Revised Proposal

Attachment 5.15.1

Nuttall Consulting

Supplementary Repex Review

January 2019

Nuttall Consulting

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Attention: Matt Webb
Head of Asset Investment
Ausgrid
Level 13, 570 George Street
Sydney, NSW 2000

Dear Mr Webb

Subject: Advice and opinion on AER Repex Modelling

Ausgrid has requested that I, Brian Nuttall of Nuttall Consulting, provide advice on the AER's assessment of Ausgrid's replacement expenditure (repex) forecast (as described in the AER's recent draft decision on Ausgrid's revenue proposal, covering the period from 1 July 2019 to 30 June 2024).

More specifically, Ausgrid has requested that I consider the AER's assessment of its repex forecast, using the AER repex model, and advise whether a small selection of its replacement programs should be reconsidered by the AER. Ausgrid's view is that these programs are "unusual" and so may need to be modelled/assessed differently within the model or excluded from the repex component assessed through the model.

The six RIN asset categories affected by these programs are:

- LV overhead conductor
- LV underground cable
- <=11kV switches
- <=11kV fuses
- <=11kV circuit breakers
- Ground-mounted transformers <22kV >600kVA multiphase.

I have considered the claims made by Ausgrid on the asset categories and other available model data and agree with Ausgrid that these asset categories most likely require further consideration by the AER. In some circumstances, programs within these categories should be excluded from the model. For the others, the AER would need to reconsider the comparative unit costs it is using in its assessment method, as these are unlikely to reflect Ausgrid's circumstances.

This letter sets out my considerations and reasoning for this view. I will address this view in terms of:

- the AER's overall assessment approach using the model and when it may be appropriate for it to reconsider the assessment findings and comparative parameters
- specific considerations of the programs based on Ausgrid's explanations of the characteristics of these programs and the AER's repex modelling results.

Before turning to these matters, it is important that I stress the following.

I do not disagree with AER's assessment approach.

Although I am suggesting here that some additional consideration is necessary, this view is specific to Ausgrid's circumstances and repex model results. I am not suggesting that the AER should routinely be undertaking detailed reviews on every asset category where the DNSP's forecast exceeds the model's forecast. This would negate largely the point of the model. I do however discuss here matters that the AER may need to consider when deciding whether it may be necessary to examine asset categories or underlying programs in more detail.

Nothing here should be taken as an endorsement or otherwise by me of Ausgrid's replacement programs, its repex forecast, its underlying asset management practices, or its associated claims summarized here.

I have not conducted any review of these programs or undertaken any investigations to confirm the validity and accuracy of the claims made by Ausgrid associated with these programs.

Considerations of the AER's repex model assessment approach and results

As I have noted above, I do not consider it necessary for the AER to routinely examine every program or asset category where a DNSP's forecast exceeds the model forecast. To do so, could introduce a bias in the assessment methodology, by unfairly allowing increases in repex when decreases elsewhere should offset these.

Therefore, there should be circumstances, tests or criteria that define when the need for more detailed investigations may be more appropriate. That is, there is sufficient evidence that these increases could be outweighing the decreases, and so further examinations are necessary.

The AER will have information from its various assessment techniques to inform this decision. However, I believe that the AER's repex modelling can provide some very useful guidance here, and I discuss this in this section.

The AER's method of defining the comparative asset life and unit cost parameters in its two critical threshold scenarios (the *cost scenario* and the *lives scenario*) can itself introduce a downward bias. In this regard, because the comparative parameter for each model asset category is set as the best-case parameter of the historical parameter and the median parameter (and forecast parameter in the case of unit costs), it assumes that the prudent/efficient forecast of any DNSP should be at least as good as history and better than the median for every asset category. As such, any asset categories with better performance than the median DNSP get locked to that performance and any asset categories with worse

than the median get brought down to the median. However, it is highly likely that any DNSP will have some asset categories where unique circumstances to the current period mean that the associated parameter (life or unit cost) is not sustainable into the next period or other asset categories where the circumstances of that DNSP mean that it cannot achieve the median.

