



Independent Pricing and Regulatory Tribunal
New South Wales

Electricity Transmission Reliability Compliance

From 1 July 2018



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1 Introduction

The Independent Pricing and Regulatory Tribunal (IPART) monitors compliance with safety and reliability obligations placed on electricity network operators in NSW. We also monitor compliance with licence conditions for gas and electricity networks.

IPART has reviewed its approach to assessing compliance with the reliability standard for electricity transmission in NSW. In November 2016, we made recommendations to the Minister for Industry, Resources and Energy setting out a new reliability standard for the Transmission Network Service Provider (TNSP) – TransGrid.^{1 2} On 1 June 2017, the Minister adopted our recommended reliability standard.

The reliability standard requires TransGrid to ensure that the transmission system is designed such that, for each bulk supply point (BSP)³, the system:

- ▼ achieves the required level of redundancy (ie, it specifies the number of back-up arrangements that must be in place to support continued supply of electricity in the event that part of the transmission network fails), and
- ▼ does not exceed the specified allowance for expected unserved energy (EUE) (ie, an expected amount of energy that cannot be supplied, taking into account the probability of supply outages attributable, expected outage duration, and forecast load).

The reliability standard does not prescribe how TransGrid must meet it. Instead it explicitly provides for TransGrid to determine the combination of network and non-network solutions it uses to meet the reliability standard.

We released an Issues Paper in June 2017 to allow stakeholders to consult with us on how IPART will assess compliance with the reliability standard. We also released a Draft Report in August 2017 outlining IPART's draft decision. This is the Final Report, which summarises the submissions we received on our Issues Paper and Draft Report, as well as our responses.

The reliability standard is provided in Appendix A.

1.1 What has IPART reviewed?

The reliability standard is a planning standard. In our Issues Paper we proposed that in assessing compliance with the reliability standard, we will review whether TransGrid has

¹ IPART, Electricity transmission reliability standards - Energy - Supplementary Final Report, November 2016.

² NSW Electricity Networks Operations Pty Limited (ACN 609 169 959) as trustee for the NSW Electricity Networks Operations Trust.

³ A BSP is a location where supply is provided to Distribution Network Service Providers (DNSPs) or directly connected customers. Generally, the locations are the busbar(s) at TransGrid's substations but sometimes the locations are where connections are made to TransGrid's transmission lines or cables (including 'tee' connections).

designed the transmission system for each BSP to achieve the prescribed level of redundancy and to not exceed the prescribed allowance for EUE.

The allowance for EUE in the reliability standard is based on both the probability of asset failures occurring and the impact of those failures on supply given the demand at each BSP. As a result, to assess compliance with the reliability standard, we will require TransGrid to provide a range of information, eg, life cycle equipment failure rates, load profiles and maximum demand.

For BSPs where TransGrid postpones network augmentations to meet the EUE, or the level of redundancy specified in the reliability standard, TransGrid can apply for an exemption if it can demonstrate the net benefit of doing so is greater than the net benefit of meeting the level of redundancy or allowance for EUE prescribed in the reliability standard.

As part of our Issues Paper, we consulted on the approach we proposed to use to assess compliance, the frequency and timing of compliance assessments, and which inputs would be used by IPART to assess compliance.

In our Draft Report we presented IPART's draft decision in response to the submissions on our Issues Paper. IPART undertook further consultation with stakeholders on the Draft Report. This Final Report represents our final decision on how we will assess compliance, taking into account all submissions. The Final Report is supported by the Reporting Manual and Audit Guideline in Appendices B and C.

1.2 What is IPART's compliance role?

We have undertaken this review of compliance as IPART is the safety and reliability regulator for the NSW electricity networks. Condition 3(a) of the *Transmission Operator's Licence under the Electricity Supply Act 1995 (NSW)* (Licence) requires TransGrid to ensure that it and all other network operators of its transmission system comply with any reliability and performance standards issued by the Minister.

IPART has a number of powers for gathering information to monitor whether TransGrid complies with the reliability standard. They include the following:

- ▼ Condition 15 of its Licence requires TransGrid to furnish such information as IPART may determine, to enable IPART to ascertain whether or not the Licence Holder is complying with the Licence conditions.
- ▼ IPART publishes Reporting Manuals that outlines the reporting requirements for all electricity network operators (including TransGrid) to provide IPART with sufficient information to exercise its regulatory functions. It is a Licence condition that TransGrid complies with a Reporting Manual issued by IPART.
- ▼ IPART publishes Audit Guidelines that outlines the audit process. It is a Licence condition that TransGrid complies with any Audit Guideline issued by IPART.
- ▼ Clause 7 of the reliability standard requires TransGrid to comply with any request notified to it by IPART for information that IPART reasonably considers to be necessary or convenient for monitoring TransGrid's compliance with the reliability standard.

Our approach to monitoring compliance is set out in the draft versions of our Reporting Manual and Audit Guideline (Appendices B and C).

1.3 Feedback provided for this review

For this review, we released an Issues Paper in June 2017 and invited stakeholder submissions. We received four submissions on our Issues Paper, from TransGrid, Ausgrid, Essential Energy and Mr Gary Blaschke (a member of the public).

IPART released a Draft Report in August 2017, inviting further stakeholder submissions. We received two submissions on our Draft Report, from TransGrid and the Public Interest Advocacy Centre (PIAC).

All submissions are available on IPART's website.

This review continues extensive work that was undertaken by IPART during 2015 and 2016 to determine the recommended reliability standard. As a result of this work, we were able to develop an approach to assessing compliance. We presented this approach in our Issues Paper and Draft Report. This Final Report outlines our decision, reached after considering stakeholder submissions.

1.4 How is this paper structured?

The rest of this report is structured as follows:

- ▼ Chapter 2 outlines our method to assess compliance.
- ▼ Chapter 3 outlines our process in relation to TransGrid's reporting obligations.
- ▼ Chapter 4 outlines our process in relation to audits.

2 IPART's method to assess compliance

In response to the Draft Report, TransGrid raised further questions regarding the inputs and calculations used to establish compliance with clause 4 of the reliability standard. These issues are discussed below and our compliance method is summarised in Boxes 2.1 and 2.2. We will publish the compliance method described in these boxes on IPART's website.

We did not receive any specific submissions on assessing compliance with clause 3 of the reliability standard. The Reporting Manual and Audit Guideline explain how we will assess compliance with these clauses (Appendices B and C).

Our decision is that we make some adjustments to our method to assess compliance in response to the submissions we received:

- ▼ change the metrics input to the method in relation to estimation of asset restoration times
- ▼ change the calculations within the method in relation to estimation of annual EUE
- ▼ change the calculations within the method in relation to the use of more granular load duration curves, and
- ▼ require additional information on restoration times.

We have also made some changes to the scope, timing and clarity of what TransGrid is required to report to IPART.

These changes are outlined in this Chapter and so are our reasons for not changing other items stakeholders commented on.

