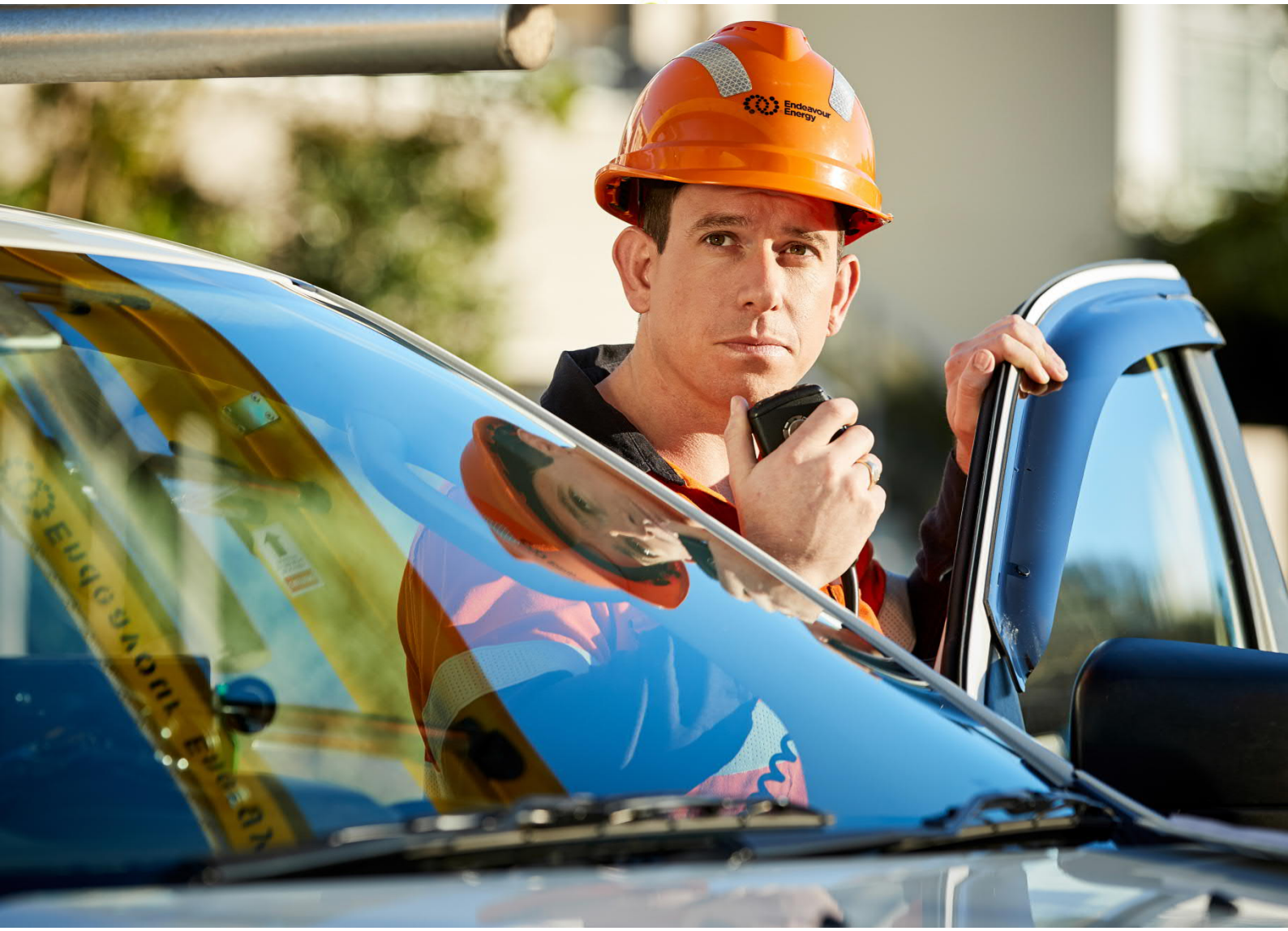
Category Analysis Regulatory Information Notice

BASIS OF PREPARATION
SUBMITTED: 31 OCTOBER 2018



Endeavour Energy

Contents

Purpose

The Category Analysis Regulatory Information Notice (RIN) requires Endeavour Energy to prepare a Basis of Preparation for all historic information in the Regulatory Templates which are the worksheets contained within the Microsoft Excel workbooks at Appendix A of the RIN. By this, the AER mean that for every historic variable in the Templates, Endeavour Energy must explain the basis upon which we prepared information to populate the input cells. The Basis of Preparation must be a separate document (or documents) that Endeavour Energy submits with its completed Templates. The AER will publish Endeavour Energy's Basis of Preparation along with the Templates.

This document is Endeavour Energy's Basis of Preparation in relation to the historic information contained within the Regulatory Templates required to be submitted to the AER by 31 October 2017.

AER's instructions
The AER requires the Basis of Preparation to follow a logical structure that enables auditors, assurance practitioners and the AER to clearly understand how Endeavour Energy has complied with the requirements of the RIN.

To do this, Endeavour Energy has structured its Basis of Preparation with a separate section to match each of the worksheets tabs where a Basis of Preparation is required.

The AER has set out what the minimum requirements for the Basis of Preparation are. This is detailed in Table 1 below:

1. Demonstrate how the information provided is consistent with the requirements of the Notice.
2. Explain the source from which Endeavour Energy obtained the information provided.
3. Explain the methodology Endeavour Energy applied to provide the required information, including any assumptions Endeavour Energy made.
4. In circumstances where Endeavour Energy cannot provide input for a Variable using Actual Information, and therefore must use an estimate, explain:
   (i) why an estimate was required, including why it was not possible for Endeavour Energy to use Actual Information;
   (ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Endeavour Energy's best estimate, given the information sought in the Notice.

Structure of this document
The document is structured as follows:

- We outline our general approach to developing our response to the RIN. We identify key systems used to provide data, note issues relating to data quality, and make comments on the reliability of the data for economic benchmarking purposes.
- We set out our response to worksheets in accordance with the AER's instructions. We note that Worksheets 1 and 3 and Tables 2.16, 7.1, 7.2 and 7.3 do not require a Basis of Preparation to be provided as they are either contain forecast information or require no input material.

General approach

In this section, we identify our general approach to collecting and preparing information.

Systems used to provide data
Where methodologies or assumptions were required to complete the files other than the mere application of the AER approved CAM to the general purpose financial statements Endeavour Energy has included commentary by way of the "note" function within Microsoft Excel to provide guidance to the AER.

Below is a listing of Endeavour Energy's systems that, to a greater or lesser extent, were directly related to or supported the development of the information contained in the RIN templates:

- Cognos – Business reporting system managing database information such as organisation policies and procedures;
- Ellipse – financial management system including: accounts payable; payroll; asset and equipment registers and financial reporting functions. The Ellipse system also caters for defect management (condition based) and also routine maintenance (planned). The equipment register is also linked to various other supporting systems such as field inspections and the Geographical Information System (GIS);
- TM1 – Endeavour Energy uses this OLAP tool for various purposes including budgeting and forecasting, monthly reporting and regulatory accounts allocations. It is a cube based technology which allows rules to be created between cubes and within cubes;
- eFrams – Endeavour Energy uses this system in relation to IT Allocation Drivers. The system enables access to all telecommunication billing, inventory management/asset register and reporting;
- Remedy - Endeavour Energy uses this system in relation to IT Allocation Drivers. This is a BMC tool used by CGI for asset management, definitive software library, incident management and service request management;
- Autocad - Endeavour Energy uses this system in relation to Property Drivers. This is a program used for computer-aided design and drafting. The program is used to maintain Floor Plans which can be used to summarise occupancy by business unit;
- Banner – Endeavour Energy's customer database and billing system;
- Figtree – Worker's compensation claims management data base. This system is maintained separate (but linked at aggregate levels) to other systems to maintain confidentiality of data as required by legislation;
- Value Development Algorithm (VDA) – Endeavour Energy uses the Value Development Algorithm (VDA) for its high level asset renewal expenditure modelling. The model is populated with specific asset data in order to produce the replacement capital forecast. Data for each asset is allocated into asset categories, which represent major components that make up the network such as poles, transformers, conductor, cable, switchgear etc. Each asset type is assigned an asset life and a replacement cost. The quantity of assets installed on the network each financial year is also entered, thus generating an age profile of the network assets;

- Visual Risk – Endeavour Energy uses this Treasury Management System for improving the productivity of its treasury operations. Visual Risk provides functions such as capturing a facility drawdown; valuing an FX option; and facilitating back office administration and financial reporting. Specifically it was used to prepare the cost of funds schedule;

- System Fault Recording (SFR) – Endeavour Energy used this Oracle database system for all reliability reporting up until 2011-12. The data in this system is accessed using Cognos, with further analysis and processing of data being undertaken using Microsoft Office programs such as Access and Excel;

- SCADA - Endeavour Energy uses this system to monitor and control its network. Information from this system feeds into OMS (see below) to enable the calculation of reliability reporting information;

- Outage Management System - Endeavour Energy uses this system to log outages and other events on its network. From 2012-13 onwards this system has been used as the source of data for all reliability reporting; and

- Contact Centre 6 – Endeavour Energy's call centre uses this system to run reports on historical call volume according to skill set (Call Type). The system is also used to assign agents to specific call taking groups based on call type.

Data quality issues
In previous consultations on the RIN, we have raised significant concerns with providing data in the form required by the AER.

Approach to our obligations under the NEL
Our view of the NEL is that a DNSP is only obligated to provide information that is available, that is, data which has been historically collected in our systems. In cases, where that information cannot be provided in the form required by the AER from our systems, we would have a reasonable excuse under section 28(5) of the NEL not to comply with that element of the notice. We have strong doubts that a RIN can require a business to prepare information by way of estimate that cannot be reasonably derived from information currently held in its systems.

Our understanding of the term 'prepare' relates to a power the AER has to compel a DNSP to collect information in the form required by the AER for future periods (for example, by developing new systems) rather than to manipulate historical data in potentially inaccurate ways. We suggest that the AER should give more careful consideration to whether it has appropriately informed itself of the distinction under section 28D of the NEL between the ability of a RIN to require existing information to be provided and the ability to require information to be prepared, maintained and kept on a going forward basis.

Recognition by AER that 'best estimates' are not robust
The AER has acknowledged that if we are compelled to provide best estimates then there is potential for the data to lack robustness. Endeavour Energy will address the implications of using best estimates which are not robust in its Basis of Preparation to accompany the final Audited Information.

Worksheet 2.1 – Expenditure Summary & Reconciliation

2.1.1 Standard Control Services Capex, 2.1.2 Standard Control Services Opex, 2.1.3 Alternative Control Services Capex, and 2.1.4 Alternative Control Service opex

Compliance with requirements of the notice

The data presented in tables 2.1.1 to 2.1.4 is consistent with the requirements of the Category Analysis RIN. In particular:

- Total opex and capex reported represents expenditure split into Standard Control Services and Alternative Control Services and reconciles to the amounts reported in the Annual RIN.
- Opex and capex reported in tables 2.1.1 to 2.1.4 reconciles to corresponding amounts reported in tables 2.2 to 2.10 and 4.1 to 4.4.
- The total expenditure for the capex and opex for each service classification is mutually exclusive and collectively exhaustive.
- A "balancing item" is included (where required) to reconcile total capex and opex in tables 2.1.1 to 2.1.4 with total capex and opex reported in the Annual RIN. The balancing items calculated include capex and opex amounts which have either been reported more than once within tables 2.2 to 2.10 and 4.1 to 4.4 or have not been reported at all in tables 2.2 to 2.10 and 4.1 to 4.4.
- A table that contains the calculation of balancing items reported in tables 2.1.1 to 2.1.4 is provided under the "Source of information" section. A summary of each balancing item is set out below:
    - Table 2.1.1 - the items included in the "balancing item" row include those capex items not reported in tables 2.2 to 2.10 and 4.1 to 4.4. This includes expenditure associated with capital contributions, infrastructure land purchases, system access/switching costs, essential spares, reliability capex, smart grid, power quality, environmental enhancement, asset relocations and direct capital overheads (not included in table 2.10 as these are not transferred from opex). In addition and adjustment is made to remove public lighting capital expenditure which is double counted in tables 2.2 and 4.1.
    - Table 2.1.2 - the items included in the "balancing item" row include the duplicated costs captured under the "non-network" and "metering" line items which are also captured under the "Network Overhead" and "Corporate Overhead" categories.
    - Table 2.1.3 – no balancing items required.
    - Table 2.1.4 – the items included in the "balancing item" row include the duplicated costs captured under the "Network Overhead" and "Corporate Overhead" categories which are captured under the "Public Lighting" category.