The possibility that this downward bias in the comparative scenario forecasts will result in a threshold forecast which does not represent the prudent and efficient forecast for a DNSP is mitigated by the method the AER uses to define the threshold. This is because the higher forecast of the two scenarios (not the lower) is selected by the AER to set the threshold. It is also mitigated by the AER using the median parameter, rather than a more aggressive parameter.

Nonetheless, it is still possible that a DNSP that is on the frontier with regard to its overall repex, would still be found to have a threshold repex forecast through this method that is below a continuation of its historical practices (ie business as usual practices) if it had any asset categories where unit costs or lives where worse than the median.

Unfortunately, the AER's scenarios do not provide an easy reference to how a DNSP's repex compares against the median DNSP, particularly in terms of the combined effects of the lives and unit costs. If anything, the AER's scenarios can provide quite a misleading view of this to any observer that does not fully understand the AER's methodology, as the comparative scenarios will always tend to produce forecasts that are lower than the *historical scenario,* which could incorrectly be interpreted by the observer to mean that the DNSP is worse than the median DNSP.

In my view, a simple solution to this is to perform additional scenarios that strictly apply the median parameters. These additional scenarios are not used to set the threshold, but the forecasts from these additional scenarios do provide a simple indication of how the DNSP compares to a theoretically median DNSP. Importantly, the results of the additional combined median unit cost and life scenario should provide a useful measure that can be used to guide when there may be good cause to examine in more detail the asset categories where the forecast is above the threshold.

For example, if a DNSP's forecast is below a forecast prepared from the median parameters (the median forecast) then it is more likely that there could be something unusual that may warrant further examination. However, if the DNSP's forecast is still above the median forecast then it is less likely a further examination is necessary.

In Ausgrid's case, it compares reasonably well to this median forecast. The additional scenario strictly applying the median unit costs and lives produces a forecast of $1,193 million, which is significantly higher than the *historical scenario* forecast of $838 million.

This result suggests that the practices Ausgrid has applied over its 3-year calibration period could be better than the equivalent practices of this theoretically median DNSP ie more than half the DNSPs have practices poorer than Ausgrid. Depending on where you may expect a

DNSP such as Ausgrid to sit in such a cohort, this *could* (note, not *does*) suggest the current practices may not be sustainable.

Furthermore, Ausgrid's comparable forecast of $930 million also compares favorably to this median forecast. This result suggests that the practices underpinning Ausgrid's forecast could still be better than the equivalent practices of this theoretically median DNSP.

It is important to acknowledge that Ausgrid's favourable results are driven somewhat by very favourable results for the underground cable group. However, even if this group is excluded, Ausgrid's historical scenario forecast is still below the median forecast and Ausgrid's forecast is only marginally (5%) above the median forecast.

As I note above, these results on their own are not sufficient to say that Ausgrid's forecast is valid. Nonetheless, given these favourable results, I *do* consider that Ausgrid has a reasonable case that some replacement programs should be considered in more detail by the AER, provided there is a reasonable basis for the model results understating the program forecasts. I will discuss my views on the reasonableness of this basis for the asset categories advised by Ausgrid in the sections below.

Asset category considerations

LV overhead conductor

Summary of AER scenario results for this asset category

- Ausgrid's forecast for this asset category is $76 million and 3,127km
- The AER's threshold result, given by the life scenario, is $25 million and 296km.
    - The comparative life for this scenario is defined by Ausgrid's historical life (80.2 years), which also appears to be the median DNSP life.
- The cost scenario is $7.1 million and 296km
    - The comparative unit cost for this scenario is defined by Ausgrid's forecast unit cost ($24k per km), which is considerably lower than its historical unit cost ($85.6k) and the median unit cost ($67k).

Appreciation of Ausgrid's underlying program

I understand from Ausgrid's explanation that:

- The major component of the forecast in this asset category relates to a planned new program, which will reconfigure and then decommission an existing dedicated LV overhead network that is used to supply public lighting.
- Advances in public lighting technology (ie low power LED lamps) mean that this dedicated network is no longer required, and so it can be decommissioned to avoid the risks of fallen conductors, with the new LED lamps supplied by Ausgrid's standard LV network.
- The unit cost for this program is much lower than historical unit costs because it is largely decommissioning work, which can be planned as a bulk retirement package of work. As such, the low unit cost is more reflective of this type of program and the

volume of work, and is not reflective of typical replacement costs for LV overhead conductor.

