TransGrid

Regulatory Information Notice

Economic Benchmarking 2015/16

31 October 2016

Contents

1. Introduction 3
2. Compliance with the RIN Requirements 3
3. Preparation Process 4
   - 3.1 Document Control 5
   - 3.2 Governance 5
   - 3.3 Review opinion provided 5
4. Principles of Preparation 6
5. Information Sources 6
6. Confidentiality Claims 8
7. Detailed Basis of Preparation 8
   - 7.1 Contents Worksheet 8
   - 7.2 Worksheet 1.0 Business & Other Details 8
   - 7.3 Worksheets 3.1 to 3.7 8
     - 7.3.1 Worksheet 3.1 Revenue 9
     - 7.3.2 Worksheet 3.2 Opex 14
     - 7.3.3 Worksheet 3.2.3 Provisions 16
     - 7.3.4 Worksheet 3.3 Assets (RAB) 24
     - 7.3.5 Worksheet 3.4 Operational Data 28
     - 7.3.6 Worksheet 3.5 Physical Assets 41
     - 7.3.7 Worksheet 3.6 Quality of Services 47
     - 7.3.8 Worksheet 3.7 Operating Environment 69

1. Introduction

TransGrid operates and manages the major high voltage electricity transmission network in NSW and the ACT as a *transmission network service provider*, connecting generators, distributors and major end users. TransGrid is the trading name for the NSW Electricity Networks Operations Pty Ltd (ACN 609 169 959) as a Trustee for the NSW Electricity Networks Operations Trust (ABN 70 250 995 390). Prior to 16 December 2015, it was a State Owned Corporation (SOC) owned by the NSW government.

On 19 December 2013, the Australian Energy Regulator (AER) issued TransGrid with a *Regulatory Information Notice Under Division 4 of Part 3 of the National Electricity (New South Wales) Law* (the 'RIN'), requiring the business to prepare and submit certain information to support the AER's regulatory responsibilities.

This Basis of Preparation document has been prepared to support the reviewed information package that is due to be submitted to the AER by 31 October 2016. The audited information package is comprised of:

1. The populated worksheets provided as Appendix A to the RIN;
2. The Basis of Preparation for each variable covered in the RIN worksheets;
3. Confidentiality Claims on any information included in the RIN worksheets;
4. Review Report by the auditor
5. Verification of the information by way of a Statutory Declaration in the form provided as Appendix B to the RIN.

2. Compliance with the RIN Requirements

The RIN outlines the requirements for the Basis of Preparation as follows:

3. BASIS OF PREPARATION

3.1 TransGrid must explain, the basis upon which TransGrid prepared information to populate the input cells (basis of preparation), for all information ..

3.2 The basis of preparation must be a separate document (or documents) that TransGrid submits with its completed regulatory templates.

3.3 The basis of preparation must follow a logical structure that enables auditors, assurance practitioners and the AER to clearly understand how TransGrid has complied with the requirements of this Notice.

3.4 At a minimum, the basis of preparation must:

(a) demonstrate how the information provided is consistent with the requirements of the Notice;

(b) explain the source from which TransGrid obtained the information provided;

(c) explain the methodology TransGrid used to provide the required information, including any assumptions TransGrid made; and

(d) explain circumstances where TransGrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for TransGrid to use actual information;

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is TransGrid's best estimate, given the information sought in the Notice.

3.5 TransGrid may provide additional detail beyond the minimum requirements if TransGrid considers it may assist a user to gain an understanding of the information presented in the regulatory templates.

3.6 When reporting an audit opinion or making an attestation report on the regulatory templates presented by TransGrid, an auditor or assurance practitioner shall opine or attest by reference to TransGrid's basis of preparation.

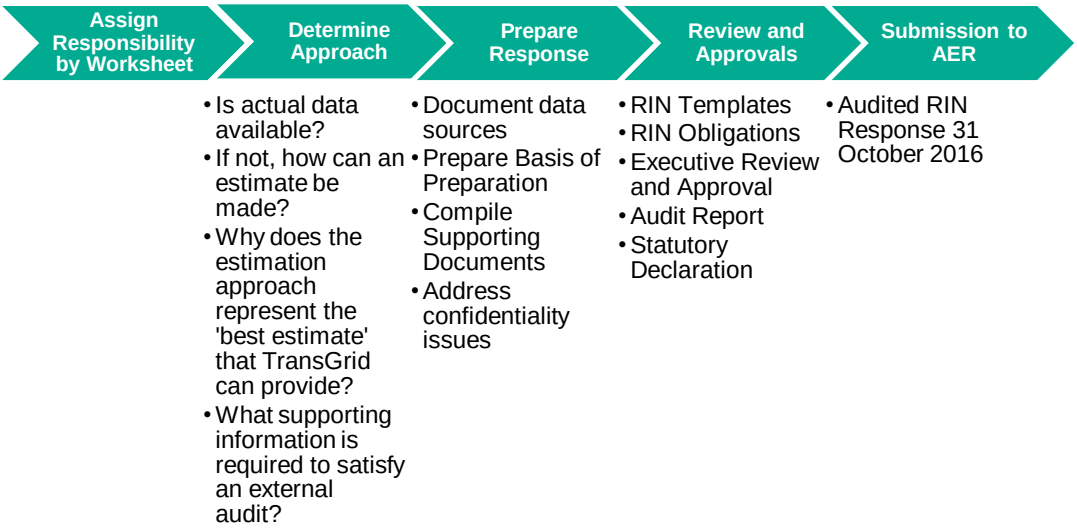
To promote a common approach across the business to addressing the requirements of the Economic Benchmarking RIN, TransGrid has gathered information from across the business using a template prepared to respond to each of the AER's requirements. This is outlined in the table below.

Data variable & TransGrid's interpretation		*Data sources, locations and 'owners'*	*Estimation or actual information, calculations and assumptions*		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[1]?	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
'Variable_Code' & 'Variable' from worksheet	*If AER definition is not clear, document TransGrid interpretation and its rationale* ***Responds to RIN requirement a)***	*Specify source systems, reports, forms, other RIN variables etc* ***Responds to RIN Requirement b)***	*Yes/No* *If estimate is used for this variable, document:* • *Why an estimate was required, including why it was not possible to use Actual Financial Information or Actual Non-Financial Information* • *Estimate basis, including the approach used, assumptions made and reasons why the estimate is TransGrid's best estimate* ***Responds to RIN Requirement d)***	*Clear description of approach steps / methodology* ***Responds to RIN Requirement c)***	*Clearly describe any assumptions used and the rationale for each* ***Responds to RIN Requirement c)***

3. Preparation Process

TransGrid's high level process for preparing its response to the RIN is outlined below.

[1] 'Information presented in response to the Notice whose presentation is not Materially dependent on information recorded in the NSP's historical accounting records or other records used in the normal course of business, and whose presentation for the purposes of the Notice is contingent on judgments and assumptions for which there are valid alternatives, which could lead to a Materially different presentation in the response to the Notice.', **page 34, "Economic benchmarking RIN For transmission network service providers, Instructions and Definitions".**



3.1 Document Control

The RIN Templates, Basis of Preparation, RIN Responses and supporting documents are located on TransGrid's file servers. These documents will be retained to support the preparation of the annual information required in future years.

3.2 Governance

The information required under the RIN has been prepared by the responsible personnel within TransGrid, termed "data collectors", who populate the RIN templates and the relevant sections of the Basis of Preparation. This information is then reviewed internally to check validity of the data collected. This internally verified information is presented to the auditors, PwC, who then verify the information with data collectors and other relevant persons within TransGrid. The finalised BOP and template is presented to the data managers, who provide sign-offs to individual sections of the RINs and the associated BOPs. A management representation letter is provided to the auditor (PwC) on accuracy of data, and validity of estimates as the best available by TransGrid.

The final RIN package will be provided by 31 October 2016, inclusive of the final Review Report and signed Statutory Declaration.

3.3 Review opinion provided

On 16 December 2015, the NSW Electricity Networks Consortium acquired TransGrid assets from the NSW State Government. As a result of the change in ownership, audited financial accounts was produced for the TransGrid NSW State Owned Corporation (SOC) for the period 1 July 2015 to 16 December 2015, and a separate set of audited financial accounts undertaken for NSW Electricity Networks for the remainder of the financial year to 30 June 2016.

The financial information used for the compilation of the relevant RIN schedules for the full financial year ended 30 June 2016 have therefore been based on the aggregation of the:

- Audited financial information for the TransGrid SOC for the period 1 July 2015 to 16 December 2015, and
- Audited NSW Electricity Networks (NSWEN) Special Purpose Aggregated Financial Report and supporting information for the remainder of the financial period to 30 June 2016.

Management of NSW Electricity Networks Operations Trust (i.e., the current entity responsible for the preparation and submission of the TransGrid RINs) have relied on the audited financial information for the TransGrid SOC in the preparation of the relevant schedules. Accordingly, the aggregation of the financial information for TransGrid SOC and NSWEN is considered to be an estimate for the year ended 30 June 2016.

4. Principles of Preparation

TransGrid's response to the RIN has been prepared in accordance with the AER issued "*Regulatory Information Notice Under Division 4 of Part 3 of the National Electricity (New South Wales) Law"* to TransGrid. This is subject to the mitigating circumstances discussed in section 3.3 above relating to change of ownership of TransGrid.

In accordance with the AER's instructions TransGrid has provided actual information using 'records used in the normal course of business' wherever this is possible.

Where TransGrid has been unable to provide actual information, the variables have been estimated as follows:

- In the first instance, where actual information exists, but the presentation is contingent of a judgement or assumption, TransGrid has used actual information to prepare the variable and stated the judgement or assumption that has been made.
- Where actual information exists, but the information is incomplete over the time period or by the categories required by the RIN, TransGrid has used the actual information as far as practicable and stated the methodology used to estimate the remaining data.
- Where no actual information is recorded for the variable in the normal course of business, TransGrid has stated the methodology that it has used to estimate the variable required by the AER, including the assumptions made and the data sources used.

By following these principles of preparation, TransGrid considers that where estimates have been provided, these represent the best estimate available for each variable, noting that considerable uncertainty remains with respect to the AER's specific purpose(s) for the information.

TransGrid has prepared the schedules in compliance with the requirements of Accounting Standard AASB 108 Accounting Policies, Changes in Accounting Estimates and Errors and in compliance with the recognition, measurement and classification requirements of other relevant Accounting Standards mentioned above. To the extent determined appropriate, the RIN schedules have been prepared in compliance with the disclosure requirements of the relevant Accounting Standards.

5. Information Sources

Due to the combination of financial and non-financial data requested by the AER, including a number of items that are not routinely reported, TransGrid has drawn data from a large number of information sources that are used across its business. In most cases it has been necessary to undertake additional analysis to derive the specific information that is required in the RIN response.

The key systems and information sources that have been relied on are summarised in the table below, and are referred to, in the detailed basis of preparation tables in section 7.

Information Source	Brief Description	Supports
AEMO Price and Demand Data Files	AEMO Price and Demand Data Files are publicly available historical records of National Electricity Market spot price and demand for each trading interval.	Worksheet 3.5 Physical Assets
AEMO Settlement Statements	AEMO issued statements for intraregional and interregional settlement residues.	Worksheet 3.1 Revenue
AEMO Connection Point Forecast	AEMO connection point forecasts (2016) are used in applying weather correction for non-coincident maximum demand	Worksheet 3.4 Operational data
AEMO NEFR 2016	National Electricity Forecasting Report (2016) by Australian Energy Market Operator (AEMO), used for applying weather correction for system maximum demand	Worksheet 3.4 Operational Data

AER Current Period Determination	The AER's final determination for the 2014/15 to 2017/18.	Worksheet 3.1 Revenue, Worksheet 3.3 Assets (RAB)
AER Roll Forward Model	TransGrid's populated Roll Forward Models provided to the AER	Worksheet 3.3 Assets (RAB)
AER STPIS Letters	Annual letters from the AER confirming the revenue attributable to the Service Target Performance Incentive Scheme	Worksheet 3.1 Revenue
Bush Fire Prone Lands	Spatial data set sourced from NSW Rural Fire Service	Worksheet 3.7 Operating Environment
Climate Zone Map	Spatial data set sourced from the Australian Bureau of Meteorology	Worksheet 3.7 Operating Environment
Ellipse	TransGrid's corporate asset management database	Worksheet 3.5 Physical Assets, Worksheet 3.7 Operating Environment
Invoices Received	Contractor invoices received for vegetation management works have been used to estimate the variables requested in Worksheet 8	Worksheet 3.7 Operating Environment
LAN	TransGrid's corporate IT network	Various (Document Locations)
LiDAR	Light Detection and Ranging data sourced from aerial surveys that is used to measure vegetation clearances from TransGrid's transmission line assets.	Worksheet 3.7 Operating Environment
Spot Height Data (25m)	Topographical information sourced from NSW Land and Property Information.	Worksheet 3.7.4 Weather Stations
System Operating Diagrams	High Voltage Operating Diagrams detail in plan view, single line format, the high voltage equipment, operational nomenclature and electrical connections for substations, switching stations and power station switchyards	Worksheet 3.5 Physical Assets
TAMIS	NSW Transmission System and TransGrid Asset Management Information System (TAMIS) is the Geographical Information System (GIS) used by TransGrid to manage its spatial asset data.The system is now referred to as TSS.	Worksheet 3.5 Physical Assets, Worksheet 3.7 Operating Environment
TransGrid Regulatory Accounts	TransGrid's annual Regulatory Accounts which are prepared and submitted in accordance with the AER's requirements.	Worksheet 3.2 Opex, Worksheet 3.2.3 Provisions
TransGrid Electrical Data Book	A central record of electrical asset data regarding TransGrid's network that is published on the TransGrid Intranet.	Worksheet 3.5 Physical Assets Worksheet 3.7 Operating Environment
TransGrid Operating Manuals	Operating Manuals for TransGrid's assets outlining ratings for assets in each region of TransGrid's network.	Worksheet 3.5 Physical Assets
TRIM	TransGrid's corporate document management system	Various (Document Locations)
TUOS System	Transmission Use of System (TUOS) charges are TransGrid's primary source of revenue. The TUOS System is the billing system that underpins TransGrid's invoicing and records the information from the various metering installations deployed across TransGrid's network.	Worksheet 3.1 Revenue Worksheet 3.4 Operational Data Worksheet 3.7 Operating Environment
The Wire	TransGrid's Intranet	Various (Document Locations)
TransGrid Manuals & Policies	Used for the operation and maintenance of TransGrid's assets, these outline equipment information, standard practices and maintenance requirements.	Worksheet 3.5 Physical Assets Worksheet 3.7 Operating Environment

6. Confidentiality Claims

TransGrid has directly connected customers, whose data is confidential. Further, demand data of NSW customers is subject to privacy requirements under Clause 7.2 of the *Transmission Operators License under the Electricity Supply Act (1995) NSW* granted to NSWEN on 16 December 2015.

