

6/07/2017

Ms Fiona Towers
Executive Director, Energy and Transport

Energy Networks Regulatory Unit
Independent Pricing and Regulatory Tribunal
PO Box K35
Haymarket Post Shop NSW 1240

Submitted by online form

Dear Fiona,

Re: TransGrid's Transmission reliability standard compliance Issue Paper – June 2017

TransGrid welcomes the opportunity to respond to the Transmission reliability standard compliance Issue Paper – June 2017 published by the Independent Pricing and Regulatory Tribunal (IPART) as part of its consultation process in assessing compliance to the Electricity transmission reliability standards (the standard), adopted by the Minister for Industry, Resources and Energy on 1 June 2017.

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 central to interstate energy trading.

Proposed approach to assessing compliance

TransGrid broadly supports IPART's proposed approach which requires TransGrid to submit an annual compliance report for the 12 months to 30 June by 31 August. This reporting milestone allows TransGrid sufficient time to annually assess the transmission system to identify bulk supply points (BSPs) which are forecast to not meet the level of redundancy and/or expected unserved energy allowance over the next ten years. This also allows network and non-network options to be economically evaluated to determine the preferred option (project) to meet the standard.

Further, TransGrid recommends it is assessed as compliant to the standard for that review year if:

- All BSPs within the transmission system are forecast to meet the level of redundancy and are forecast to meet the expected unserved energy allowance.
- Where there are BSPs forecast to not meet the level of redundancy and/or forecast to not meet the expected unserved energy allowance, however a project work plan is in place where both the forecast level of redundancy and/or forecast expected unserved energy allowance will be met following commissioning of the project. The work plan will

comprise internal project business cases to enable completion within standard delivery time frames. The audit scope of business cases would be that the project will meet the standard and the proposed delivery schedule is consistent with standard project delivery timeframes.

TransGrid supports flexibility around the level of redundancy or expected unserved energy allowance at specific BSP's on a case by case basis. This flexibility allows TransGrid to manage unexpected network or maximum demand changes where there would be insufficient time to deliver the project or where it is likely to provide a greater net benefit than would be provided by compliance to the standard. A specific plan would be developed and submitted for IPART's approval, inclusive of the alternative level of redundancy and/or expected unserved energy allowance.

Annual compliance report

TransGrid supports that the annual compliance report consist of confirmation the transmission system has been designed to achieve the level of redundancy set out in the standard, and a spreadsheet setting out the formula and inputs that have been used to estimate annual expected unserved energy. In addition TransGrid suggests the inclusion of a project status section to demonstrate to IPART the progress of projects (where required), against the business case, required to meet the standard.

Where Distribution Network Service Provider (DNSP) networks are used as a backup supply to the transmission system, TransGrid recommends that accepted joint planning meeting minutes (section on transmission reliability standard) be sufficient documented evidence of agreement between TransGrid and the DNSP to achieve compliance to the standard. It is suggested that TransGrid and the DNSP would:

- For the level of redundancy assessment, confirm the network arrangement. For example, at a BSP, if there were no proposed planning changes to the DNSP network then the level of redundancy would remain the same.
- For the estimate of annual expected unserved energy, confirm the DNSP backup switching times (which are an input to the expected unserved energy calculation).

BSPs forecast to not meet the expected unserved energy allowance prior to 1 July 2018

TransGrid recommends that for BSPs forecast to not meet the expected unserved energy allowance prior to 1 July 2018, a transition period of 24 months be provided, to allow the preferred option (project) that meets the expected unserved energy allowance to be commissioned. The commissioned project will be included within the annual compliance report submitted to the IPART on 31 August 2021.

The BSPs Molong and Mudgee were forecast to not meet the unserved energy allowance following TransGrid's own assessment of redundancy and calculation of expected unserved energy for all BSPs, shared with the IPART in 2016. Work plans comprising internal project business cases were included in TransGrid's 2018/19 to 2022/23 Revenue Proposal. On the basis that these projects are on track to be completed as scheduled, TransGrid recommends that it is assessed as compliant to the standard.

BSPs forecast to not meet the level of redundancy and/or expected unserved energy allowance on or after 1 July 2018

For BSPs that are:

- Forecast to not meet the level of redundancy, and/or

- Forecast to not meet the expected unserved energy allowance

TransGrid supports the proposal that details of actions (and timeframes) are provided to IPART as part of the annual compliance report. TransGrid recommends the project work plans, business cases prepared internally for project approval, inclusive of standard project delivery timeframes, are sufficient documented evidence.

TransGrid will include in the annual compliance report a project status section that will provide IPART visibility to the progress of projects previously identified.

In addition, for BSPs that become unable to meet the level of redundancy and/or expected unserved energy allowance during a year due to unforeseen changes in circumstance, TransGrid recommends that these are assessed in the same way.