Ausgrid's key concern is that the AER's two scenarios do not allow for such an increase in replacement volume, but still introduce the program's much lower unit cost into the cost scenario.

My view and considerations

I agree with Ausgrid that this program, as described, will not be treated appropriately through the AER's methodology. Based on the explanation provided, I consider it more appropriate to exclude this program and the associated assets from the repex modelling, and review this program on its own merits through a detail review.

In forming this view, there are two key considerations:

- the use of the forecast unit cost in these circumstances
- whether to include or exclude the program from the model.

Regarding the use of forecast unit costs in the assessment, I don't have a significant concern with how the AER use this, in principle. However, I believe its suitability is for circumstances when it is reasonable to assume that a lower cost compared to history is broadly reflective of a predicted productivity improvement for the type of work captured by the historical lives and unit costs, and the lives and unit costs that will define the median parameters. This should ensure that the cost scenario remains consistent with the lives scenario when a forecast parameter is used for an asset category.

In Ausgrid's case, the forecast unit cost seems to break this assumption. The forecast unit cost is approximately 28% of the historical unit cost and 36% of the median unit cost. It is also significantly lower than most other DNSPs[1]. As such, it seems reasonable to conclude that it is highly likely that this unit cost is not reflective of Ausgrid's historical practices or other DNSPs' practices. Therefore, it may not be appropriate to use this forecast unit cost in the scenarios.

For the draft decision, this has not affected the threshold amount, as this is based on the *lives scenario*, and hence Ausgrid's historical unit cost. However, this could be far more material for modelling associated with the final decision if this changes the threshold scenario to the *cost scenario*.

To this point, I have only argued that the use of the forecast unit cost is not appropriate for this asset category and the *cost scenario*. However, a further issue is whether the repex associated with this specific program should be allowed for in the model assessment at all. Typically, I would say that repex should be included where a relationship can be assumed between the age of an asset and the need to replace it ie its economic life is age-related in some reasonable way; for example, via condition and/or the costs/risks to maintain. In this

[1] United Energy's unit costs is the lowest at $0.3 per km, but it is assumed that this is anomalous – possibly due to unit anomaly in reported volumes ie reporting meters rather than kilometers.

way, the model can take the input age profile and make some prediction of expected replacement needs as the assets continue to age, based on a view of the distribution of economic lives.

For the asset underpinning this program (ie the LV conductor supplying this public lighting), this age relationship seems to be very weak because of the effects of the new technology. As I understand matters, the technology means that the existing dedicated network is effectively redundant, and so it is not so much the ongoing aging of the assets that form this network which is driving the need, but the current role of the network – or lack of. Although it could be argued that the risks of fallen conductors will still increase as these assets continue to age, it is my understanding that Ausgrid considers that the network is already at the point where these risks outweigh this decommissioning cost, given it has a reduced service value.

In these circumstances, I do not consider that the model is a suitable tool to assess the program volumes as the model is unlikely to have predictive abilities for this asset cohort and program. This program would be better suited to assessment through a detailed review.

Ausgrid should consult with the AER on its preferred approach to report data in these circumstances. However, as a guide only, I suggest the following:

- the assets associated with this program should be removed from the LV conductor age profile, and moved to an LV conductor "other" sub-category
- the historical and forecast expenditure and volumes should be removed from the LV conductor category, and moved to an LV conductor "other" sub-category.

In this way, the repex associated with the standard LV network can be assessed through the repex model, and this program can be assessed through a detailed review to test Ausgrid's claim.