TransGrid has identified the following issues where measures need to be taken to protect confidential information. This is summarised below:

Document affected	Issue	TransGrid Resolution
Worksheet 3.4 Operational Data (TOPED0105 and TOPED0106)	Certain TransGrid Bulk Supply Points (BSPs) are predominantly (or exclusively) connected to direct customers. As NSWEN's conditions of lease included mandatory provisions in relation to keeping customer data confidential, TransGrid will exclude the load related data of these customers from the public version of the Category Analysis RIN template.	TransGrid will add the GWh energy delivered under TOPED0105 and TOPED0106 to TOPED0103 in the public version.

7. Detailed Basis of Preparation

The following sections outline the Basis for Preparation for each line item in the RIN Templates.

7.1 Contents Worksheet

The Contents Worksheet does not require any input by TransGrid.

7.2 Worksheet 1.0 Business & Other Details

Worksheet 1.0 Business & Other Details requires general business address and contact information.

7.3 Worksheets 3.1 to 3.7

The Basis of Preparation outlines the necessary explanations with regards to the preparation of the RIN template, as per section 2 above.

7.3.1 Worksheet 3.1 Revenue

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[2]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
TREV0101 From Fixed Customer (Exit Point) Charges	Connection Exit charges for distributors & direct connect customers based on fixed daily rate	From invoices generated by the Pricing team on the monthly basis using a core business TUOS billing system. Revenue from these invoices are summarised in the TUOS Data spreadsheets to facilitate internal financial reporting.	No	Prices for all customer connection points are calculated annually as per the AER approved Pricing Methodology. Approved prices by the Executive General Manager/Business Growth and Revenue are published on TransGrid's website by 15 May. These (prices) are entered into the TUOS billing system and invoices for all customers are generated each month using the TUOS billing system.	-
TREV0102 From Variable Customer (Exit Point) Charges	This type of charge is not applicable for TransGrid, all exit charges are on fixed basis above	-	No	-	-
TREV0103 From Fixed Generator (Entry Point) Charges	Connection Entry charges for generators based on fixed daily rate	As per TREV0101	No	As per TREV0101	-

[2] 'Information presented in response to the Notice whose presentation is not Materially dependent on information recorded in the NSP's historical accounting records or other records used in the normal course of business, and whose presentation for the purposes of the Notice is contingent on judgments and assumptions for which there are valid alternatives, which could lead to a Materially different presentation in the response to the Notice.', **page 34, "Economic benchmarking RIN For transmission network service providers, Instructions and Definitions".**

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[2]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
TREV0104 From Variable Generator (Entry Point) Charges	This type of charge is not applicable for TransGrid, all entry charges are on fixed basis above	-	No	-	-
TREV0105 From Fixed Energy Usage Charges (Charge per day basis)	Charges applied for a direct connect customer.	As per TREV0101	No	As per TREV0101	-
TREV0106 From Variable Energy Usage charges (Charge per kWh basis)	Energy based (per kWh rate) usage charges from loads customers.	As per TREV0101	No	As per TREV0101	-
TREV0107 From Energy based Common Service and General Charges	Energy based (per kWh rate) Common Service and Non-locational TUOS (previously called General Charges) from all loads customers.	As per TREV0101	No	As per TREV0101	-
TREV0108 From Fixed Demand based Usage Charges	Revenue from charges based on a nominated/agreed demand basis	As per TREV0101	No	As per TREV0101	-

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[2]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
TREV0109 From Variable Demand based Usage Charges	Demand based (per kW rate) usage charges from all loads customers.	As per TREV0101	No	As per TREV0101	-
TREV0110 Revenue from other Sources	Intra-regional residues and Inter-regional Settlement residues auction proceeds, net financial transfers per TREV0201, net adjustments of network support pass through amounts, revenue deferral and TUoS under/over collection adjustment for financial year.	From AEMO settlement statements, issued TUOS invoices, AER STPIS letters, TUOS revenue reconciliations	No	Other Revenue (TREV0205) + Revenue from Other Connected transmission Systems (TREV0201)	-
TREV0201 From Other connected transmission networks	Net of financial transfers to & from other NSW/ACT market region TNSPs, and net inter-regional TUOS (for FY16 this includes ActewAGL, Ausgrid, Directlink and the net MLEC charge to Powerlink Queensland and AEMO Victoria).	As per TREV0101	No	As per TREV0101	-

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[2]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
TREV0202 From Distribution networks	Total amount charged to ActewAGL, Ausgrid, Essential Energy, Endeavour Energy less financial transfers in TREV0201	As per TREV0101	No	As per TREV0101	-
TREV0203 From Directly connected end–users	Total amounts charged to direct customers	As per TREV0101	No	As per TREV0101	-
TREV0204 From Generators	Total connection Entry charges for generators	As per TREV0101	No	As per TREV0101	-
TREV0205 Other revenue	Intra-regional residues and Inter-regional Settlement residues auction proceeds net adjustments of network support pass through amounts, revenue deferral and TUOS under/over collection adjustment for financial year	From AEMO settlement statements, issued TUOS invoices, AER STPIS letters, TUOS revenue reconciliations	No	AEMO email a Final Settlements report each week with the intra-regional and inter-regional settlements figures, as well as a settlement residue auctions report on a quarterly basis. These figures are compiled into the Settlement residues spreadsheet. This forms part of the monthly account reconciliation process, confirming that the data within the spreadsheet is correct.	-
TREV0301 EBSS	AER Approved EBSS revenue	Current regulatory determination	No	-	-

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[2]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
TREV0302 STPIS	AER Approved STPIS revenue	Approval letter from AER	No	-	-
TREV0303 Other	Any additional AER approved revenue for 'other' incentive schemes	-	No	-	-
TREV03 Total revenue of incentive schemes	Total of TREV0301, TREV0302 and TREV0303.	-	No	TREV0301 + TREV0302 + TREV0303.	-

Approved by: Nicola Tully, Manager / Prescribed Revenue and Pricing

7.3.2 Worksheet 3.2 Opex

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[3]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
Table 3.2.1 Current opex categories and cost allocations TOPEX0101 Maintenance – Lines & Cable To TOPEX0120 Network Support	The Opex line items reported are consistent with TransGrid's Revenue proposal opex line items and definitions. As required by the "*Economic Benchmarking RIN for TNSP Instructions and Definitions Nov 2013*", opex line items reported in Table 3.1.2 align with Opex line items reported in the Regulatory Accounting Statements. Prescribed Opex is equal to the following Ellipse P&L categories: - Labour - Materials	2015-16 Regulatory Accounts 'DISAGG Opex', 'RFS Inc Network' and DISAGG Inc' templates – Prescribed column. Categories of the Regulatory Account templates can be mapped to the EB 3.2 as follows: • Network Maintenance – TOPEX0101 to TOPEX0105 • Network Operations – TOPEX0106 to TOPEX0108 • Other Controllable Costs – TOPEX0109 to TOPEX0118 • Self-Insurance Costs – TOPEX0119 The source data is extracted from Ellipse and re-categorised into regulatory categories based on Responsibility Centres.	No	Prepared in accordance with the requirements of the annual Regulatory Accounts.	Figures reconcile to the Regulatory accounts

[3] 'Information presented in response to the Notice whose presentation is not Materially dependent on information recorded in the NSP's historical accounting records or other records used in the normal course of business, and whose presentation for the purposes of the Notice is contingent on judgments and assumptions for which there are valid alternatives, which could lead to a Materially different presentation in the response to the Notice.', **page 34, "Economic benchmarking RIN For transmission network service providers, Instructions and Definitions".**

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[3]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
	- Operating Expenses - Statutory & External Charges - Support Costs - Defined Benefit Super The following items have been excluded from Prescribed Opex for 2015-16: - Lease transaction costs - Bid expenditure				

Approved by: Boon Thiow, Group Financial Controller

7.3.3 Worksheet 3.2.3 Provisions

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[4]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
TOPEX03A Long Service Leave	As required by the *Economic Benchmarking RIN For TNSP Instructions and Definitions Nov 2013*, financial information on provisions as reported in EB RIN 3.2.3 reconcile to the reported amounts for provisions in the Regulatory Accounting Statements.	2015-16 TransGrid Financial Statements and Ellipse General Ledger translated into the working papers for the preparation of the Regulatory Accounts 'DISAGG ProvSum' schedule. (Including only the prescribed portion).	No		
TOPEX0301A The carrying amount at the beginning of the period To	*Opening balance* – Closing balance from the prior period *Additional provisions made in the period* – Oncosts provided	2015-16 TransGrid Financial Statements and Ellipse General Ledger translated into the working papers for the preparation of the Regulatory Accounts 'DISAGG ProvSum' schedule. (Including only the prescribed portion).	No	From the Provisions supporting detailed analysis, the opening balance, closing balance and movement details for Long Service Leave are extracted.	Actual opex/capex and prescribed / non-prescribed is based on the actual year end oncost adjustment splits from Ellipse General Ledger, which are calculated as follows: • Opex/Capex – Based on the break-up of the actual oncost recoveries to capex and

[4] 'Information presented in response to the Notice whose presentation is not Materially dependent on information recorded in the NSP's historical accounting records or other records used in the normal course of business, and whose presentation for the purposes of the Notice is contingent on judgments and assumptions for which there are valid alternatives, which could lead to a Materially different presentation in the response to the Notice.', page 34, "Economic benchmarking RIN For transmission network service providers, Instructions and Definitions".

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[4]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
TOPEX0314A The carrying amount at the end of the period	during the period *Amounts used* – Payments *The increase during the period in the discounted amount arising from the passage of time and the effect of any change in the discount rate* - One-off adjustment to Long Service Leave during 2015-16. This was due to the adoption of the corporate bond rate from the government bond rate in the valuation of Long Service Leave *Closing balance* – Opening balance + Additional Provisions – Amounts Used +/- Discount rate movement				opex provided during the period. • Capex adjustment to Business Streams – Based on the break up of active capital projects during the period. • Opex adjustments to Business Streams – Based on the break up of the actual oncost recoveries to the Business Streams during the period.

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[4]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
TOPEX03B Annual Leave	As required by the *Economic Benchmarking RIN For TNSP Instructions and Definitions Nov 2013*, financial information on provisions as reported in EB RIN 3.2.3 reconcile to the reported amounts for provisions in the Regulatory Accounting Statements.	2015-16 TransGrid Financial Statements and Ellipse General Ledger translated into the working papers for the preparation of the Regulatory Accounts 'DISAGG ProvSum' schedule. (Including only the prescribed portion).	No		
TOPEX0301B The carrying amount at the beginning of the period To TOPEX0314B The carrying amount at the end of the period	*Opening balance* – Closing balance from the prior period *Additional provisions made in the period* – Oncosts provided during the period *Amounts used* – Payments *Closing balance* – Opening balance + Additional Provisions – Amounts Used +/- Discount rate	2015-16 TransGrid Financial Statements and Ellipse General Ledger translated into the working papers for the preparation of the Regulatory Accounts 'DISAGG ProvSum' schedule. (Including only the prescribed portion).	No	From the Provisions supporting detailed analysis, the opening balance, closing balance and movement details for Annual Leave are extracted.	Actual opex/capex and prescribed / non-prescribed is based on year end oncost adjustment splits from Ellipse General Ledger, which are determined as follows: • Opex/Capex – Based on the break up of the actual oncost recoveries to capex and opex during the period. • Capex adjustment to Business Streams – Based on the break up of active capital projects during the period. • Opex adjustments to Business Streams – Based on the break up of the actual oncost recoveries to the Business

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[4]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
	movement				Streams during the period.
TOPEX03C Short Term Incentives	As required by the *"Economic Benchmarking RIN For TNSP Instructions and Definitions Nov 2013"*, financial information on provisions as reported in EB RIN 3.2.3 reconcile to the reported amounts for provisions in the Regulatory Accounting Statements.	2015-16 TransGrid Financial Statements and Ellipse General Ledger translated into the working papers for the preparation of the Regulatory Accounts 'DISAGG ProvSum' schedule. (Including only the prescribed portion).	No		
TOPEX0301C The carrying amount at the beginning of the period To TOPEX0314C The carrying amount at the end of the period	*Opening balance – Closing balance from the prior period* *Additional provisions made in the period – Expense accrued in the profit and loss for short term incentive applicable for the financial year.*	2015-16 TransGrid Financial Statements and Ellipse General Ledger translated into the working papers for the preparation of the Regulatory Accounts 'DISAGG ProvSum' schedule. (Including only the prescribed portion). From the Provisions supporting detailed analysis, the opening balance, closing balance and movement details for Short Term Incentives are extracted.	No		

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[4]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
	Amounts used – Payments *Closing balance – Opening balance + Additional Provisions – Amounts Used +/- Discount rate movement*				
TOPEX03D Workers' Compensation	As required by the *Economic Benchmarking RIN For TNSP Instructions and Definitions Nov 2013*, financial information on provisions as reported in EB RIN 3.2.3 reconcile to the reported amounts for provisions in the Regulatory Accounting Statements.	2015-16 TransGrid Financial Statements and Ellipse General Ledger translated into the working papers for the preparation of the Regulatory Accounts 'DISAGG ProvSum' schedule. (Including only the prescribed portion).	No		
TOPEX0301D The carrying amount at the beginning of the	*Opening balance* – Closing balance from the prior period *Additional provisions*	2015-16 TransGrid Financial Statements and Ellipse General Ledger translated into the working papers for the preparation of the Regulatory Accounts 'DISAGG ProvSum' schedule. (Including only the prescribed	No	From the Provisions supporting detailed analysis, the opening balance, closing balance and movement details	Actual opex/capex and prescribed / non-prescribed is based on year end on cost adjustment splits from Ellipse General Ledger, which are calculated as follows as follows:

