,000 per unit). However, ground switches are necessitated to service our customers in more densely populated areas where the network has to be placed underground.

We refer to this case study on <=11kV switches in the next part of our submission. In our view, a greater level of asset stratification in data reporting would allow for a better grouping of assets that are of a common type, ultimately improving benchmarking through enhanced like-for-like comparisons of unit costs and asset lives. In the meantime, however, there may be a need to separately assess some categories of assets outside the Repex Model using cost-benefit analysis, as the AER did when assessing proposed expenditure on <=11kV switches in our 2019-24 determination.

Part 2: Issues Paper Questions

In this section, we provide our views on each of the questions in the AER's Issues Paper.

Limiting asset replacement lives

Question 1

Do you consider that setting defined maximum and minimum expected asset replacement lives would improve the forecasting accuracy of the repex model?

Ausgrid broadly supports the setting of maximum and minimum expected asset replacement lives.

Unlike opex that is generally recurrent in nature, the capital investment needed to maintain reliability, safety and the security of the network tends to be 'lumpy'. For electricity distributors, this can lead to variations in their capital investment requirements from one period to the next. In recognition of this, a cap on expected maximum lives could help protect customers by promoting greater stability in repex, and therefore pricing and reliability, outcomes.

For example, there may be times when an electricity distributor needs to engage in a period of high investment in response to a significant, but short lived, network risk or in catch up following a period of underinvestment. In the absence of a floor on replacement lives, calibrating the Repex Model during this period could lock in a cycle of high investment in future regulatory periods when it may not be required, leading to higher prices for customers than efficient.

Equally, calibration of the Repex Model during a period of abnormally low investment may imply longer lives than is sustainable. This could lock in a cycle of underinvestment that ultimately presents risks to customers in terms of network reliability and safety.

We therefore agree that having maximum and minimum expected asset replacement lives should lead to improved forecasting accuracy and drive stable outcomes for customers. This is by safeguarding against the Repex Model locking in cycles of atypical periods of high or low investment into future periods.

Question 2:

What do you consider would be the preferred approach to setting maximum and minimum expected asset replacement lives, including supporting engineering and statistical evidence?

We recommend that the AER explores multiple options for setting the maximum and minimum expected asset replacement lives.

Our initial view is that the AER should have regard to the failure rates included in an electricity distributor's cost benefit analysis (CBA) modelling. Where there is a material difference between the expected replacement lives calculated in the Repex Model and the replacement volumes based on CBA failure rates, then this should serve as a 'trigger' for further analysis.

When undertaking further analysis, we would recommend a case-by-case approach. This could include having regard to an engineering assessment or an independent consultant report. The AER could also have regard to benchmarking analysis of replacement rates for other businesses if a like-for-like comparison can be made.

Question 3:

Is the current approach of addressing these concerns on a case-by-case basis sufficient, as we have done for previous decisions? If not, why not?

We wish to commend the AER for its collegiate approach to addressing issues in the 2019-24 determination. When applying the Repex Model, AER staff were open to engaging with Ausgrid on the concerns we had raised and willing to explore potential solutions.

In future regulatory determinations, we expect that greater stratification of the underlying data in regulatory information notices (RIN) will lower the variability in data lives and, in doing so, reduce the need for case-by-case assessments.

For example, greater asset stratification for <=11kV switches may have avoided the need for Ausgrid to engage with the AER about the unit costs associated with this asset group during our 2019-24 distribution determination. This is because the data inputted into the Repex Model would have already adjusted for the high degree of asset type heterogeneity among <=11kV switches.

Notwithstanding, it is not possible to have perfect foresight. It is therefore highly likely that, even after improving the level of asset stratification in RIN data, the AER will still need to undertake case-by-case assessments in some circumstances to ensure efficient outcomes.

Question 4:

Do you consider that there are any other elements we need to consider should we limit expected asset replacement lives?

Our submission outlines two additional elements for the AER to consider in relation to how it limits the expected asset replacement lives in the Repex Model.

Greater asset stratification

We consider that the Repex Model will improve in accuracy and deliver stronger outcomes for customers if the data used by the model is enhanced. This can primarily be achieved, as outlined above, by introducing greater stratification in how data on the age and unit costs of assets is collected through the AER's RIN processes.

The table below sets out examples of asset categories which we consider would benefit from greater asset stratification. This includes a recommendation for how the Repex Model could be extended to recognise prudent life extension options that lead to more efficient outcomes for customers. Part 1 of this submission also included a case study on this topic for <=11kV switches.