LV underground cable

Summary of AER scenario results for this asset category

- Ausgrid's forecast for this asset category is $145 million and 161km
- The AER's threshold result, given by the life scenario, is $95 million and 161km.
    - The comparative life for this scenario is defined by Ausgrid's historical life (73 years); the median life is significantly shorter at 60 years.
- The cost scenario is $49 million and 161km
    - The comparative unit cost for this scenario is defined by the median unit cost ($304k per km), which is considerably lower than Ausgrid's historical unit cost ($595k) and the forecast unit cost ($898k).

Appreciation of Ausgrid's underlying program

I understand from Ausgrid's explanation that:

- A significant component of the forecast in this asset category relates to the replacement of Consac and HDPE cable types.
- Ausgrid has been experiencing an increasing number of neutral/earthing failures of these cable types, which can expose the public and field staff to significant electrical safety risks as well as loss of supply.
- These cable types are found to fail at an earlier age than the overall populations, 45 years rather than the average of 73 years, which predominately represents non-Consac cable which are only replaced reactively (or as a result of distribution substation replacements).
- The unit cost for replacing the Consac and HDPE cables are typically significantly higher (almost double) than for the reactive or ancillary replacement of conventional LV cable. Ausgrid's forecast unit rate of $850/km is an average of typical replacements.
- Consac was primarily installed in the late 1960's and early 1970's in what are now inner urban areas. The replacement of these cables involves:
    - trenching and installation of ducts and pillars (these cables were predominantly direct buried, and connections were teed-off - no pillars were installed)
    - significant re-instatement costs as these cables are generally laid in footpaths
    - temporary supply where replacement involves significant disruption to commercial and residential customers.
- The historical unit rate is lower than the forecast unit rate because over this historical period Ausgrid focused on the Central Coast and Hunter areas due to resourcing issues. It considers that these areas are less dense areas, and therefore, are less impacted by reinstatement or traffic control issues.

Ausgrid's key concern is that the unit rates for some other DNSPs do not reflect the same scope of work as Ausgrid because it is likely that their replacements can be achieved without trenching and do not involve significant re-instatement costs or the other complexities noted above to the same extent as Ausgrid. Ausgrid considers that the replacement of this asset type should be evaluated on the basis of cost-benefit analysis.

My view and considerations

I agree with Ausgrid that this program, as described, may not be treated appropriately through the AER's methodology. Although I consider that this asset category and the underlying programs should still be allowed for in the modelling, further testing of the model/scenario results are likely to be required to investigate the appropriate parameters and possible adjustments. This is likely to require some form of detailed review of the programs in this category and Ausgrid's claims.

In forming this view, the following are relevant points:

- First, I consider that these replacements will be strongly age-related, and therefore, these appear to be replacements that I consider would usually be modellable (based on the reasoning discussed above on LV conductors).
- The scenario volume forecast appears to be similar to Ausgrid's forecast. Therefore, the model life of 73 years, must on average be reflective of the various cable type lives underpinning the forecast. As such, the unit cost parameter is the factor driving the difference between the model and Ausgrid's forecast.
- A model scenario that uses both the AER's median unit cost and median life produces a forecast of $169 million, which is above Ausgrid's forecast. This suggest that the combination of its forecast unit cost and the underlying forecast life assumptions are together more favourable than a theoretical median DNSP.

Ideally, I would recommend that the model could be improved by developing sub-categories by the cable types and possibly regions. This should provide a more accurate historical scenario, presumably exposing the unit cost and life parameters associated with the different cable types and regions. This could indicate how the relative proportions of the lower and higher cost replacements are predicted to change, providing some support to the higher forecast unit cost.

However, it is unlikely that the AER can generate suitable cable type medians, as the RIN data of other DNSP will not readily allow this, and therefore, the AER is unlikely to be able to definitively test this alternative model set-up through its model assessment approach.

Ausgrid's reasoning for the significantly higher forecast unit cost for these cable types seems reasonable, in principle. Therefore, given this and the favourable result noted above using both the median unit costs and lives, I consider there is a strong case that the AER should consider the appropriate unit cost for this asset category further, possibly supported by the enhanced modelling noted above. This will likely require a detailed review by the AER to test Ausgrid's claims.