Source of information

Table 2.1.1 - Standard Control Services Capex

Replacement Expenditure	147,368,717	Table 2.2 - Repex
Connections	21,420,016	Table 2.5 - Connections
Augmentation Expenditure	48,025,451	Table 2.3 - Augex
Non-Network	53,560,976	Table 2.6 - Non-network
Capitalised Network Overheads	31,867,425	Table 2.10 - Overheads
Capitalised Corporate Overheads	21,189,589	Table 2.10 - Overheads
Metering	-	Table 4.2 - Metering
Public Lighting	-	Table 4.1 - Public Llighting
Balancing Item	164,908,620	See below
Total Gross Capex (includes Cap Cons)	**488,340,794**	
Capital Contributions	147,795,218	
Annual RIN	340,545,576	
Check (reconciles to annual RIN)	*(0)*	

Balancing Items

Cap Cons	147,795,218	Annual RIN Table 8.2 - Customer contributions by Asset Class
Infrastructure Land	453,908	General ledger (TM1 Project Reporting cube)
Switching	4,588,877	General ledger (TM1 Project Reporting cube)
Essential Spares	842,230	General ledger (TM1 Project Reporting cube)
Asset Relocation	1,896,653	General ledger (TM1 Project Reporting cube)
Reliability	3,473,304	General ledger (TM1 Project Reporting cube)
Power Quality	543,001	General ledger (TM1 Project Reporting cube)
Environmental Enhancement	-	General ledger (TM1 Project Reporting cube)
Efficiency Programs	4,186,514	General ledger (TM1 Project Reporting cube)
Metering	451,147	General ledger (TM1 Project Reporting cube)
Direct Capitalised Overheads	14,619,127	General ledger (TM1 PNL cube)
Public Lighting	(3,694,982)	Should be excluded from SCS and therefore removed
Other (balancing item of other items)	(10,246,377)	Remaining balancing item
Total Balancing Items	**164,908,620**	

Table 2.1.2 - Standard Control Services Opex

Vegetation Management	41,759,745	Table 2.7 - Vegetation Management
Maintenance	49,215,839	Table 2.8 - Maintenance
Emergency Response	15,801,119	Table 2.9 - Emergency Response
Non-Network	54,694,157	Table 2.6 - Non-network
Network Overheads	57,147,991	Table 2.10 - Overheads
Corporate Overheads	93,398,203	Table 2.10 - Overheads
Balancing Item	(54,694,157)	See below
Total Opex	**257,322,897**	
Check (reconciles to TM1)	*(1)*	

Balancing Items

Non-network	54,694,157	Double counted in table 2.10
Total Balancing Items	**54,694,157**	

Table 2.1.3 - Alternative Control Services Capex		
Connections		
Capitalised Network Overheads		
Capitalised Corporate Overheads		
Metering	985,508	Table 4.2 - Metering
Public Lighting	17,062,181	Table 4.1 - Public Llighting
Fee & Quoted		
Balancing Item	1,733,968	<<< switching / overheads and non system ACS related to Metering
Total Capex	**19,781,657**	
Check (reconciles to annual RIN)	*(0)*	

Table 2.1.4 - Alternative Control Services Opex		
Connections		
Network Overheads	10,456,457	Table 2.10 - Overheads
Corporate Overheads	23,380,217	Table 2.10 - Overheads
Metering	17,572,224	Table 4.2 - Metering
Public Lighting	14,335,117	Table 4.1 - Public Llighting
Fee & Quoted	31,200,995	Table 4.3 & 4.4 - Fee & Quote Based Services
Balancing Item	(33,836,674)	Overheads double counted in 2.10 and 4.* series
Total Opex	**63,108,336**	
Check (reconciles to TM1)	*(2)*	

Methodology and assumptions

Table	Methodology	Assumptions
2.1.1, 2.1.2, 2.1.3 & 2.1.4	1. Extract expenditure from the Category Analysis RIN templates listed in the source of information above and link to the relevant category in tables 2.1.1 to 2.1.4.	Nil
	2. Identify balancing items by extracting information from the general ledger and/or linking to double counted amounts in the Category Analysis RIN.	Nil
	3. Reconcile the total of each table to the Annual RIN.	Nil

Use of estimated information

All information provided in tables 2.1.1 to 2.1.4 consists of Actual Information (no Estimated Information required).

Reliability of information

All information provided represents information extracted from Endeavour Energy's reporting systems and has been reconciled to reported figures in the Annual RIN. As a result, the information contained in tables 2.1.1 to 2.1.4 is considered to be reliable.

2.1.5 Dual Function Assets Capex

Endeavour Energy does not have any dual function assets and therefore does not need to complete table 2.1.5

2.1.6 Dual Functions Assets Opex

Endeavour Energy does not have any dual function assets and therefore does not need to complete table 2.1.6.

Worksheet 2.2 – Replacement Expenditure

2.2.1 Replacement Expenditure, Volumes and Asset Failures by Asset Category and 2.2.2 Selected Asset Characteristics

Compliance with requirements of the notice

Past expenditure and replacement quantities were estimated and provided to comply with the requirements of tables 2.2.1 and 2.2.2.

Source of information

- Installed quantities from Table 5.2 (2017-18)
- Finance expenditure data (June 2018)
- VDA cost estimates (Prepared for 2017 model)
- Ellipse asset database (Data extracted using Cognos in August 2018)
- Network statistics reports (June 2017 & June 2018)
- GIS
- Reset RIN table 2.4.1 (2019 Submission)

Methodology and assumptions

- Past renewal expenditure was categorised into the major categories of table 2.2.1. The category totals were proportioned into the subcategories of table 2.2.1. Proportions were weighted by 2017-18 installed quantities and replacement unit costs from the VDA cost estimates.

- Replacement quantities were calculated by dividing the expenditure derived above by the replacement unit costs from VDA cost estimates.

- Not all line items in the RIN template have a one to one correlation to the line items in the VDA cost estimates. Some weighted averaging was carried out to translate replacement unit costs from VDA cost estimates to the RIN. The replacement unit costs were weighted by total asset quantities. No data has been provided for pole top structures as that data is unavailable. Costs for the replacement of pole top structures are covered under other categories such as “Poles” and “Overhead conductors”.

- Some larger type of asset types have expenditure but no quantities. This is due to the phasing of larger projects. In addition, some miscellaneous expenditures are captured into some categories which are renewal based but do not replace entire assets. In some of these instances, expenditure was proportioned by total population quantity.

- Some quantities were zeroed where it is known that Endeavour Energy does not have a replacement program for that asset type.

- Some calculated replacement quantities were overridden with the installed quantity. A higher calculated replacement quantity is due to the inclusion of additional miscellaneous expenditure costs into the major categories.

- The “Other” major category has been utilised for data relating to Zone & Transmission Substation Assets and Distribution Substation Assets.

- Quantities for Urban, Rural Short and Rural Long assets were estimated by applying percentages to total volumes and estimated replacement quantities. The percentages were calculated from feeder lengths and their classifications. Distribution feeder classifications

were calculated by EE. Transmission feeder classifications were obtained from the Reset RIN Table 2.4.1)

- The quantities for the replacement of overhead conductors by material type were estimated from the reductions of conductor types from 2016-17 to 2017-18. The reduction quantities were categorised into conductor types and used to calculate the proportional percentages of conductor materials that have reduced. These percentages were applied to the total overhead conductor replacement quantities. (Conductor type data was based on Network Statistics)

- Failure rates were based on work orders for defects and fault and emergencies. Work orders were extracted and assessed to determine whether they were counted as a failure. The work order information was extracted from the Ellipse database.

- The total transformer MVA replaced was estimated by multiplying replacement quantities and an average MVA rating for the transformer category.

- Total MVA disposed was assumed to be equal to the Total MVA replaced.

Use of estimated information

All replacement costs are actuals at a high level. Due to the way that expenditure is accounted for, estimation is required to proportion the costs to sub category levels.

Reliability of information

The information is principally based on Ellipse data, GIS data and corporate finance reports available at the time of preparation.

Worksheet 2.3 – Augex Data

2.3.1 Augex Asset Data – Subtransmission Substations, Substations, Switching Stations and Zone Substations

Compliance with requirements of the notice

The information provided on this work sheet is consistent with the requirements of this Notice. Where possible, actual costs and values have been used and in areas where individual work orders would need to be obtained and analysed, estimates have been made as outlined below.

Source of information

Project information has been obtained from the following sources:

- Network Investment Options Reports;
- Project Definitions;
- Transmission line designs;
- Post Commissioning Review Reports;
- SAMP Delivery Status Report; and,
- Ellipse.

Methodology and assumptions

The methodology used to complete table 2.3.1 is outlined below:

- From the Finance group, a list of all projects that had money spent from the 2008-09 financial year to the 2015-16 financial year was obtained for the purposes of the Regulatory Submission and RIN last year. This data was updated with more recent information from the Finance group. The information related to financial year end figures to 30 June 2018.
- From these projects, projects with minimal spend (less than five million) in the above period were removed
- For each of the remaining projects:
    - Actual costs for each of the projects by organisational unit broken into the categories “Labour, Materials, Contractors & Consultants, IT&T Expenses and Other Expenses” for each financial year from 2006-07 to 30 June 2018 was obtained.
    - Actual costs for each of the projects separated into Labour, Materials, etc. was obtained for the period 2000-01 to 2005-06. These costs were not available on an organisational unit basis and hence, were separated using averages from the 2006-07 to June 2018 costs.
    - The organisational units were divided into six distinct categories, “Subs, Mains, Subs Civil, Distribution, Land and Projects” based on the organisational unit. The Projects category was required as often work for project is costed to the “Capital Projects” or “Major Projects” group which encompasses substations and mains works, it also includes outsourced work.
    - The number of transformers, switchgear (i.e. HV and LV circuit breakers, e.g. for a 132/11kV zone substation the number of 132kV and 11kV circuit breakers installed) and capacitor banks installed under the project and the actual costs for these plant items was obtained from Ellipse.
    - From the initial Project Definition a ratio of “Transmission Mains costs”, “Transmission mains civil costs”, “Substation civil costs” and “Substation costs” to the total costs of

the project was obtained. Where one of these classes of costs was not available an estimate was made based on other projects of a similar nature. These ratios were used to divide the costs of the "Projects" category between table 2.3.1 and 2.3.2.

- The costs for "Civil Works", "Other Direct", and "Related Party Contracts" were calculated by apportioning actual costs based on the ratios calculated for the "Projects" type above between the table 2.3.1 and 2.3.2.

- For a limited number of projects the costs had to be subtracted from the "Related Party Contracts" column and added to "Other Plant Costs" to give positive costs for the "Other Plant Costs". In these scenarios it is likely that the other plant was actually purchased under contracts and hence is in the "Contractors & Consultants" costs.

- If a project's Project Definition and Change Controls indicate a project's scope entirely consisting of substation work, mains and distribution costs and labour hours were added to the project totals.

The costs have been indexed based on the multipliers below. This is consistent with the information provided in the Regulatory Submission:

	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
CPI	0.015	0.045	0.044	0.030	0.028	0.023	0.027	0.035	0.0233
Index	1.452	1.390	1.331	1.293	1.258	1.229	1.197	1.156	1.130

	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
CPI	0.0435	0.0182	0.0285	0.0339	0.018	0.025	0.025	0.025	0.025
Index	1.083	1.063	1.034	1	0.983	0.993	0.983	0.993	0.983

	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
CPI	0.025	0.025	0.025	0.025	0.025	0.025
Index	0.993	0.983	0.993	0.983	0.993	0.983

It should be noted that the majority of projects have a substations and a mains component. The total project costs are the sum of the substations and mains component. If the costs from these tables are to be used to determine a $/MVA for the costs a new zone substation then the costs from the substations component (Table 2.3.1) and the costs from the mains component (Table 2.3.2) have to be summated.

It should be noted that the following projects were triggered by increases in demand.

Project Number	Project Number	Project Number	Project Number	Project Number
PR090				

PR090 was triggered by the need to address load at risk on the Doonside and Quakers Hill sub-transmission systems as well as load at risk on Doonside 33/11 kV substation which had reached end of life.

Use of estimated information

Other Plant Item Expenditure

This value was calculated by subtracting total material costs (apportioned to the substations component) minus the costs for transformers, switchgear and capacitors. In some projects, some costs from the "Contracts" component have been moved to the "Other Plant" costs as the plant

may have been procured under “Contracts”. This estimation method was required as it would have been too time consuming to go through individual project work orders to obtain the material costs for each “Other Plant Item”.

Installation (Labour) – Volume
For the periods 2006-07 to June 2016 volume of labour was readily available from the financing systems. For periods outside this, the volume of labour has been estimated based on the average $/hour of the period 2006-07 to June 2016. This labour volume is the labour for the whole project it includes volume for work outside of the installation of plant. This estimation method was required as it would have been too time consuming to go through individual project work orders to determine labour attributable to installation and labour that isn’t.

Installation (Labour) – Expenditure
This value was calculated by adding costs from the “Labour” category. The breakdown of the “Projects” component has been estimated based on the initial Project Definition. This labour expenditure is the labour expenditure for the whole project (except for civil works) and it includes volume for work outside of the installation of plant. This estimation method was required as it would have been too time consuming to go through individual project work orders to determine labour attributable to installation and labour that isn’t.

