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Dear Mr Feather

Consultation Paper: Values of Customer Reliability

TransGrid welcomes the opportunity to respond to the Australian Energy Regulator's (AER) consultation paper on Values of customer reliability (VCR).

TransGrid is the operator and manager of the high voltage transmission network connecting electricity generators, distributors and major end users in New South Wales and the Australian Capital Territory. TransGrid's network is also interconnected to Queensland and Victoria, and is instrumental to an electricity system that allows for interstate energy trading.

Australia is in the midst of an energy transformation. This is primarily driven by changing community expectations and choices, advances in renewable energy technologies, retirement of existing generation, and the adjustments required in Australia's economy to meet our international climate change commitments. These changes raise complex issues in relation to the design of the National Electricity Market (NEM) which must adapt to these changes and provide the basis for low emissions, reliable supply at the lowest cost to consumers over the long run.

As identified in the Australian Energy Market Operator's (AEMO) 2018 Integrated System Plan, transmission investment is essential for the development of a low cost, reliable and low emissions electricity supply. The AER should consider this context in its development of VCRs. A robust VCR methodology and estimates are critical for efficient transmission investment and the benefits it brings to consumers.

TransGrid appreciates the opportunity to comment on the AER's VCR consultation paper. If you would like to discuss this submission, please contact Rebecca El-Khoury, Regulatory Analyst on 02 9284 3299.

Yours faithfully



Caroline Taylor
Acting Executive Manager, Policy and Corporate Affairs

1. Introduction

TransGrid supports the AER's development of a nationally consistent Values of customer reliability (VCR) methodology, with the first VCR estimates to be calculated and published by 31 December 2019. The development of a consistent and robust VCR methodology that delivers consistent and stable VCR estimates is essential to facilitate efficient network capital expenditure.

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As identified in the Australian Energy Market Operator's (AEMO) 2018 Integrated System Plan, transmission investment is essential for the development of a low cost, reliable and low emissions electricity supply¹. TransGrid recommends the AER considers this context in its development of VCRs. A robust VCR methodology and estimates are critical for efficient transmission investment and the benefits it brings to consumers.

In this context, the VCR methodology must be fit for purpose – that is, it must provide for different locational, customer types (by size and activities undertaken) and duration and frequency of outage reliability event. It should also be clear, and its application be without ambiguity as it will build confidence for all stakeholders.

The VCR methodology must also contain an appropriate approach to value the effect of high impact low probability (HILP) events. During the development of a new reliability standard recently in NSW, TransGrid received independent economic advice that without this VCR estimates are likely to be understated.²

TransGrid has contributed to an industry response through Energy Networks Australia and agrees with the issues raised and recommendations outlined in this response.

This submission sets out TransGrid's views on the issues identified by the AER in its consultation paper. It is structured as follows:

- > Section 2 sets out our general comments on the AER's development of a VCR methodology.
- > Section 3 sets out our comments on the current and potential uses of VCRs.
- > Section 4 sets out our comments on the methodologies for deriving VCRs.

¹ Australian Energy Market Operator 2018, *Integrated System Plan*, 17 July, available at: https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/ISP/2018/Integrated-System-Plan-2018_final.pdf

² Houston Kemp 2016, *CBD and Inner Metro VCR estimates - A final report for TransGrid on research, methodology and results*, 28 July, Sydney, available at: <https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/investigation-section-12-publications-electricity-transmission-reliability-standards/consultant-report-transgrid-vcr-estimates-july-2016.pdf>

2. General comments

2.1 Target completion date

Network investment decisions and planning processes are dependent on robust VCRs. Given the importance of changes to VCRs on long term network planning and network capital work programs, achieving the required output by the target completion date of 31 December 2019 is essential.

2.2 Consumer engagement plan

TransGrid considers that one of the learnings from AEMO's 2014 review of VCR values was the difficulty in obtaining engagement with some consumer groups, leading to substantial delays. TransGrid recommends the AER develop a consumer engagement plan for the initial preparation of the VCR methodology and values and the ongoing validation of VCR. This will help avoid delays and facilitate ongoing engagement between the AER and consumers throughout the process.

Under the National Electricity Rules (NER), the AER is required to consult with each jurisdictional regulator, such as the Independent Pricing and Regulatory Tribunal (IPART) of New South Wales. We consider that consultation with jurisdictional regulators that enforce regulations regarding reliability is essential to ensure the AER's VCR methodology and estimates are consistent with jurisdictional-specific requirements.

2.3 Building on previous work

We note that the AER has identified that it intends to build on the previous work undertaken by AEMO to develop the VCR methodology. TransGrid recommends that the AER avoid the limitations of the AEMO's 2014 review and deliver VCRs that provide greater granularity, stability and accuracy that are now required for contemporary reliability assessments.

An example of these limitations is made clear when considering AEMO's 2014 review of VCR values as applied to the Powering Sydney's Future project. The VCR estimates were considered to understate the value of this project due to two key limitations:³

- > The VCR estimates do not differentiate between sub regions, such as Inner Sydney where it is reasonable to expect higher VCR values for customers as compared to the state averages.
- > The VCR estimates do not consider prolonged outages (the longest outage considered was 12 hours), which may be significantly lower than for failure of supply cables to Inner Sydney.