Box 2.1 Calculating annual EUE

At each BSP, the minutes of expected unserved energy (EUE_(min)) would be the MWh of EUE per year multiplied by 60 (to get MW minutes) divided by the average annual demand at that BSP expressed in MW:

$$(1) \text{EUE}_{(\min)} = \text{EUE}_{(\text{MWh})} * 60 / \text{avg demand}_{(\text{MW})}$$

To simplify the following equations use the notation “tx” to denote transformer. The term “FR” is the failure rate: FR is the expected average number of failures per year per transformer or line. For transformers, this rate would be either FR_c for catastrophic failures or FR_n for non-catastrophic failures. For lines, this rate will depend on the length. The term “TTR” is time to restore a failed asset into service: TTR_l for lines, TTR_c for catastrophic transformer failures or TTR_n for non-catastrophic transformer failures, which might involve replacement.

The MWh of EUE per year is the sum of EUE across four different asset failure scenarios:

1. A single transformer fails.
2. A single line fails.
3. A period of time in which two transformers at the same BSP are out of service.
4. A period of time in which two lines at the same BSP are out of service.

For the purpose of these calculations, the terms cable and line are interchangeable.

Dual failure scenarios will not be applicable to BSPs where there is only one transformer or one line. The single transformer failure scenario will not be applicable to BSPs that do not have any transformers. In those cases, the relevant terms in the sum below will be zero.

$$(2) \text{EUE (MWh)} = \text{EUE (1 tx fails)} + \text{EUE (2 tx fail)} + \text{EUE (1 line fails)} + \text{EUE (2 lines fail)}$$

The four terms in equation (2) can be evaluated using equations (3) to (6):

$$(3) \text{EUE (1 line fails)} = L * \text{FR}_l \text{ 1st line} * \text{TTR}_l \text{ 1st line}$$

$$(4) \text{EUE (2 lines fail)} = M * \text{FR}_l \text{ 1st line} * \text{FR}_l \text{ 2nd line} * \text{TTR}_l \text{ 1st line} * \text{TTR}_l \text{ 2nd line} / 8760$$

$$(5) \text{EUE (1 tx fails)} = N * ((\text{FR}_c \text{ 1st tx} * \text{TTR}_c \text{ 1st tx}) + (\text{FR}_n \text{ 1st tx} * \text{TTR}_n \text{ 1st tx}))$$

$$(6) \text{EUE (2 tx fail)} = O * ((\text{FR}_c \text{ 1st tx} * \text{TTR}_c \text{ 1st tx}) + (\text{FR}_n \text{ 1st tx} * \text{TTR}_n \text{ 1st tx})) \\ * ((\text{FR}_c \text{ 2nd tx} * \text{TTR}_c \text{ 2nd tx}) + (\text{FR}_n \text{ 2nd tx} * \text{TTR}_n \text{ 2nd tx})) / 8760$$

The number 8760 = 24 * 365, which is the number of hours in a typical year.

The variables L, M, N, and O each represent the average MW of demand that would fail to be served if the failure mode in question applied for the entire year.

$$(7) L = \frac{(\sum_1^{8760*2} \max\{0, (D_i - C_{(1 \text{ line fails})})\})}{8760*2}$$

$$(8) M = \frac{(\sum_1^{8760*2} \max\{0, (D_i - C_{(2 \text{ lines fail})})\})}{8760*2}$$

$$(9) N = \frac{(\sum_1^{8760*2} \max\{0, (D_i - C_{(1 \text{ transformer fails})})\})}{8760*2}$$

$$(10) O = \frac{(\sum_1^{8760*2} \max\{0, (D_i - C_{(2 \text{ transformers fail})})\})}{8760*2}$$

Note that the values for C_(failure mode) refer to the capacity of the BSP when the particular failure mode applies. For a given failure mode it is likely that C will have the same value in every time period i. In each formula, D_i is the load at time i.

Equations (7) to (10) assume that dynamic load shedding is available for the BSP. If that were not the case, then an overloaded BSP would be unable to supply any load and different formulae would be appropriate.

Box 2.2 Estimating annual EUE for grouped BSPs

The reliability standard sets an expected unserved energy allowance for some individual BSPs as if they were a group. For example, the five Inner Sydney BSPs: Beaconsfield, Haymarket, Rookwood Rd, Sydney North and Sydney South are grouped together.

The combined EUE for a group is calculated as follows:

$$(11) \text{ Group EUE}_{(\min)} = \text{sum} [\text{EUE (MWh}_b\text{)}] * 60 / \text{sum} [\text{MD}_b * \text{LF}_b]$$

The sums are over all BSPs in the group. The subscript “b” refers to the summation index—one value per BSP. MD is the annual maximum demand in MW, and LF is the load factor (average demand/maximum demand) for each BSP.

2.1 Metrics used as inputs into calculations within the method

In response to the Draft Report, TransGrid provided comment on aspects of the method. We have accepted their proposed changes for the estimation of annual EUE, the granularity of load duration curves, and the source of the peak demand used. With the exception of fixing a typographical error in the Underground Cable failure rate, we did not make any changes to the failure rates or the nature of outages included in the method.

To assist in ensuring that TransGrid uses the correct inputs with this method, we will provide example inputs on our website. We will not publish any of the actual inputs used by TransGrid for assessing their compliance against the reliability standard.

2.1.1 Estimation of annual EUE

Estimation of annual EUE for dual failures

In response to the Issues Paper, TransGrid identified that the equations used to estimate annual EUE for dual failures do not accurately reflect the process of restoring those failures. TransGrid has proposed amended calculations accordingly.

IPART accepted the revised calculations for the Draft Report, as these changes better reflect the annual EUE. In its submission on the Draft Report, the PIAC has supported the revised calculations.

Estimation of annual EUE for new BSPs where historical information is unavailable

In response to the Draft Report, TransGrid identified that there may be insufficient historical information to estimate the annual EUE for a new BSP. Instead, TransGrid proposed that it should be allowed to estimate the EUE based on the load duration curve of an existing BSP with a similar composition of load types, with that curve scaled by the forecast maximum demand.

IPART has accepted TransGrid’s proposal for the estimation of EUE for new BSPs where historical information is unavailable. Our view is that this method reflects the process used to identify the need for the new BSP.

Inclusion of catastrophic transformer failures in the EUE calculation

In response to the Draft Report, TransGrid submitted that the transformer failure rate in the Box 2.1 equations should apply only for non-catastrophic transformer failures.

IPART does not accept that submission. The EUE allowance contained in the standard was determined by explicitly modelling the impact of both catastrophic and non-catastrophic transformer failures. If catastrophic transformer failures were not included in the compliance reporting, then it would understate the true EUE. We clarified this point in the amended equations (5) and (6) in Box 2.1 above to make explicit how the catastrophic and non-catastrophic transformer failures will be taken into account.

2.1.2 Use of more granular load duration curves

In response to the Issues Paper, TransGrid identified that load duration curves used to determine the allowable EUE are coarse, and have the potential to misrepresent the performance of assets. TransGrid proposed that more granular load duration curves should be used to allow more accurate input information for assessing compliance with the allowable EUE.

IPART has accepted this proposed change since it may provide more accurate outputs. This change is reflected in Box 2.1.

2.1.3 Lifecycle average failure rate

In response to the Issues Paper, TransGrid and Ausgrid raised concerns with using the lifecycle average failure rate when determining compliance with clause 4 of the reliability standard, as it does not account for increasing failure rates at the end of an asset's life.