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[4]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
period To TOPEX0314D The carrying amount at the end of the period	*made in the period]*– Oncosts provided during the period *Amounts used* – Payments *Unused amounts reversed* – One-off adjustment to Workers Compensation during 2015-16. This was due to the provision being transferred to the NSW State Government. *Closing balance* – Opening balance + Additional Provisions – Amounts Used +/- Discount rate movement	portion).		for Insurance are extracted.	• Opex/Capex – Based on the breakup of the actual oncost recoveries to capex and opex during the period. • Capex adjustment to Business Streams – Based on the breakup of active capital projects during the period. • Opex adjustments to Business Streams – Based on the breakup of the actual oncost recoveries to the Business Streams during the period.
TOPEX03E Defined Benefits Superannuation Schemes	As required by the "*Economic Benchmarking RIN For TNSP Instructions and Definitions Nov 2013"*, financial information on	2015-16 TransGrid Financial Statements and Ellipse General Ledger translated into the working papers for the preparation of the Regulatory Accounts 'DISAGG ProvSum' schedule. (Including only the prescribed portion).	No	-	-

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[4]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
	provisions as reported in EB RIN 3.2.3 reconcile to the reported amounts for provisions in the Regulatory Accounting Statements.				
TOPEX0301E The carrying amount at the beginning of the period To TOPEX0314E The carrying amount at the end of the period	*Opening balance* – Closing balance from the prior period *Additional provisions made in the period* – oncosts recovered during the period *Amounts used* – Payments *Unused amounts reversed*– Transfer of the balance of the Defined Benefits Superannuation balance relating to retired members to the NSW State Government *The increase during the period in the discounted amount*	2015-16 TransGrid Financial Statements and Ellipse General Ledger translated into the working papers for the preparation of the Regulatory Accounts 'DISAGG ProvSum' schedule. (Including only the prescribed portion).	No	From the Regulatory Accounts working papers, the opening balance, closing balance and movement details for Superannuation are extracted.	The assumption for allocation of defined benefits superannuation to prescribed is based on the split of in-service and out of service members. As at 30th June 2014, 50% of TransGrid's EISS members are in-service and 50% are out of service. The out of service members are considered to be wholly prescribed as there is no meaningful way to allocate them the non-prescribed work business streams. Allocating the remaining 50% of the defined benefit super movements and balance to prescribed and non-prescribed business streams results in an immaterial allocation to non-prescribed. As out of service members will continue to grow as more members retire, any allocation of defined benefit super to non-prescribed business streams will continue to reduce.

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[4]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
	arising from the passage of time and the effect of any change in the discount rate - Adoption of the corporate bond rate from the government bond rate in the valuation of Defined Benefit Superannuation *Closing balance* – Opening balance + Additional Provisions – Amounts Used +/- Discount rate movement				

Approved by: Boon Thiow, Group Financial Controller

7.3.4 Worksheet 3.3 Assets (RAB)

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[5]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
TABLE 3.3.1 – REGULATORY ASSET BASE VALUES TRAB0101 Opening Value To TRAB0107 Closing value for asset value	As per Instruction and Definition provided by the AER	Electricity Transmission Network Service Provider Roll Forward Model (RFM), with TransGrid information	No	Prepared in accordance with the requirements of the AER Determination. This is the sum of all the "Asset Category" below. "As Commissioned" RAB used.	-
TABLE 3.3.2 – ASSET VALUE ROLL FORWARD Overhead Transmission Assets TRAB0201 Opening Value To TRAB0207 Closing value for asset value	As per Instruction and Definition provided by the AER	Electricity Transmission Network Service Provider Roll Forward Model (RFM), with TransGrid information	No	Prepared in accordance with the requirements of the AER Determination. "As Commissioned" RAB used. In the RFM, the categories that are noted as "Transmission Lines"	Asset category Transmission Lines & Cables (09-14) forms part of the overhead transmission assets category opening value. During the 2009-14 period there were no cable assets commissioned, as such this asset category only includes overhead transmission assets commissioned during

[5] 'Information presented in response to the Notice whose presentation is not Materially dependent on information recorded in the NSP's historical accounting records or other records used in the normal course of business, and whose presentation for the purposes of the Notice is contingent on judgments and assumptions for which there are valid alternatives, which could lead to a Materially different presentation in the response to the Notice.', **page 34, "Economic benchmarking RIN For transmission network service providers, Instructions and Definitions".**

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[5]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
					2009-14. Transmission Line Life Extension in the 2014-18 Regulatory Period has been included.
Underground Transmission Assets TRAB0301 Opening Value To TRAB0307 Closing value for asset value	As per Instruction and Definition provided by the AER	Electricity Transmission Network Service Provider Roll Forward Model (RFM), with TransGrid information	No	Prepared in accordance with the requirements of the AER Determination. "As Commissioned" RAB used In the RFM, the categories that are noted as "Underground Cables"	-
Transmission Switchyards, Substations TRAB0401 Opening Value To TRAB0407 Closing value for asset value	As per Instruction and Definition provided by the AER, except it does not include substation land as this is included in Easements	Electricity Transmission Network Service Provider Roll Forward Model (RFM), with TransGrid information	No	Prepared in accordance with the requirements of the AER Determination. "As Commissioned" RAB used In the RFM, the categories that are noted as "Substations"	-
Easements TRAB0501 Opening Value To TRAB0507 Closing value for asset value	As per Instruction and Definition provided by the AER	Electricity Transmission Network Service Provider Roll Forward Model (RFM), with TransGrid information	No	Prepared in accordance with the requirements of the AER Determination. "As Commissioned" RAB used In the RFM, the categories that are noted as "Land and Easements"	-

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[5]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
Other Assets with Long Lives TRAB0601 Opening Value To TRAB0607 Closing value for asset value	As per Instruction and Definition provided by the AER	Electricity Transmission Network Service Provider Roll Forward Model (RFM), with TransGrid information	No	Prepared in accordance with the requirements of the AER Determination. "As Commissioned" RAB used In the RFM, the categories that are noted as "SCADA and Communications", "SMHEA Assets", "Secondary Systems", "Communications", "Communications (short life)", "Equity Raising Costs"	-
Other Assets with Short Lives TRAB0701 Opening Value To TRAB0707 Closing value for asset value	As per Instruction and Definition provided by the AER	Electricity Transmission Network Service Provider Roll Forward Model (RFM), with TransGrid information	No	Prepared in accordance with the requirements of the AER Determination. "As Commissioned" RAB used In the RFM, the categories that are noted as "Non-network Assets", "Business IT", "Minor Plant", "Motor Vehicles & Mobile Plant"	-
TABLE 3.3.3 – TOTAL DISAGGREGATED RAB ASSET VALUE TRAB0801 Overhead transmission assets (wires and towers/poles etc.) To TRAB0806 Other assets with short lives (please specify)	As per Instruction and Definition provided by the AER	Electricity Transmission Network Service Provider Roll Forward Model (RFM) , with TransGrid information	No	This is calculated as the average of the opening and closing RAB values for the Regulatory Year for each RAB Asset Category as per Page 22 of the Instruction.	-
TABLE 3.3.4 – ASSET LIVES 3.3.4.1 Asset Lives –	As per Instruction and Definition provided by the AER	Electricity Transmission Network Service Provider Roll Forward Model (RFM), with TransGrid information	No	Calculation for Weighted Average Asset lives of new assets for each asset category, in accordance with Page 22 of the	-

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[5]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
estimated service life of new assets TRAB0901 Overhead transmission assets To TRAB0905 Other assets with short lives				Instruction.	
3.3.4.2 Asset Lives – estimated residual service life TRAB1001 Overhead transmission assets To TRAB1005 Other assets with short lives	As per Instruction and Definition provided by the AER	Electricity Transmission Network Service Provider Roll Forward Model (RFM), with TransGrid information	No	This is calculated using Opening Asset Value divided by depreciation for the year.	As depreciation is already weighted averaged, the residual service life is considered weighted averaged.

Approved by: Boon Thiow, Group Financial Controller

7.3.5 Worksheet 3.4 Operational Data

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[6]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
Table 3.4.1 Energy Delivery Energy Grouping by Downstream Connection Type TOPED0101 To other connected transmission networks	Energy supplied to transmission networks in adjacent NEM regions (i.e. flows related to interconnectors). Both exports and imports have been considered, with each being added for the four relevant interconnectors. Flows to other transmission networks have been taken to be flows to adjacent NEM Regions. Flows to other transmission networks within the NSW region of the NEM (to networks owned by DNSPs) have been included in "Flows to Distribution Networks"	TransGrid's TUOS billing system	No	Data have been obtained from revenue or statistical 15 minute metering registrations. For each of the categories, those 15 minute data have been summated to obtain figures for each regulatory (financial) year. Energy calculations involve spreadsheets which sum the 15 minute registrations for the relevant period(s) and make any adjustments to achieve the appropriate units of measurement (for example, dividing by 1,000 to convert from kWh to MWh) Energy flow to other TNSPs was found by summing up interconnector imports and exports to or from TransGrid's network, irrespective of direction of flow. These are at Jindera-Wodonga, Buronga-Red Cliffs, and Murray–Dederang to Victoria and QNI to Queensland.	DNSP transmission assets are not included in this calculation. Rounded to three significant figures

[6] 'Information presented in response to the Notice whose presentation is not Materially dependent on information recorded in the NSP's historical accounting records or other records used in the normal course of business, and whose presentation for the purposes of the Notice is contingent on judgments and assumptions for which there are valid alternatives, which could lead to a Materially different presentation in the response to the Notice.', **page 34, "Economic benchmarking RIN For transmission network service providers, Instructions and Definitions".**

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[6]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
Table 3.4.1 Energy Delivery Energy Grouping by Downstream Connection Type TOPED0102 To distribution networks	Energy supplied to the distribution networks has been taken to be the energy supplied to the distributors in NSW and the ACT. Energy supplied to customers directly connected via dedicated connections owned by third parties such as a DNSP are included in TOPED0103.	TransGrid's TUOS billing system	No	This was calculated as the summation of energy flows leaving TransGrid's network. Data have been obtained from revenue or statistical 15 minute metering registrations. For each of the categories, those 15 minute data have been summated to obtain figures for each regulatory (financial) year. Energy calculations involve spreadsheets which sum the 15 minute registrations for the relevant period(s) and make any adjustments to achieve the appropriate units of measurement (for example, dividing by 1,000 to convert from kWh to MWh).	Energy supplied to the distribution networks has been taken to be the energy supplied to the distributors in NSW and the ACT, even though parts of Ausgrid's and Essential Energy's networks are considered to serve a transmission function.
Table 3.4.1 Energy Delivery Energy Grouping by Downstream Connection Type TOPED0103 to TOPD0112 To directly connected end-users	Energy supplied to customers directly connected via dedicated connections owned by third parties such as a DNSP (excluding customers whose identity could be deduced from the voltage of supply – Reported in TOPED0102) Aggregated data for customers supplied at 132 kV has been provided.	TransGrid's TUOS billing system	No	This was calculated as the energy flows to each of the industrial loads connected at 330kV, 220kV and 132 kV.	Includes some industrial loads connected via dedicated feeders owned by DNSPs

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[6]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
Table 3.4.1 Energy Delivery Energy Grouping by Downstream Connection Type TOPED0113 Pumping and power station auxiliaries	Energy supplied to pumps and power station auxiliaries	TransGrid's TUOS billing system	No		
Table 3.4.1 Energy Delivery Energy Grouping by Downstream Connection Type TOPED01 Total energy transported	The total (gross) energy delivered by TransGrid's network at the locations where it connects to other party's networks.	TransGrid's TUOS billing system	No	Summation of metered energy delivered at the individual locations within each category. TOPED0101 includes both exports from and imports to TransGrid's network.	Other connected networks have been taken to be interconnections to adjacent states. Distribution networks have been taken to be DNSP networks, even though some parts of those networks may serve a transmission function. End-use customers directly connected via dedicated assets owned by a third party have been taken to be "Directly connected end-users".

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[6]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
Table 3.4.2 Connection Points[7] TOPCP0101 to TOPCP0111 Number of entry points at each transmission voltage level	This variable is interpreted as locations of connections between TransGrid's network and generators at TransGrid's network at locations that have a Transmission Node Identifier (TNI).	Based on AEMO TNIs, as described in their documents giving marginal loss factors.	No	At a particular location (such as a TransGrid substation): • TNIs are taken to define the node, and connection points are counted at the nominal connection voltage • Entry connections are generator only connections where TransGrid is the relevant TNSP. • Bidirectional flows across connection points not associated with generators are not classified an entry point • Where there is more than one TNI having the same voltage designation (such as for supplies to different customers or multiple generator connection) only one is counted. That is, there can only one connection point per voltage level at a particular location; • The voltage has been taken to be the designated voltage of the physical connection point	TNIs which are not part of or directly connected to TransGrid's network have been excluded.

7

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[6]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
				associated with the TNI. The data for 2015/16 are the average of the numbers at the beginning and end of that financial year.	
Table 3.4.2 Connection Points TOPCP0201 to TOPCP0212 Number of exit points at each transmission voltage level	This variable is interpreted as locations of connections between TransGrid's network and networks of other parties, where real power can flow directly out of TransGrid's network and those locations have a Transmission Node Identifier (TNI).	Based on AEMO TNIs, as described in their documents giving marginal loss factors	No	At a particular location (such as a TransGrid substation): • TNIs are taken to define the node, and connection points are counted at the nominal connection voltage • Entry connections are generator only connections where TransGrid is the relevant TNSP. • Bidirectional flows across connection points not associated with generators are classified an exit point • Interconnectors are classified as exit points • Where there is more than one TNI having the same voltage designation (such as for supplies to different customers or multiple customer connections) only one is counted. That is, there can only one connection point per voltage	TNIs which are not part of or directly connected to TransGrid's network have been excluded.