Other limitations of AEMO's 2014 review, which TransGrid recommends the AER consider are:

- > A lack of representation of important energy consumers for central business districts and inner metropolitan areas (e.g. the Australian Securities Exchange (ASX), NSW Parliament, large financial institutions, public transport agencies and Sydney airport).
- > AEMO did not provide any information or data on CBD-specific sampling.
- > The VCR methodology applied did not distinguish the losses incurred by residential customers as the result of a supply disruption to those incurred by commercial businesses who rely on electricity to generate and collect revenue, which will be significantly different in nature.

TransGrid considers that, consistent with good practice, the AER undertakes an in-depth scan of potential methodologies and outcomes for VCRs, including those developed and applied internationally. This will better inform decision making on which approach(es) are better suited for estimating VCRs.

For example, the Ernest Orlando Lawrence Berkeley National Laboratory recently updated its value of service reliability estimates for electric utility customers in the United States. The report provides updates to the 2009

³ Houston Kemp 2016, *CBD and Inner Metro VCR estimates - A final report for TransGrid on research, methodology and results*, 28 July, Sydney, available at: <https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/investigation-section-12-publications-electricity-transmission-reliability-standards/consultant-report-transgrid-vcr-estimates-july-2016.pdf>

meta-analysis, which includes 34 survey datasets across 10 different utility companies between 1989 and 2012.⁴ These econometric studies provide inputs into the Interruption Cost Estimate (ICE) Calculator⁵.

2.4 Expected outputs

The AER's expected outputs at the end of this process needs to be made clear. The NER requires the AER to produce the VCR methodology and estimates.

TransGrid seeks to clarify if the AER intends to publish an all-inclusive and exhaustive publication of VCR estimates across all jurisdictions, customer types, and duration segments. If so, TransGrid suggests the AER consider the following questions:

- > Will this be updated to include VCR estimates for any new and amended loads in the future?
- > Will the AER verify an applicable VCR value where the standard published VCR does not appear applicable for unique directly connected customers?

If this is not the AER's intention, the alternative is to provide NSPs all the relevant information and guidance to undertake an assessment of VCRs, where required. For example, for newly connected loads or where a significant modification of an existing load means the existing values are not valid. If so, TransGrid recommends that the AER develop and publish a VCR application guideline in consultation with stakeholders.

TransGrid also believes it would be valuable to have access to all the research, aggregated data and other supporting material related to VCRs, subject to confidentiality.

Once the VCR values are established, it is important that NSPs and all stakeholders have confidence in the stability of these values when applying them in planning process, including the regulatory investment tests for transmission (RIT-T). We note that VCR estimates have been the subject of a recent RIT-T dispute resolved by the AER. It would be appropriate as part of this process for the AER to express a view on how it will manage a conflict of interest should a dispute be raised on VCR in the RIT-T process.

3. Current and potential future uses of VCRs

VCRs are primarily used by NSPs as inputs into network planning and decision making processes for capital expenditure and asset replacement investments, including RIT-Ts. For these purposes the VCR is determinative as it provides a risk quantification of the reliability component in modelling investment options.

For all other potential uses of VCRs by NSPs identified in chapter 4.2 of the AER's consultation paper such as load shedding, the VCRs are informative, but not determinative. While VCRs may provide some assistance in the additional uses identified, its use should be limited. TransGrid recommends that the AER's development of VCRs be tailored to meet its primary planning purposes, and not be diminished to meet design requirements for less useful applications.

In this context, TransGrid recommends that the AER develop its VCR methodology and estimates to compliment the network planning requirements including forecasts of VCRs that align with the network planning horizon. These forward-looking VCRs should provide a clearly defined confidence interval and the context in which its application is appropriate. This includes the limitations and boundaries on validity that provides clarity when establishing VCRs for application in investment evaluations (e.g. test boundaries of 10 to 15 per cent).

The VCR methodology must contain an appropriate methodology for properly understanding and reflecting the value customers attribute to the effect of HILP events, which was not reflected in AEMO's VCR Review in 2014. Without this, VCR estimates are likely to be understated.⁶ This is particularly important at the transmission level; under the NER, transmission network service providers are required to assess the risk of a HILP event on power system security.

⁴ Sullivan, M J, Schellenberg, J A, Blundell, M 2015, *Updated Value of Service Reliability Estimates for Electric Utility Customers in the United States*, January, California, available at: <http://eta-publications.lbl.gov/sites/default/files/lbnl-6941e.pdf>

⁵ The ICE Calculator is an online tool designed for electric reliability planners at utilities, government organizations or other entities that are interested in estimating interruption costs and/or the benefits associated with reliability improvements.

⁶ Houston Kemp 2016, *CBD and Inner Metro VCR estimates - A final report for TransGrid on research, methodology and results*, 28 July, Sydney, available at: <https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/investigation-section-12-publications-electricity-transmission-reliability-standards/consultant-report-transgrid-vcr-estimates-july-2016.pdf>

At present there is a lack of clarity and consistency of what constitutes a HILP event, and this is likely to cause inconsistencies in interpretation across regulating bodies, network service providers, and other industry participants.