On the basis that projects are on track to be completed as scheduled, TransGrid recommends that it is assessed as compliant to the standard.

Independent audit of compliance

TransGrid supports the proposed requirement to engage and commission a suitably qualified auditor, approved by IPART, to independently assess compliance with the standard by:

- Sampling a sufficient number of BSPs,
- Assessing the design of the transmission system to achieve the level of redundancy specified in the standard,
- Assessing the network management strategies and non-network solutions in place to achieve the restoration and repair times used as inputs to the calculation of expected unserved energy.

Compliance assessment with the reliability standard

Assessment inputs

TransGrid supports the provision of the following information to IPART:

- Annual ten year 50% PoE (50% probability of exceedance) **maximum (peak) demand (MW)** forecasts for BSPs as published in TransGrid's Transmission Annual Planning Report (TAPR) be used for each subsequent years annual compliance report. For instance, the 2018 TAPR forecasts, published on 30 June 2018, would be used as an input for the 2018/19 annual compliance report, due 31 August 2019.
- **Load duration curves** based on historical data to calculate the expected unserved energy.
- **Length of lines feeding the BSP (km)** in the first year only. Only changes to existing line lengths or new lines will be provided in the next annual compliance report.
- **Proportion of lines that are overhead or underground by feeder** in the first year only. Any updates will be provided in the next annual compliance report where changes have occurred.
- **Maximum feasible supply (MW) under each of the four failure modes** where applicable. For example, the two transformer failure scenario cannot be assessed at BSPs that only have one transformer. Power flow simulation modelling, inclusive of all planned augmentations, will be completed to determine this.

- **Life cycle average failure rates** for compliance assessment, as per Table 3.1¹. TransGrid notes that the failure frequency of 0.00595 in Table 3.1 Asset failure frequency rates, Asset type, Underground cables (failures per year per 100km) should be 0.0595 as described in the Electricity transmission reliability standards Supplementary Final Report Table D.10.
- The **time to restore** transformers and lines.

TransGrid does not support the requirement to annually report on its probability of failure or event consequences for all major asset classes – overhead lines, underground cables and transformers. These values may be volatile year on year, and would provide little benefit as the longer term average view is of importance. TransGrid suggests submission of this data when IPART revises the standard in advance of each regulatory control period, normally every five years.

Required level of redundancy

TransGrid supports the requirement to annually confirm the transmission system has been designed to achieve the level of redundancy set out in the standard. In the first annual compliance report, network / circuit diagrams will be included to demonstrate this level of redundancy.

Expected unserved energy calculations

TransGrid broadly supports the expected unserved energy calculation methodology as proposed in Boxes 3.1² and 3.2³.

TransGrid suggests Box 3.1 equation (4) be amended to allow the time to repair for each line to be individually included in the calculation, to cater for circumstances in which lines have different times to repair. The change is set out below:

- From (TTR 2nd line)².
- To (TTR 1st line) * (TTR 2nd line).

Similarly TransGrid suggests Box 3.1 equation (6) be amended to allow the time to repair for transformers to be individually included in the calculation. The change is set out below:

- From (TTR 2nd tx)².
- To (TTR 1st tx) * (TTR 2nd tx).

TransGrid suggests Box 3.1 variables L, M, N and O be derived from the **load duration curves** provided to IPART and not from IPART's look-up to a logistic curve expressing the Load Duration information for the BSP. The **load duration curves** are based on historical data and provide an improved profile of the load at the BSP.

For new BSPs, TransGrid proposes the use of a load duration curve from another BSP with a similar composition of load types scaled to the forecast maximum demand, in the absence of specific historical information for a new BSP,

Allowance for annual expected unserved energy for inner Sydney

¹ IPART Transmission reliability standard compliance, Issues Paper, June 2017, page 15.

² IPART Transmission reliability standard compliance, Issues Paper, June 2017, page 11

³ IPART Transmission reliability standard compliance, Issues Paper, June 2017, page 12

TransGrid does not support IPART's proposal to only consider the probability and impact of asset unavailability due to breakdown failures. Corrective failures should be considered in the expected unserved energy calculation as they are not always able to be repaired during a planned maintenance period. For instance:

- Cable joint boxes failures may require immediate repair to ensure oil leakage is contained.
- Cable link boxes may require immediate repair due to safety risks from earth potential rise.

Ongoing engagement with IPART and other stakeholders

TransGrid looks forward to continuing engagement with IPART and other stakeholders to finalise this important review. TransGrid also acknowledges that further detailed engagement with all parties will be particularly important as TransGrid looks to implement the standard as part of its planning, reporting and compliance processes.

If you would like to discuss any matter raised in this submission, please contact Vincent Ong on [REDACTED]

Yours faithfully

[REDACTED]

Gerard Reiter
Executive Manager / Network Planning and Operations