Following separate meetings with TransGrid⁴ and Ausgrid⁵ to discuss their submissions to the Issues Paper, IPART decided to maintain the use of the lifecycle average failure rate when determining compliance with the Standard. This maintains consistency with the process by which the EUE in the reliability standard was calculated, allowing a like for like comparison when determining compliance.

In response to the Draft Report, TransGrid supported IPART's decision to use the lifecycle average failure rate.

The lifecycle average failure rate was originally proposed as a means to ensure the smoothed lifetime performance of an asset is assessed, rather than short-term failure rates that can fluctuate. Our approach ensures that the more predictable lifetime performance of an asset is used as a trigger for action, rather than short-term fluctuations. The prospect of exceeding the EUE is then a driver to identify options to plan the network to meet the reliability standard, it is not a driver of asset replacement.

TransGrid has identified that Table 3.1 of the Issues Paper used an incorrect value for the failure frequency of underground cables. The correct frequency rate is 0.0595.

⁴ Meetings at IPART's offices, McKell Building Sydney, 13 July 2017, 25 August 2017 and 7 September 2017

⁵ Meeting at Ausgrid's Head Office Building, 12 July 2017

TransGrid has proposed IPART review the input asset failure rates and the repair and replacement times prior to the commencement of a new regulatory period. IPART has decided that this is appropriate as it ensures consistency between the setting of the reliability standard and assessing compliance with the reliability standard.

2.1.4 Exclusion of semi-forced outages

The Issues Paper proposed that semi-forced outages be excluded from contributing to the allowable EUE when assessing compliance with the reliability standard.

A semi-forced outage is where the imminent failure of an asset is identified, with an immediate outage required to allow maintenance and prevent an actual failure from occurring. TransGrid and Ausgrid raised concerns about the exclusion of semi-forced outages in the EUE allowance in the reliability standard. This concern arises from TransGrid's inability to prevent an occurrence of unserved energy in a semi-forced outage scenario. This may make an asset non-compliant with the allowable EUE. As part of the Issues Paper, further consultation with TransGrid and Ausgrid has indicated that the impact of semi-forced outages may not be material to an asset's compliance with the allowable EUE.

For the final decision, IPART will exclude semi-forced outages when considering EUE, but will continue to consult with relevant stakeholders regarding the impact of semi-forced outages. This information will be used for the purpose of reviewing the allowable EUE in the reliability standard, should IPART be requested to undertake a review in the future.

2.1.5 Estimation of asset restoration times

The estimation of asset restoration times is an important variable in calculating EUE. In response to the Issues Paper, Essential Energy's submission provided items it would like to be used as evidence of the reasonableness of asset restoration times. These items are:

1. staff availability (the ability to secure staff to undertake restorations)
2. depot proximity (how close staff and equipment are to the assets to restore them), and
3. evidence of any third party agreements that are in place for responding to regional and remote BSPs.

IPART supported the inclusion of items 1 and 2 into the compliance model in the Draft Report, but TransGrid does not have to report these items to IPART on an annual basis as part of its compliance reporting. The information should instead be available for potential audits.

In response to the Draft Report, TransGrid has proposed that the mean restoration time, rather than the maximum restoration time, be used to calculate the EUE. IPART agrees that this is appropriate as the mean is reflective of an asset's lifecycle performance.

IPART agrees with the inclusion of item 3 and will maintain this item for assessing compliance with the reliability standard. IPART's view is that evidence of third party agreements, including minutes of joint planning meetings, should be provided by TransGrid in all instances where an agreement is put forward as establishing compliance with the reliability standard. This includes both asset redundancy and estimated EUE across

TransGrid's entire network. IPART will assess any agreement to ensure the arrangement clearly identifies its impact on compliance with the redundancy and estimated EUE conditions.

TransGrid has recommended that joint planning meeting minutes be accepted as evidence of third party agreements, where those minutes include:

- For the level of redundancy assessment, confirmation of the continuation, for the foreseeable future, of the network arrangement. For example, at a BSP if there were no proposed changes to the DNSP network, then the level of redundancy would remain the same.
- For the assessment of annual EUE, confirmation of the DNSP backup supply switching times (which are an input to the EUE calculations).

IPART's view is that the information TransGrid would include in their minutes is appropriate for the examples provided.

2.1.6 Latest peak demand forecasts to be used as inputs for the annual compliance report

In response to the Draft Report, TransGrid has proposed to use the latest peak demand forecasts as an input into their annual compliance reports. IPART agrees that TransGrid should use the latest peak demand forecasts. As the EUE is based on a duration at average demand, and not the peak demand, the use of the latest peak demand forecasts is unlikely to make a material difference to the calculations.

2.2 Potential modifications to the reliability standard

In our Issues Paper we consulted on whether IPART or the Minister should approve a method for the purpose of assessing compliance. As part of this consultation, we sought stakeholder feedback on potential changes to the reliability standard to include the following definition: *Annual expected unserved energy method means the document of that title approved from time to time and published on the Tribunal's website.*⁶

Our final decision is that neither IPART nor the Minister need to approve a method for the purpose of assessing compliance. We have decided not to recommend a change to the reliability standard. Instead, we have stated in the Reporting Manual that we will assess compliance using the method available on our website. We consider that this will provide enough guidance for TransGrid for the submission of their annual compliance report. The method is detailed in Boxes 2.1 and 2.2 and the process is explained in Chapter 3 and Appendix B of this report.

2.3 Approval of plans under clauses 5 or 6 of the reliability standard

In response to the Draft Report, TransGrid requested that IPART identify a clear process for the submission and approval of plans under clauses 5 and 6 of the reliability standard. Our view is that each plan is likely to be unique, with each plan requiring a different depth and

⁶ *Transmission reliability standard compliance – From 1 July 2018 – Issues Paper*

breadth of information to allow us to make a decision. Defining a process at this point in time may constrain our ability to review each plan on its merits.

Our decision is that we will not define a process at this point in time for the submission and approval of plans under clauses 5 and 6 of the reliability standard. We expect that TransGrid will liaise with us at the earliest opportunity regarding any plan. We will manage each submission on a case-by-case basis, including feedback to TransGrid on how to progress the approval process.

2.4 Minimum 90 day notification to the Tribunal before entering into any contract for the construction of a new BSP

In response to the Draft Report, TransGrid has submitted that, for the purposes of assessing compliance with clause 7(d) of the reliability standard, “any contract for the construction of a new BSP” be taken to refer to “any contract for the civil and electrical construction works of the new BSP”, and explicitly exclude contracts for long lead time items.

IPART has accepted this proposal and we have clarified this in the Reporting Manual and Audit Guideline accordingly.

3 IPART's process to assess compliance – Reporting Manual requirements

Our decision is that TransGrid's compliance with clause 4 of the reliability standard will be assessed using the method available on our website and hence we have specified in the Reporting Manual that it report its EUE for each BSP using that method. We do not use our method to assess compliance with clause 3, the redundancy level, at each BSP.

This Chapter explains how we intend to assess TransGrid's compliance with the reliability standard and what information TransGrid will be required to submit to IPART annually.