11kV switches

Summary of AER scenario results for this asset category

- Ausgrid's forecast for this asset category is $84 million and 2,862 units
- The AER's threshold result, given by the life scenario, is $27 million and 1,542 units
    - The comparative life for this scenario is defined by Ausgrid's historical life (70 years); the median life is shorter at 66 years.
- The cost scenario is $15 million and 1,542 units
    - The comparative unit cost for this scenario is defined by the median unit cost ($9.7k), which is considerably lower than Ausgrid's historical unit cost ($17k) and forecast unit cost ($29k).

Appreciation of Ausgrid's underlying program

I understand from Ausgrid's explanation that this asset category captures a broad range of asset types, covering lower cost air break switches ($11k) and higher cost ring main Isolators and fuse switches ($45k) contained within underground and chamber substations.

Ausgrid's key concern is that there is a broad range of unit costs for the other DNSPs, and these variations are probably more reflective of the predominant types, rather than relative efficiencies. It notes that the median is set by Essential, which has a predominantly overhead network that will cover lower cost asset types.

Ausgrid believes that consideration should be given to different switch types in setting the comparative unit costs.

My view and considerations

I agree with Ausgrid that this asset category, as described, may not be treated appropriately through the AER's methodology and further consideration should be given to the unit costs in Ausgrid's circumstances. This will be particularly important if the threshold scenario would change to the cost scenario.

In principle, 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 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 appear to benchmark poorly.

In forming this view, it is worth noting that Ausgrid's forecast is still a significant increase from historical practices – both in terms of aggregate volumes and average forecast unit cost. This is also significantly higher than a forecast generated from the median unit costs and median life. Although adjusting the unit cost could increase the forecast, it is unlikely to result in an amount as high as Ausgrid's forecast.

11kV fuses

Summary of AER scenario results for this asset category

- Ausgrid's forecast for this asset category is $20 million and 5,225 units
- The AER's threshold result, given by the life scenario, is $10 million and 1,786 units
    - The comparative life for this scenario is defined by Ausgrid's historical life (62 years); the median life is significantly shorter at 51 years.
- The cost scenario is $5 million and 1,786 units
    - The comparative unit cost for this scenario is defined by the median unit cost ($3.0k), which is lower than Ausgrid's historical unit cost ($5.8k) and slightly lower than its forecast unit cost ($3.8k).

Appreciation of Ausgrid's underlying program

Ausgrid's reasoning for 11kV fuses is very similar to 11kV switches discussed above, in that it considers that this asset category captures a broad range of asset types, covering lower cost overhead fuses ($3.0k) and higher cost indoor units ($5.0k).

Similarly, Ausgrid's key concern is that variations between DNSPs are probably more reflective of the predominant types, rather than relative efficiencies and therefore consideration should be given to different fuse types in setting the comparative unit costs.

My view and considerations

For similar reasons to those discussed above on 11kV switches, I agree with Ausgrid that this asset category, as described, may not be treated appropriately through the AER's methodology and further consideration should be given to the unit costs in Ausgrid's circumstances.

Also similar to my considerations on 11kV switches, it is worth noting that Ausgrid's forecast is still a significant increase from historical practices, particularly in terms of aggregate volumes. This forecast is also significantly higher than a forecast generated from the median unit cost and median life. Although adjusting the unit cost could increase the forecast, it is unlikely to result in an amount as high as Ausgrid's forecast.

11kV circuit breakers

Summary of AER scenario results for this asset category

- Ausgrid's forecast for this asset category is $86 million and 928 units
- The AER's threshold result, given by the life scenario, is $36 million and 426 units
    - The comparative life for this scenario is defined by Ausgrid's historical life (65 years); the median life is much shorter at 53 years.
- The cost scenario is $31 million and 426 units
    - The comparative unit cost for this scenario is defined by the median unit cost ($73k), which is lower than Ausgrid's historical unit cost ($85k) and forecast unit cost ($92k).

Appreciation of Ausgrid's underlying program

Ausgrid's reasoning for 11kV circuit breakers is also similar to the 11kV switches discussed above, in that it considers that this asset category captures a range of asset types and replacement types, noting it captures circuit breakers within distribution substations, outdoor zone substations and indoor zone substations.