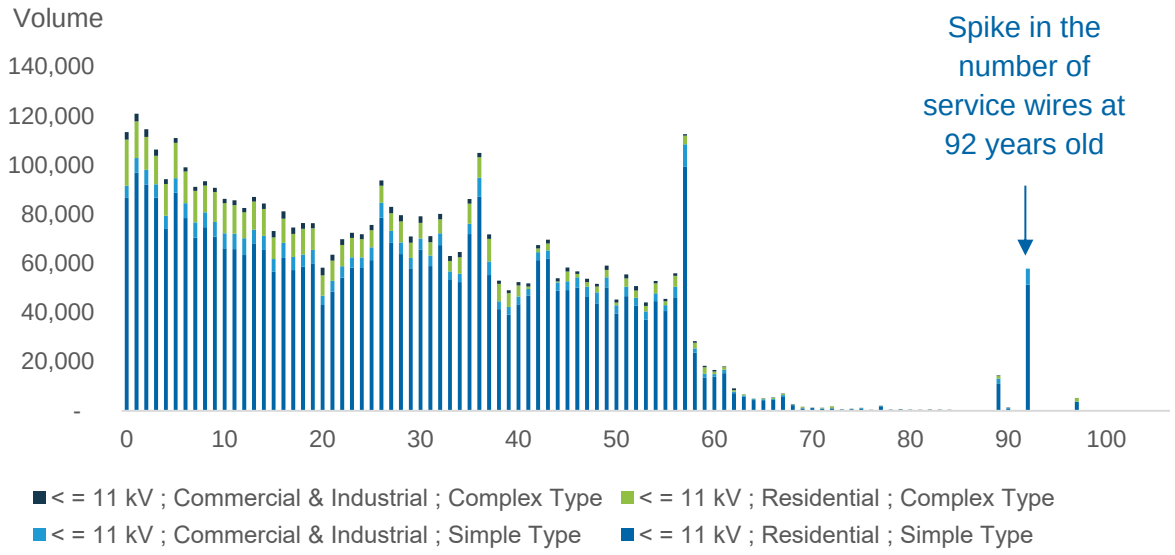
Asset class	Issue	Proposed solution
Switchgear (unit costs of <=11kV switches)	RIN categories mix lower cost air break switches (about $10k per unit) with higher cost ring main isolators and fuse switches (about $45k). The higher cost switches are common in CBD and urban networks.	Data collection for the Repex Model should stratify assets fuse break switches, ring main isolators and fuse switches.
Switchgear (prudent life extension options)	The Repex Model does not recognise life extension options. This is particularly an issue for switchgear given that the life of these assets is often extended by replacing individual components on a piecemeal basis.	The Repex Model should incorporate efficient life extension options that defer capex. This is by collecting more stratified data on the components of switchgear (breakers, panels, etc) that are often replaced in stages as part of a prudent capex deferral strategy.
Underground cables	RIN categories presently do not disaggregate between different insulation types and their housing (conduit or directly buried). These factors can all impact unit costs and expected replacement lives.	Data collection for the Repex Model should stratify assets between paper/lead, HDPE and XPLE insulation. These categories should then be further stratified by whether a cable is housed in a conduit or directly buried.
Service wires	Insulation can be PVC, butyl rubber or bare wire. These different materials have significantly different replacement lives.	Data collection for the Repex Model should stratify assets by insulator (PVC, butyl rubber or bare wire)

Potential anomalies

The AER uses audited data to run its Repex Model. This should provide electricity distributors, customers, and other stakeholders with the confidence that the Repex Model dataset has passed a robust, independent verification process.

Steps should nonetheless be taken to address potential data anomalies when they are observed. As an example, the age of service wires among electricity distributors in the NEM is set out in Figure 7 below. It shows that there is a large volume of these assets within the Repex Model dataset that are 92 years old. Instances such as this, which appear anomalous, should be identified and subject to further scrutiny.

Figure 5 Service wire age profile – All business in the NEM[3]



Calibration Period

Question 5:

Do you consider that there is a better approach to selecting the calibration period?

We generally support the AER's current practice of using an electricity distributor's past replacement practices to estimate the expected replacement lives.