The information TransGrid is required to submit is set out in our Reporting Manual (Appendix B). The Reporting Manual contains guidance for the preparation of TransGrid's annual compliance reports.

In response to the Issues Paper, TransGrid broadly agreed with our proposed approach that it will submit an annual compliance report to demonstrate that its transmission system has been designed to achieve the level of redundancy and EUE at each BSP as specified in the reliability standard. It also agreed that it will submit a plan to IPART under clauses 5 and/or 6 of the reliability standard, for BSPs where it does not forecast to meet clauses 3 and/or 4 of the reliability standard.

3.1 How we will assess compliance

The method used by IPART to assess compliance is the method set out in Boxes 2.1 and 2.2 of this document.

Our Reporting Manual describes TransGrid's reporting obligations in more detail and sets out the information IPART will use to assess compliance with the reliability standard.

TransGrid will be compliant with the reliability standard if it can demonstrate that the transmission system is designed (see Chapter 4) such that each BSP:

1. meets the redundancy category specified in the reliability standard, and
2. does not exceed the annual allowance for EUE specified in the reliability standard, where the annual EUE is to be calculated using the method available on IPART's website.

As an alternative to complying with (1) (clause 3 of the reliability standard), TransGrid can seek and obtain IPART's written approval in respect of a plan or plans under clause 5(a) of the reliability standard and implement the plan or plans to IPART's satisfaction.

As an alternative to complying with (2), (clause 4 of the reliability standard), TransGrid can seek and obtain IPART's written approval in respect of a plan or plans under clause 6(a) of the reliability standard and implement the plan or plans to IPART's satisfaction.

Clauses 5 and 6 of the reliability standard require TransGrid to use the cost-benefit methodology defined in the Regulatory Investment Test for Transmission (RIT-T), when applying to have plans approved under these clauses. The full RIT-T process, developed by the Australian Energy Regulator, includes requirements in addition to the cost-benefit analysis that IPART requires. Our final decision is that we will require TransGrid to undertake only the parts of the RIT-T necessary for us to assess TransGrid's compliance with the reliability standard. As part of the approval process, TransGrid must use the portion of the RIT-T outlined in chapter 3 of the application guidelines⁷.

A plan submitted to IPART under clauses 5 or 6 of the reliability standard must demonstrate that not meeting the reliability standard would provide a net economic benefit. TransGrid is not required to follow the process described in chapter 4 of the RIT-T application guidelines in order to submit a plan for IPART approval. We may liaise with the Australian Energy Regulator in relation to the application of this test.

We understand that TransGrid may use assets owned by other network operators or non-network solutions to comply with the reliability standard. We will require TransGrid to provide evidence demonstrating how an agreement contributes to TransGrid being compliant with the reliability standard.

For shared assets, we will require TransGrid to provide evidence of any such agreement, eg, in the form of signed minutes of joint planning meetings between TransGrid and the other network operator, as described in section 2.1.5.

For BSPs where non-network solutions are used, TransGrid will be required to provide IPART with the relevant third party agreements in force.

IPART can also, at its discretion, audit annual reports on TransGrid's compliance with the reliability standard. The audit process is set out in Chapter 4 of this report and the Audit Guideline (Appendix C).

⁷ *Regulatory investment test for transmission application guidelines* – June 2010 – Australian Energy Regulator

4 IPART's process to assess compliance – Audit Guideline requirements

TransGrid submitted that it agrees with the audit process outlined in our Issues Paper. Our decision is that we will use the same process for audits of TransGrid's compliance with the reliability standard as we do in our other energy compliance functions.

Where legislation does not prescribe an audit, IPART will require audits of compliance reports using a risk-based approach. This means that IPART could request an audit if it considers that the risk of non-compliance is high enough to justify an audit.

Our Audit Guideline explains the process for an audit of TransGrid's compliance with the reliability standard. Additionally, the Audit Guideline provides the criteria against which the systems relating to transmission reliability compliance are assessed. Full details of the proposed Audit Guideline are provided in Appendix C.

4.1 Our audit process

When we require TransGrid to undertake an audit, we will inform it in writing and provide the scope. It would have to engage a suitably qualified auditor to independently assess compliance with the reliability standard. IPART would approve the suitability of the auditor on each occasion unless the auditor is pre-approved on our audit panel. IPART would also approve the proposal of the audit.

If IPART requires TransGrid to undertake an independent audit, an auditor would likely sample a sufficient number of BSPs covering a range of redundancy requirements (N, N-1 and N-2) and location types (suburban, regional and remote locations). The information provided should be sufficient for the auditor to provide an opinion.

The criteria are designed to ensure that TransGrid achieves the requirements of their Licence in relation to the reliability standard. That is, TransGrid has designed its network to achieve:

- ▼ the level of redundancy at each BSP as specified in the reliability standard, and
- ▼ the EUE at each BSP as specified in the reliability standard.

Clauses 3 and 4 of the reliability standard require the Licence holder to “ensure that the transmission system is designed such that” it meets the levels of redundancy and EUE allowances prescribed in clause 8. For the avoidance of any doubt, that means that the existing physical assets must be designed to meet those requirements; it is not sufficient that there is a plan on paper for the transmission system to meet those requirements. This clarification is included in the Audit Guideline.

Alternatively, if any plans have been submitted to IPART under clauses 5 and 6 of the reliability standard, then the audit will test whether the plans have been prepared in accordance with the reliability standard, that they have been approved by IPART, and that they have been properly implemented.

Independent audits are an important part of IPART's electricity network compliance framework. Broadly, we would expect that the scope of an audit would focus on:

- ▼ Whether the transmission system has been designed to achieve the level of redundancy specified in the reliability standard. To do this, we would expect that the auditor would confirm that the necessary assets (including shared assets) and non-network solutions are/were operated in a manner consistent with network/circuit diagrams provided as part of the annual compliance report for the reliability standard.
- ▼ Whether TransGrid has network management strategies or non-network solutions in place to achieve the restoration and repair times that are used as inputs to the estimates of EUE at each BSP.



Appendices



A Reliability Standard



Don Harwin MLC

Minister for Resources, Minister for Energy and Utilities,
Minister for the Arts, Vice-President of the Executive Council

Electricity Supply Act 1995

NSW Electricity Transmission Reliability and Performance Standard 2017

I, Don Harwin, Minister for Energy and Utilities, hereby issue the *NSW Electricity Transmission Reliability and Performance Standard 2017* set out in Schedule 1 to apply from 1 July 2018.

The *NSW Electricity Transmission Reliability and Performance Standard 2017* is issued:

- (a) for the purposes of clause 3 of the transmission operator's licence issued to NSW Electricity Network Operations Pty Ltd (TransGrid)(ACN 609 169 959) under the *Electricity Supply Act 1995*.
- (b) pursuant to clause 7 (2)(b) of the *Electricity Supply (Safety and Network Management) Regulation 2014*, to notify the transmission network operator, TransGrid that the *NSW Electricity Transmission Reliability and Performance Standard 2017* must be included in the content of TransGrid's safety management system.