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[6]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
				level at a particular location; • The voltage has been taken to be the designated voltage of the physical connection point associated with the TNI. The data for 2015/16 are the average of the numbers at the beginning and end of that financial year.	
Table 3.4.3 System Demand Table 3.4.3.1 Annual system maximum demand characteristics – MW measure TOPSD0101 Transmission System coincident maximum demand (MD)	Raw network demand only in TransGrid's bulk supply points (BSPs) over rolling half hour periods on an as-delivered basis considered in identifying MD.	TransGrid's TUOS billing system	No .	Transmission system coincident MD in TransGrid's network is calculated as the maximum of the summated rolling half hour period demands for each and every BSP and other locations within TransGrid's network. All half hours periods for all days within FY 2015-16 have been considered for calculation of this variable.	Reported to three significant figures Raw network demand only in TransGrid's BSPs over rolling half hour periods on an as-delivered basis considered in identifying MD.
Table 3.4.3 System Demand Table 3.4.3.1 Annual system maximum demand characteristics – MW measure TOPSD0102 Transmission System coincident weather	This is the network coincident maximum demand with weather correction applied to the raw maximum demand to obtain a 10% POE maximum demand	TransGrid's TUOS billing system, AEMO National Electricity Forecasting Report (NEFR) 2016	Yes	$(AEMO_{10\%\ POE}/AEMO_{NSW\ RAW\ MD})$ x TransGrid $_{RAW\ MD}$ a) TransGrid $_{RAW\ MD}$ is the TransGrid raw network coincident MD b) $AEMO_{NSW\ RAW}$ is the NSW raw MD as reported by AEMO, and c) $AEMO_{10\%\ POE}$ is the 10% POE MD.	TransGrid does not produce weather corrected maximum demands for its transmission system. The source data is based on the TUOS billing system and the AEMO NEFR 2016. The response is materially dependent on the assumption that there is a consistent relationship

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[6]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
adjusted maximum demand 10% POE					between the native maximum demand of the NSW region of the NEM and the gross maximum demand delivered by TransGrid's network.
Table 3.4.3 System demand Table 3.4.3.1 Annual system maximum demand characteristics – MW measure TOPSD0103 Transmission System coincident weather adjusted maximum demand 50% POE	This is the network coincident maximum demand with weather correction applied to the raw maximum demand to obtain a 50% POE maximum demand	TransGrid's TUOS billing system, AEMO NEFR 2016	Yes	As per TOPSD0102, except using 50% POE	As per TOPSD0102
Table 3.4.3 System Demand Table 3.4.3.1 Annual system maximum demand characteristics – MW measure TOPSD0104 Transmission System non-coincident summated maximum demand	This is the summation of raw maximum demands at TransGrid's downstream connection and supply locations irrespective of when they occur in the year.	TransGrid's TUOS billing system	No	Transmission system non-coincident summated MD in TransGrid's network is calculated as the summated rolling half hour period local maximum demands for each and every BSP and other locations within TransGrid's network. All half hours periods for all days within FY 2015-16 have been considered for calculation of this variable.	It has been assumed that all components of this total are to be calculated on a consistent basis, i.e. on an "as delivered" basis. Reported to three significant figures.
Table 3.4.3 System Demand	This is the summation of the weather corrected MD at TransGrid's Down-stream connection	TransGrid's TUOS billing system, AEMO Connection Point forecasts 2016	Yes	The maximum demand for each BSP is calculated using $(AEMO_{10\%\ POE}/AEMO_{NSW\ RAW\ MD})$ x	TransGrid does not produce weather corrected maximum

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[6]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
Table 3.4.3.1 Annual system maximum demand characteristics – MW measure TOPSD0105 Transmission System non-coincident weather adjusted summated maximum demand 10% POE	and supply locations at the 10 % POE level irrespective of when they occur in the year.			TransGrid $_{RAW\ MD}$ where: a) TransGrid $_{RAW\ MD}$ is the sum of TransGrid raw MD for each BSP b) $AEMO_{NSW\ RAW}$ is the NSW raw MD as reported by AEMO connection point forecasts, and c) $AEMO_{10\%\ POE}$ is the 10% POE MD, as reported by AEMO connection point forecasts. The figure is adjusted (as per CA RIN 5.4) for load transfers where appropriate. For certain industrial loads, no weather correction is made, as loads are not weather dependent. The corrected (non-coincident) maximum demand for each bulk supply point and other locations was then summed to obtain this variable.	demands for individual BSPs. The source data is based on TUOS billing system and 2016 AEMO Connection Point Forecast data containing weather corrected and raw maximum demand data.
Table 3.4.3 System Demand Table 3.4.3.1 Annual system maximum demand characteristics – MW measure TOPSD0106	This is the summation of the weather corrected MD at TransGrid's down-stream connection and supply locations at the 50% POE level irrespective of when they occur in the year	TransGrid's TUOS billing system, AEMO Connection Point forecasts 2016	Yes	As per TOPSD0105, except using 50% POE MD numbers	It has been assumed that all components of this total are to be calculated on a consistent basis that is on an "as delivered" basis. Reported to three significant figures.

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[6]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
Transmission System non-coincident weather adjusted summated maximum demand 50% POE					
Table 3.4.3 System Demand Table 3.4.3.1 Annual system maximum demand characteristics – MVA measure TOPSD0201 Transmission System coincident maximum demand	This is the network coincident raw maximum demand , converted to MVA	Variables: TOPSD0101 TOPSD0301	Yes	Divide Transmission System Coincident Maximum Demand MW number (TOPSD0101) by Average Overall Network Power Factor (TOPSD0301) for conversion to MVA.	Accuracy is limited by the uncertainty inherent in the calculation of the average power factor. Refer to 'Note to TOPSD0201 and TOPSD0301'
Table 3.4.3 System Demand Table 3.4.3.1 Annual system maximum demand characteristics – MVA measure TOPSD0202 Transmission System coincident weather adjusted maximum demand 10% POE	This is the the weather corrected network coincident maximum demand at the 10 % POE level. MW values are converted to MVA.	Variables: TOPSD0102 TOPSD0301	Yes	Divide Transmission System Coincident Maximum Demand 10% POE (TOPSD0102) by Average Overall Network Power Factor (TOPSD0301) for conversion to MVA.	As per TOPSD0201 The data is materially dependent on availability of MVAr data, and accuracy of power factor estimates in their absence.
Table 3.4.3 System Demand Table 3.4.3.1 Annual	This is the network coincident weather corrected maximum demand at the 50%	- Variables: TOPSD0103	Yes	Divide Transmission System Coincident Maximum Demand 50% POE (TOPSD0103) by Average Overall Network Power Factor	As per TOPSD0201 The data is materially dependent on availability of MVAr data, and

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[6]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
system maximum demand characteristics – MVA measure TOPSD0203 Transmission System coincident weather adjusted maximum demand 50% POE	POE level at the time when this summation is greatest. MW values are converted to MVA.	TOPSD0301		(TOPSD0301) for conversion to MVA.	accuracy of power factor estimates in their absence.
Table 3.4.3 System Demand Table 3.4.3.1 Annual system maximum demand characteristics – MVA measure TOPSD0204 Transmission System non-coincident summated maximum demand	This is the actual unadjusted summation of actual raw maximum demand at TransGrid's downstream connection and supply locations irrespective of when they occur in the year. MW values are converted to MVA.	Variables: TOPSD0104 TOPSD0301	Yes	Divide Transmission System non-coincident weather summated maximum demand (TOPSD0104) by Average Overall Network Power Factor (TOPSD0301) for conversion to MVA.	As per TOPSD0201 The data is materially dependent on availability of MVAr data, and accuracy of power factor estimates in their absence.
Table 3.4.3 System Demand Table 3.4.3.1 Annual system maximum demand characteristics – MVA measure TOPSD0205 Transmission System non-coincident weather adjusted summated	This is the weather corrected summation of MD at TransGrid's downstream connection and supply locations (i.e. individual BSPs) at 10% POE level, irrespective of when they occur in the year. MW values are converted to MVA.	Variables: TOPSD0105 TOPSD0301	Yes	Divide Transmission System non-coincident weather adjusted summated maximum demand 10% PoE (TOPSD0105) by Average Overall Network Power Factor Conversion between MVA and MW (TOPSD0301) for conversion to MVA.	As per TOPSD0201. The data is materially dependent on availability of MVAr data and accuracy of power factor estimates in their absence.

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[6]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
maximum demand 10% POE					
Table 3.4.3 System Demand Table 3.4.3.1 Annual system maximum demand characteristics – MVA measure TOPSD0206 Transmission System non-coincident weather adjusted summated maximum demand 50% POE	This is the weather corrected summation of maximum demand at TransGrid's downstream connection and supply locations at 50% POE level, irrespective of when they occur in the year. MW values are converted to MVA.	Variables: TOPSD0106 TOPSD0301	Yes	Divide Transmission System non-coincident weather adjusted summated maximum demand 50% PoE (TOPSD0106) by Average Overall Network Power Factor Conversion between MVA and MW TOPSD0301.	As per TOPSD0201 The data is materially dependent on availability of MVAr data and accuracy of power factor estimates in their absence.
Table 3.4.3 System Demand Table 3.4.3.3 Power factor Power factor conversion between MVA and MW TOPSD0301 Average overall network power factor conversion between MVA and MW	Total system MW divided by total system MVA, as on day of TransGrid network maximum demand	TransGrid's TUOS billing system	Yes	TransGrid does not collect data to derive network wide power factors. However, there is data for reactive loading at some (but not all) bulk supply points. This data has been used to develop a broad approximation of system wide power factors. Refer to note below.	Refer to 'Note to TOPSD0201 and TOPSD0301'
Table 3.4.3 System Demand	This variable has been taken to be the power factor derived from the	TransGrid's SCADA system	Yes	Information on the MW and MVAr flows at each end of TransGrid lines at the time of the overall network	The assumptions include that the measure:

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[6]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
Table 3.4.3.3 Power factor Power factor conversion between MVA and MW TOPSD0302 to TOPSD0312 Average power factor conversion for lines, per voltage level	aggregate MW and MVAr flows, at the time of overall maximum demand, on TransGrid's lines which operate at the particular nominal voltage. Where TransGrid does not have any lines operating at a particular nominal voltage, the average power factor provided for those lines is unity.			maximum MW loading were extracted from TransGrid's SCADA system. For lines operating at each nominal voltage the aggregate MW and MVAr flows at the "sending end" (where real power flows into the line) and the "receiving end" (where real power flows out of the line) were calculated. The power factors of the aggregate sending end flows and the aggregate receiving end flows were calculated. The average of these two power factors was taken to be the average power factor for the lines operating at that nominal voltage.	• Relates to MW and MVAr flows at the time of the maximum MW loading on TransGrid's network, rather than being an average across the year. • Is based on the power factor of the aggregated MW and MVAr flows on all TransGrid lines operating at a particular nominal voltage, rather than being the average of the power factors derived for the individual lines. This assumption is critical as the outcomes of these two possible approaches are very different. For 132 kV lines, the first approach (that adopted for this RIN) gives an average power factor of 1.00 whereas the second approach gives 0.92. TransGrid does not have any assets with metered MVArs at 275kV, 110kV or lower. Hence these values of 1 are provided only in keeping with the RIN instructions.

Note to TOPSD0201 and TOPSD0301 0

The nature of transmission systems is that they are "better" at transmitting real power (MW) than reactive power (MVAr)[8]. Consequently, reactive power needs (to manage voltage levels) are met on a local basis, rather than a network wide basis. This involves the installation of reactive plant (such as shunt capacitors, shunt reactors, statcoms and static VAr compensators) at strategic locations, as well as utilisation of the reactive generation/absorption capability of generators. In some circumstances reactive plant may be installed in "downstream" networks, rather than at bulk supply points, if there is also a need to manage voltage levels (or reactive power loadings) within those networks.

As network wide reactive loads and their derivative network wide power factors, are not used, TransGrid does not routinely collect data to derive them. However, TransGrid does have reactive loading data for some (but not all) bulk supply points. Those data have been used to develop a broad approximation of system wide power factors. This has been done by:

- Deriving the real and reactive power loads for individual bulk supply points where data are available and usable[9] at the time of overall maximum (MW) demand for on TransGrid's network; and
- Summating those individual bulk supply point demands to derive the diversified (coincident, as delivered) maximum demand on TransGrid's network and the associated power factor.

The real and corresponding reactive power loads at the individual bulk supply points are derived from revenue[10] and in some cases statistical metering data. Generally, the statistical metering uses the same class of metering instruments (current transformers, voltage transformers and meters) as the revenue metering at that site.

TransGrid's bulk supply points provide supply at a number of voltages (between 11 kV and 330 kV) with supply from most being at 66 kV or below. Those supplies are at what can be considered to be the "edges" of TransGrid's network. Thus power factor data at bulk supply points do not necessarily provide any meaningful information about the power factors in other parts of TransGrid's network. As the system average power factor is only a very broad estimate, the figure is given to two only significant figures (to avoid a false sense of precision).

Approved by: Nalin Pahalawaththa, Manager / Power System Analysis

[8] This stems from the fact that the reactance of transmission lines and transformers is typically several (to many) times greater than their resistance. This leads to the voltage drops associated with reactive power flows through those network elements being commensurately higher than those associated with real power flows. Consequently, it is much more difficult to meet reactive power needs from "remote" locations than is the case for real power needs. This leads to reactive power needs being met on a "more local" basis.

[9] At some locations the meters measure the real and reactive power flows on the customers lines supplied from the bulk supply point. In these cases, calculations are straight forward. At other locations, the meters measure the real and reactive power flows in the transformers at the bulk supply point. In these cases the reactive power flows are affected by any reactive plant connected to the low voltage busbar. Where reactive plant is also installed within the customer's networks, it is sometimes not possible to identify, and adjust for, the impact of TransGrid's reactive plant. Where this is the case, the particular bulk supply points have been excluded from the calculations.

[10] The accuracy requirements for revenue metering installations are specified in the National Electricity Rules.