Ultimately, we consider the length of the calibration period is a decision that requires the exercise of the AER's judgment on a case-by-case basis. This is after taking into consideration any regulatory, engineering or economic considerations that may narrow or broaden the calibration period so that it is

3 Ausgrid analysis, based on AER RINs

more reflective of future replacement conditions. In doing this, the AER must take into account submissions made by electricity distributors and the views of customer representatives.

The indirect impact of unique or abnormal events that affect the calibration period should also be considered, as outlined in our response to question 6 below.

Questions 6:

Are there any issues with the current approach to select the calibration period?

There is likely to always be a need to exercise a level of judgement regarding the calibration period that should be applied to an electricity distributor's efficient replacement needs.

In Ausgrid's case, the years our business were subject to deterministic planning requirements were excluded from the calibration period applied in the Repex Model analysis used for our 2019-24 determination. While this would have addressed the direct impact of our past licence conditions, some of the indirect effects may have not been properly adjusted for.

In particular, it is likely that a prudent and efficient response by an electricity distributor exiting a period of deterministic planning would be to replace less assets for at least a short-term period. This is given that there is likely to be residual benefits from the relatively high levels of investment under a deterministic planning approach, that an electricity distributor would be able to leverage for a period without severely risking reliability or safety.

This response, while prudent and efficient, may recreate issues for the Repex Model. In applying a short-term calibration period that coincides with unusual or one-off circumstances, the Repex Model could produce a low cycle of investment that does not reflect future needs. This, in our view, may have been driving some of the anomalies we identified in our last determination.

To address this, we suggest that the AER will need to reserve a level of judgement in deciding the calibration period. In resolving ad hoc issues that arise, electricity distributors should also be encouraged to work collaboratively with customer representatives.

Question 7:

What other issues or factors should we take into when determining the calibration period?

We suggest that the AER considers how the Repex Model can better accommodate different operating environments. This includes differences in the level of overhead and underground assets and the level of CBD, urban and rural assets.

There are several data reporting issues we would be open to engaging further with the AER during later rounds of consultation. These include suggestions for potentially driving greater consistency among electricity distributors in how age and unit cost data is reported. There are instances, such as

when to report a replacement as due to “other drivers”, that we consider could benefit from updated guidance from the AER.

Question 8:

Is our current approach to forecasting repex for wooden poles clear and appropriate based on the information available? If not, why?

Ausgrid is broadly comfortable with the AER’s current approach to forecasting repex for wooden poles. As with other asset categories, we would nonetheless suggest that the AER reserves a level of discretion when developing its substitute forecast using the Repex Model. This is particularly in relation to ‘pole staking’.

The efficiency of staking, as opposed to replacing, a wooden pole will vary across electricity distributors depending on their operating environments. For example, humid conditions or where there is a high concentration of termites can significantly affect the durability of a wooden pole, potentially ruling out the viability of life extension through staking. The AER should take this into account when assessing the efficient level of pole staking that is possible.

In doing so, we would caution against the AER developing a strict rule about the efficient level of staking for an electricity distributor, and then trying to apply that benchmark across all electricity distributors in the NEM. Our recommendation would be to instead take a case-by-case approach that assesses, based on individual operating conditions, what an efficient mix of staking and wooden pole replacement should be. This should drive more accurate Repex Model results and, ultimately, lead to better outcomes for customers.

Question 9:

What are your views on the appropriate estimation method for wooden pole staking or replacement volumes when the required data is not available?

The AER should take a case-by-case approach that adapts the estimation method according to the circumstances that are under consideration.

To promote transparency and greater regulatory certainty, the AER could specify a set of factors that it will consider when undertaking its case-by-case assessment. This could include guidance about the weight that will be given to consultancy reports, engineering assessments and economic analysis.

Question 10:

Are there any other approaches that could be applied to reasonably forecast repex for wooden pole asset categories?

We are broadly comfortable with the AER's current approach to assessing the replacement needs for wooden poles using the Repex Model. There are no other approaches which we wish to raise for consideration at this point.

Excluded asset categories

Question 11:

Do you consider the assumption and rationale underpinning the exclusion of unique assets is clear and appropriate based on the information available?

We consider that the AER could offer more guidance about when unique assets will be excluded.

Case study 1: LV overhead conductors

In our 2019-24 proposal, we put forward a planned replacement program for LV overhead conductors. The AER excluded this program from the Repex Model in our determination given that:

- it related to a planned decommissioning of a dedicated public lighting network
- advancements in low power LED lamps meant that this dedicated network was no longer required and presented safety risks in the form of fallen conductors
- unit cost efficiencies were forecast to be achieved from a planned bulk replacement and thus they would not reflect historical unit costs.

