Ausgrid

Revised Proposal

Attachment 5.13.M.21 Frontier Economics methodology review of Ausgrid repex CBA models

January 2019

REVIEW OF CAPEX CBA METHODOLOGY

REPORT FOR AUSGRID

20 DECEMBER 2018

Frontier Economics Pty Ltd is a member of the Frontier Economics network, and is headquartered in Australia with a subsidiary company, Frontier Economics Pte Ltd in Singapore. Our fellow network member, Frontier Economics Ltd, is headquartered in the United Kingdom. The companies are independently owned, and legal commitments entered into by any one company do not impose any obligations on other companies in the network. All views expressed in this document are the views of Frontier Economics Pty Ltd.

Disclaimer

None of Frontier Economics Pty Ltd (including the directors and employees) make any representation or warranty as to the accuracy or completeness of this report. Nor shall they have any liability (whether arising from negligence or otherwise) for any representations (express or implied) or information contained in, or for any omissions from, the report or any written or oral communications transmitted in the course of the project.

CONTENTS

1 BACKGROUND

This report confirms the scope, process and findings of our review of Ausgrid's methodology for conducting cost-benefit analysis (CBA) modelling in respect of four classes of assets in its network.

The four asset classes are referred to by the following names:

- Services
- Dedicated LV mains
- CBD Isolators (also known as CBD I&E switches) and
- Consac & HDPE.

The broad methodology used in these models is described in a separate document.

This report is arranged as follows:

- Section 2 describes the scope of Frontier Economics' methodology review
- Section 3 explains the process followed in undertaking the review
- Section 4 sets out the findings of Frontier Economics' review, including the subsequent actions taken by Ausgrid in response to our findings
- Section 5 is a concluding summary of our review.

2 SCOPE OF REVIEW

Frontier Economics' review of Ausgrid's capex CBA modelling has been limited to a review of the methodology that Ausgrid has applied in undertaking its assessment of when particular network assets in certain network classes should be replaced. While the Frontier team has undertaken a high-level review of Microsoft Excel models for each of the four asset classes referred to above, the Frontier team has not conducted a detailed review of the formulae and statistical approaches used in the models. In particular, we have not performed a cell-by-cell audit.

3 PROCESS

The review has involved a constructive and cooperative process, with Ausgrid offering timely and appropriately-qualified resources to address any questions quickly and clearly.

The Frontier Economics team met with Ausgrid's regulatory team on Wednesday 14th November 2018 and participated in an introductory workshop at Ausgrid's offices.

During the workshop, Ausgrid staff provided the Frontier team with an initial draft of the broad methodology paper entitled, "Document No. XXXXX, Cost Benefit Modelling – Methodology, August 2018" (Methodology report), as well as another paper entitled, "CBD I&E Switches, Risk/Health Index" (CBD summary paper). Ausgrid staff proceeded to explain the steps set out in the Methodology report and how this produced results such as those shown in the CBD summary paper.

Subsequently, Ausgrid provided electronic copies of the Methodology report, the CBD summary paper and one of the four Excel CBA model (CBD I&E Switches) to Frontier Economics. Ausgrid staff also referred the Frontier team to a recent draft practice note published by the Australian Energy Regulator (AER) on asset replacement planning (AER practice note).[1]

The Frontier team proceeded to review the Methodology report and the CBD summary paper. On 20th November 2018, the Frontier team raised a number of brief queries about both documents with Ausgrid staff, who replied shortly afterwards providing initial brief written responses. Later that day, Ausgrid and Frontier Economics staff held a telephone discussion about the queries and responses, which enabled most of the queries to be resolved. Frontier Economics followed up with written comments on both papers in a document entitled, "Ausgrid CBA methodology review, Initial Feedback", on 21st November 2018 (Initial feedback). On the same day, the Frontier team held a telephone conference with Ausgrid staff to explain our initial findings.

On Monday 26th November, Ausgrid provided Frontier Economics with an updated Methodology report and an initial copy of one of the CBA Excel models (Services), which Ausgrid staff explained had not yet been updated to reflect the advice contained in our Initial feedback note. The Frontier team began reviewing the Services model on that basis.

On Tuesday 4th December 2018, Rajat Sood of Frontier Economics participated in a workshop with Ausgrid staff and staff from the AER, where Ausgrid staff explained Ausgrid's proposed CBA methodology.

On Thursday 6th December 2018, Ausgrid provided Frontier Economics with copies of the following documents that had been tabled during the workshop with the AER:

- Updated version of the Methodology report
- Cost Benefit Analysis, Replacement Asset Modelling (PowerPoint slides)
- CONSAC & HDPE cable, Cost Benefit Modelling, summary paper
- CBD summary paper.

On Friday 7th December, Ausgrid staff provided the Frontier team with access (via Dropbox) to draft version of the four Excel models dealing with each of the four asset types listed above.

[1] AER, *Draft Industry Practice Note, Asset replacement planning*, September 2018, available at: https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/industry-practice-application-note-for-asset-replacement-planning (accessed 20 December 2018).

Frontier staff proceeded to review the methodology used in these four models and provided Ausgrid with comments on each model inserted into the relevant Excel model.

The Frontier team provided comments to Ausgrid on the:

- Excel models for Services, CBD Isolators and Dedicated LV Mains (via email) on Wednesday 12th December 2018 and
- Excel model for CONSAC & HDPE (via USB memory stick) on Monday 17th December 2018.

Also on Monday 17th December, Frontier team members held a telephone discussion on some specific statistical issues with Ausgrid staff.

This letter represents in the final stage in Frontier Economics' review of the CBA modelling.