It considers that the median replacement unit cost set by Essential Energy is likely to be reflective of switchgear replacement in distribution substations (typically 1-2 breakers per location) or outdoor circuit breakers only, which it considers is relatively consistent with its own costs for this type of circuit breaker.

It claims that its replacements in this category involve a larger volume of higher cost brownfield and in-situ replacement the circuit breakers (and associated switchboard) in indoor zone substations, at a cost of on average $141k per breaker, where this higher cost includes:

- civil buildings, cable basement modification costs to accommodate new switchgear (which is generally of a different size or configuration) which represents 30% of the cost of a typical project
- re-cabling within the zone substation (around 10% of the cost of a typical project);
- additional costs associated with transferring load away from the substation to enable replacement works to be undertaken, referred to as load transfer costs. This involves laying additional 11kV cable capacity to transfer load to adjoining substations, where feasible and economic. These load transfer costs are feasible since the cost of the alternative option (i.e. a new substation) involves replacement of all equipment and significantly higher civil and land costs.

Ausgrid considers that brownfield replacement of 11kV circuit breakers should be considered outside of the model.

My view and considerations

I agree that the appropriate comparative unit cost for this category would need to be given further consideration by the AER, due to the likely higher costs of Ausgrid. I consider that there is less of a reason to routinely assess brownfield elements of this category outside of the model; however, given some mitigating matters I'll discuss below, I consider that there could be a sufficient case to make this appropriate for Ausgrid's circumstances.

With regard to the forecast unit cost, for similar reasons to those discussed above on 11kV switches and fuses, I consider it reasonable that further consideration should be given to the appropriate comparative unit cost in Ausgrid's circumstances.

With regard to whether the brownfield replacement component should be assessed outside of the model, then usually I would consider that this was not appropriate. For reasons discussed above on LV conductors, this replacement need seems to be strongly age-related and so should be modellable.

However, in the case of Ausgrid and the AER's assessment methodology there seems to be some mitigating matters:

- The brownfield replacements appear to be a significant component of the 11kV circuit breaker category for Ausgrid, and therefore, it is more important that this program is reasonably accurately allowed for.
- These replacements are likely to be occurring in large projects, replacing multiple units at the same time. Furthermore, they also include other cost elements, such as load transfer costs, and other options. These matters will also need to be considered, if the AER is determining the appropriate comparative unit cost to use in

the model. Therefore, there is a reasonable synergy between the review necessary to determine suitable comparative unit costs for this program, and the overall detailed review of this program.

Therefore, given Ausgrid compares favourably overall when the set of median lives and unit costs is applied, I consider that there is a reasonable case to exclude these brownfield components from the model and assess them separately through a detailed review.

Ausgrid should consult with the AER on its preferred approach to report data in these circumstances. However, as a guide only, I suggest the following:

- the indoor circuit breakers associated with this program should be removed from the 11kV circuit breaker age profile and moved to an 11kV circuit breaker "other" sub-category
- the historical and forecast expenditure and volumes should be removed from the 11kV circuit breaker category and moved to an 11kV circuit breaker "other" sub-category.

In this way, the repex associated with the remaining 11kV circuit breakers can be assessed through the repex model, and this program can be assessed through a detailed review to test Ausgrid's claims.

Ground-mounted Transformers <22kV >600kVA multiphase

Summary of AER scenario results for this asset category

- Ausgrid's forecast for this asset category is $18 million and 224 units
- The AER's threshold result, given by the life scenario, is $7 million and 190 units.
    - The comparative life for this scenario is defined by Ausgrid's historical life (60 years); the median life is slightly shorter at 58 years.
- The cost scenario is the same as the life scenario at $7 million and 190 units
    - The comparative unit cost for this scenario is defined by the historical unit cost ($34k), which is considerably lower than the median unit cost ($80k) which is similar to the forecast unit costs ($81k).