7.3.6 Worksheet 3.5 Physical Assets

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[11]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
Table 3.5.1.1 Overhead network length of circuit at each voltage TPA0101 to TPA0111	Overhead line total length operating at each voltage. TransGrid has no Transmission Line assets at 275kV, 110kV, 88kV, 33kV or lower	TransGrid Asset Management Information System (TAMIS)	No	All line information relevant to TransGrid was downloaded from the TransGrid's Asset Management Information System (TAMIS)	No assumptions were made in calculations as the asset is static Circuits with sections of split phase arrangement are counted as a single length. Lines are reported at their operating voltage, although they may be constructed suitable for operation at a higher voltage.
Table 3.5.1.2 Underground cable circuit length at each voltage TPA0201 to TPA0211	Underground cable circuit length at each voltage. TransGrid has no Underground Cable assets at 500kV, 275kV, 220kV, 110kV, or lower.	Electrical Data Book Project Records (EDMS)	No	TransGrid's Electrical Database (published as the Electrical Data Book) records the commissioning date of segments of transmission cable circuits. For high voltage cables within substations, the length of the cables has been estimated from project drawings	No assumptions were made in calculations as the asset is static Cables are reported at their operating voltage, although they may be constructed suitable for operation at a higher

[11] 'Information presented in response to the Notice whose presentation is not Materially dependent on information recorded in the NSP's historical accounting records or other records used in the normal course of business, and whose presentation for the purposes of the Notice is contingent on judgments and assumptions for which there are valid alternatives, which could lead to a Materially different presentation in the response to the Notice.', **page 34, "Economic benchmarking RIN For transmission network service providers, Instructions and Definitions".**

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[11]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
					voltage.
Table 3.5.1.3 Estimated overhead network weighted average MVA capacity by voltage class TPA0301 to TPA0311	This variable is interpreted as the sum of all {peak transmission circuit capacity × relevant circuit lengths} for all circuits at each voltage level , divided by the total circuit length for that voltage level TransGrid has no Transmission Line assets at 275kV, 110kV, 88kV, 33kV or lower	Uses other calculated value: TPA0101 to TPA0111 TransGrid Operating Manuals: • OM304 Ratings of Main Grid Circuits • OM305 Ratings of Subsystem Circuits In Northern Region • OM 306 - Ratings Of Subsystem Circuits In Central Region • OM307 - Ratings of Subsystem Circuits In Southern Region TUOS for time of maximum demand determination	No	Line ratings vary on time of year and time of day, TUOS was used to determine date/time of maximum demand and thus which rating to use. For FY16, the maximum demand was in June at 1815 hrs, so Winter Night ratings were used. The version of OM304, OM305, OM306 or OM307 that was current at the time of maximum demand was obtained. The "Normal MVA" ratings applicable for the time of maximum demand for each line were entered into a spreadsheet which multiplied the rating with the length of the line (obtained as part of the TPA0101 to TPA0111 calculation) to give a MVA × km value. The sum of the MVA × km values was then divided by the determined kilometres for the voltage class in TPA0101 to TPA0111	Constrained values are included where applicable. E.g. A line rating may be constrained by terminal equipment (such as CT's, wavetraps, etc). In this case the constrained value will be entered, not the line rating Where the ratings are dependent on the load flow direction, the most likely direction will be shown. This is based on: • Load will be going away from Generator sites • Load is assumed to flow from the higher voltage site, or the site closest to the higher voltage network. Where a new line is commissioned or altered after the maximum demand event occurs, the rating shown will be the

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[11]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
					appropriate season's rating at the end of the financial year.
Table 3.5.1.4 Estimated underground network weighted average MVA capacity by voltage class TPA0401 to TPA0411	This variable is interpreted as the sum of all {peak transmission circuit capacity × relevant circuit lengths} for all underground circuits at each voltage level, divided by the total underground circuit lengths at that voltage level TransGrid has no Underground transmission Cable assets at 500kV, 275kV, 220 kV, 110kV or lower.	Uses other calculated value TPA0201 to TPA0211 TransGrid Operating Manual OM304 Ratings of Main Grid Circuits TUOS for time of maximum demand determination	No	Cable ratings can vary on time of year, TUOS was used to determine date/time of maximum demand and thus which rating to use. For FY16, the maximum demand was in June at 1815 hrs, so winter night ratings were used. The version of OM304 that was current at the time of maximum demand was obtained. The normal cyclic rating was multiplied by the length of the circuit to give an MVA × km value. The sum of the MVA × km values was then divided by the determined kilometres for the voltage class TPA0202 to TPA211 to determine a weighted average MVA.	It is assumed that the AER require Cyclic rating for underground cables.
Table 3.5.1.5 Installed transmission system transformer capacity TPA0501 Transmission substations (eg 500 kV to 330 kV)	These were taken to be the sum of nameplate capacities of transformers with a primary winding voltage rating of 220 kV and above and not used to supply load directly	Ellipse: Equipment Register Tracing Data Nameplate Data System operating diagrams and amendments GM AS S1 009 and amendments – In-Service and	No	1. Create valid list A valid list of transformers current at June 2015 was compiled. Non-current records were filtered from the equipment register data and reviewed to remove a small number of errors. 2. Process capacity values and crosscheck	When relocations were known to have happened, it was assumed that transformers were moved at the end of a financial year and for a replacement, no overlap was shown. Spare transformers temporarily connected to

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[11]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
		Spare Power Transformers and Reactors Equipment Manuals		Nameplate ratings for each transformer was processed to a simple list form and this was then linked to the equipment register on equipment identifier and ratings reviewed and possible errors checked using operating diagram amendments. 3. Trace each year's data Tracing data was used to identify transformers in service for each financial year in the required range using the 2014 RIN information as the base. System spares were cross checked using amendments of GM AS S1 009.	facilitate project staging were considered as remaining as spares. The quoted year is assumed to be the second year of a financial year period – e.g.: 2006 = 2005/2006. A frequency injection transformer located at Forbes (Asset ID: COSFB24K) was omitted. Its only function is for the injection of the DNSP ripple control into the network.
Table 3.5.1.5 Installed transmission system transformer capacity TPA0502 Terminal points to DNSP systems	Transformers primarily used to directly supply DNSP load.	As per TPA0501	No	As per TPA0501	As per TPA0501
Table 3.5.1.5 Installed transmission system transformer capacity TPA0503 Transformer capacity for directly connected end–users owned by the TNSP	Transformers used to supply direct customers exclusively. Owned by TransGrid. One transformer (Equipment reference SWSGAD1A2) was identified that falls into	As per TPA0501 Information from Customer Access files and Connection Agreements	No	As per TPA0501 Used to identify direct customer connected transformers	As per TPA0501

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[11]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
	this category.				
Table 3.5.1.5 Installed transmission system transformer capacity TPA0504 Transformer capacity for directly connected end–users owned by the end–user	Transformers used to supply direct customers exclusively. Owned by the customer. These transformers were separately identified and are not part of TransGrid's asset management system and their categorisation was obvious.	As per TPA0501 Information from Customer Access files and Connection Agreements	No	As per TPA0501 Used to identify direct customer connected transformers. Operating diagrams were also used to obtain transformer ratings.	As per TPA0501. End customer transformers were only counted if part of a prescribed connection.
Table 3.5.1.5 Installed transmission system transformer capacity TPA0505 Interconnector capacity	These were taken to be transformers used to directly connect interstate. None were identified.	As per TPA0501	No	As for TPA0501	As per TPA0501
Table 3.5.1.5 Installed transmission system transformer capacity TPA0506 Dedicated SVC transformers	SVC transformers are provided to connect SVCs to the network. They do not fit into the other provided categories	As per TPA0501	No	As for TPA0501	As per TPA0501

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[11]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
Table 3.5.1.6 Cold Spare Capacity TPA06 Cold Spare capacity	Transformers that are not connected to the network and are used as spares to cover against possible failure.	As per TPA0501	No	As for TPA0501	As per TPA0501

Approved by: Lance Wee, Manager / Asset Strategy

7.3.7 Worksheet 3.6 Quality of Services

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
TQS0101 Lines outage rate – fault	TQS0102 / TQS0103	Refer to RIN variables TQS0102 and TQS0103	No	TQS0101 = TQS0102 / TQS0103	NIL
TQS0102 Number of Lines fault outages	This variable is interpreted as the total number of instantaneous outages (fault outages as defined by the AER) on transmission line and/or underground cable circuits owned by TransGrid at 66kV and above. This measure has excluded outages (as defined in V4 of the AER STPIS) removed from the count.	The "QAPR Comment on Outage" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "NPR Outages List Linked Table" worksheet of spreadsheet RINB-36-01. The "QAPR Comment on Outage" Table in THEOS PC Stats.accdb is populated by importing data into it from THEOS (the business application used by Network Operations staff to record outage data). Each of these outage records in the THEOS PC Stats database is assigned with an AER code. Selecting the appropriate AER code occasionally requires obtaining additional information	No	Every outage record in the "NPR Outages List Linked Table" worksheet of the RINB-36-01 spreadsheet whose AER code field (column L) is C or Z, and Component Type field (column P) is TL or UG, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01.	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid.

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
		from Opslog (a separate business application used as a diary/logbook by Network Operators).			
TQS0103 Number of defined Lines	This variable is interpreted as the total number (three phase equivalent) of transmission line and/or underground cable circuits owned by TransGrid at 66kV and above. This measure is an average number over twelve months in a calendar year.	The "tblCircuits_SettingData" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "Equipment Count Linked Table" worksheet of spreadsheet RINB-36-01. The data contained in the "tblCircuits_SettingData" table in THEOS PC Stats.accdb is regularly updated in an incremental manner, based on System Development Summaries periodically released by the Network Operations group.	No	Every equipment record in the "Equipment Count Linked Table" worksheet of the RINB-36-01 spreadsheet whose Component field (column A) is TL or UG, has its AllCircuits count (column G) averaged across each month of the relevant calendar year.	Accuracy of the System Development Summary documents produced by the Network Operations group within TransGrid.
TQS0104 Transformer outage rate – fault	TQS0105 / TQS0106	Refer to RIN variables TQS0105 and TQS0106	No	TQS0104 = TQS0105 / TQS0106	NIL
TQS0105 Number of Transformer	This variable is interpreted as the total number of instantaneous outages (fault outages as defined by the	The "QAPR Comment on Outage" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with	No	Every outage record in the "NPR Outages List Linked Table" worksheet of the RINB-36-01 spreadsheet whose AER code field (column L) is C or Z, and Component Type field (column P) is TX, is counted	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
fault outages	AER) on transformers owned by TransGrid at 66kV and above. This measure has excluded outages (as defined in V4 of the AER STPIS) removed from the count.	secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "NPR Outages List Linked Table" worksheet of spreadsheet RINB-36-01. The "QAPR Comment on Outage" Table in THEOS PC Stats.accdb is populated by importing data into it from THEOS (the business application used by Network Operations staff to record outage data). Each of these outage records in the THEOS PC Stats database is assigned with an AER code. Selecting the appropriate AER code occasionally requires obtaining additional information from Opslog (a separate business application used as a diary/logbook by Network Operators).		across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01.	
TQS0106 Number of defined Transformers	This variable is interpreted as the total number (three phase equivalent) of transformers owned by TransGrid at 66kV and above. This measure is an average number over twelve months in a calendar year.	The "tblCircuits_SettingData" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "Equipment Count Linked Table" worksheet of spreadsheet RINB-36-01. The data contained in the	No	Every equipment record in the "Equipment Count Linked Table" worksheet of the RINB-36-01 spreadsheet whose Component field (column A) is TX, has its AllCircuits count (column G) averaged across each month of the relevant calendar year.	Accuracy of the System Development Summary documents produced by the Network Operations group within TransGrid.