Signed by:

The Hon Don Harwin MLC

Minister for Energy and Utilities

Date:

1.6.17

Schedule 1

NSW Electricity Transmission Reliability and Performance Standard 2017

1. Status of this standard

- (a) This standard is a reliability and performance standard issued by the Minister for the purposes of clause 3(a) of the Licence.
- (b) This standard may be cited as the Transmission Reliability and Performance Standard 2016 No. 1.

2. Interpretation

- (a) In this standard, where the terms below are italicised they have the corresponding meanings set out below.

Expected unserved energy means the expected amount of energy that cannot be supplied, taking into account the probability and expected impact (including expected outage duration and forecast load) of the following:

- (i) failure of a single *system element*;
- (ii) double transformer failure, or failure of equivalent *system elements*; and
- (iii) double line failure, or failure of equivalent *system elements*.

Inner Sydney means the inner metropolitan transmission system, which is that part of the *transmission system* constituted by:

- (i) cables 41 and 42;
- (ii) the 330/132kV substations at Rookwood Road, Beaconsfield, Haymarket, Sydney North and Sydney South;
- (iii) any future associated 330kV cables and 330/132kV substations; and
- (iv) any of Ausgrid's 132k transmission network that links any of the above.

Level of redundancy means:

- (i) for category 1 bulk supply points, a supply interruption may occur following the outage of a single system element;
- (ii) for category 2 bulk supply points, a non-zero amount of load must be supplied following the outage of a single system element; and
- (iii) for category 3 bulk supply points, a non-zero amount of load must be supplied following the outage of a single system element. In addition, for Inner Sydney, a non-zero amount of load must be supplied following the simultaneous outage of a single 330 kV cable and any 132 kV feeder or 330/132 kV transformer.

Licence means the Transmission Operator's Licence under the *Electricity Supply Act 1995* granted to NSW Electricity Networks Operations Pty Limited (ACN 609 169 959) as trustee for the NSW Electricity Networks Operations Trust dated 7 December 2015, or a licence that replaces it.

Licence Holder has the same meaning as under the *Licence*.

Minister has the same meaning as under the *Licence*.

RIT-T means the *Regulatory investment test for transmission and application guidelines 2010* published by the Australian Energy Regulator, or any replacement of that document from time to time.

System element means:

- (i) a transmission circuit (a line or a cable);
- (ii) a transformer;
- (iii) a component of physical infrastructure other than a transmission circuit or transformer; or
- (iv) network support arrangements, backup supply capability, or other measure that provides supply capacity.

Transmission system has the same meaning as under the *Licence*.

~~**Tribunal** has the same meaning as under the *Electricity Supply Act 1995*.~~

(b) Headings and notes which appear in this standard are intended as an aide to usage only, and do not form part of this standard.

(c) References to clauses in this standard are references to clauses of this standard, unless this standard expressly provides otherwise.

3. Requirement to design for a specified level of redundancy for each bulk supply point

Subject to clause 5(a) below, the *Licence Holder* must ensure that the *transmission system* is designed such that, for each bulk supply point listed in the table in clause 8, the *transmission system* achieves the *level of redundancy* category specified for that bulk supply point in the table in clause 8.

4. Requirement to design for a level of expected unserved energy for each bulk supply point

Subject to clause 6(a) below, the *Licence Holder* must ensure that the *transmission system* is designed such that the annual *expected unserved energy* in respect of a bulk supply point listed in the table in clause 8 does not exceed the allowance for *expected unserved energy* specified for that bulk supply point in the table in clause 8.

5. Flexibility in planning for the level of redundancy

(a) The *Licence Holder* is not required to comply with clause 3 above in respect of a bulk supply point listed in the table in clause 8 provided that:

- (i) the *Licence Holder* has developed and submitted to the *Tribunal* a plan regarding measures for altering the reliability of the supply capacity of the bulk supply point;
 - (ii) that plan provides a greater net-benefit, using the cost-benefit methodology defined in the *RIT-T*, than the net-benefit of complying with clause 3 above; and
 - (iii) the *Tribunal* has advised the *Licence Holder* in writing that it is satisfied that the plan submitted under clause 5(a)(i) above would, if implemented, be likely to provide a greater net-benefit than would be provided by the *Licence Holder* complying with clause 3 above in relation to the bulk supply point.
- (b) The *Licence Holder* must implement the plan within a time specified by the *Tribunal* to the *Licence Holder*, and such implementation must be to the reasonable satisfaction of the *Tribunal*.
- (c) For the avoidance of any doubt:
- (i) the *Licence Holder* may submit, from time to time, a proposed replacement for a plan referred to in clause 5(a); and
 - (ii) clause 5(a) applies to such a plan in the same way that it would apply to the first plan submitted under that clause in relation to a bulk supply point.
-
- (d) Where the *Tribunal* has expressed satisfaction in writing under clause 5(a)(iii) about a plan that relates to a bulk supply point or bulk supply points listed in the table in clause 8, the *Licence Holder* may advise the *Tribunal* in writing that it has elected not to implement the plan. If the *Licence Holder* so advises the *Tribunal* of such an election:
- (i) the *Licence Holder* is not required to implement the plan in question, despite clause 5(b);
 - (ii) despite clause 5(a), the *Licence Holder* must comply with clause 3 in respect of the bulk supply point or bulk supply points to which the plan in question relates; and
 - (iii) the *Licence Holder's* election not to implement the plan may not be reversed, unless the *Tribunal* provides its written consent for the reversal.

6. Flexibility in planning for the level of expected unserved energy

- (a) The *Licence Holder* is not required to comply with clause 4 above in respect of a bulk supply point listed in the table in clause 8 provided that:
- (i) the *Licence Holder* has developed and submitted to the *Tribunal* a plan regarding measures for altering the reliability of the supply capacity of the bulk supply point;
 - (ii) that plan provides a greater net-benefit, using the cost-benefit methodology defined in the *RIT-T*, than the net-benefit of complying with clause 4 above; and

- (iii) the Tribunal has advised the *Licence Holder* in writing that it is satisfied that the plan submitted under clause 6(a)(i) above would, if implemented:
 - (A) be likely to provide a greater net-benefit than would be provided by the *Licence Holder* complying with clause 4 above in relation to the bulk supply point; and
 - (B) not result in a material reduction in the level of *expected unserved energy* at any bulk supply point.
- (b) The *Licence Holder* must implement the plan within a time specified by the *Tribunal* to the *Licence Holder*, and such implementation must be to the reasonable satisfaction of the *Tribunal*.
- (c) For the avoidance of any doubt:
 - (i) the *Licence Holder* may submit, from time to time, a proposed replacement for a plan referred to in clause 6(a); and
 - (ii) clause 6(a) applies to such a plan in the same way that it would apply to the first plan submitted under that clause in relation to a bulk supply point.
- (d) Where the *Tribunal* has expressed satisfaction in writing under clause 6(a)(iii) about a plan that relates to a bulk supply point or bulk supply points listed in the table in clause 8, the *Licence Holder* may advise the *Tribunal* in writing that it has elected not to implement the plan. If the *Licence Holder* so advises the *Tribunal* of such an election:
 - (i) the *Licence Holder* is not required to implement the plan in question, despite clause 6(b);
 - (ii) despite clause 6(a), the *Licence Holder* must comply with clause 4 in respect of the bulk supply point or bulk supply points to which the plan in question relates; and
 - (iii) the *Licence Holder's* election not to implement the plan may not be reversed, unless the *Tribunal* provides its written consent for the reversal.