TransGrid recommends the AER provide a clear definition of what is considered a HILP event. In coming up with this definition the AER should consider including the probability of occurrence of a HILP event and the potential size of the impact of the event, including 'flow-on' impacts such as loss of revenue and risk to safety.

4. Methodologies for deriving VCRs

4.1 Approaches

The AER has proposed a number of different approaches for estimating VCRs, and it is expected that each of these have different strengths and weaknesses, as well as being more or less useful for the various uses of VCRs. For example, choice modelling (CM) may be considered more appropriate for consumers that have an elementary understanding of the potential impacts of power outages. This is because CM allows respondents to choose between scenarios rather than provide an abstract dollar value, which is required in contingent valuation surveys.

However, the AER has not provided a clear evaluation criteria that could be applied to determine the preferred approach for each circumstance and ensuring that it is fit for purpose in that circumstance. This could also be useful when considering how to apply the VCR methodology for future calculations of VCR estimates.

TransGrid recommends the AER develops an evaluation criteria for the different options of deriving VCRs, including the strengths and weaknesses of each approach as well as what approach is best suited for each of the different uses of VCRs.

4.2 Customer Segments

VCRs underpin a high proportion of network investment across the NEM each year. This investment is crucial to ensure the network is sufficient to cater for changes in load and demand factors, as well as maintaining a secure and reliable system. Given this, TransGrid considers that there is sufficient value in dedicating time and effort to achieve a modest degree of segmentation of VCRs. This will support network planning processes and ensure modelling is representative of the consumer impact.

TransGrid recommends the following customer segments:

- > Commercial and Industrial (small)
- > Commercial and Industrial (large)
- > Agriculture (energy critical)
- > Agriculture (non-energy critical)
- > Residential
- > Major business district (e.g. Chatswood, South Sydney Industrial Area, Macquarie Park)
- > Central business district (e.g. Sydney CBD)
- > Inner Metropolitan
- > Large or directly connected customers
- > Summer – morning, afternoon - evening, night
- > Winter - day, night

4.3 Outage characteristics

To build up a Consumer Damage Function (CDF) versus duration, TransGrid recommends that VCR values would be needed at each of the following time intervals following the occurrence of the outage event:

- > Momentary (less than < 1 minute)
- > 30 minutes
- > 1 hours
- > 4 hours
- > 8 hours
- > 16 hours

TransGrid recommends that periods longer than 16 hours be considered, however we note that consumer surveys are unlikely to provide robust VCRs that accurately reflect the value of avoiding such an event. This is because most consumers have no experience a power system outage of longer than 16 hours and, as such, may not fully understand the extent of its impacts. This is also true of HILP events.

The AER should consider alternative approaches for establishing the relevant VCRs for these events. It is important that the approach(es) adopted accurately reflect the direct and indirect implications of these events. This includes social impacts such as safety risks (for example fatality and injury) and economic impacts beyond revenue implication such as potential implications on long term decision making (for example a commercial office for the Asia Pacific region will not locate in a city with poor electricity supply).

4.4 Projection for Forecasting

Regulatory investment tests for networks are a complex process, which take a significant amount of time and expense. Stability, certainty and consistency of VCR estimates is crucial for this process to run efficiently. TransGrid supports a five year VCR review, with initial VCR being completed by December 2019.

TransGrid does not consider that annual adjustments of VCRs should be required under the NER unless these are limited to escalations factors already included in the VCR methodology. That is, VCR estimates should be indexed year to year unless a fundamental change occurs which requires a change in VCR and this is agreed with the relevant NSPs.

There has been some discussion that yearly adjustments should be indexed to CPI, which is a simple and widely used approach. However, this would potentially understate the annual change in VCR values given other related observations – such as:

- > Increases in energy efficiency would see each unit of electricity being leveraged to produce higher levels of output. This suggests the value of each unit of energy used is also increasing.
- > Productivity improvements tend to be built around innovation and technological improvements, which are typically leveraged off electricity e.g. greater use of automation and artificial intelligence.
- > Residential and commercial premises are becoming increasingly reliant on device connectivity.

4.5 Transitioning to new VCR values

It is important that VCR estimates are relatively stable over a reasonable timeframe. Significant changes to VCR estimates can have significant impacts on current capital work programs. This is especially relevant for replacement expenditure allocated during revenue determination processes.

TransGrid recommends the AER considers transitional arrangement options to help NSPs manage the impact of changes to VCR estimates. This may include providing an adjustment period to help reduce the impact on investment decision modelling underway. The Reliability Panel sets its reliability standard and settings for NEM two years ahead. The AER should consider a similar arrangement that coincides with the network planning time horizon, thus allowing for NSPs to transition to newly derived VCR estimates.

5. Next steps

TransGrid appreciates the opportunity to comment on the AER's consultation paper on VCR. We look forward to ongoing and meaningful consultation with the AER on the issues and recommendations made above.

If you would like to discuss this submission, please do not hesitate to contact Rebecca El-Khoury, Regulatory Analyst on 02 9284 3299.