4 FINDINGS

Frontier Economics considers that the methodology used by Ausgrid to assess the appropriate timing of replacement investment across the four asset classes outlined above conforms to sound principles of cost-benefit analysis. The methodology involves setting the (net) benefits of replacement derived from the expected reduction in the probability of asset failure in a given year – and the economic cost consequences thereof – against the (annual) costs of replacement as valued by the cost of capital saving from deferring replacement by a year. The nature of the economic cost consequences reflected in the analysis appropriately reflect:

- Legal obligations on Ausgrid (e.g. safety)
- Expected costs of clean-up and fines expected to be imposed on Ausgrid (e.g. environmental)
- Expected losses to consumers from loss of supply events; and
- Financial costs attributable to the additional costs of reactive replacement in the event of failure.

If anything, Ausgrid's methodology appears to *understate* the benefits of replacement by not adjusting the probabilities of consequence of various severity failures upon the replacement of an aging asset by a new asset. Ausgrid staff have indicated that this is an enhancement they intend to pursue in the future.

Frontier Economics' Initial feedback paper made several recommendations and raised a number of issues for Ausgrid's consideration.

The key recommendation concerned the importance of the CBA methodology incorporating a comparison of risk value with and without new investment when determining the value of Risk ($) in section 3.10 of the Methodology report. This is because a replacement asset is unlikely to eliminate all the risk arising from a network element and so, as initially described in the Methodology report, the risk said to be avoided from investment overestimated the true risk avoided. Ausgrid had acknowledged this point in its initial response to the queries raised by Frontier Economics on 20th November 2018, and Ausgrid staff suggested that one way to overcome this issue was to subtract the risk when an asset is new from the current estimate of the risk avoided by investing in the replacement asset. The Initial feedback note we prepared suggested that this approach was likely to be the best way of address this issue.

Another recommendation provided in the Initial feedback was that the investment decision criterion used for CBA purposes should in most cases be that replacement is undertaken when it is net beneficial in present value terms, rather than the alternative options highlighted in the original Methodology report. These alternatives included replacing assets more gradually than precisely when replacement becomes net beneficial (say, over the course of a regulatory control period), or seeking to maintain present levels of risk (expected costs). In the case of higher-value assets (that nevertheless still lie below the Regulatory Test for Distribution (RIT-D) threshold), the decision criterion could be modified to allow for consideration of alternatives to 'like-for-like' or 'new' (technically superior) replacement. However, this will not be worthwhile or practicable with most sub-RIT-D threshold assets.

In addition, the Initial feedback provided comments on appropriate values or levels of key parameters highlighted in the Methodology report – for the gross disproportionality factor (GDF) and the value of customer reliability (VCR). However, these comments were suggestions for Ausgrid's consideration based on the AER practice note or other documents rather than methodological recommendations.

In reviewing Ausgrid's four Excel models, Frontier Economics found that the models broadly reflected the methodology set out in the Methodology report. Therefore, the Frontier team's comments on the models largely involved raising queries of detail regarding the appropriateness of some of the formulae and statistical approaches used in the models rather than on the application of a suitable methodology. We note that as the Frontier team did not undertake an audit of the models, it is not possible for Frontier Economics to warrant that the models – which continue to be updated – are mathematically and statistically correct in all respects.

Subsequent follow-up

The Frontier team and Ausgrid staff held further discussions over Monday 17th December 2018 and Tuesday 18th December 2018. During those discussions, the Frontier team raised additional formulae and statistical queries about operations in the Services model, which the Ausgrid team indicated it had already addressed or would investigate further. However, the Frontier team did not find or raise any additional issues regarding modelling methodology.

As part of these discussions, Ausgrid staff explained to the Frontier team how the Services model had been revised to take into account the key recommendation raised in the Initial feedback – to ensure the value of Risk ($) reflected the net reduction in risk due to asset replacement. Ausgrid staff further explained that the other models also reflected this key recommendation in a similar way.

5 SUMMARY

This report describes the scope, process and findings of our review of Ausgrid's methodology for conducting CBA modelling in respect of four classes of assets in its network.

We consider that the methodology used by Ausgrid to assess the appropriate timing of replacement investment across the relevant four asset classes conforms to sound principles of cost-benefit analysis. The methodology involves setting the (net) benefits of replacement derived from the expected reduction in the probability of asset failure in a given year – and the economic cost consequences thereof – against the (annual) costs of replacement as valued by the cost of capital saving from deferring replacement by a year. If anything, Ausgrid's methodology appears to *understate* the benefits of replacement by not adjusting the probabilities of consequence of various severity failures upon the replacement of an aging asset by a new asset. Ausgrid staff have indicated that this is an enhancement they intend to pursue in the future.

Frontier Economics' initial feedback to Ausgrid made several recommendations and raised a number of issues for Ausgrid's consideration. We understand that Ausgrid has modified its models to reflect our key recommendation – to ensure the value of Risk ($) reflects the net reduction in risk due to asset replacement.

Importantly, our review of Ausgrid's capex CBA modelling has been limited to a review of the methodology that Ausgrid has applied – we have not conducted a detailed review of the formulae and statistical approaches used in the models or undertaken a model audit.

The review has involved a constructive and cooperative process, with Ausgrid offering timely and appropriately-qualified resources to address any questions quickly and clearly.

frontier economics

BRISBANE | MELBOURNE | SINGAPORE | SYDNEY

Frontier Economics Pty Ltd
395 Collins Street Melbourne Victoria 3000

Tel: +61 (0)3 9620 4488
www.frontier-economics.com.au

ACN: 087 553 124 ABN: 13 087 553