7. Requirement to provide information to the Tribunal

- (a) The *Licence Holder* must comply with any request notified to the *Licence Holder* by the *Tribunal* for information that the *Tribunal* reasonably considers to be necessary or convenient for the *Tribunal* in monitoring the *Licence Holder's* compliance with this standard.
- (b) The *Licence Holder* must comply with a request under clause 7(a) within a reasonable timeframe notified to the *Licence Holder* by the *Tribunal*.
- (c) If reasonably requested to do so by the *Tribunal*, the *Licence Holder* must commission an audit of its compliance with this standard (or specified aspects of this standard). Such an audit must be conducted:
 - (i) by an auditor approved by the *Tribunal* in writing;

- (ii) at the expense of the *Licence Holder*; and
 - (iii) such that a report on the audit by the auditor is provided to the *Tribunal* within a reasonable timeframe notified to the *Licence Holder* by the *Tribunal*.
- (d) At least 90 days before entering into any contract for the construction of a new bulk supply point intended to form part of the *transmission* system (or within a different timeframe proposed by the *Licence Holder* and agreed to in writing by the *Tribunal*), the *Licence Holder* must submit a proposal regarding the new bulk supply point to the *Tribunal*. The proposal must:
- (i) propose a *level of redundancy* category that this standard should specify for the new bulk supply point;
 - (ii) propose a level of *expected unserved energy* that this standard should specify for the new bulk supply point; and
 - (iii) set out reasons justifying the *level of redundancy* category and level of *expected unserved energy* proposed.
-

8. Table of values

	Redundancy category	Unserved energy allowance, maximum minutes per year at average demand
1. Inner Sydney		
Beaconsfield West 132 kV	3	0.6a
Haymarket 132 kV	3	
Rookwood Road 132 kV	3	
Sydney North 132 kV	3	
Sydney South 132 kV	3	
2. Other bulk supply points		
Albury 132 kV	2	14
ANM 132 kV	2	6
Armidale 66 kV	2	7
Beryl 66 kV	2	5
Boambee South 132 kV	2	18
Canberra 132 kV and Williamsdale 132 kV	2	3
Coffs Harbour 66 kV	2	10
Coleambally 132 kV	2	32
Cooma 66 kV	2	28
Cooma 132 kV	2	11
Cowra 66 kV	2	25
Dapto 132 kV	2	4
Darlington Point 132 kV	2	4
Deniliquin 66 kV	2	19
Finley 66 kV	2	12
Forbes 66 kV	2	19
Gadara (132 kV & 11 kV)	2	13
Glen Innes 66 kV	2	43
Griffith 33 kV	2	12
Gunnedah 66 kV	2	19
Holroyd 132 kV	2	24
Ingleburn 66 kV	2	5
Inverell 66 kV	2	40
Kempsey 33 kV	2	24
Koolkhan 66 kV	2	19

Liddell 330 kV	2	2
Lismore 132 kV	2	4
Liverpool 132 kV	2	5
Macarthur 132 kV and 66 kV	2	3
Macksville 132 kV	2	23
Manildra 132 kV	2	6
Moree 66 kV	2	5
Mount Piper 66 kV	2	19
Munmorah 132 kV	2	20
Murrumburrah 66 kV	2	19
Muswellbrook 132 kV	2	3
Nambucca 66 kV	2	65
Narrabri 66 kV	2	5
Newcastle 132 kV	2	2
Orange North 132 kV / Orange 132 kV and Panorama 66 kV	2	7
Parkes 132 kV	2	5
Parkes 66 kV	2	9
Port Macquarie 33 kV	2	51
Queanbeyan 66 kV	2	14
Raleigh 132 kV	2	4
Regentville 132 kV	2	32
Stroud 132 kV	2	13
Sydney East 132 kV	2	21
Sydney West 132 kV	2	2
Tamworth 66 kV	2	1
Taree 66 kV and 33 kV	2	4
Tenterfield 22 kV	2	15
Tomago 132 Note 3	2	79
Tomago 330 kV	2	13
Tuggerah 132 kV	2	13
Tumut 66 kV	2	14
Vales Pt 132 kV	2	13
Vineyard 132 kV	2	3
Wagga 66 kV	2	1
Wagga North 132 kV	2	33
Wallerawang 132 kV	2	5
Wallerawang 66 kV	2	26
	2	31

Waratah West 132 kV	2	3
Wellington 132 kV	2	6
Yanco 33 kV	2	41
Balranald 22 kV	1	115
Broken Hill 22 kV and Broken Hill 220 kV	1	10
Casino 132 kV	1	7
Dorrigo 132 kV	1	41
Hawks Nest 132 kV	1	42
Hérons Creek	1	17
Ilford 132 kV	1	14
Marulan 132 kV	1	10
Molong 66 kV	1	46
Morven 132 kV	1	33
Mudgee 132 kV	1	14
Munyang 33 kV	1	14
Murrumbateman 132 kV	1	49
Snowy Adit 132 kV	1	52
Wagga North 66 kV	1	42
Wellington Town	1	21
Yass 66 kV	1	22

^a Applies across all the Inner Sydney

B Reporting Manual



Independent Pricing and Regulatory Tribunal
New South Wales

Electricity Networks Reporting Manual – Transmission reliability standard



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Mr Ed Willett

Ms Deborah Cope

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1 Compliance with transmission reliability standard

Reporting requirements outlined in this document apply to TransGrid¹ only.

TransGrid is required, under condition 3 of its operating licence, to comply with any transmission reliability and performance standard issued by the Minister. The *NSW Electricity Transmission Reliability and Performance Standard 2017* (Standard) was issued by the Minister for Energy and Utilities on 1 June 2017, to apply from 1 July 2018.

Condition 11 of the Transmission Operator's Licence under the *Electricity Supply Act 1995* (NSW), requires TransGrid to prepare and submit reports in accordance with any applicable Reporting Manuals issued by the Independent Pricing and Regulatory Tribunal (IPART). The reporting requirements outlined in this Reporting Manual will assist IPART to determine whether or not the licence holder is complying with the Standard.

From time to time, IPART might request further information from TransGrid to assist in determining compliance or for another purpose.

1.1 Annual reports

TransGrid is required to report on its compliance with the Standard annually. Annual reports should include the information set out below.

1.1.1 Information regarding compliance with clause 3 of the Standard – level of redundancy

For each bulk supply point (BSP), TransGrid is required to:

- ▼ report on the level of redundancy achieved in respect of that BSP, and
- ▼ provide a network/circuit diagram depicting how that level of redundancy is achieved.

For a BSP where non-network solutions are relevant to the level of redundancy achieved, TransGrid is required to provide evidence of how the non-network solutions contribute to achieving the level of redundancy, such as any relevant third party agreements. For third party agreements, we will consider what the arrangement is and how it will impact on compliance with the redundancy requirements of the reliability standard. We will also have regard to minutes from joint planning meetings that evidence the network arrangement, and the term of the arrangement.