Other Expenditure - Civil Works
This value was calculated by adding costs from the “Subs civil” category and “Projects” category. The breakdown of the “Projects” component has been estimated based on the initial Project Definition. This estimation method was required as it would have been too time consuming to go through individual project work orders to obtain the material costs for each “Other Plant Item”.

Other Expenditure – Other Direct
This value was calculated by adding costs from the “Other Expenses” group, the breakdown of the “Projects” component has been estimated based on the initial Project Definition. This estimation method was required as it would have been too time consuming to go through individual project work orders to determine parts attributable to table 2.3.1 and 2.3.2.

All related party contracts – Total
This value was calculated by adding costs from the “Contactors and Consultants” group, the breakdown of the “Projects” component has been estimated based on the initial Project Definition. This estimation method was required as it would have been too time consuming to go through individual project work orders to determine parts attributable to table 2.3.1 and 2.3.2.

Reliability of information
The actual total costs (total costs from Table 2.3.1 and Table 2.3.2 summated for the project) for the projects are reliable as it is straight from Ellipse. The cost breakdowns between table 2.3.1 and 2.3.2 are estimates; these estimates are then applied to variables outlined above. The apportioning of costs associated incurred by the “Projects” group to the substation/mains component is based on initial estimates in the Project Definitions. The actual proportions may have changed depending on actual designs and unforseen issues.

2.3.2 Augex Asset Data – Subtransmission Lines

Compliance with requirements of the notice

The information provided on this work sheet is consistent with the requirements of this Notice. Where possible, actual costs and values have been used and in areas where individual work orders would need to be obtained and analysed, estimates have been made as outlined below.

Source of information

Project information has been obtained from the following sources:

- Network Investment Options Reports;
- Project Definitions;
- Transmission line designs;
- Post Commissioning Review Reports;
- SAMP Delivery Status Report;
- Ellipse; and
- GIS.

Methodology and assumptions

The methodology used to complete table 2.3.2 is outlined below:

- From the Finance group a list of all projects that had money spent from the 2008-09 financial year to the 2014-15 financial year was obtained for the purposes of the Regulatory Submission and RIN last year. This data was updated with more recent information from the Finance group. The information related to financial year end figures to 30 June 2018.

- From these projects, projects with minimal spend (less than five million) in the above period were removed.

- For each of the remaining projects:

    - Actual costs for each of the projects by organisational unit broken into the categories “Labour, Materials, Contractors & Consultants, IT&T Expenses and Other Expenses” for each financial year from 2006-07 to 30 June 2018 was obtained.

    - Actual costs for each of the projects separated into Labour, Materials, etc. was obtained for the period 2000-01 to 2005-06. These costs were not available on an organisational unit basis and hence, were separated using averages from the 2006-07 to June 2018 costs.

    - The organisational units were divided into six distinct categories, “Subs, Mains, Subs Civil, Distribution, Land and Projects” based on the organisational unit. The Projects category was required as often work for project is costed to the “Capital Projects” or “Major Projects” group which encompasses substations and mains works, it also includes outsourced work.

    - The number of poles/towers added, upgraded was obtained from the relevant transmission line design drawings. Where a pole was replaced it was counted as upgraded, where a new pole was installed it was counted as pole added.

    - The transmission line lengths were obtained from project definitions, transmission line drawings and the GIS system.

- From the initial Project Definition a ratio of “Transmission Mains costs”, “Transmission mains civil costs”, “Substation civil costs” and “Substation costs” to the total costs of the project was obtained. Where one of these classes of costs was not available an estimate was made based on other projects of a similar nature. These ratios were used to divide the costs of the “Projects” category between table 2.3.1 and 2.3.2.

- The costs for “Civil Works”, “Other Direct”, and “Related Party Contracts” were calculated by apportioning actual costs based on the ratios calculated for the “Projects” type above between the table 2.3.1 and 2.3.2.

- For a limited number of projects the costs had to be subtracted from the “Related Party Contracts” column and added to “Other Plant Costs” to give positive costs for the “Other Plant Costs”. In these scenarios it is likely that the other plant was actually purchased under contracts and hence is in the “Contractors & Consultants” costs.

- Where existing lines being operated originally at a lower voltage have been reused at a higher voltage without any re-conductoring they have still been included in “Circuit km upgraded”.

- If a project’s Project Definition and Change Controls indicate a project’s scope entirely consisting of subtransmission mains work, substation and distribution costs and labour hours were added to the project totals.

The costs have been indexed based on the multipliers below. This is consistent with the information provided in the Regulatory Submission:

	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
CPI	0.015	0.045	0.044	0.030	0.028	0.023	0.027	0.035	0.0233
Index	1.452	1.390	1.331	1.293	1.258	1.229	1.197	1.156	1.130

	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
CPI	0.0435	0.0182	0.0285	0.0339	0.018	0.025	0.025	0.025	0.025
Index	1.083	1.063	1.034	1	0.983	0.993	0.983	0.993	0.983

	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
CPI	0.025	0.025	0.025	0.025	0.025	0.025
Index	0.993	0.983	0.993	0.983	0.993	0.983

It should be noted that the majority of projects have a substations and a mains component. The total project cost is the sum of the substations and mains component. If the costs from these tables are to be used to determine a $/MVA for the costs a new zone substation then the costs from the substations component (Table 2.3.1) and the costs from the mains component (Table 2.3.2) have to be summated.

It should be noted that the following projects were initiated by growths in demand.

Project Number	Project Number	Project Number	Project Number	Project Number
P090	PR157			

No projects had triggers listed as “Other – specify”.

Specifically in relation to Schedule 2 instruction 7.3(p) for Table 2.3.2, Endeavour Energy does not record easements as a separate project line item. Endeavour Energy does not acquire land for sub-transmission lines: its policy is to only acquire easements. Land and Easements are itemised as separate expenses within a project.

Use of estimated information

Poles/Towers – Expenditure
A standard rate has been assumed for the pole costs based on the most common pole type used which has then been multiplied by the number of poles added and upgraded. This estimation method was required as it would have been too time consuming to go through individual project work orders to obtain the material costs for each pole.

Overhead Lines/Underground Cables – Expenditure
A per km rate for material for the standard types of conductors/cables was obtained from the Transmission Mains group. The type of conductor/cable was determined from transmission line drawings/network characteristics document. The standard material rate was applied to the transmission line to calculate the material costs. This estimation method was required as it would have been too time consuming to go through individual project work orders to obtain the material costs for each conductor/cable.

Other Plant Item – Expenditure
This value was calculated by subtracting total material costs (apportioned to the mains component) minus the costs for poles, conductors and cables. In some projects some costs from the "Contracts" component have been moved to the "Other Plant" costs as the plant may have been procured under "Contracts". This estimation method was required as it would have been too time consuming to go through individual project work orders to obtain the material costs for each "Other Plant Item".

Installation (Labour) – Volume
For the periods 2006-07 to June 2016 volume of labour was readily available from the financing systems. For periods outside this the volume of labour has been estimated based on the average $/hour of the period 2006-07 to June 2016. This labour volume is the labour for the whole project it includes volume for work outside of the installation of plant. This estimation method was required as it would have been too time consuming to go through individual project work orders to determine labour attributable to installation and labour that isn't.

Installation (Labour) – Expenditure
This value was calculated by adding costs from the "Labour" category. The breakdown of the "Projects" component has been estimated based on the initial Project Definition. This labour expenditure is the labour expenditure for the whole project (except for civil works) and it includes volume for work outside of the installation of plant. This estimation method was required as it would have been too time consuming to go through individual project work orders to determine labour attributable to installation and labour that isn't.

Other Expenditure - Civil Works
This value was calculated by adding costs from the "Subs civil" category and "Projects" category. The breakdown of the "Projects" component has been estimated based on the initial Project Definition. This estimation method was required as it would have been too time consuming to go through individual project work orders to obtain the material costs for each "Other Plant Item".

Other Expenditure – Other Direct
This value was calculated by adding costs from the "Other Expenses" group, the breakdown of the "Projects" component has been estimated based on the initial Project Definition. This estimation method was required as it would have been too time consuming to go through individual project work orders to determine parts attributable to table 2.3.1 and 2.3.2.

All related party contracts – Total
This value was calculated by adding costs from the "Contactors and Consultants" group, the breakdown of the "Projects" component has been estimated based on the initial Project Definition. This estimation method was required as it would have been too time consuming to go through individual project work orders to determine parts attributable to table 2.3.1 and 2.3.2.

Reliability of information
The actual total costs (total costs from Table 2.3.1 and Table 2.3.2 summated for the project) for the projects are reliable as it is straight from Ellipse. The cost breakdowns between table 2.3.1 and 2.3.2 are estimates; these estimates are then applied to variables outlined above. The apportioning of costs associated incurred by the "Projects" group to the substation/mains component is based on initial estimates in the Project Definitions. The actual proportions may have changed depending on actual designs and unforseen issues.

2.3.3 Augex Asset Data – HV/LV Feeders and Distribution Substations

Compliance with requirements of the notice
This section is intended to demonstrate how the information provided is consistent with the requirements of this notice.

Table 2.3.3 – Descriptor Metrics displays the following over the 2016-17 period:

- The quantum of assets added in the HV feeder category (both underground and overhead)
- The quantum of assets added in the LV Feeder category (both overhead and underground)
- The quantum of assets added in the Distribution substation category (indoor, ground and pole mounted)
- The quantum of assets upgraded in the HV feeder category (both underground and overhead)
- The quantum of assets upgraded in the LV Feeder category (both overhead and underground)
- The quantum of assets upgraded in the Distribution substation category (indoor, ground and pole mounted)

Table 2.3.3 – Cost Metrics displays the total costs of the above activities for the 2016-17 financial year expressed in 2016-17 dollars.

Source of information
Expenditure information for the projects associated with tables 2.3.3 has been sourced from Ellipse.

HV feeder project cost information was obtained from the financial data contained within the Ellipse system associated with the distribution projects that were completed within the 2015-16 financial year. It includes costs for those items that were contracted to external accredited designers and constructors. The asset length data for LV feeders was calculated by applying suitable unit rates to the costs incurred by the projects in the 2016-17 year. The asset length data for HV feeders was obtained from the DARRTS (Distribution Augmentation, Reliability and Refurbishment Tracking System) database.

Distribution Substation and LV feeder information was also obtained from the Ellipse database from the following categories;

- LV001 – Overloaded distribution Substation uprates: Captures costs associated with upgrades to distribution substation transformers based on maximum demand readings.

- LV002 – Quality of supply reactive projects: Captures costs associated with responding to customer complaints about low volts, frequent loss of supply due to LV overloads and overvoltage issues. Rectification may involve the installation or upgrade of distribution substations and LV overhead and underground feeders.

- LV003 – Quality of Supply planned projects: This is reserved for when transformers are not able to be upgraded in LV001 due to capacity constraints and a new substation at another location needs to be established. The scope of work may include installing new pole mount or ground mount subs and new LV overhead or underground feeders.

- LV004 – Low voltage system augmentation: This is used to augment mainly LV overhead feeders, for example upgrading undersized LV conductors due to overloading or voltage drop issues.

It should be noted that Table 2.3.3 does not contain expenditure and quantities relating to network augments or upgrades associated with customer connections.

Methodology and assumptions

The financial details and the calculated length data was gathered on a project to project basis for HV feeders. The length and category of each line item included in each project in DARRTS was used to determine the total "Units Added" and Units Upgraded" in table 2.3.3 – Descriptor Metrics. The total cost of each project was then apportioned to the Overhead and Underground categories according the length of the line items included in the project. The costs under each category for the all the projects was then summed to produce the results for table 2.3.3 – Cost Metrics.

Any project that was driven by fault exceeded conductors was not included in the costs represented in Table 2.3.3. Note all projects have been included irrespective of whether they are material or non-material, i.e., above or below $500,000.

For distribution transformers and LV feeders, the costs associated with each category (LV001 – 004) were allocated to the following 5 categories by applying the historical ratios for the split of expenditure as shown by the following formulae. The lengths/quantities were calculated using typical per unit rates and applying them to the expenditure in each of the 5 categories.

(i)	LV feeder augmentations - overhead lines:	D+(B+C)*0.1
(ii)	LV feeder augmentations - underground cables:	(B+C)*0.4
(iii)	Distribution substation augmentations - pole mounted ($000's) :	0.54*(A+(B+C)*0.4)
(iv)	Distribution substation augmentations - ground mounted ($000's):	0.44*(A+(B+C)*0.4)
(v)	Distribution substation augmentations - indoor ($000's):	0.02*(A+(B+C)*0.4)
(vi)	LV feeder non-material projects:	T – [(i)+(ii)+(iii)+(iv)+(v)]

where:

A=LV001, B=LV002, C=LV003, D=LV004, T=A+B+C+D

Use of estimated information
Apart from the assumptions mentioned above, no other estimated information was used in this section.