Appreciation of Ausgrid's underlying program

I understand from Ausgrid's explanation that:

- The increase in the forecast unit cost from the historical amount is because this asset category is affected by the need to replace CBD Conservator type transformers in underground substations. The unit cost of these replacements is $110K per unit.
- The reason for this much higher cost is that the replacement of these assets involves underground substations (with confined spaces), after-hours work and CBD road closures.
- This asset type accounts for 73% of forecast expenditure for this asset category, which heavily influences the average unit rate.

Ausgrid's key concern is that the forecast unit cost is not directly comparable with any of its peers and should be determined by means other than standard peer comparison.

My view and considerations

I agree with Ausgrid that this program, as described, may not be treated appropriately through the AER's methodology. Although I consider that this asset category and the underlying programs should still be allowed for in the modelling, further testing of the model/scenario results are likely to be required to investigate the appropriate parameters and possible adjustments. This is likely to require some form of detailed review of Ausgrid's claims.

With regard to the appropriate unit cost, I consider that there are a number of matters that support Ausgrid's view and suggest the comparative cost could be unfairly representing Ausgrid's needs:

- Ausgrid's historical unit cost is the lowest unit cost of the DNSPs and is much lower than the median unit cost, which suggests there is something unusual with Ausgrid's historical unit cost and this low cost may not be sustainable.
- Ausgrid's forecast unit cost is in line with the median unit cost, which indicates that Ausgrid's predicted change in the make-up of its replacements in this category is not taking it out of step with the median DNSP.
- A model scenario that uses both the AER's median unit cost and median life produces a forecast of $19 million, which is slightly above Ausgrid's forecast. This suggests that the combination of its forecast unit cost and the underlying forecast life assumptions are together more favourable than a theoretical median DNSP.

Ausgrid's reasoning for the significantly higher forecast unit cost for these transformers is reasonable, in principle. Therefore, given this and the favourable result noted above, I consider there is a strong case that the AER should consider the appropriate unit cost for this asset category further. This will likely require a detailed review by the AER to test Ausgrid's claims.

Similar to LV cables above, ideally, I would also recommend that the model could be improved by developing sub-categories by the transformer types. This should provide a more accurate historical scenario, presumably exposing the unit cost and life parameters associated with the different types. This could indicate how the relative proportions of the lower and higher cost replacements are predicted to change, providing some further support to the higher forecast unit cost.

Summary

I consider it reasonable that the six asset categories discussed here may require further consideration by the AER, given:

- the comparatively good performance of Ausgrid's historical and forecast repex against a theoretical median DNSP

- the various claims of Ausgrid on the specific circumstances of the programs in these asset categories.

In summary:

- There are two programs where it is likely to be reasonable to exclude them from the repex model:
    - The **public lighting LV conductor program** should be excluded from the repex model and assessment, as it appears to be very weakly age-related and so the predictive abilities of the repex model are unlikely to appropriately allow for this need.
    - The **11kV circuit breaker indoor brownfield replacement program** would more typically be included in the model, but there are circumstances relevant to Ausgrid where it may be better for this program to be assessed outside of the model.
- For the remaining four asset categories discussed here, it is likely that the comparative unit costs will not adequately reflect Ausgrid's circumstances, and therefore, the AER may need to investigate these categories in more detail to confirm the appropriate unit cost in the context of the set of DNSP unit costs. This may also involve some enhanced modelling by Ausgrid, using sub-categories to reflect the various asset types in these asset categories. The programs cover:
    - **LV underground cables**
    - **11kV switches**
    - **11kV fuses**
    - **ground-mounted Transformers <22kV >600kVA multiphase**.

The AER will be best placed to decide to what extent it undertakes detailed review of the relevant matters, in the context of the findings it has available from all its assessment techniques. This may only require the review and consideration of unit cost assumptions and claims in some circumstances. However, where it considers that detailed reviews of the underlying program volumes are necessary, then I would expect that formal cost-benefit analysis will be required and so Ausgrid should ensure that this is available.

Closing

I trust you will find this letter helpful. If you require any further clarifications, I can be contacted on 0434 390 623.

Yours sincerely

Brian Nuttall

Brian Nuttall
Director, Nuttall Consulting