¹ NSW Electricity Networks Operations Pty Limited (ACN 609 169 959) as trustee for the NSW Electricity Networks Operations Trust.

1.1.2 Information regarding compliance with clause 4 of the Standard – Expected Unserved Energy (EUE)

TransGrid is required to report its levels of EUE for each of its BSPs. IPART assesses TransGrid's compliance using the methodology available on our website.

For each BSP, TransGrid is also required to report the inputs used to calculate the amount of unserved energy. Numerical inputs will be required to be provided prior to the commencement of a new regulatory period to allow a review of EUE allowances. These inputs are:

- ▼ failures per transformer per annum
- ▼ failures per annum per 100km overhead line
- ▼ failures per annum per 100km underground cable
- ▼ mean hours to replace/repair transformer
- ▼ mean hours to repair overhead line
- ▼ mean hours to repair cable.

1.1.3 Evidence of agreement to share assets

Where the EUE calculation includes the usage of assets controlled by someone other than TransGrid, TransGrid should submit evidence of an agreement to use these assets and include the agreed availability. For third party agreements, we will consider evidence establishing:

- ▼ the network arrangement, and the duration of that arrangement, where the agreement is for compliance with redundancy requirements, or
- ▼ an asset's contribution to the EUE calculations of a BSP.

Such evidence could include signed meeting minutes of joint planning meetings between TransGrid and Ausgrid (or another network operator) or an exchange of letters. Evidence should be submitted to IPART as an attachment to the annual report.

Non-network solutions

For a BSP where non-network solutions are relevant to the calculation of EUE, TransGrid is required to provide evidence of how the non-network solutions affect the level of EUE, such as any relevant third party agreements. As above, this evidence would need to confirm how the non-network solution will contribute to the EUE calculations of a BSP.

1.1.4 Network/circuit diagrams relevant to compliance with the Standard

TransGrid is required to report network/circuit diagrams in the annual compliance self-report, where a permanent change to the network is made that impacts compliance with the Standard. TransGrid is not required to submit all network/circuit diagrams when a change has been made, only those that have been altered by the change. Such changes include the commissioning or decommissioning of a line or BSP that is relied upon to meet redundancy requirements, EUE allowances, or plans that have been approved by the Tribunal.

1.1.5 Declaration of compliance

TransGrid must provide with its annual compliance report a declaration, signed by the chief executive officer and the chairman of the board of directors (or another director approved by the board, other than the chief executive officer), that TransGrid complies with its licence obligations except to the extent disclosed in its report (Appendix A).

The annual report must disclose all instances where TransGrid fails to comply with any obligations in the Standard, describing:

- ▼ the extent and nature of the non-compliance including whether and how many customers and/or other licence holders are affected
- ▼ the reasons for non-compliance
- ▼ the actions taken, or proposed, to rectify the non-compliance and to prevent it reoccurring, and
- ▼ the anticipated date of full compliance and the state of the remedial action as at 30 June of the reporting year.

The reporting obligations in the Standard are summarised in Appendix B.

1.1.6 Timing and lodgement

Reporting in accordance with this manual is required annually. TransGrid must submit the annual compliance report determining compliance on 1 July of the current financial year to IPART no later than 31 August each year, or at an alternate date approved by IPART. It must be included as part of TransGrid's annual licence compliance report.

Annual compliance reports should be lodged by email to energy@ipart.nsw.gov.au. Name and contact details (phone, email) of the primary contact should also be provided. An alternative contact for those times when the primary contact is unavailable should also be nominated.

1.2 Ad hoc information submissions to IPART

From time to time, IPART may request further information from TransGrid to assist in determining compliance or for another purpose. For instance, we may request the asset risk register to inform a review of the reliability standard. A separate information request would be issued and would include a reasonable timeframe for TransGrid to respond.

IPART may also request the estimated EUE for a new BSP where there is insufficient historical information for the load the BSP is expected to supply. In this case, IPART will consider the use of a load duration curve from an existing BSP with a similar load type, scaled to the anticipated maximum demand.

Clause 7 of the Standard requires TransGrid to comply with a request from IPART, within a reasonable timeframe nominated by IPART, for information which IPART considers to be necessary or convenient for monitoring compliance with the Standard.

Clause 7(d) of the Standard requires TransGrid to:

-
- ▼ submit a proposal for any new BSP that proposes a level of redundancy and EUE for the new BSP
 - ▼ provide reasons justifying the proposal, and
 - ▼ submit the proposal at least 90 days before entering into any contract for the construction of the new BSP.

For clarity, we consider the relevant construction contracts to be those associated with the civil and electrical construction works.

1.3 Additional information on asset risk profiles

TransGrid must provide IPART with reports it requests from time to time containing information on annual asset failure rates and risk profiles for major asset classes.



Appendices



A Annual Compliance Report Pro-Forma

Annual Compliance Report for 20 -
Submitted by [name] ACN:

To: The Chief Executive Officer
Independent Pricing and Regulatory Tribunal of NSW
PO Box K35
Haymarket Post Shop NSW 1240

[Name] reports as follows:

1. This report documents compliance at 1 July [year] with all obligations to which [name] is subject by virtue of its Transmission Operator or Distribution Network Service Provider Licence.
2. This report has been prepared by [name] with all due care and skill in full knowledge of conditions to which it is subject and in compliance with IPART's [current Electricity Network Reporting Manual]/[Transmission/Distribution Electricity Network Performance Report].
3. Schedule A provides information on all obligations with which [name] did not fully comply at 1 July [year].
4. Other than the information provided in Schedule A, [name] has complied with all conditions to which it is subject.
5. This compliance report has been approved by the Chief Executive Officer (or equivalent) and the Chairman of the Board of Directors (or a duly authorised board member other than the CEO) of [name] on [date].

DATE: DATE:

Signed: Signed:

Name: Name:

Designation:..... Designation:

B Summary of obligations in the transmission reliability standard

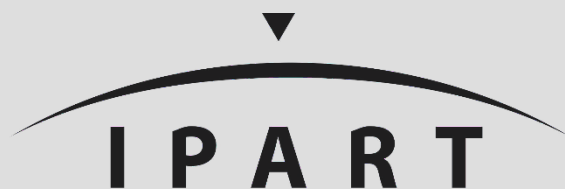
Table B.1 Minimum reporting requirement against the reliability standard

IPART Code	Condition number	Name of reporting requirement	Brief description of obligation in the Standard
RS1	3	System designed to achieve prescribed level of redundancy	The Licence Holder must ensure that the transmission system is designed such that, for each BSP listed in the table in clause 8, the transmission system achieves the level of redundancy category specified for that BSP in the table in clause 8, except to the extent that the Licence Holder is not required to comply with clause 3 of the Standard due to clause 5(a) of the Standard.
RS2	4	System designed so as not to exceed prescribed allowances for EUE	The Licence Holder must ensure that the transmission system is designed such that the annual EUE in respect of a BSP listed in the table in clause 8 does not exceed the allowance for EUE specified for that BSP in the table in clause 8, except to the extent that the Licence Holder is not required to comply with clause 4 of the Standard due to clause 6(a) of the Standard.
RS3	5(b)	Implementation of approved plans – level of redundancy	If IPART has advised the Licence Holder in writing that it is satisfied that one or more plans submitted under clause 5(a)(i) would, if implemented, be likely to provide a greater net-benefit than would be provided by the Licence Holder complying with clause 3 in relation to the BSP or points that are the subject of the plan or plans, and to the extent that clause 5(d)(i) does not apply to the plan or plans, the Licence Holder must implement the plan or plans within a time specified by IPART and to the reasonable satisfaction of IPART.
RS4	6(b)	Implementation of approved plans – EUE	If, in respect of one or more plans submitted under clause 6(a)(i), IPART has advised the Licence Holder in writing that it is satisfied of the matters set out in clause 6(a)(iii), and to the extent that clause 6(d)(i) does not apply to the plan or plans, the Licence Holder must implement the plan or plans within a time specified by IPART and to the reasonable satisfaction of IPART.
RS5	7(a) and 7(b)	Provide information to IPART	The Licence Holder must comply with any request by IPART made under clause 7(a), within a reasonable timeframe notified to the Licence Holder by IPART.