Reliability of information
The base data presented in Table 2.3.3 is resident in Endeavour Energy's Ellipse system which provides both financial tracking and project lists. Detailed analysis of the project lists within the Distribution Works Program were also utilised to provide more detailed understanding of the work undertaken, this was used to assign a work category.

The data is therefore considered to be reliable.

2.3.4 Augex Data – Total Expenditure

Compliance with requirements of the notice
The information is obtained from the available data in Endeavour Energy.

Source of information
The financial information was sourced from the Ellipse database.

Methodology and assumptions
The expenditure in 2017-18 dollars for the following rows was derived as follows:

- Subtransmission Substations, Switching Stations and Zone Substations: The basis of preparation for table 2.3.1 allocated expenditure according to substations or lines. All expenditure occurring in 2015-16 for the substations category was summated from the same worksheet used to derive data for table 2.3.1.
- Subtransmission Lines: The basis of preparation for table 2.3.1 allocated expenditure according to substations or lines. All expenditure occurring in 2015-16 for the subtransmission lines category was summated from the same worksheet used to derive data for table 2.3.2.
- HV Feeders: From table 2.3.3 – Descriptor Metrics.
- HV Feeders - Land Purchases and Easements: No land purchase cost captured as most.
- HV feeders are on State land or on road reserves.
- Distribution Substations: From table 2.3.3 – Cost Metrics.
- Distribution Substations - Land Purchases and Easements: Cost is estimated only for any added ground substations that require land easement (see below). Not required for pole mount or indoor substation.
- LV Feeders: From table 2.3.3 – Cost Metrics.
- LV Feeders - Land Purchases and Easements: No land purchase cost captured as most LV feeders are on State land or on road reserves.
- Other Assets: Nil

Use of estimated information

A land purchase and easement cost is paid only for newly added ground mount substation. It is very time consuming to search the individual cost of these easements, thus an estimate cost of $12,000 (includes land purchase, survey and legal cost) was used for each ground mount substation added as shown in Table 2.3.3 – Cost Metrics. An estimated cost was provided by the Network Property section.

Reliability of information

The information is based on input from other tables.

Worksheet 2.5 - Connections

2.5.1 Descriptor Metrics

Compliance with requirements of the notice

The data provided in this section seeks to address the requirements of Schedule 2, Clause 10 and Appendix F of the Regulatory Information Notice. Where the data is readily available, actual data has been used to complete template 2.5.1. In other instances, data has been derived from actual data and for the remainder, data has been estimated / calculated based on a number of known parameters.

Important Note

From 2017-2018 onwards Endeavour Energy has increased its funding of Assets via a capital uplift program. This in turn will see an increase in the Substation and HV cables funding for the future.

Source of information

Data has been obtained from a number of internal sources as outlined below:

- Finance and Compliance Division – general ledger, fixed asset register and customer data.
- Network Connections Branch – Customer connection, NOSW information and SAMP 10 year forecast of lots serviced.
- Network Connections Expenditure PIP 9 forecast model
- MVA data for number of connections

Methodology and assumptions

The data held by the Company did not in all cases align with the data breakout as required by the reporting template. As a result it was necessary to cross match and supplement base data with other actual data available from other Company systems. Where data was not readily available from historical records, required template information was derived/calculated from actual data and current information obtained from analysis and review of available information.

The data used in the completion of the template were as follows:

- Actual customer numbers by class and forward estimate.
- Fixed asset register and general ledger for financial details by class.
- Customer Application Management System (CAMS) for validation of transformer numbers and size.
- Asset Valuation Sheet (AVS) used for the estimation of UG and OH circuit lengths.
- Notification of Service Work (NOSW) Endeavour Energy form number FPJ4503, sample used to determine connection types, customer proportions and connection methodology. The data was collated from the NAAS. This data was used to assist in proportioning the connection types for residential, industrial/commercial and subdivision and as a subset the embedded generator connections that occur to an existing network connection.
- Developed estimation ratios for each connection class and type to fill template requirements.
- Financial Report actuals and forward estimates.

- Strategic Asset Management Plan (SAMP) 10 year financial data.
- SAMP 10 year Lot forecast to determine residential and subdivision customer proportions.
- Network Connections Expenditure PIP 9 forecast model.

Use of estimated information

Endeavour Energy has used estimated information for the following elements of the template:

- The split of OH and UG connections for each of the Connection Subcategories in Template 2.5.1
- The circuit km added to the network for each of the Connection Subcategories in Template 2.5.1
- An estimate was required for the above reporting elements because actual data was not available from Company records.
- The basis for the estimates is outlined below:

a) Determination of customer numbers in Residential and Subdivision categories – The Company has the customer numbers data contained Domestic and Controlled Load customers, however, the customer numbers were not available in the domestic and subdivision categories. To determine the number of customers in each domestic and subdivision category, SAMP 10 year Lot forecast with 2015-16 actuals was used to develop the proportions for the required categories and then applied the proportion for residential and subdivision customers.

b) Split of OH and UG connections – This estimation was applied to connections in the Residential, Commercial/Industrial and Subdivision categories of template 2.5.1. Whilst historical customer data was maintained by the Company in the three major reporting categories it did not naturally break into overhead and underground connections. We a have used previous years % for UG and OH split. From this analysis, assumptions were developed and applied to the actual data provided in the customer numbers document. These numbers were then included in the reporting template. The process applied used the year on year customer number change, split the numbers into the required categories and then applied the proportion for the OH and UG connection split.

c) Circuit km added to the network – The Company did not have available the data that would allow the ready completion of the template for these categories for HV and LV connection. Financial data was available from the financial reports, for both overhead and underground connections, however, route length was not available. To derive these lengths, the current Asset Valuation Sheet (AVS) was used to develop typical costs for standard construction types per km for both HV and LV overhead and underground installations. The financial from the AVS data was then used to derive route lengths for each connection type. The AVS 15b data was used to calculate the preceding year's conductor length data as they still related 2017-18 for cable cost.

d) Cost per Lot has been obtained by calculation using the SAMP financial data and the lot numbers included in the SAMP 10 year lot forecast.

Reliability of information

The core data used in the approximation was Company data that had a high level of integrity. The estimation process outlined in (a), (b), (c) and (d) is technically sound and when applied to the core data has produced acceptable results.

The results are then compared against with the forward estimate data provided to AER in August 2015 as a basis for verification with the forward estimates. The estimation method is sound and verifiable.

Information Not Included in the Template

The following information has not been included in the template:

Residential – Mean Days to Connect Residential Customer with LV single phase connection
The Company does not maintain records of the length of time negotiated or accomplished by a Level 2 Accredited Service Provider in completing the Connection Service arranged with their individual customers. The Company has no involvement in the allocation or monitoring of work completion by Level 2 Accredited Service Providers.

Embedded Generation – Distribution Substations and Circuit Augmentation
Small scale embedded generation systems connected to the network are required to first be a retail customer and have an installation which is already connected to the network. As a result load related matters are dealt with during the load connection process. There are no available Company records that indicate that any distribution substations have been added to the network or circuit augmentation required to facilitate the connection of a small scale embedded generator.

The numbers included in the templates for embedded generator connections are not considered as additional new customers connecting to the network. They therefore are not included in the connection data by Connection Subcategory – Residential, Industrial/Commercial or Subdivision.

The numbers quoted are standalone based on the connection requirements outlined in paragraph 1 of this reporting item.

2.5.2 Cost Metrics by Connection Classification

Compliance with requirements of the notice

The data provided in this section is based on the core data used to respond to the requirements for template 2.5.1. The data for this template is a restatement of the data provided in the previous template with a focus in this instance on the connection methodology defined in Appendix F.

Source of information

Data has been obtained from a number of internal sources as outlined below:

- Finance and Compliance Division – general ledger, fixed asset register and customer data.
- Network Connections Branch – Customer connection and NOSW information.

The data included in template 2.5.1 using the above sources has been used to complete the relevant parts of template 2.5.2. For example, the number of simple residential connections included in table 2.5.2 for 2017-2018 is the sum of the OH and UG connections from line numbers 1 and 2 of the Residential category in table 2.5.1.

Methodology and assumptions

The data held by the Company did not align with the data breakout as required by the reporting template. As a result it was necessary to cross match and supplement base data with other actual data available from other Company systems. Where data was not readily available from

historical records, required template information was derived from actual data and current information obtained from analysis and review of available information.

The assumptions used in the completion of this template are as follows:

- Residential – All residential connections are simple connections to existing LV infrastructure allowing connection of up to 100 amps single phase or 63 amps three phase.
- Commercial/Industrial – All commercial/industrial connections are complex, customers are connected at LV and there is some upstream network works required.
- Subdivision – All subdivision connections are complex with HV extension to the network to allow connections to be completed at LV to developed infrastructure.
- Embedded Generation – All embedded generation less than 5kW single phase is a simple connection made to an existing network connection for the residential load at the connected premises.

Endeavour Energy funded works Capital uplift- Forecast

From 2017-2018 onwards the company has decided to uplift capital with HV cables and packaged substation.

Assumption Capital Uplift			
	HV Cables	Substation	
ULL			
UIL			
UIS			
UCS			
UCL			Industrial Commercial
UML			
NRL			Residential
NRS			
URS			
UMS			Subdivision

Historical data standard Control – Capital Contribution

The data was sourced from the Non cash capital contribution Asset Register provided by Finance.

All assets were included in the basis of the prep including land.

Other noncustomer connection (Asset Relocation and Other) was added into the Industrial Commercial (HV) category as advised by AER due to the considerable amount.

Non Customer connections was categorised as Complex connection HV (customer connected at HV) it include Asset Relocation which has HV cables.

Use of estimated information

The completion of this template has been based on information contained in template 2.5.1. The data used are actual values based on the source data provided by groups listed under the heading “Source of Information”.

Reliability of information

The data used to complete the historical data in the template is based on actual data and has a high level of integrity and reliability.

Information Not Included in the Template

- Residential – The rows for Complex Connection LV and Complex Connection HV have not been allocated any values for the period.
- Commercial/Industrial – The rows for Simple Connection, Complex Connection HV (Customer Connected at LV, upstream asset works), Complex Connection HV (Customer connected at HV) and Complex Connection Sub – Transmission, have not been allocated any values for the period.
- Subdivision – The rows for Complex Connection, and Complex Connection HV (with upstream asset works), have not been allocated any values for the period.
- Embedded Generation – The rows for Complex Connection HV (Small Capacity) and Complex Connection HV (Large Capacity), have not been allocated any values for the period.

Worksheet 2.6 – Non-Network Expenditure

2.6.1 Non-Network Expenditure

Service Subcategory
IT and Communications

Compliance with requirements of the notice
The data presented in the tables contained in table 2.6.1 is consistent with the definition of Non-network IT and Communications Expenditure per the RIN definitions contained in Appendix F. In particular:

- The data presented in table 2.6.1 reflects IT & Communications opex and capex expenditure. The data is reported by Asset Category in accordance with the RIN definitions contained in Appendix F.

- The non-network IT & Communications opex and capex listed in table 2.6.1 is all non-network expenditure directly attributable to IT and communications assets including replacement, installation, operation, maintenance, licensing, and leasing costs but excluding all costs associated with SCADA and Network Control Expenditure that exist beyond gateway devices (routers, bridges etc.) at corporate offices.

- The opex data presented in tables 2.6.1 represents the total operating expenditure including labour, overtime, plant, materials, maintenance, other contractors, professional services and other operating expenses pertaining to all non-network IT & Communications expenditure. Further, Maintenance includes Computer Expenses (expense element 3600), Telephone-Land Line Lse/Purch/Call Chrgs (expense element 3610), Telephone-Employee Rembrs Call Chrg/Rent (expense element 3615) and Telephone-Mobile Phone Lse/Purch/Call Chr (3616).

- The Capex data presented in tables 2.6.1 represents the total operating expenditure including labour, overtime, plant, materials, maintenance, other contractors, professional services and other operating expenses pertaining to all non-network IT & Communications expenditure.

- The non-network IT & Communications opex and capex in table 2.6.1 is directly attributable to this expenditure category in this regulatory template. For the purposes of table 2.6.1 we have reported all capex and/or opex as Direct Costs as required, irrespective of them also being classified as Corporate Overheads or Network Overheads or other capex or opex categories.

Source of information
The information used to populate the tables contained in section 2.6.1 was extracted directly from TM1. Endeavour Energy uses this OLAP tool for various purposes including budgeting and forecasting, monthly reporting and regulatory account allocations and it has been used historically to provide data for previous audited RINs. It is a cube based technology which allows rules to be created between cubes and within cubes.

Set out in the table below are the specific cubes used to obtain the required information for the tables in section 2.6.1, along with a description in relation to the use of the cube by Endeavour Energy:

Table	TM1 Cube	Description
2.6.1	PNL cube	The PNL cube contains General ledger information sourced from Ellipse (GL system) based on Endeavour Energy's chart of accounts.
2.6.1	Project Reporting cube	The Project Reporting cube contains General ledger information sourced from SQL server database which is extracted nightly from Ellipse (GL System).