In our view, the exclusion of LV overhead conductor replacement program could serve as an AER case study for providing guidance about the exclusion of unique programs. It shows that in deciding if a program is 'unique' it is important to have regard to any changes in technology that may have occurred and the drivers at hand, including whether there are any safety risks that urgently need to be addressed. Efficiencies from a bulk replacement, or other unique circumstances that impact unit costs, should be considered too.

Case study 2: Civil structures

An emerging issue involving the capital investment required to replace civil works should be noted.

Buildings generally have a longer technical life than the assets that they house. While in the past this has allowed us to replace enclosed electrical equipment without having to invest in the surrounding civil works, this is unlikely to be possible in the coming years. Due to the age of many of our sites, we expect upward pressure on building replacement and refurbishment.

We support the continued exclusion of civil structures from the Repex Model. The long investment cycles associated with these assets should also rule out a simple trend forward of expenditure. We would nonetheless see merit to a 'base, step, trend' approach, like in opex, where consideration is given to 'step change' events. More detail about how we envisage this approach could work is outlined in our response to question 12 below.

Other matters

The AER has requested information on protection devices including age profiles. These assets have yet to be integrated into the Repex Model. Guidance regarding whether the AER intends to integrate protection systems or keep them as an excluded asset would be helpful.

Question 12:

Are there any other approaches that could be applied to reasonably model excluded asset categories, while incorporating a level of benchmarking?

To inform our capex replacement program for our current 2019-24 regulatory period, we developed a CBA method that applies a series of models to assess the timing of investment decisions. This method is based on the principles of *ISO31000: Risk Management* and considers risk in terms of likelihood and consequence. The application of a robust CBA method, such as this, would provide a strong basis on which to assess excluded asset categories.

The AER could also consider using a 'base, step, trend' approach similar to how it assesses the prudent and efficient opex of an electricity distributor. This approach would use a base level of expenditure on past excluded asset categories as its starting point. The AER could then consider whether any step changes, either positive or negative, should be applied to that base. Examples of step changes could include new regulatory obligations or evidence of a change in the age or failure rate for assets within the excluded category.

Other Issues

Question 13:

What other repex model issues outside the scope of this review should the AER consider in future repex model reviews or forums?

We wish to raise four further issues in anticipation of future repex model reviews and forums.

Network deferrals

The AER should consider ways of accommodating the deferral of assets within the Repex Model.

Currently, an efficient decision by an electricity distributor to defer the replacement of assets during the calibration period will result in the Repex Model producing a lower volume of replacement going forward. Though the introduction of maximum asset lives will help address this issue, the AER may consider ways for the Repex Model to expressly accommodate asset deferrals as a way to promote efficient outcomes for customers.

Distinguishing from full replacement

The Repex Model cannot, at present, distinguish between full replacement, life-extension (or partial refurbishment) and decommissioning activities. These different responses to age related risks can lead to significant variations in asset lives and cost.

By not accounting for these different potential responses, we consider that the Repex Model may generate results that do not fully reflect the least cost investment options for customers. Ausgrid suggests that the AER considers ways to address this aspect of the model as part of a broader, long-term review.

Technological change

The electricity supply chain is experiencing change on an unprecedented scale. Technology, moreover, is driving this transformation, through the emergence of greater network automation, cheaper storage and the increasing decentralisation of generation.

These changes present enormous opportunities for electricity distributors and, ultimately, our customers. New technologies should unlock customer savings and improve the quality of the services we can offer.

We encourage the AER to monitor these changes. As new technologies emerge with different unit costs and replacement lives to the assets they are replacing, further revisions to the Repex Model and RIN reporting may need to be made following a period of consultation.

Submissions

We invited stakeholders to comment on our submission. Members of our Customer Consultative Committee (CCC) noted the importance of the Repex Model as an expenditure assessment tool. PIAC expressed support for the AER continuing to work with electricity distributors to strengthen the Repex Model.[4] The Council on the Ageing (NSW) commented that 'repex plans should closely consider, at each point, whether investment in network replacement, upgrade or innovation is the most efficacious strategy in the longer term'.[5]

4 PIAC, Email dated 3 October 2019
5 COTA (NSW), Email 2 October 2019


Thank you