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
		"tblCircuits_SettingData" table in THEOS PC Stats.accdb is regularly updated in an incremental manner, based on System Development Summaries periodically released by the Network Operations group.			
TQS0107 Reactive Plant outage rate – fault	TQS0108 / TQS0109	Refer to RIN variables TQS0108 and TQS0109	No	TQS0107 = TQS0108 / TQS0109	NIL
TQS0108 Number of Reactive plant fault outages	This variable is interpreted as the total number of instantaneous outages (fault outages as defined by the AER) on Reactors and Capacitors at 66kV and above, and Static VAr Compensators (SVCs) at all voltages, owned by TransGrid. This measure has excluded outages (as defined in V4 of the AER STPIS) removed from the count.	The "QAPR Comment on Outage" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "NPR Outages List Linked Table" worksheet of spreadsheet RINB-36-01. The "QAPR Comment on Outage" Table in THEOS PC Stats.accdb is populated by importing data into it from THEOS (the business application used by Network Operations staff to record outage data). Each of these outage records in the THEOS PC Stats database is assigned with an AER code. Selecting the appropriate AER code occasionally requires	No, this variable was determined from the sources mentioned in the relevant columns. It is considered actual data	Every outage record in the "NPR Outages List Linked Table" worksheet of the RINB-36-01 spreadsheet whose AER code field (column L) is C or Z, and Component Type field (column P) is CAP or RX or SVC, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01.	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
		obtaining additional information from Opslog (a separate business application used as a diary/logbook by Network Operators).			
TQS0109 Number of defined Reactive Plant	This variable is interpreted as the total number (three phase equivalent) of Reactors and Capacitors at 66kV and above, and Static VAr Compensators (SVCs) at all voltages, owned by TransGrid. This measure is an average number over twelve months in a calendar year.	The "tblCircuits_SettingData" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "Equipment Count Linked Table" worksheet of spreadsheet RINB-36-01. The data contained in the "tblCircuits_SettingData" table in THEOS PC Stats.accdb is regularly updated in an incremental manner, based on System Development Summaries periodically released by the Network Operations group.	No	Every equipment record in the "Equipment Count Linked Table" worksheet of the RINB-36-01 spreadsheet whose Component field (column A) is CAP or RX or SVC, has its AllCircuits count (column G) averaged across each month of the relevant calendar year.	Accuracy of the System Development Summary documents produced by the Network Operations group within TransGrid.
TQS0110 Lines outage rate – forced	TQS0111 / TQS0103	Refer to RIN variables TQS0111 and TQS0103	No	TQS0110 = TQS0111 / TQS0103	NIL
TQS0111 Number of Lines forced	This variable is interpreted as the total number of outages that are not instantaneous, however less than 24 hours'	The "QAPR Comment on Outage" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with	No	Every outage record in the "NPR Outages List Linked Table" worksheet of the RINB-36-01 spreadsheet whose AER code field (column L) is B or E, and Component Type field (column P) is TL or UG, is	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
outages	notice is given to the customer and/or AEMO (forced outages as defined by the AER) on transmission line and/or underground cable circuits owned by TransGrid at 66kV and above. This measure has excluded outages (as defined in V4 of the AER STPIS) removed from the count.	secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "NPR Outages List Linked Table" worksheet of spreadsheet RINB-36-01. The "QAPR Comment on Outage" Table in THEOS PC Stats.accdb is populated by importing data into it from THEOS (the business application used by Network Operations staff to record outage data). Each of these outage records in the THEOS PC Stats database is assigned with an AER code. Selecting the appropriate AER code occasionally requires obtaining additional information from Opslog (a separate business application used as a diary/logbook by Network Operators).		counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01.	
TQS0112 Transformers outage rate – forced	TQS0113 / TQS0106	Refer to RIN variables TQS0113 and TQS0106	No	TQS0112 = TQS0113 / TQS0106	NIL
TQS0113 Number of Transformers forced	This variable is interpreted as the total number of outages that are not instantaneous, however less than 24 hours' notice is given to the customer and/or AEMO	The "QAPR Comment on Outage" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff).	No	Every outage record in the "NPR Outages List Linked Table" worksheet of the RINB-36-01 spreadsheet whose AER code field (column L) is B or E, and Component Type field (column P) is TX, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
outages	(forced outages as defined by the AER) on transformers owned by TransGrid at 66kV and above. This measure has excluded outages (as defined in V4 of the AER STPIS) removed from the count.	An extract of this table is provided in the worksheet "NPR Outages List Linked Table" worksheet of spreadsheet RINB-36-01. The "QAPR Comment on Outage" Table in THEOS PC Stats.accdb is populated by importing data into it from THEOS (the business application used by Network Operations staff to record outage data). Each of these outage records in the THEOS PC Stats database is assigned with an AER code. Selecting the appropriate AER code occasionally requires obtaining additional information from Opslog (a separate business application used as a diary/logbook by Network Operators).		presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01.	
TQS0114 Reactive Plant outage rate – forced	TQS0115 / TQS0109	Refer to RIN variables TQS0115 and TQS0109	No	TQS0114 = TQS0115 / TQS0109	NIL
TQS0115 Number of Reactive Plant forced outages	This variable is interpreted as the total number of outages that are not instantaneous, however less than 24 hours' notice is given to the customer and/or AEMO (forced outages as defined by	The "QAPR Comment on Outage" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided	No	Every outage record in the "NPR Outages List Linked Table" worksheet of the RINB-36-01 spreadsheet whose AER code field (column L) is B or E, and Component Type field (column P) is CAP or RX or SVC, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN"	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
	the AER) on Reactors and Capacitors at 66kV and above, and Static VAr Compensators (SVCs) at all voltages, owned by TransGrid. This measure has excluded outages (as defined in V4 of the AER STPIS) removed from the count.	in the worksheet "NPR Outages List Linked Table" worksheet of spreadsheet RINB-36-01. The "QAPR Comment on Outage" Table in THEOS PC Stats.accdb is populated by importing data into it from THEOS (the business application used by Network Operations staff to record outage data). Each of these outage records in the THEOS PC Stats database is assigned with an AER code. Selecting the appropriate AER code occasionally requires obtaining additional information from Opslog (a separate business application used as a diary/logbook by Network Operators).		worksheet of the spreadsheet RINB-36-01.	
TQS0116 Number of events greater than 0.05 system minutes per annum (X)	This is taken to be the number of unplanned outages in the relevant year entailing a loss of supply exceeding the 'X' threshold set by the AER for TransGrid (which is 0.05 system minutes) where the loss of supply also is greater than 0.05 system minutes, subtracting any applicable exclusions as defined by the AER STPIS V4.	The "ENS Lost Load" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "ENS Lost Load Linked Table" worksheet of spreadsheet RINB-36-01. The "ENS Lost Load" Table in THEOS PC Stats.accdb is populated by manually entering data into it using information	No	Every outage record in the "ENS Lost Load Linked Table" worksheet of the RINB-36-01 spreadsheet which is not excluded (i.e. column N is false) and whose MWh value (column G) exceeds the threshold which is equivalent to 0.05 system minutes, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01. The mathematical relationship between MWh and system minutes is: *MWh = system minutes / 60 * (record MW demand)* The record MW demand was obtained from a	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
		sourced from THEOS (the business application used by Network Operations staff to record outage data) and/or Opslog (a separate business application used as a diary/logbook by Network Operators).		spreadsheet on AEMO's website (shortcut RINB-36-02 & extract RINB-36-03), in cell B25 of the "NSW_Sum" worksheet.	
TQS0117 Number of events greater than 0.1 system minutes per annum (X)	This is taken to be the number of unplanned outages in the relevant year entailing a loss of supply exceeding the 'X' threshold set by the AER for TransGrid (which is 0.05 system minutes) where the loss of supply also is greater than 0.1 system minutes, subtracting any applicable exclusions as defined by the AER STPIS V4.	The "ENS Lost Load" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "ENS Lost Load Linked Table" worksheet of spreadsheet RINB-36-01. The "ENS Lost Load" Table in THEOS PC Stats.accdb is populated by manually entering data into it using information sourced from THEOS (the business application used by Network Operations staff to record outage data) and/or Opslog (a separate business application used as a diary/logbook by Network Operators).	No	Every outage record in the "ENS Lost Load Linked Table" worksheet of the RINB-36-01 spreadsheet which is not excluded (i.e. column N is false) and whose MWh value (column G) exceeds the threshold which is equivalent to 0.1 system minutes, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01. The mathematical relationship between MWh and system minutes is: *MWh = system minutes / 60 * (record MW demand)* The record MW demand was obtained from a spreadsheet on AEMO's website (shortcut RINB-36-02 & extract RINB-36-03), in cell B25 of the "NSW_Sum" worksheet.	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid
TQS0118 Number of events greater than	This is taken to be the number of unplanned outages in the relevant year entailing a loss of supply exceeding the 'X'	The "ENS Lost Load" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access	No	Every outage record in the "ENS Lost Load Linked Table" worksheet of the RINB-36-01 spreadsheet which is not excluded (i.e. column N is false) and whose MWh value (column G) exceeds the threshold	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
0.2 system minutes per annum (X)	threshold set by the AER for TransGrid (which is 0.05 system minutes) where the loss of supply also is greater than 0.2 system minutes, subtracting any applicable exclusions as defined by the AER STPIS V4.	for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "ENS Lost Load Linked Table" worksheet of spreadsheet RINB-36-01. The "ENS Lost Load" Table in THEOS PC Stats.accdb is populated by manually entering data into it using information sourced from THEOS (the business application used by Network Operations staff to record outage data) and/or Opslog (a separate business application used as a diary/logbook by Network Operators).		which is equivalent to 0.2 system minutes, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01. The mathematical relationship between MWh and system minutes is: *MWh = system minutes / 60 * (record MW demand)* The record MW demand was obtained from a spreadsheet on AEMO's website (shortcut RINB-36-02 & extract RINB-36-03), in cell B25 of the "NSW_Sum" worksheet.	
TQS0119 Number of events greater than 0.25 system minutes per annum (X)	This is taken to be the number of unplanned outages in the relevant year entailing a loss of supply exceeding the 'X' threshold set by the AER for TransGrid (which is 0.05 system minutes) where the loss of supply also is greater than 0.25 system minutes, subtracting any applicable exclusions as defined by the AER STPIS V4.	The "ENS Lost Load" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "ENS Lost Load Linked Table" worksheet of spreadsheet RINB-36-01. The "ENS Lost Load" Table in THEOS PC Stats.accdb is populated by manually entering data into it using information sourced from THEOS (the business application used by	No	Every outage record in the "ENS Lost Load Linked Table" worksheet of the RINB-36-01 spreadsheet which is not excluded (i.e. column N is false) and whose MWh value (column G) exceeds the threshold which is equivalent to 0.25 system minutes, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01. The mathematical relationship between MWh and system minutes is: *MWh = system minutes / 60 * (record MW demand)* The record MW demand was obtained from a spreadsheet on AEMO's website (shortcut RINB-36-02 & extract RINB-36-03), in cell B25 of the	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
		Network Operations staff to record outage data) and/or Opslog (a separate business application used as a diary/logbook by Network Operators).		"NSW_Sum" worksheet.	
TQS0120 Number of events greater than 0.3 system minutes per annum (X)	This is taken to be the number of unplanned outages in the relevant year entailing a loss of supply exceeding the 'X' threshold set by the AER for TransGrid (which is 0.05 system minutes) where the loss of supply also is greater than 0.3 system minutes, subtracting any applicable exclusions as defined by the AER STPIS V4.	The "ENS Lost Load" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "ENS Lost Load Linked Table" worksheet of spreadsheet RINB-36-01. The "ENS Lost Load" Table in THEOS PC Stats.accdb is populated by manually entering data into it using information sourced from THEOS (the business application used by Network Operations staff to record outage data) and/or Opslog (a separate business application used as a diary/logbook by Network Operators).	No	Every outage record in the "ENS Lost Load Linked Table" worksheet of the RINB-36-01 spreadsheet which is not excluded (i.e. column N is false) and whose MWh value (column G) exceeds the threshold which is equivalent to 0.3 system minutes, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01. The mathematical relationship between MWh and system minutes is: *MWh = system minutes / 60 * (record MW demand)* The record MW demand was obtained from a spreadsheet on AEMO's website (shortcut RINB-36-02 & extract RINB-36-03), in cell B25 of the "NSW_Sum" worksheet.	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid
TQS0121 Number of events greater than 0.5 system minutes per	This is taken to be the number of unplanned outages in the relevant year entailing a loss of supply exceeding the 'X' threshold set by the AER for TransGrid (which is 0.05	The "ENS Lost Load" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this	No	Every outage record in the "ENS Lost Load Linked Table" worksheet of the RINB-36-01 spreadsheet which is not excluded (i.e. column N is false) and whose MWh value (column G) exceeds the threshold which is equivalent to 0.5 system minutes, is counted across the relevant calendar year and forms this	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
annum (X)	system minutes) where the loss of supply also is greater than 0.5 system minutes, subtracting any applicable exclusions as defined by the AER STPIS V4.	table is provided in the worksheet "ENS Lost Load Linked Table" worksheet of spreadsheet RINB-36-01. The "ENS Lost Load" Table in THEOS PC Stats.accdb is populated by manually entering data into it using information sourced from THEOS (the business application used by Network Operations staff to record outage data) and/or Opslog (a separate business application used as a diary/logbook by Network Operators).		value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01. The mathematical relationship between MWh and system minutes is: *MWh = system minutes / 60 * (record MW demand)* The record MW demand was obtained from a spreadsheet on AEMO's website (shortcut RINB-36-02 & extract RINB-36-03), in cell B25 of the "NSW_Sum" worksheet.	
TQS0122 Number of events greater than 0.75 system minutes per annum (X)	This is taken to be the number of unplanned outages in the relevant year entailing a loss of supply exceeding the 'X' threshold set by the AER for TransGrid (which is 0.05 system minutes) where the loss of supply also is greater than 0.75 system minutes, subtracting any applicable exclusions as defined by the AER STPIS V4.	The "ENS Lost Load" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "ENS Lost Load Linked Table" worksheet of spreadsheet RINB-36-01. The "ENS Lost Load" Table in THEOS PC Stats.accdb is populated by manually entering data into it using information sourced from THEOS (the business application used by Network Operations staff to record outage data) and/or Opslog (a	No	Every outage record in the "ENS Lost Load Linked Table" worksheet of the RINB-36-01 spreadsheet which is not excluded (i.e. column N is false) and whose MWh value (column G) exceeds the threshold which is equivalent to 0.75 system minutes, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01. The mathematical relationship between MWh and system minutes is: *MWh = system minutes / 60 * (record MW demand)* The record MW demand was obtained from a spreadsheet on AEMO's website (shortcut RINB-36-02 & extract RINB-36-03), in cell B25 of the "NSW_Sum" worksheet.	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
		separate business application used as a diary/logbook by Network Operators).			