In addition, information from Work orders was utilised in section 2.6.1 which is extracted directly from MS Access query against the SQL server database which is extracted nightly from Ellipse. Query is run on parameters specified to extract the data.

Methodology and Assumptions

The following table sets out the methodology applied to calculate the required data for the IT and Communications sections in table 2.6.1:

Table	Methodology	Assumptions
2.6.1 (opex)	1. Extract IT & Communications Opex data from the TM1 PNL cube for Information Communication & Technology Division. 2. Extract IT & Communications Maintenance data from the TM1 PNL cube for all Divisions (excluding Information Communication & Technology Division). 3. Extract Work order data from MS Access query, parameters org unit I350 ICT Contracts & Commercial, Maintenance expense elements. Balance to extract of TM1 PNL cube for org unit I350, Maintenance category. 4. Extract data from TM1 cube Project Reporting to identify Retail Sale Labour Costs included in Information Communication & Technology Division Labour category. 5. Asset category allocation of above data based on RIN definitions. 6. Reconcile Asset Category to TM1 PNL cube data extracted above. 7. Identify subcategory SCADA and Network Control from Work order data	• Table 2.6.1 reflects historic opex figures stated in nominal dollars

Table	Methodology	Assumptions
	extract above and exclude for IT & Communications Asset Categories Client Device, Recurrent and Non-Recurrent expenditure as have individual subcategory. 8. Extract standard control only component by calculating the average opex standard control % of each branch associated with these non-network categories	
2.6.1 (capex)	1. Extract Capital Expenditure data from the TM1 PNL cube for all Org Units across Endeavour Energy coded to IT Capex Sub-Activities: • WD – WIP – IT&T Hardware • WE – WIP – IT&T Software • WF – WIP – IT&T Infrastructure 2. Extract data from TM1 cube Project Reporting against above Sub-Activities and allocate asset category against projects per RIN definition. 3. Extract standard control only component by reconciling to annual RINs	• Re-current refers to capital expenditures to Maintain Capability; example includes: applications and server refresh. • Non re-current refers to capital expenditures to Develop New Capabilities and New business enabling technologies, examples include: Transformation, Strategic Re-engineering, Process Re-engineering, CRM, Mobility and AMI. • Table 2.6.1 reflects historic opex figures stated in nominal dollars

Use of estimated information

While Endeavour Energy made an assumption in order to allocate the IT and Communications expenditure into the Asset Categories in the RIN templates, the opex and capex in table 2.6.1 reconciles to the annual RIN (as outlined above), it has not used estimated Information as provided in the definitions with the Regulatory Information Notice.

Reliability of information

All historical information provided represents Actual Information extracted from Endeavour Energy's reporting systems and reconciles to all reported IT and Communications opex and capex figures in the annual RIN however assumptions were made in order to classify the data into Asset Categories. As a result, the information contained in the tables in section 2.6.1 is considered to be reliable.

Service Subcategory

Motor Vehicles

Compliance with requirements of the notice

The data presented in the tables contained in table 2.6.1 is consistent with the definition of Motor Vehicles Expenditure per the RIN definitions contained in Appendix F. In particular:

- The Opex data presented in tables 2.6 represents the total operating expenditure including leasing, fuel, registration, CTP insurance, self-insurance, inspections, labour, materials, maintenance, contractor and other operating expenses pertaining to all Motor Vehicle expenditure.
- The Capex data presented in tables 2.6 represents the total capital expenditure pertaining to all Motor Vehicle expenditure including procurement of motor vehicles, labour, materials and major overhaul costs.
- The non-network Motor vehicle opex and capex in table 2.6.1 is directly attributable to this expenditure category in this regulatory template. For the purposes of table 2.6.1 we have reported all capex and/or opex as Direct Costs as required, irrespective of them also being classified as Corporate Overheads or Network Overheads or other capex or opex categories.

Source of information

The information used to populate the tables contained in section 2.6.1 was extracted directly from TM1. Endeavour Energy uses this OLAP tool for various purposes including budgeting and forecasting, monthly reporting and regulatory account allocations and it has been used historically to provide data for previous audited RINs. It is a cube based technology which allows rules to be created between cubes and within cubes.

Table	TM1 Cube	Description
2.6.1	PNL cube	The PNL cube contains General ledger information sourced from Ellipse (GL system) based on Endeavour Energy's chart of accounts.

In addition, information was also sourced from:

- The Ellipse Equipment register was utilised in section 2.6.1 which was utilised to extract vehicle numbers and is extracted directly from MS Access query against the SQL server database which is extracted nightly from Ellipse. Query is run on parameters specified to extract the data; and
- Fuel reports provided by suppliers were utilised to calculate kilometres travelled.

Methodology and Assumptions

The following table sets out the methodology applied to calculate the required data for the motor vehicles sections in table 2.6.1:

Table	Methodology	Assumptions
2.6.1 (opex)	1. The Opex data presented in table 2.6.1 was sourced from TM1 through the Fleet org units below which contain all motor vehicle expenditure. • S750 – Fleet Management • S751 – Fleet Operations • S752 - Vehicle Workshops • S753 – Fabrication Workshops 2. Historical data for 2016-17 is based on actuals in TM1	• Motor vehicle leasing, fuel, registration and CTP insurance costs by vehicle type have been maintained since Endeavour Energy started leasing vehicles in December 2009, thus allowing the classification of costs. • Fleet Labour, materials, contractors and other costs are not captured by vehicle type hence was apportioned based on advice from the Fleet manager.
2.6.1 (capex)	1. The Capex data presented in table 2.6.1 was sourced from TM1 through org unit S350 – Fleet Capital 2. Historical data for 2016-17 is based on actuals in TM1.	

Use of estimated information

The opex and capex in table 2.6.1 reconciles to the annual RIN (as outlined above), it has not used estimated Information as provided in the definitions with the Regulatory Information Notice.

Reliability of information

All historical information provided represents Actual Information extracted from Endeavour Energy's reporting systems, however assumptions were made in order to classify the data into Asset Categories. As a result, the information contained in the tables in section 2.6.1 is considered to be reliable.

Service Subcategory

Buildings & Property

Compliance with requirements of the notice

The data related to buildings and property expenditure presented in table 2.6.1 is consistent with the requirements of the Category Analysis RIN. In particular:

- The opex and capex reported relates to expenditure directly attributable to non-network buildings and property assets including the replacement, installation, operation and maintenance of non-network buildings, fittings and fixtures. It includes expenditure related to real chattels (e.g. interests in land such as a lease) but excludes expenditure related personal chattels (e.g. furniture) that is reported under non-network other expenditure.

- The opex and capex reported represents total expenditure including labour, plant, property, taxes, materials, maintenance, contractor and other expenses pertaining to all non-network building and property expenditure;

- The opex and capex reported in table 2.6.1 is directly attributable to this expenditure category in this regulatory template. For the purposes of table 2.6.1, Endeavour Energy have reported all capex and/or opex as *Direct Costs* as required, irrespective of them also being classified as *Corporate Overheads* or *Network Overheads* or other capex or opex categories.

Source of information

Opex
Buildings and property opex data in table 2.6.1 was extracted directly from TM1. Endeavour Energy uses this OLAP tool for various purposes including budgeting and forecasting, monthly reporting and regulatory account allocations and it has been used historically to provide data for previous audited Regulatory Accounts/ RINs. It is a cube based technology which allows rules to be created between cubes and within cubes.

Table	TM1 Cube	Description
2.6.1	PNL cube	The PNL cube contains General ledger information sourced from Ellipse (GL system) based on Endeavour's chart of accounts.

Capex
The information used to populate buildings and property capex data in table 2.6.1 was extracted directly from Endeavour Energy's general ledger (Ellipse). All non-system capex transactions for the financial year were extracted directly from Ellipse through the use of linked access database.

Methodology and Assumptions

The following table sets out the methodology applied to calculate the required data for non-network buildings and property expenditure reported in table 2.6.1:

Table	Methodology	Assumptions
2.6.1 (opex)	1. The Opex data presented in table 2.6 was sourced from TM1 through the Property Services org units below which contain all the non-network buildings and property expenditure • S200 - Facilities, Business & Information Support • S220 - Facilities Support - FSC • S230 - Facilities Support - Office Accommodation • S500 - Security Management • S510 - Security Locking • S210 - Property Portfolio Management • S300 - Fleet & Property Management 2. Only 50% of S300 costs were allocated to Buildings & Property expenditure as this org unit contains the Property & Fleet branch management costs which are split between Property & Fleet.	

Table	Methodology	Assumptions
	3. Historical data for 2016-17 is based on actuals in TM1.	
2.6.1 (capex)	1. All non-system capex transactions for the financial year were extracted from the general ledger through an access database query (all activity 92 transactions); 2. Those transactions relating to non-network buildings and property expenditure were identified via the sub-activity assigned to the transaction. Endeavour Energy uses sub-activity WC to identify expenditure on non-network buildings and property; 3. The standard control component of each transaction was identified by applying asset allocation drivers used in the preparation of the Annual RIN; 4. The total standard control component of non-network buildings and property was calculated and reported in table 2.6.1. It should be noted that the non-network buildings and property capex reported in table 2.6.1 reconciles to the non-network buildings and property capex reported in the Annual RIN.	None.

Use of estimated information

Endeavour Energy has not used Estimated Information, as defined in the RIN Instructions & Definitions, in reporting buildings and property expenditure in table 2.6.1.

Reliability of information

All information provided represents Actual Information extracted from Endeavour Energy's reporting systems and reconciles to non-network building and property expenditure reported in the Annual RIN. As a result, the buildings and property expenditure reported in table 2.6.1 is considered to be reliable.

Service Subcategory

Other

Compliance with requirements of the notice

The data related to other non-network expenditure presented in table 2.6.1 is consistent with the requirements of the Category Analysis RIN. In particular:

- The opex and capex reported relates to expenditure directly attributable to the replacement, installation, maintenance and operation of non-network assets, excluding Motor Vehicle assets, Building and Property assets and IT and Communications assets and includes:
    - non road registered motor vehicles; non road motor vehicles (e.g. forklifts, boats etc.);
    - mobile plant and equipment; tools; trailers (road registered or not);

- elevating work platforms not permanently mounted on motor vehicles; and
- mobile generators.

- The opex and capex reported represents total expenditure including labour, plant, property, taxes, materials, maintenance, contractor and other expenses pertaining to all non-network building and property expenditure;

- The opex and capex reported in table 2.6.1 is directly attributable to this expenditure category in this regulatory template. For the purposes of table 2.6.1, Endeavour Energy has reported all capex and/or opex as *Direct Costs* as required, irrespective of them also being classified as *Corporate Overheads* or *Network Overheads* or other capex or opex categories.

Source of information

Opex
Endeavour Energy has not identified any opex incurred during the financial year which meets the definition of non-network other expenditure.

Capex
The information used to populate non-network other capex data in table 2.6.1 was extracted directly from Endeavour Energy's general ledger (Ellipse). All non-system capex transactions for the financial year were extracted directly from Ellipse through the use of linked access database.

Methodology and Assumptions

The following table sets out the methodology applied to calculate the required data for non-network other expenditure reported in table 2.6.1:

Table	Methodology	Assumptions
2.6.1 (capex)	1. All non-system capex transactions for the financial year were extracted from the general ledger through an access database query (all activity 92 transactions); 2. Those transactions relating to non-network other expenditure were identified via the sub-activity assigned to the transaction. Endeavour Energy uses sub-activity WG to identify expenditure on furniture fittings, plant and equipment and WH to identify expenditure on motor vehicles (a subset of which meets the definition of non-network other expenditure); 3. For the non-system capex expenditure on motor vehicles, those transactions relating to non-road registered motor vehicles, non-road motor vehicles (e.g. forklifts, boats etc.) and mobile plant and equipment were identified. This was performed using the assigned	None.

Table	Methodology	Assumptions
	asset class for unregistered plant and information provided by Fleet in relation to the type of equipment purchased (i.e. bobcats, trailers etc); 4. The standard control component of each transaction was identified by applying asset allocation drivers used in the preparation of the Annual RIN; 5. The total standard control component of non-network other capex was calculated and reported in table 2.6.1.	

Use of estimated information
Endeavour Energy has not used Estimated Information, as defined in the RIN Instructions & Definitions, in reporting non-network other expenditure in table 2.6.1.

Reliability of information
All information provided represents Actual Information extracted from Endeavour Energy's reporting systems and reconciles to total non-network expenditure reported in the Annual RIN. As a result, the non-network other expenditure reported in table 2.6.1 is considered to be reliable.