IPART Code	Condition number	Name of reporting requirement	Brief description of obligation in the Standard
RS6	7(c)	Audit compliance	<p>If reasonably requested to do so by IPART, the Licence Holder must commission an audit of its compliance with the Standard (or specified aspects of the Standard). The audit must be conducted:</p> <ul style="list-style-type: none"> a) by an auditor approved by IPART in writing; b) at the expense of the Licence Holder; and c) such that a report on the audit by the auditor is provided to IPART within a reasonable timeframe notified to the Licence Holder by IPART.
RS7	7(d)	Planning for new BSP	<p>At least 90 days before entering into any contract for the civil and electrical construction works of a new BSP intended to form part of the transmission system (or within a different timeframe proposed by the Licence Holder and agreed to in writing by IPART), the Licence Holder must submit a proposal regarding the new BSP to IPART. The proposal must:</p> <ul style="list-style-type: none"> a) propose a level of redundancy category that this standard should specify for the new BSP; b) propose a level of EUE that this standard should specify for the new BSP; and c) set out reasons justifying the level of redundancy category and level of EUE proposed.

Note: TransGrid should also refer to the complete wording in the transmission reliability standard

C Audit Guideline



Independent Pricing and Regulatory Tribunal
New South Wales

Electricity Networks Audit Guideline – Transmission reliability standard



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1 Transmission reliability standard

Audit requirements outlined in this document apply to TransGrid¹ only.

TransGrid is required, under condition 3 of its operating licence, to comply with any transmission reliability and performance standard issued by the Minister. The *NSW Electricity Transmission Reliability and Performance Standard 2017* (Standard) was issued by the Minister for Energy and Utilities on 1 June 2017, to apply from 1 July 2018.

1.1 Objective

The objective of this audit is to assess the network operator's compliance with the Standard.

1.2 Scope

The audit must be comprehensive in assessing the network operator's compliance in accordance with any particulars as may be requested by the Independent Pricing and Regulatory Tribunal (IPART) from time to time.

TransGrid will be compliant with the Standard if it can demonstrate that the transmission system is designed such that each bulk supply point (BSP):

1. meets the redundancy category specified in the Standard, and
2. does not exceed the annual allowance for expected unserved energy specified in the Standard, where the annual expected unserved energy is to be calculated using the methodology available on IPART's website.

As an alternative to complying with (1) (clause 3 of the Standard), TransGrid can seek and obtain IPART's written approval in respect of a plan or plans under clause 5(a) of the Standard and implement the plan or plans to IPART's satisfaction. As an alternative to complying with (2) (clause 4 of the Standard), TransGrid can seek and obtain IPART's written approval in respect of a plan or plans under clause 6(a) of the Standard and implement the plan or plans to IPART's satisfaction.

1.3 Interpretation

Clauses 3 and 4 of the Standard require the licence holder to "ensure that the transmission system is designed such that" it meets the levels of redundancy and expected unserved energy allowances prescribed in clause 8. For the avoidance of any doubt, that means that the existing physical assets must be designed to meet those requirements; it is not sufficient that there is a plan on paper for the transmission system to meet those requirements.

¹ NSW Electricity Networks Operations Pty Limited (ACN 609 169 959) as trustee for the NSW Electricity Networks Operations Trust.

Clause 7(d) of the Standard requires the licence holder to submit a proposal to the Tribunal “at least 90 days before entering into any contract for the construction of a new bulk supply point...”. For the purposes of clause 7(d) of the reliability standard, we consider “any contract for the construction” refers to “any contract for the civil and electrical construction works”.

1.4 Specific auditor expertise

The auditor must be approved by IPART. This can be achieved by the auditor being on our audit panel or being approved by IPART following a request from TransGrid. When assessing whether to approve the auditor, we will consider their auditing skills and experience as well as their qualifications and experience with network planning.

More information about obtaining auditor approval is included in a separate document - *Audit Guideline - Audit fundamentals, process and findings* available on IPART’s website.

1.5 Audit timing

Audit timing will be at the discretion of IPART and will be included in any request to undertake an audit.

1.6 Criteria

The auditor will review audit evidence to test against the audit criteria listed in Table A.1 in Appendix A, as it applies to the scope provided by IPART in its request.



Appendices



A Audit criteria for transmission reliability audits

Table A.1 Minimum audit criteria for audits of compliance with the reliability standard

Reference – the Reliability Standard	Minimum audit criteria	Auditor's comments	Audit Grade
Clause 3	The transmission system must be designed such that, for each bulk supply point listed in the table in clause 8, the transmission system achieves the level of redundancy category specified for that bulk supply point in the table in clause 8, except to the extent that the Licence Holder is not required to comply with clause 3 of the Standard due to clause 5(a) of the Standard.		
Clause 4	The transmission system must be designed such that the annual expected unserved energy in respect of a bulk supply point listed in the table in clause 8 does not exceed the allowance for expected unserved energy specified for that bulk supply point in the table in clause 8.		
Clause 4	The annual expected unserved energy has been calculated using a methodology consistent with IPART's methodology (as published on IPART's website).		
Clause 4	The inputs used by the Licence Holder in their methodology are correct and free of errors. See the full list in Table B.1 in IPART's <i>Electricity Networks Reporting Manual for the Transmission Reliability Standard</i> .		
Clause 5(b)	If IPART has advised the Licence Holder in writing that it is satisfied that one or more plans submitted under clause 5(a)(i) would, if implemented, be likely to provide a greater net-benefit than would be provided by the Licence Holder complying with clause 3 in relation to the bulk supply point or points that are the subject of the plan or plans, and to the extent that clause 5(d)(i) does not apply to the plan or plans, the Licence Holder must implement the plan or plans within a time specified by IPART and to the reasonable satisfaction of IPART.		
Clause 6(b)	If, in respect of one or more plans submitted under clause 6(a)(i), IPART has advised the Licence Holder in writing that it is satisfied of the matters set out in clause 6(a)(iii), and to the extent that clause 6(d)(i) does not apply to the plan or plans, the Licence Holder must implement the plan or plans within a time specified by IPART and to the reasonable satisfaction of IPART.		