TQS0123 Number of events greater than 1.0 system minutes per annum (X)	This is taken to be the number of unplanned outages in the relevant year entailing a loss of supply exceeding the 'X' threshold set by the AER for TransGrid (which is 0.05 system minutes) where the loss of supply also is greater than 1.0 system minutes, subtracting any applicable exclusions as defined by the AER STPIS V4.	The "ENS Lost Load" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "ENS Lost Load Linked Table" worksheet of spreadsheet RINB-36-01. The "ENS Lost Load" Table in THEOS PC Stats.accdb is populated by manually entering data into it using information sourced from THEOS (the business application used by Network Operations staff to record outage data) and/or Opslog (a separate business application used as a diary/logbook by Network Operators).	No	Every outage record in the "ENS Lost Load Linked Table" worksheet of the RINB-36-01 spreadsheet which is not excluded (i.e. column N is false) and whose MWh value (column G) exceeds the threshold which is equivalent to 1.0 system minutes, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01. The mathematical relationship between MWh and system minutes is: *MWh = system minutes / 60 * (record MW demand)* The record MW demand was obtained from a spreadsheet on AEMO's website (shortcut RINB-36-02 & extract RINB-36-03), in cell B25 of the "NSW_Sum" worksheet.	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid
TQS0124 Number of events greater than 0.05 system minutes per annum (Y)	This is taken to be the number of unplanned outages in the relevant year entailing a loss of supply exceeding the 'Y' threshold set by the AER for TransGrid (which is 0.25 system minutes) where the loss of supply also is greater	The "ENS Lost Load" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "ENS Lost Load Linked Table"	No	Every outage record in the "ENS Lost Load Linked Table" worksheet of the RINB-36-01 spreadsheet which is not excluded (i.e. column N is false) and whose MWh value (column G) exceeds the threshold which is equivalent to 0.25 system minutes, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
	than 0.05 system minutes, subtracting any applicable exclusions as defined by the AER STPIS V4.	worksheet of spreadsheet RINB-36-01. The "ENS Lost Load" Table in THEOS PC Stats.accdb is populated by manually entering data into it using information sourced from THEOS (the business application used by Network Operations staff to record outage data) and/or Opslog (a separate business application used as a diary/logbook by Network Operators).		of the spreadsheet RINB-36-01. The mathematical relationship between MWh and system minutes is: *MWh = system minutes / 60 * (record MW demand)* The record MW demand was obtained from a spreadsheet on AEMO's website (shortcut RINB-36-02 & extract RINB-36-03), in cell B25 of the "NSW_Sum" worksheet.	
TQS0125 Number of events greater than 0.1 system minutes per annum (Y)	This is taken to be the number of unplanned outages in the relevant year entailing a loss of supply exceeding the 'Y' threshold set by the AER for TransGrid (which is 0.25 system minutes) where the loss of supply also is greater than 0.1 system minutes, subtracting any applicable exclusions as defined by the AER STPIS V4.	The "ENS Lost Load" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "ENS Lost Load Linked Table" worksheet of spreadsheet RINB-36-01. The "ENS Lost Load" Table in THEOS PC Stats.accdb is populated by manually entering data into it using information sourced from THEOS (the business application used by Network Operations staff to record outage data) and/or Opslog (a separate business application used as a diary/logbook by	No	Every outage record in the "ENS Lost Load Linked Table" worksheet of the RINB-36-01 spreadsheet which is not excluded (i.e. column N is false) and whose MWh value (column G) exceeds the threshold which is equivalent to 0.25 system minutes, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01. The mathematical relationship between MWh and system minutes is: *MWh = system minutes / 60 * (record MW demand)* The record MW demand was obtained from a spreadsheet on AEMO's website (shortcut RINB-36-02 & extract RINB-36-03), in cell B25 of the "NSW_Sum" worksheet.	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
		Network Operators).			
TQS0126 Number of events greater than 0.2 system minutes per annum (Y)	This is taken to be the number of unplanned outages in the relevant year entailing a loss of supply exceeding the 'Y' threshold set by the AER for TransGrid (which is 0.25 system minutes) where the loss of supply also is greater than 0.2 system minutes, subtracting any applicable exclusions as defined by the AER STPIS V4.	The "ENS Lost Load" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "ENS Lost Load Linked Table" worksheet of spreadsheet RINB-36-01. The "ENS Lost Load" Table in THEOS PC Stats.accdb is populated by manually entering data into it using information sourced from THEOS (the business application used by Network Operations staff to record outage data) and/or Opslog (a separate business application used as a diary/logbook by Network Operators).	No	Every outage record in the "ENS Lost Load Linked Table" worksheet of the RINB-36-01 spreadsheet which is not excluded (i.e. column N is false) and whose MWh value (column G) exceeds the threshold which is equivalent to 0.25 system minutes, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01. The mathematical relationship between MWh and system minutes is: *MWh = system minutes / 60 * (record MW demand)* The record MW demand was obtained from a spreadsheet on AEMO's website (shortcut RINB-36-02 & extract RINB-36-03), in cell B25 of the "NSW_Sum" worksheet.	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid
TQS0127 Number of events greater than 0.25 system minutes per annum (Y)	This is taken to be the number of unplanned outages in the relevant year entailing a loss of supply exceeding the 'Y' threshold set by the AER for TransGrid (which is 0.25 system minutes) where the loss of supply also is greater than 0.25 system minutes,	The "ENS Lost Load" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "ENS Lost Load Linked Table" worksheet of spreadsheet RINB-	No	Every outage record in the "ENS Lost Load Linked Table" worksheet of the RINB-36-01 spreadsheet which is not excluded (i.e. column N is false) and whose MWh value (column G) exceeds the threshold which is equivalent to 0.25 system minutes, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
	subtracting any applicable exclusions as defined by the AER STPIS V4.	36-01. The "ENS Lost Load" Table in THEOS PC Stats.accdb is populated by manually entering data into it using information sourced from THEOS (the business application used by Network Operations staff to record outage data) and/or Opslog (a separate business application used as a diary/logbook by Network Operators).		of the spreadsheet RINB-36-01. The mathematical relationship between MWh and system minutes is: *MWh = system minutes / 60 * (record MW demand)* The record MW demand was obtained from a spreadsheet on AEMO's website (shortcut RINB-36-02 & extract RINB-36-03), in cell B25 of the "NSW_Sum" worksheet.	
TQS0128 Number of events greater than 0.3 system minutes per annum (Y)	This is taken to be the number of unplanned outages in the relevant year entailing a loss of supply exceeding the 'Y' threshold set by the AER for TransGrid (which is 0.25 system minutes) where the loss of supply also is greater than 0.30 system minutes, subtracting any applicable exclusions as defined by the AER STPIS V4.	The "ENS Lost Load" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "ENS Lost Load Linked Table" worksheet of spreadsheet RINB-36-01. The "ENS Lost Load" Table in THEOS PC Stats.accdb is populated by manually entering data into it using information sourced from THEOS (the business application used by Network Operations staff to record outage data) and/or Opslog (a separate business application used as a diary/logbook by	No	Every outage record in the "ENS Lost Load Linked Table" worksheet of the RINB-36-01 spreadsheet which is not excluded (i.e. column N is false) and whose MWh value (column G) exceeds the threshold which is equivalent to 0.3 system minutes, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01. The mathematical relationship between MWh and system minutes is: *MWh = system minutes / 60 * (record MW demand)* The record MW demand was obtained from a spreadsheet on AEMO's website (shortcut RINB-36-02 & extract RINB-36-03), in cell B25 of the "NSW_Sum" worksheet.	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
		Network Operators).			
TQS0129 Number of events greater than 0.5 system minutes per annum (Y)	This is taken to be the number of unplanned outages in the relevant year entailing a loss of supply exceeding the 'Y' threshold set by the AER for TransGrid (which is 0.25 system minutes) where the loss of supply also is greater than 0.5 system minutes, subtracting any applicable exclusions as defined by the AER STPIS V4.	The "ENS Lost Load" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "ENS Lost Load Linked Table" worksheet of spreadsheet RINB-36-01. The "ENS Lost Load" Table in THEOS PC Stats.accdb is populated by manually entering data into it using information sourced from THEOS (the business application used by Network Operations staff to record outage data) and/or Opslog (a separate business application used as a diary/logbook by Network Operators).	No	Every outage record in the "ENS Lost Load Linked Table" worksheet of the RINB-36-01 spreadsheet which is not excluded (i.e. column N is false) and whose MWh value (column G) exceeds the threshold which is equivalent to 0.5 system minutes, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01. The mathematical relationship between MWh and system minutes is: *MWh = system minutes / 60 * (record MW demand)* The record MW demand was obtained from a spreadsheet on AEMO's website (shortcut RINB-36-02 & extract RINB-36-03), in cell B25 of the "NSW_Sum" worksheet.	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid
TQS0130 Number of events greater than 0.75 system minutes per annum (Y)	This is taken to be the number of unplanned outages in the relevant year entailing a loss of supply exceeding the 'Y' threshold set by the AER for TransGrid (which is 0.25 system minutes) where the loss of supply also is greater than 0.75 system minutes,	The "ENS Lost Load" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "ENS Lost Load Linked Table" worksheet of spreadsheet RINB-	No.	Every outage record in the "ENS Lost Load Linked Table" worksheet of the RINB-36-01 spreadsheet which is not excluded (i.e. column N is false) and whose MWh value (column G) exceeds the threshold which is equivalent to 0.75 system minutes, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
	subtracting any applicable exclusions as defined by the AER STPIS V4.	36-01. The "ENS Lost Load" Table in THEOS PC Stats.accdb is populated by manually entering data into it using information sourced from THEOS (the business application used by Network Operations staff to record outage data) and/or Opslog (a separate business application used as a diary/logbook by Network Operators).		of the spreadsheet RINB-36-01. The mathematical relationship between MWh and system minutes is: *MWh = system minutes / 60 * (record MW demand)* The record MW demand was obtained from a spreadsheet on AEMO's website (shortcut RINB-36-02 & extract RINB-36-03), in cell B25 of the "NSW_Sum" worksheet.	
TQS0131 Number of events greater than 1.0 system minutes per annum (Y)	This is taken to be the number of unplanned outages in the relevant year entailing a loss of supply exceeding the 'Y' threshold set by the AER for TransGrid (which is 0.25 system minutes) where the loss of supply also is greater than 1.0 system minutes, subtracting any applicable exclusions as defined by the AER STPIS V4.	The "ENS Lost Load" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "ENS Lost Load Linked Table" worksheet of spreadsheet RINB-36-01. The "ENS Lost Load" Table in THEOS PC Stats.accdb is populated by manually entering data into it using information sourced from THEOS (the business application used by Network Operations staff to record outage data) and/or Opslog (a separate business application used as a diary/logbook by	No	Every outage record in the "ENS Lost Load Linked Table" worksheet of the RINB-36-01 spreadsheet which is not excluded (i.e. column N is false) and whose MWh value (column G) exceeds the threshold which is equivalent to 1.0 system minutes, is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01. The mathematical relationship between MWh and system minutes is: *MWh = system minutes / 60 * (record MW demand)* The record MW demand was obtained from a spreadsheet on AEMO's website (shortcut RINB-36-02 & extract RINB-36-03), in cell B25 of the "NSW_Sum" worksheet.	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
		Network Operators).			
TQS0118 Average outage duration	This is the average duration in minutes of all unplanned outages in a given year involving a loss of supply, which are not excluded (as defined by the AER STPIS V4).	The "ENS Lost Load" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "ENS Lost Load Linked Table" worksheet of spreadsheet RINB-36-01. The "ENS Lost Load" Table in THEOS PC Stats.accdb is populated by manually entering data into it using information sourced from THEOS (the business application used by Network Operations staff to record outage data) and/or Opslog (a separate business application used as a diary/logbook by Network Operators).	No	Every outage record in the "ENS Lost Load Linked Table" worksheet of the RINB-36-01 spreadsheet which is not excluded (i.e. column N contains FALSE), has its Lost Load Time Hrs (column E) averaged across the relevant calendar year. This is subsequently multiplied by 60 to convert from hours to minutes, which forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01.	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid
TQS0119 Failure of protection system	Number of events in a given year where the protection system does not operate for a fault or operates where there is no actual fault.	The "QAPR Comment on Outage" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "NPR Outages List Linked Table" worksheet of	No	Every outage record in the "NPR Outages List Linked Table" worksheet of the RINB-36-01 spreadsheet classified as a Protection Failure (i.e. column AL contains TRUE), is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01.	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
		spreadsheet RINB-36-01. The "QAPR Comment on Outage" Table in THEOS PC Stats.accdb is populated by importing data into it from THEOS (the business application used by Network Operations staff to record outage data), after having assigned every outage record in THEOS with an AER code. Selecting the appropriate AER code occasionally requires obtaining additional information from Opslog (a separate business application used as a diary/logbook by Network Operators).			
TQS0120 Material failure of Supervisory Control and Data Acquisition (SCADA) system	The number of TransGrid SCADA outage events advised by AEMO to TG in any given year.	Email from Terry Day (AEMO) received on 07/01/2016 (RINB-36-04).	No	This value was calculated by counting all occurrences of SCADA outages reported from AEMO to TG, for the relevant calendar year. AEMO is responsible for monitoring and reporting this variable.	Accuracy of data from AEMO.
TQS0121 Incorrect operational isolation of primary or secondary equipment	Number of events in a given year where the primary or secondary equipment is not properly isolated during scheduled or emergency maintenance. Incorrect isolation is defined as any	The "QAPR Comment on Outage" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided	No	Every outage record in the "NPR Outages List Linked Table" worksheet of the RINB-36-01 spreadsheet classified as an Incorrect Isolation (i.e. column AM contains TRUE), is counted across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-	Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
	accidental or deliberate action by a staff member or contractor that results in an unplanned outage. No data is available to indicate the occurrence of incorrect isolation action which did not lead to outages.	in the worksheet "NPR Outages List Linked Table" worksheet of spreadsheet RINB-36-01. The "QAPR Comment on Outage" Table in THEOS PC Stats.accdb is populated by importing data into it from THEOS (the business application used by Network Operations staff to record outage data), after having assigned every outage record in THEOS with an AER code. Selecting the appropriate AER code occasionally requires obtaining additional information from Opslog (a separate business application used as a diary/logbook by Network Operators).		36-01.	
TQS02 Market Impact Parameter	The number of binding constraint dispatch periods with a marginal cost of constraint >$10/MWh due to TransGrid outages that are not excluded (according to the AER STPIS V4)	The "tblMITC_SettingData" table within the THEOS PC Stats.accdb database stored on TransGrid's shared drive (with secure access for only Asset Performance & Systems staff). An extract of this table is provided in the worksheet "MIC Limked Table" worksheet of spreadsheet RINB-36-01. The "tblMITC_SettingData" Table in THEOS PC Stats.accdb is populated by manually entering data into it which is output from the MITC Reporting.xlsm spreadsheet. The MITC	No	Every monthly penalty count record in the "MIC Linked Table" worksheet of the RINB-36-01 spreadsheet has its non-excluded penalty count (i.e. the number in column C) summed across the relevant calendar year and forms this value. This RIN variable (amongst various others) is presented in the "Economic RIN" worksheet of the spreadsheet RINB-36-01.	Accuracy of National Electricity Market data from AEMO, which is provided via the ez2view software and NOS. Accuracy of the record data sources (THEOS and/or Opslog) maintained by the Network Operations group within TransGrid