2.6.2 Annual Descriptor Metrics – IT and Communications Expenditure

Service Subcategory
IT and communications expenditure

Compliance with requirements of the notice
The data presented in the tables contained in table 2.6.2 is consistent with the definition of Non-network IT and communications expenditure per the RIN definitions contained in Appendix F. In particular:

- The *Non-network IT & Communication - user numbers* are the active IT system log in accounts used for regulated purposes and the *Non-network IT & Communications – device numbers* are the number of client devices used to provide regulated services. Client Devices are hardware devices that accesses services made available by a server and may include desktop computers, laptops, tablets and thin client interfaces and handheld end user computing devices including smart phones, tablets and laptops.

Source of information
The information used to populate the tables contained in section 2.6.2 financials was extracted directly from TM1. Endeavour Energy uses this OLAP tool for various purposes including budgeting and forecasting, monthly reporting and regulatory account allocations and it has been used historically to provide data for previous audited RINs. It is a cube based technology which allows rules to be created between cubes and within cubes.

Table	TM1 Cube	Description
2.6.2	Labour Info cube	The PNL cube contains Staff Details and FTE/Headcount.

2.6.2	AER Totex by account cube	The AER Totex by account cube provides financials for forecast AER period.

Set out in the table below are the specific reports used to obtain the required information for section 2.6.2:

Table	Descriptor Metrics	Description / Source
2.6.2	Employee Numbers	Historic – monthly headcount staff listing as agreed with Human Resources on a monthly basis.
2.6.2	User Numbers	CGI Active Directory Listing
2.6.2	Number of Devices	CGI Billing report Schedule U – total desktop & laptops Optus & Telstra Billing Summary report – total PDA's Capital transaction report Workorder specific – Total Tablets

To proportion metrics to regulated services, historic Standard Control % for PC/Devices was sourced from the Annual RIN.

Methodology and assumptions

The following table sets out the methodology applied to calculate the required data for the IT sections in table 2.6.2:

Table	Methodology	Assumptions
2.6.2	1. Employee Numbers extracted from Monthly Headcount Staff Listing Report for historic data. 2. Standard Control % extracted from TM1 cube Reg Accounts 3. Apply extracted Standard Control % against Employee Numbers for regulated data.	• Employee Numbers are headcount numbers at June for each year. Headcount numbers provide a better comparison for user and device numbers. • Standard Control % allocation sourced from Reg Accounts and AER cubes for Endeavour Energy, Labour category for each year.
2.6.2	1. User Numbers for 2016-17 actuals extracted from CGI Active Directory Listing (@ July 2016). 2. Apply extracted Standard Control % allocation against User Numbers for regulated data.	• CGI Active Directory Listing lists every active account at the present time, Endeavour Energy, CGI, Optus and any other third party who needs to have access to our systems. Periodically this list is reviewed and updated and access is removed

Table	Methodology	Assumptions
		for employees who have left the organisation, contractors who no longer need to have access etc. • Standard Control % allocation sourced from Annual RIN
2.6.2	1. Device Numbers (excluding PDA's) extracted from CGI Billing report Schedule U – total desktop & laptops for historic data. 2. Device Numbers (PDA only) extracted from Optus and Telstra Billing reports for historic data. 3. Device Numbers (Tablets only) extracted from capital expenditure report for historical data. 4. Apply extracted Standard Control % against Device Numbers for regulated data.	CGI Billing Report, Schedule U provides number of desktops and laptops. Utilised CSI Billing Report for June. • Optus and Telstra billing report for June provides the number of PDA's. • Capital expenditure report for 2016-17, extracted from access database (Ellipse connector script), with total for workorder 04021137 for Del Tablet 7130 utilised for 2016-17 Actuals. • Standard Control % allocation sourced from the Annual RIN

Use of estimated information

Endeavour Energy has not used estimated information, as defined in the RIN Instructions & Definitions in reporting expenditure in table 2.6.3.

Reliability of information

All historical information provided represents Actual Information extracted from Endeavour Energy's reporting systems. As a result, the information contained in the tables in section 2.6.1 is considered to be reliable.

2.6.3 Annual Descriptor Metrics – Motor Vehicles

Service Subcategory

Motor vehicles expenditure

Compliance with requirements of the notice

The data presented in table 2.6.3 is consistent with the definitions of Motor Vehicle Descriptor Metrics per the RIN definitions contained in Appendix F.

Source of information

The information used to populate the tables contained in section 2.6.3 was extracted from internal Fleet management reports and is consistent with other benchmarking figures provided to Networks NSW. Fleet Service Provider reports were also utilised to extract average kilometres travelled.

Methodology and assumptions

The following table sets out the methodology applied to calculate the required data for the Annual Descriptor metrics for motor vehicles in table 2.6.3:

Table	Methodology	Assumptions
2.6.3	1. **Average kilometres travelled** were derived from Fuel reports provided by leasing companies (Fleet-Plus & SG Fleet) for the leased vehicles and from the Fuel companies (Shell & Caltex) for company owned vehicles. 2. **Numbers purchased** were extracted from the Equipment register in Ellipse 3. **Numbers leased** were based on reports provided by leasing companies (Fleet-Plus & SG Fleet) and is the average number during the year 4. **Number in Fleet** is the combination of leased vehicles and company owned vehicles and is the average throughout the year	• None

Use of estimated information

Endeavour Energy has not used estimated information, as defined in the RIN Instructions & Definitions in reporting expenditure in table 2.6.3.

Reliability of information

All historical information provided represents Actual Information extracted from Endeavour Energy's reporting systems. As a result, the information contained in table 2.6.3 is considered to be reliable.

Worksheet 2.7 – Vegetation Management

2.7.1 Descriptor Metrics by Zone

Compliance with requirements of the notice
The data presented in table 2.7.1 is consistent with the requirements of the Economic Benchmarking RIN. In particular, Endeavour Energy has provided data for the descriptor metrics by zone 1.

Source of information
Information provided in table 2.7.1 was sourced from Endeavour Energy's Geographical Information System (GIS), Rural Fire Service map polygons applied to the GIS, a Scope data directly supplied by our Contractors and Audit review of vegetation management contracts using the GIS Cloud work flow management system, and the Bureau of Meteorology web site and the Vegetation Program Completion Process.

GIS Cloud Work flow Management System:

The GIS Cloud mobile data collection system was implemented FY16 to replace the AM4 System. It delivers to Endeavour Energy improved functionality over the provision of an auditable, sophisticated workflow management system that is geospatially enabled (including tracking) with real time data capability.

GIS Cloud is a cloud based solution delivering a "Real-time mapping platform for the entire workflow of your organisation and integrates with Ellipse. Endeavour Energy implements the workflow described below to manage;

1. Vegetation Management contracts
2. Auditing function
3. the Defect management system to integrate with the Ellipse corporate asset database.

The Vegetation Program Completion Process is detailed in Branch Work Place Instruction WVM 0838.The purpose of this Branch Workplace Instruction is to define the process, including clarity of roles and responsibilities within the Vegetation Control Section of the Maintenance Branch. It is also to minimise business risk. It should be noted by all parties that being flexible and adaptable to the evolving needs of the business is a necessary element of this process and additional information may be requested by the Program Director, the Vegetation Control Manager or the Vegetation Contracts Operations Manager, as required, at any point in the program delivery cycle.

This Branch Workplace Instruction is underpinned by effective, collaborative working relationships between all parties. Equally important is all parties fostering effective relationships with other stakeholders.

The information provided in table 2.7.2 was provided from the financial accruals and work orders contained in corporate database Ellipse.

Methodology and assumptions
The assumptions made in regard to the data in Table 2.7.1 are as follows:

1. Average number of trees per urban and CBD vegetation maintenance span?

Average = total number of trees identified for trimming in urban areas divided by the total number of maintained spans in urban areas.

2. Average number of trees per rural vegetation maintenance span?

Average = the total number of trees identified for trimming in rural areas divided by the total number of maintained spans in rural areas.

Table 2.7.1 identifies a descriptor for vegetation corridors in kilometres. The length of the corridors has described urban and CBD and rural and the data is developed from a spatial query and uses the Urban Centres and Localities (UCL) dataset from Australian Bureau of Statistics attached to the GIS data clipped to the Endeavour Energy franchise. The query describes the length of vegetation corridors as zero as these are included in the route line length and is not in addition to the route line length.

Use of estimated information
In table 2.7.1 the average number of trees per span is estimated as outlined in the methodology above.

Reliability of information
All the information provided represents actual information extracted from Endeavour Energy's reporting systems and reconciled to reported figures in previous audited benchmark RINs. As a result the information contained in table 2.7.1 is considered to be reliable.

2.7.2 Expenditure Metrics by Zone

Compliance with requirements of the notice
The data presented in the tables contained in section 2.7.2 is consistent with the requirements of the Economic Benchmarking RIN.

Since Endeavour Energy completed the 2009 Distribution Determination RIN there have been a range of structural and operational changes across divisions as well as within the network functions.

As a consequence, Endeavour Energy's activities and sub-activities that are used to identify actual costs by the opex categories contained in the annual RIN were reviewed and updated to ensure that the relationship between internal functions and reported costs is as robust and accurate as possible.

The cost metrics in Table 2.7.2 has been categorised and reported in a manner that is consistent with Endeavour Energy's approved Cost Allocation Method and most recent annual reporting RIN activities in the 2013-14 Regulatory Financial Statements.

The expenditure on vegetation corridor clearance and other vegetation management costs are included in the tree trimming (excluding hazard trees) expenditure line. Endeavour Energy's systems do not capture data on 'vegetation corridor clearance' and 'other vegetation management costs' as they are defined in the RIN. In the absence of both technical and financial information for these expressly termed classifications, Endeavour Energy cannot form a basis for estimation of their volumes or costs.

Source of information
The information used to populate the tables contained in tables 2.7.2 was extracted directly from TM1 and work order account codes in Ellipse. Endeavour Energy uses this OLAP tool for various purposes including budgeting and forecasting, monthly reporting and regulatory account

allocations. It is a cube based technology which allows rules to be created between cubes and within cubes.

Methodology and assumptions

The information in table 2.7.2 was already prepared and reported in the Annual Financial Statements for each year of the reported periods and the information has been transposed from the final Annual Financial Statements (rather than being re-performed).

Set out in the table below are the specific cubes used to obtain the required information for tables 2.7.2, along with a description in relation to the use of the cubes by Endeavour Energy:

Table	TM1 Cube	Description
2.7.2	Reg Accounts cube	The Reg Accounts cube is used by Endeavour Energy to store and report the Opex into the service categories (i.e. Standard Control, Alternate Control and Unregulated categories) at the account code level. It is the primary tool used to allocate opex in accordance with Endeavour Energy's approved Cost Allocation Method. Standard control vegetation data was extracted from the TM1 Reg Accounts cube at the account code level (N level org units) for each financial year for the category called "Regulated Network $".

Use of estimated information

All the information provided represents actual information extracted from Endeavour Energy's reporting systems and reconciled to reported figures in previous audited benchmark RINs. As a result the information contained in table 2.7.2 is considered to be reliable.

Reliability of information

All the information provided represents actual information extracted from Endeavour Energy's reporting systems and reconciled to reported figures in previous audited RINs. As a result the information contained in table 2.7.2 is considered to be reliable.

2.7.3 Descriptor Metrics Across all Zones – Unplanned Vegetation Management Events (fire reporting)

Source of information

Incidents on the network are recorded in Endeavour Energy's Outage Management System (OMS). OMS is routinely interrogated using a Cognos Impromptu query to identify any incidents where fire was involved.

A nominated representative from each of Endeavour Energy's three regions is contacted on a monthly basis and requested to co-ordinate the submission of reports containing information relating to the incidents identified by the Cognos Impromptu query.

Information contained in the fire reports is entered into a MS Access database known as the Fire Reporting database.

The documentation relating to the above process is contained in Company Procedure (Network) GAM 0121 – Fire Incident investigation, Company Form (Network) FAM 0057 – Fire investigation report – Form A and Branch Work Place Instruction (Network Data and Performance) WPB 2008 - Management of the network fire reporting process.

Methodology

For the 2017-18 financial year records of each of the fires occurring in the year each were extracted from the Fire Reporting database and exported into a MS Excel spreadsheet. A series

of calculations were embedded into the spreadsheet to identify those incidents that were vegetation related. 19 incidents were identified.

In 2015-16 the Fire Reporting database was modified to also include a field 'AER Root Cause". This field is populated, if appropriate, at the time when the details of the fire incident are first entered into the database. This field is used to determine the number of incidents that meet the AER reporting criteria.

Reliability of information

All the information provided represents actual information extracted from Endeavour Energy's reporting systems and reconciled to reported figures via the process detailed above. As a result the information contained in table 2.7.3 is considered to be reliable.

Worksheet 2.8 - Maintenance

2.8.1 Descriptor Metrics for Routine and Non-Routine Maintenance

Compliance with requirements of the notice
The asset quantities have been developed from Endeavour Energy's asset base and the number of assets maintained during 2017-18 have been entered and therefore comply with requirements.

Source of information
- Ellipse/Cognos
- GIS/Network Statistics (June 2018)
- NMIP Reporting provided from Portfolio Management & Governance Branch
- Network Maintenance Standards
- RIN Table 2.2
- RIN Table 5.2

Methodology and assumptions
- Asset quantities have been obtained from GIS/Network Statistics (June 2018) and Ellipse data.
- Inspected/Maintained quantities have been obtained a PowerBI Report managed by Portfolio Management & Governance Branch.
- The average age of the asset group was calculated from the average age of each asset category within the group weighted by the total replacement cost for each category.
- Inspection cycle data was obtained from the Network Maintenance Standards for each asset group.

Use of estimated information
Estimation based on the methods noted above was used to provide maintenance quantities and the average age of the asset group.

Reliability of information
The information provided has been principally based on Ellipse data and corporate finance reports available at the time of preparation.

Pole tops and overhead lines
- Asset quantities obtained from Network Statistics.
- Maintenance quantities obtained from PowerBI NMIP Report.

Service lines
- Asset quantities obtained from Network Statistics.

Overhead lines
- Asset quantities obtained from Network Statistics.
- Maintenance quantity obtained PowerBI NMIP Report.
- Line lengths were estimated from pole and tower volumes and typical spans for pole and tower lines.

Underground cables: by voltage
- Asset quantities obtained from Network Statistics.
- Maintenance quantities obtained from regional maintenance data.

Underground cables: by location

- Underground cables of all voltages obtained from Network Statistics and included in Non-CBD Asset Category.
- Maintenance quantities derived from GIS cable data under the assumption all patrols were carried out.

Distribution substation transformers

- Asset quantities obtained from Ellipse data.
- Maintenance quantity obtained PowerBI NMIP Report.

Distribution substation switchgear

- Asset quantities obtained from Ellipse data.
- Maintenance quantity obtained PowerBI NMIP Report.

Distribution substation – property

- Asset quantities obtained from Network Statistics.
- Maintenance quantity obtained PowerBI NMIP Report.

Number of zone substation transformers

- Asset quantities obtained from Ellipse data.
- Maintenance quantity obtained PowerBI NMIP Report.

Number of distribution transformers within zone substations

- Asset quantities obtained from Network Statistics and Ellipse data.
- Maintenance quantity obtained PowerBI NMIP Report.

Zone substation properties

- Asset quantities obtained from Network Statistics.
- Maintenance quantity obtained PowerBI NMIP Report.

Public lighting

- Asset quantities obtained from Network Statistics.
- All public lighting assets were included in the Minor Roads Asset Category.
- Maintenance quantity obtained PowerBI NMIP Report.

SCADA & network control maintenance

- Asset quantities obtained from the SCADA group.
- Maintenance quantity obtained PowerBI NMIP Report.

Protection systems maintenance

- Asset quantities obtained from Ellipse.
- Maintenance quantity obtained PowerBI NMIP Report.

2.8.2 Cost Metrics for Routine and Non-Routine Maintenance

Compliance with requirements of the notice

The financial costs of asset maintenance for the 2017-18 year have been entered and therefore comply with the requirements.

Source of information

- Financial standard control opex records
- Ellipse/Cognos

Methodology and assumptions

- Financial Sub Activity types "RI – Inspection and Investigation" and "RP – Preventative Based Maintenance" have been categorised as Routine Maintenance expenditure.
- All the other Financial Sub Activity types have been categorised as Non-Routine Maintenance expenditure.
- Financial Activity Types have been grouped into Maintenance Activities and Maintenance Asset Categories as shown in the Table below.

Financial Activity Type	RIN Maintenance Activity	RIN Maintenance Asset Category
• OLI /GLI	Pole inspection and treatment	All poles
• Transmission Mains Maintenance (OH Mains and Vegetation Control) • Distribution Mains Maintenance	Overhead asset inspection	All overhead assets
• Distribution UG Mains Maintenance	Network underground cable maintenance: by voltage	LV - 11 to 22 kV
• Transmission Mains Maintenance (excluding OH Mains and Vegetation Control)	Network underground cable maintenance: by voltage	33 kV and above
• Distribution UG Mains Maintenance • Transmission Mains Maintenance (excluding OH Mains and Vegetation Control)	Network underground cable maintenance: by location	Non-CBD
• Distribution Substation Maintenance	Distribution substation equipment & property maintenance	Distribution substation transformers
		Distribution substation switchgear (within-substations and stand-alone switchgear)
		Distribution substation - other equipment
		Distribution substation - property
• Transmission Substation Maintenance (excluding building repairs and maintenance)	Zone substation equipment maintenance	Transformers - zone substation
		Transformers - distribution
		Transformers - HV
		Zone substation - other equipment
• Transmission Substation Maintenance (Building repairs and maintenance)	Zone substation property maintenance	All zone substation properties
• Protection and Control System Maintenance	Protection systems maintenance	Protection systems maintenance
• All other maintenance activities	Other	DNSP to nominate

Use of estimated information

Financial reporting data for some maintenance activities do not have asset category level information required by RIN. In such cases estimates have been used as follows.

- Routine maintenance expenditure for "Distribution Substation Equipment & Property Maintenance" and "Zone Substation Equipment Maintenance" prorated to asset categories based on the ratios developed from NMIP routine maintenance targets.

- Non-routine maintenance expenditure for “Distribution Substation Equipment & Property Maintenance” and “Zone Substation Equipment Maintenance” prorated to asset categories based on the ratios developed from 2017-18 work order expenditure for Fault and Emergencies and Condition Based Maintenance.

Reliability of information

Actual numbers from financial standard control opex records were used.

Worksheet 2.9 – Emergency Response

2.9.1 Emergency Response Expenditure (Opex)

Compliance with requirements of the notice

The data presented in table 2.9.1 is consistent with the requirements of the Category Analysis RIN. In particular:

- The data presented in table 2.9.1 (Emergency response expenditure) represents the opex split of emergency response expenditure into Standard Control Services with the definition of emergency response provided in Appendix F of the Regulatory Information Notice.
- Emergency response expenditure reported in table 2.9.1 only relates to direct expenditure incurred to restore a failed component to an operational state including all expenditure relating to the work incurred where supply has been interrupted or assets damaged or rendered unsafe by a breakdown, making immediate operations and/or repairs necessary.
- Emergency response expenditure is primarily required due to network failure caused by weather events, vandalism, traffic accidents or other physical interference by non-related entities.
- Total emergency response expenditure (A) reported in table 2.9.1 consists of direct expenditure only and excludes overheads (Direct "Network" overheads and Indirect "Corporate" overheads) and reconciles to the total direct emergency response opex as disclosed in the Annual RIN.
- All emergency response expenditure reported in table 2.9.1 are Direct Costs only as outlined in section 1.15 in Appendix E (Principles and Requirements) of the RIN and excludes expenditures on Overheads also as defined in Appendix E (Principles and Requirements) of the RIN.

Source of information

- Total direct emergency response expenditure was extracted from the Annual RIN work papers. Emergency response expenditure is identified by analysing the activity and sub-activity attributes of operating expenditure transactions. Only those transactions with the following activity and sub activity combinations were applicable:

Activity	Sub Activity	Justification
All operating activities (excluding activity 11 – Third Party Impacts which is below)	RF - Fault and Emergency Repairs	Fault and Emergency repair costs are associated with the unscheduled maintenance or repair / replacement of major defective components associated with Endeavour Energy assets and equipment (e.g. through storm damage).
	74 - Unplanned Switching	Unplanned switching work costs are incurred and required for operational maintenance and construction work where no access permit has been obtained.

Activity	Sub Activity	Justification
	75 - Emergency Switching	Emergency switching work costs relate to the provision of switching and fault location on the network under emergency conditions and includes work carried out by Emergency Response Officers.
11 - Third Party Impacts	All sub activities	Non recoverable costs incurred as a result of events such as motor vehicle accidents, vandalism, and impact damage to poles, mains, substations and street lighting requiring immediate rectification and/or repairs to make safe and operational.

- To complete parts (B) and (C) all emergency response transactions were extracted from the General ledger (Ellipse - ERP). Endeavour Energy uses Ellipse for various purposes including accounts payable, payroll, asset and equipment registers and financial reporting functions.

- A list of Major event days was provided by the Network Performance Review Manager.

Methodology and assumptions

Table	Methodology	Assumptions
2.9.1 (A) Total Emergency Response expenditure	• Total emergency response direct expenditure was extracted from the AER Totex by Account cube in TM1.	None.
2.9.1 (B) Major Events O&M expenditure	• The major events identified in section 2.9.1(c) will also be reported in section 2.9.1(b). Extract all emergency response transactions from the ellipse transaction database. • Using the list of major event days provided by the Network Performance Review Manager, match these events with the expenditure captured by the parent work orders raised for each event. • Group the transactions under each of these parent work orders and report the totals for each major event day. • Also review all work orders not linked to a parent work order to determine if they relate to a major event day based on their description and add them to the reported totals.	
2.9.1 (C) Major Event Days O&M expenditure	• The major events identified in section 2.9.1(b) will also be reported in section 2.9.1(c).	

Use of estimated information

Information reported in table 2.9.1 consists of Actual Information as defined in the RIN Instructions & Definitions.

Reliability of information

Information reported in table 2.9.1 consists of Actual Information extracted from Endeavour Energy's reporting systems and reconciles to direct emergency response opex figures calculated for the purposes of the Annual RIN. As a result, the information contained in table 2.9.1 is considered to be reliable.

Worksheet 2.10 – Overheads

2.10.1 Network Overheads Expenditure and 2.10.2 Corporate Overheads Expenditure

Compliance with requirements of the notice

The data presented in tables 2.10.1 and 2.10.2 is consistent with the requirements of the Category Analysis RIN. In particular:

- The data presented in table 2.10.1 (Network Overheads expenditure) represents the opex split of network overheads expenditure into Standard Control Services with the definition of network overheads provided in Appendix F of the RIN;
- Endeavour Energy has previously reported *network operating costs* in its Regulatory Accounting Statements, therefore Endeavour Energy have reported this expenditure under network overhead in regulatory template 2.10.1 and into the six mandatory subcategories provided;
- Network operating costs are disaggregated into the following six sub categories: network management, network planning, network control and operational switching, quality and standard functions, project governance and related functions and other;
- Endeavour Energy has previously reported *corporate overheads* in its Regulatory Accounting Statements and are not included in any other overhead subcategory, therefore Endeavour Energy have reported this expenditure in regulatory template 2.10.2;
- The data in tables 2.10.1 and 2.10.2 are overhead costs that are reported before allocation to services or direct expenditure and before any capitalisation. The opex in tables 2.10.1 and 2.10.2 has been categorised and reported in a manner that is consistent with Endeavour Energy's approved Cost Allocation Method and the 2016-17 Annual RIN.

Endeavour Energy capitalises a portion of its overheads which are directly attributable to capital works in order to facilitate the identification of the true cost of activities performed. This enables capitalised projects with enduring economic benefit to be capitalised at their true cost.

Source of information

Financial data is sourced from the AER Totex by Account cube in TM1. Endeavour Energy uses this OLAP tool for various purposes including budgeting and forecasting, monthly reporting and regulatory account allocations and it has been used historically to provide data for previous audited Regulatory Accounts/RINs. It is a cube based technology which allows rules to be created between cubes and within cubes.

In particular, the AER Totex by Account cube is used by Endeavour Energy to store and report annual opex into the service categories (i.e. Standard Control, Alternate Control and Unregulated categories) at the account code level. It is the primary tool used to allocate opex in accordance with Endeavour Energy's approved Cost Allocation Method.

Methodology and assumptions

Table	Methodology	Assumptions
2.10.1 and 2.10.2	1. Extract opex data from the TM1 AER Totex by Account cube at the account code and AER category level for the financial year. 2. Reconcile the total derived at the individual	

Table	Methodology	Assumptions
	account code level to the total from the TM1 AER Totex by Account cube (N Level Org Units) to ensure no account codes have been excluded. 3. Determine which of the mandatory six subcategories that the costs that have been allocated to the category of "Network operating costs". Assign the costs to a subcategory based on the account code combination, org unit or Branch in addition to the guidelines provided in Appendix E and Appendix F of the guidelines document. 4. Add back the proportion of capitalised overheads from the historical period. 5. Populate tables 2.10.1 and 2.10.2 based on the outcome of steps 1 to 4 above. *Note: given TM1 AER Totex by Account cube data is available and represents previously reported figures, all information provided for this table consists of actual information (no estimated information required).*	

Use of estimated information

Information reported in table 2.10.1 and 2.10.2 consists of Actual Information as defined in the RIN Instructions & Definitions.

Reliability of information

Information reported in table 2.10.1 and 2.10.2 consists of Actual Information extracted from Endeavour Energy's reporting systems and reconciles to opex figures calculated and reported in the Annual RIN. As a result, the information contained in table 2.10.1 and 2.10.2 is considered to be reliable.