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[12]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
		Reporting.xlsm spreadsheet is a macro enabled spreadsheet in which the user inputs relevant data from various sources including THEOS (the business application used by Network Operations staff to record outage data), Opslog (a separate business application used as a diary/logbook by Network Operators), ez2view (a software package developed by 3rd party vendor Global Roam, used to retrieve National Electricity Market data from AEMO), and NOS (AEMO's online database for network outage data resulting in market constraints).			
TQS03 System Losses	{(Energy into TransGrid – Energy out of TransGrid)/Energy into TransGrid)}*100	TransGrid's TUOS billing system	No	This is defined as {(Energy into TransGrid – Energy out of TransGrid)/Energy into TransGrid)}*100 2015 calendar year data for the energy into TransGrid's network and the energy out of TransGrid's network have been extracted from the spreadsheets developed for the 2014/15 and 2015/16 RINs [January to June 2015 from the 2014/15 RIN and July to December 2015 from the 2015/16 RIN].	Rounded to one significant figure commensurate with the precision of the input data.

Approved by: Lance Wee, Manager / Asset Strategy (all except TQS03)
Approved by: Nalin Pahalawaththa, Manager / Power System Analysis (TQS03 only)

7.3.8 Worksheet 3.7 Operating Environment

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[13]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
TEF0101 Total number of maintenance spans	Where the contractor has claimed and been paid for maintenance work in a span, or where self-performed work has been undertaken during the financial year, it is counted as a maintenance span.	The data is sourced from the vegetation maintenance contractors who are contracted to perform maintenance work for TransGrid, in addition to self-performed work by TransGrid easement officers. The contractors prepare an invoice input spreadsheet as part of their invoices submitted for vegetation maintenance. In regards to self-performed work, logs from work completed by internal staff where vegetation maintenance occurred on the spans were also added to the list of maintenance spans. Previous RIN's did not have this data.	No	A count of spans where payment has been claimed by the contractors. The data is calculated from invoices where the vegetation maintenance contractors have claimed against contract rates for work carried out on each span. Where TransGrid easement officers have trimmed lopped or sprayed a tree or trees during a line inspection and this information has been recorded by them in their work logs, it will also be included as a maintenance span. The data was cross-checked to ensure a span was not counted twice if it was noted on multiple invoices of internal works schedule.	
TEF0102 Average Frequency of Cutting Cycle (Years)	The straight average of the vegetation maintenance period for each transmission line for the appropriate year. No weighting for	Transmission Line Maintenance Plan contains the maintenance frequency tables	Yes	The vegetation maintenance cycle in years was listed for each circuit, then the average was taken. All lines were included in all years, not just those with Vegetation Maintenance Spans.	Where lines cross regional boundaries, the maintenance frequency for the region with the longer portion of the line was chosen.

[13] 'Information presented in response to the Notice whose presentation is not Materially dependent on information recorded in the NSP's historical accounting records or other records used in the normal course of business, and whose presentation for the purposes of the Notice is contingent on judgments and assumptions for which there are valid alternatives, which could lead to a Materially different presentation in the response to the Notice.', **page 34, "Economic benchmarking RIN For transmission network service providers, Instructions and Definitions".**

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[13]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
	line length was used.			There has been no change in maintenance plan since the previous RIN, so 2014/15 RIN values were used.	Line length was not taken into account, a 'simple' average was taken, as per the instructions: " The average vegetation Maintenance Span Cycle can be calculated based on a simple average of all the Maintenance Span Cycles"
TEF0103 Average number of trees per maintenance span (0's)	Average number of trees per maintenance span is the number of trees maintained in that span, as trees not maintained are not counted.	Determined during scoping stage of works (described in detail in this item) tree count estimates are included on the work plans. If this tree count estimate was not available then the number of trees can generally be calculated using the contractor invoices, as the tree cutting rates are based upon hectare rates and hourly rates. The data is sourced from the vegetation maintenance contractors who prepare an invoice input spreadsheet (schedule of rates) as part of their invoices submitted for vegetation maintenance. These input spreadsheets also contain the scoping stage tree counts noted on the work plans. Where TransGrid staff have removed trees or lopped during a line inspection and this information has been recorded it has been included in the tree counts. Accounts Payable reports provided lists of invoices paid on each vegetation management work order. This was reconciled against invoice spreadsheets to ensure that the complete list of invoices was used in the preparation.	Yes During the scoping phase of the works an attempt is made to gauge the number of trees by selecting an indicative square metre area that best represents the average vegetation cover within the span and then simply counting the number of trees within the selected area. This number of trees is then multiplied by the total number of square metres to obtain the total number of trees to be maintained in the span. Often, with a small number of trees being removed or pruned, they actually count the individual trees. This was a new initiative	When scoping vegetation maintenance work an attempt is made to gauge the number of trees being removed, pruned and/or mulched or sprayed by selecting an indicative square metre area that best represents the average vegetation cover within the span and then simply counting the number of trees within the selected area. This number of trees is then multiplied by the total number of square metres to obtain the total number of trees to be maintained in the span. Often, with a small number of trees being removed or pruned, trees are individually counted. This was a new initiative introduced during FY16. To review this new method a sample of the calculated count of trees was carried out as follows: A database of unique spans and associated tree count actuals was compiled for the entire network. A seeding process was	When this estimate was not completed (a small portion of the works) the contractor invoice was used. For hectare rates, the following vegetation crown densities apply: • Scattered is <5% coverage, use 3% • Light is 5-15% coverage, use 10% • Medium is 15-25% coverage, use 20% • Heavy (or high) is >25% coverage, use 40% as an average • Slashing is taken to be 40% coverage as slashing can only be

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[13]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
			introduced during FY16. When this estimate was not completed, the contractor invoices were used, unless a sample. The contractor invoices are based upon contract rates by either hectare or hourly rates. Work amounts for hectare rate work are agreed with the contractor before work based upon vegetation densities in an agreed format. These vegetation densities are used to determine a coverage percentage and an estimate of a number of trees to be maintained based upon canopy size. Hourly rate work has been estimated to be able to maintain certain numbers of trees per hour using the various types of maintenance.	undertaken to determine a nominal sample size of 300. These 300 samples cover approximately 16% of the maintenance spans, with a fairly even split between each region. The accuracy of the actual tree counts was achieved by comparing the reported figures with: a. Work plans generated in the planning of the maintenance (specifying intended work activities) b. Invoice items for contractor claims (including actual areas maintained and work methods used) c. Aerial imagery to validate the landscape type and time-lapse changes to vegetation on easement d. Easement officer discussions where necessary. e. LIDAR reports where necessary. Some spans identified too many trees, some too few, but in an overall sense the figures were deemed reasonable. Where a new estimate was unavailable, as per the previous RIN, the count was determined using contractor invoices (input spreadsheets) as follows: Hourly rate total hours are converted to trees using trees per hour figure for the various maintenance activities as per the	used where trunks are less than 75mm thick at the cutting level. Vegetation crown sizes are estimated as the following: • Hectare Hand Clearing – 4 m^2 crown – 2500 trees/hectare @100% coverage • Hectare Mulching – 2 m^2 crown – 5000 trees/hectare @100% coverage • Hectare Slashing or Spraying – 2 m^2 crown – 5,000 trees/hectare @100% coverage For hourly rates, the following progress is estimated: • Hand clearing – 10 trees per hour • Hand clearing > 18° Slope – 5 trees per hour • 'Drive Through' – 10

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[13]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
				'Assumptions made to allow calculation / estimation of the variable' column. Hectare rate total hectares maintained are converted to trees by a vegetation coverage density percentage multiplied by a number of trees per hectare at 100% coverage based on crown size suitable for the type of maintenance.	trees per hour - Where a contractor goes with the inspector and trees are removed at the time • Spraying – 15 trees per hour, or 30 trees per hour with a spray truck • Slashing – 500 trees per hour • Pruning by climbing – 1 tree per hour • Pruning by EWP – 2 trees per hour • Tritter/Excavator – 70 trees per hour • Small Mulcher – 20 trees per hour • Medium Mulcher – 75 trees per hour • Large Mulcher – 100 trees per hour • Mechanical Pruning (Jaraff, etc) – 50 trees per hour
TEF0104 Average number of defects per vegetation maintenance span	A defect tree is a tree that is identified as being within the clearance requirements of GM	The results from TransGrid's Routine LiDAR scanning of the network for vegetation infringements.	Yes	For each Maintenance Span, LiDAR results were reviewed using a spatial analysis. Defect vegetation points were counted as one tree if they were within a 1m radius of each other. Total defect trees per	Defect vegetation is in contravention to the requirements of GM AS L1 005 where maintenance work is

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[13]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
	AS L1 005 – "Maintenance of Easements and Access Tracks" at the time of maintenance work A defect tree is counted if the identified tree was in a span where maintenance was carried out in the applicable year			maintenance span were then totalled.	expected to take into account regrowth prior to the next maintenance cycle such that vegetation never encroaches on safe clearances to conductors. Multiple LiDAR shots are likely to be reported as within clearance requirements of GM AS L1 005, as the point density of the LiDAR is greater than the size of each tree. The routine used to group these into tree counts assumes a suitable radius of each point.
TEF0105 – Tropical Proportion Number of spans	Vegetation Maintenance Spans within the Bureau of Meteorology "Warm Humid Summer" zone	Climate zone map http://www.bom.gov.au/jsp/ncc/climate_averages/climate-classifications/index.jsp TAMIS (GIS system)	No	Climate zone digital map utilised to run query in GIS (TAMIS) based on spans within class "Warm Humid Summer", and allocate this list against maintenance spans only.	
TEF0106 Standard vehicle access	An area with no Standard Vehicle Access would not be accessible by a two wheel drive vehicle Value provided is length of network	Ellipse report on electronically recorded mains inspections carried out from 2009 to 2014. TAMIS report on electronically recorded mains inspections carried out from 2001 to 2010. Route line length figure provided in other areas of the RIN.	Yes	A proportion of the network with accessible spans was calculated for 2014/15 RIN at 80.9% using prior inspection results, where access was regarded as OK or YES. It is considered appropriate to continue to use this proportion, and multiply it with the published line route length for 2016, and	The proportion of accessible structures is not generally going to change year to year. The same proportion is allocated each year to the actual route length of the system and rounded to

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[13]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
	which is accessible by 2WD vehicle			round to the nearest 100km. Route line length = 11,291 km Std. vehicle access = 11,291* 80.9% = 9,134km ≈9,100 km	the nearest 100km. What is considered accessible by 2WD on any given day could easily change if it rained overnight. A gentle slope when wet on a grassed paddock will stop most 2WD vehicles.
TEF0107 – Altitude Length of line (km) above elevation 600 metres	Length of line with structures above 600m.	25m grid spot height data http://www.lpi.nsw.gov.au/mapping_and_imagery/spatial_data/topographic_data	No	The structure location referenced against spot heights within 30m to determine if elevation above 600m. If the structure was above then attached spans included for length calculation.	-
TEF0108 – Bushfire Risk Number of spans	Maintenance spans within RFS classification of Category 1, 2 or buffer	Bush Fire Prone Lands (BFPL) http://www.rfs.nsw.gov.au/dsp_content.cfm?cat_id=1052	No	Digital map of BFPL used to run query against spans in either Category 1, 2 or buffer lands, and allocate this list against **maintenance spans only**.	RFS web site documents all category 1, 2 and buffer lands as bush fire prone lands
TEF0201 Route line length	The length of line routes. Where a line is a double circuit line or split phase, that section of the route is only counted once.	TransGrid Asset Management Information System (TAMIS)	No	Span lengths for all circuits were extracted from TAMIS. Route length was averaged from the two spans attached to dual circuit structures and added to single circuit spans	Route line length includes overhead lines and underground cables.
TEF0202 Variability of Dispatch	AER definition refers to non-thermal generators. Thermal generators have been taken to be generators	TransGrid's TUOS billing system	Yes The figure is based on NEM metering which is used as part of TransGrid's normal course of business. It is	Uses data calculated for Energy In as part of calculations for TQS03. This is total Energy Input into TransGrid network. Percentage is taken of 'non-thermal'	The definition refers to non-thermal generators. Thermal generators have been taken to be generators using steam

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[13]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
	using steam turbines. Using this definition, non-thermal generators are wind turbines, hydro generators and open cycle gas turbines.		also materially dependent on whether the energy from non-thermal generators should be expressed as a proportion of total energy into TransGrid's network (from all "sources") or total energy into TransGrid's network from generators(that is, ignoring sources, such as interconnectors, where it is not possible to identify whether the energy was produced by thermal or non-thermal generators).	generation to total Energy Input.	turbines. Using that definition, the non-thermal generators are wind turbines, hydro generators and open cycle gas turbines. Energy supplied to TransGrid's network from embedded generators has been included in the calculations.
TEF0203 Concentrated Load Distance	AER definition refers to individual nodes with 30% capacity of generation/load. For a transmission network the size of TransGrid's, it would not be prudent to configure the network such that there is 30% or more of generation/load at risk for a major event at a single location. To satisfy criteria of 30% or more	Data from that used to calculate TEF0201	Yes As nodes within each group are separate, using groups of nodes does not automatically give a single figure for the concentrated load distance.	The definition of this parameter mentions nodes which have at least 30% of generation capacity or load connected to them. For a transmission network transporting the magnitude of load that TransGrid's network does, it would not be prudent to configure it in a way which places 30% or more of generation or load at risk for a major event at a single location. Consequently, no individual nodes within TransGrid's network meet the criteria. However, if groups of nodes in relatively close geographical proximity are considered, rather than single nodes, it is possible to derive a concentrated load distance. In this case the most widely separated groups of nodes are those in the southern part of the	Groups of nodes in close geographical location are considered to be 30% of generation or load. The most widely separated groups are those in the Snowy Mountains area and in the Sydney basin. The average of the route line lengths between the closest nodes in the two areas and the two nodes furthest apart.

Data variable & TransGrid's interpretation		Data sources, locations and 'owners'	Estimation or actual information, calculations and assumptions		
Variable reference & AER description	TransGrid's interpretation of data variable	Data sources	Is this variable 'Estimated Information' as per AER definition[13]? (Y/N)	How the values for this variable are calculated	Assumptions made to allow calculation / estimation of the variable
	generation/load, groups of nodes are considered, allowing a concentrated load distance to be derived.			state (including generation connected at Gullen Range, Capital, Uranquinty Murray, Upper Tumut and Lower Tumut) and in the Sydney basin (loads connected at Beaconsfield West, , Haymarket, Holroyd, Ingleburn, Liverpool, Macarthur, Regentville, Rookwood Road, Sydney East, Sydney North, Sydney South, Sydney West and Vineyard).	
TEF0204 Total number of spans	The total number of spans on the network	TransGrid Asset Management Information System (TAMIS)	No	A total count of all spans used to calculate route line length	

Approved by: Lance Wee, Manager / Asset Strategy (all except TEF0202 and TEF0203)
Approved by: Nalin Pahalawaththa, Manager / Power System Analysis (TEF0202 and TEF0203 only)