Worksheet 2.11 – Labour

2.11.1 Cost Metrics per annum and 2.11.2 Descriptor Metrics

Compliance with requirements of the notice

The data presented in tables 2.11.1 and 2.11.2 is consistent with the requirements of the Category Analysis RIN. In particular:

- Only labour costs allocated to the provision of standard control services is reported in the labour cost tables.
- Labour used in the provision of contracts for both goods and services, other than contracts for the provision of labour (i.e. labour hire contracts), is not reported in these tables.
- All labour data has been presented according to the labour classification levels provided in the relevant table in the template. The methodology adopted to classify workers into the various classification levels is outlined below.
- The quantities of labour, expenditure and stand-down occurrences have not been reported multiple times across the tables.
- The Average Staff Level ('ASL') for each labour classification level reflects the average paid FTEs for each classification level over the course of the year. Specifically, this represents the average of the opening (30 June 2016) and closing (30 June 2017) staff levels for the year. One ASL is equal to one FTE employee undertaking standard control services work receiving salary or wages over the entire year. Therefore, one FTE that spends 50% of their time on standard control services work is reported as 0.5 ASL.
- Stand down periods are reported against the relevant classification level in the table containing the relevant labour.
- The labour costs consist of labour hire, ordinary time earnings, other earnings, oncosts and taxes and superannuation.

Source of information

- ASL numbers were sourced from 30 June 2016 and 30 June 2017 detailed FTE reports stored on Endeavour Energy's shared network directory. This detailed FTE information is used in labour reporting to executive management to monitor and manage labour expenditure.
- Labour expenditure, labour rates (normal time and overtime) and overtime hours information was extracted from various reporting cubes in TM1 (PNL cube, Labour Info cube, Labour Reporting cube and AER Totex by Account cube). Endeavour Energy uses TM1 for various purposes including budgeting and forecasting, monthly reporting and regulatory account allocations and it has been used historically to provide data for previous audited Regulatory Accounts/RINs. It is a cube based technology which allows rules to be created between cubes and within cubes.
- Average productive work hours were sourced from the detailed FTE reports which provide weekly hours per FTE and is used to estimate the annual productive hours.
- Stand-down occurrences were sourced from Cognos Impromptu. Cognos is a reporting tool used to extract data from Ellipse (ERP).

Methodology and assumptions

The following tables set out the methodology applied to obtain the required data for tables 2.11.1 and 2.11.2.

Table	Methodology	Assumptions
2.11.1	**Average Staff Level (ASL)** 1. Obtain detailed FTE reports as at 30 June 2016 and 30 June 2017 used in the preparation of labour reporting to executive management. 2. Map each worker to a labour classification level required by table 2.11.1 based on the workers position description. In addition, a Network/Corporate allocation is performed based on the workers home org unit. 3. Multiply each FTE by a standard control percentage in order to calculate standard control FTEs. The standard control percentage is calculated by analysing the standard control component of total labour expenditure (opex and capex) for each org unit. 4. Determine ALSs for each labour classification level by calculating the average standard control FTEs for the year using 30 June 2016 and 30 June 2017 data and populate table 2.11.1.	The standard control percentage for each org unit is assumed to apply equally to all employees within that org unit.
	Total Labour Expenditure 1. Extract system capex labour expenditure from the ellipse transaction database at the project, org unit and expense element level. Allocate switching and capitalised overheads to each line item on a pro-rata basis and identify the standard control labour expenditure for each line item (i.e. all line items excluding projects SL****, MC101, MC104, MC107 and MC110 will be standard control). 2. Extract non-system capex labour expenditure from the from the ellipse transaction database at the org unit and expense element level. Apply standard control percentages obtained from the non-system capex Annual RIN workings to each asset class in order to calculate the standard control component of each line item. • 3. Extract standard control opex labour expenditure from the AER Totex by account cube at the org unit and expense element level. • 4. Calculate total labour cost for standard control	• The standard control percentage for each org unit is assumed to apply equally to all employees within that org unit. • Standard control labour expenditure per org unit is assumed to be attributed to each labour classification level based on the ratio of FTEs.

Table	Methodology	Assumptions
	services by org unit. Pro-rata the standard control labour cost at the org unit level to each labour classification level identified for each org unit from the detailed FTE report. • 5. Summarise standard control labour expenditure by labour classification level and populate table 2.11.1.	
	Average Productive Work Hours 1. Calculate the annual productive hours for each FTE in the detailed FTE report as hours per week x 52.17 weeks x the average productive rate per FTE (84%). 2. Using the labour classification level mappings completed for ASL purposes, calculate the average productive hours per labour classification level and populate table 2.11.1.	Average productive rate per FTE at Endeavour Energy is estimated to be 84%.
	Stand-down Occurrences 1. Extract all stand-down transactions from Ellipse via a Cognos report which restricts transactions to labour earning code 011 (stand-down). 2. Using the employee's service number, map each employee to the relevant labour classification level (from ASL workings). • 3. Divide the total number of stand-down occurrences by the ASL for each labour classification level to calculate average stand-down occurrences per ASL and populate table 2.11.1.	None.
2.11.2	**Average productive work hours (ordinary time) per ASL** is equal to the figures reported in table 2.11.1.	None.
	Average hourly rate (ordinary time) per ASL 1. Extract ordinary time hourly rates including oncost from the Labour Info cube in TM1 for each FTE listed in the detailed FTE report. 2. Using the labour classifications determined for each employee for the purposes of completing table 2.11.1, calculate an average hourly rate for each labour classification level and populate table 2.11.2.	None.
	Average productive work hours (overtime) per ASL 1. Extract overtime hours per org unit from the Labour Hours Reporting cube in TM1.	The overtime hours worked per org unit are pro-rated against the labour classification levels for each org unit based on FTE

Table	Methodology	Assumptions
	2. Pro-rata the overtime hours for each org unit over the labour classification levels within each org unit (based on FTEs) to determine overtime hours per labour classification level. • 3. Divide the overtime hours for each labour classification level by the equivalent ASL for the current year to determine the average productive work hours (overtime) per ASL.	mappings.
	Average hourly rate (overtime) per ASL 1. Extract overtime hourly rates from the Labour Info cube in TM1 for each FTE listed in the detailed FTE report. **2.** Using the labour classifications determined for each employee for the purposes of completing table 2.11.1, calculate an average hourly rate for each labour classification level and populate table 2.11.2.	None.

Use of estimated information

Estimated information was used in the following instances:

- Labour classification levels were assigned to each FTE based on an assessment of each FTEs position description. This categorisation is not maintained by Endeavour Energy in its reporting systems.

- Productive hours for each FTE were estimated since Endeavour Energy's reporting systems do not have the capability to report productive hours per FTE for the time period requested. The estimate of productive hours is based on hours worked per week times 52.17 weeks per year multiplied by the average productive labour rate (84%).

Reliability of information

Employee data, labour expenditure and stand down occurrences represent Actual Information extracted from Endeavour Energy's reporting systems. Although assumptions were required to classify the data into the labour classification levels required by the AER and determine the average productive hours, there were no other alternatives available to present the data in the form required by the AER. Therefore the data provided is considered to be reliable.

Worksheet 2.12 – Input Tables

2.12.1 Input Tables

Compliance with requirements of the notice

The data presented in table 2.12 is consistent with the requirements of the Category Analysis RIN. In particular:

- The total amounts reported in table 2.12 reconciles to the amounts reported in tables 2.7, 2.8, 2.10, 2.3, 2.5, 2.9, 4.1, 4.2, 4.3, 4.4, 2.2 and 2.6.
- The opex and capex data reported in table 2.12 is reported on an as-incurred basis

Source of information

Several sources of information were used in the completion of table 2.12:

- System capex data by project and expense type was extracted from the annual system capex report.
- Non-network expenditure (capex and opex) by expense type was extracted from the general ledger (TM1 PNL cube).
- Standard control services and alternative control services opex by expense type was extracted from the AER Totex by Account cube in TM1. This cube is used by Endeavour Energy to store and report opex into service categories (i.e. Standard Control, Alternative Control and Unregulated) at the account code level. It is the primary tool used to allocate opex in accordance with Endeavour Energy's approved Cost Allocation Method. Standard and alternative control opex data was extracted from the TM1 AER Totex by Account cube at the account code level (N level org units) for the categories called "Regulated Network $" (i.e. standard control services) and "Street Lighting $" (i.e. alternative control services).
- Category Analysis RIN tables 2.7, 2.8, 2.10, 2.3, 2.5, 2.9, 4.1, 4.2, 4.3, 4.4, 2.2 and 2.6 were also used complete table 2.12.

Methodology and assumptions

Table	Methodology	Assumptions
2.12 Input Tables - Vegetation Management - Routine Maintenance - Non-routine Maintenance - Overheads - Emergency Response - Metering (opex)	1. Extract standard control services opex at the account code/expense element level from the AER Totex by Account cube in TM1.Using the allocations performed for the purposes of the Annual RIN, map each account code to one of the following categories: • 2.7 Vegetation Management • 2.8 Maintenance • 2.9 Emergency Response	The following Annual RIN category mappings were adopted in step 1: • 'Vegetation Management - Direct' mapped to '2.7 Vegetation Management' • 'Inspection – Direct & Specific', 'Maintenance & Repair – Direct & Specific' and 'Other NM Operating Costs Direct & Specific' mapped to '2.8 Maintenance' • • 'Emergency Response – Direct

Table	Methodology	Assumptions
- Fee & Quote Based Services	• 2.10 Overheads • 4.2 Metering • 4.3 & 4.4 Fee & Quote Based Services 2. Determine the proportional split by expense category (labour, materials, contractors and other) for each of the above allocations for standard control services. 3. Multiply the relevant total expenditure amount from tables 2.7, 2.8, 2.9, 2.10, 4.2, 4.3 and 4.4 by the proportion for each expense category calculated in step 2 above and populate table 2.12.	& Specific' mapped to '2.9 Emergency Response' • • Contestable Metering - Corporate OH, Customer Funded - Corporate OH, Customer Funded - Network OH, Customer Service - Corporate OH, Customer Service - Direct, Customer Service - Network OH, Customer Specific - Corporate OH, Customer Specific - Network OH, Emergency & Recoverable Works - Corporate OH, Emergency & Recoverable Works - Network OH, Emergency Response - Corporate OH, Emergency Response - Network OH, Inspection - Corporate OH, Inspection - Network OH, Maintenance & Repair - Corporate OH, Maintenance & Repair - Network OH, Night watch - Corporate OH, Night watch - Network OH, Other Network Operating Costs - Corporate OH, Other Network Operating Costs - Direct, Other Network Operating Costs - Network OH, Other Network Operating Costs - Specific, Other NM operating costs - Corporate OH, Other NM operating costs - Network OH, Other operating costs - Corporate OH, Other operating costs - Direct, Other operating costs - Network OH, Other operating costs - Specific, Vegetation Management - Corporate OH, Vegetation Management - Network OH mapped to '2.10 Overheads' • ''Metering 5-6 – Specific, Network OH & Corporate OH' mapped to '4.2 Metering' • • 'Ancillary Network Services – Direct, Specific, Network OH &

Table	Methodology	Assumptions
		Corporate OH' mapped to '4.3 & 4.4 Fee & Quote Based Services' This methodology assumes that the proportional split by expense element obtained from the mappings outlined above represents the split of total expenditure disclosed in tables 2.7, 2.8, 2.9, 2.10, 4.2, 4.3 and 4.4.
2.12 Input Tables - Augex - Connections - Repex - Metering (capex) - Public Lighting (capex)	1. Extract system capex at the account code/expense element level from the annual system capex report and map each account code to one of the following categories based on parent project numbers: • 2.3 Augex – LV feeders • 2.2 Repex – Other • 2.2 Repex – Poles / Pole top structures / Overhead conductors / Underground cables / Service lines / Transformers / Switchgear • 2.3 Augex – Distribution substations • 2.3 Augex – HV feeders • 2.3 Augex – Subtransmission substations, switching substations, zone substations and subtransmission lines • 2.5 Connections • 4.1 Public Lighting • 4.2 Metering 2. Determine the proportional split by expense category (labour, materials, contractors and other) for each of the above allocations for system capex.	The following capex project number mappings were adopted in step 1: • All PR*** projects excluding land purchases mapped to 2.3 Augex – Subtransmission substations, switching stations, zone substations and subtransmisson lines. • All TM, TS & DS projects mapped to 2.2 Repex – Poles / Pole top structures / Overhead conductors / Underground cables / Service lines / Transformers / Switchgear • All HVW and OFP projects mapped to 2.3 Augex – HV feeders. • Project LV001 mapped to 2.3 Augex – Distribution substations. • All other LV*** projects mapped to 2.3 Augex – LV feeders. • All projects starting with IC, NU, UR and AR mapped to 2.5 Connections. • All projects starting with MC mapped to 4.2 Metering. • All projects starting with SL mapped to 4.1 Public Lighting. • All communications, automation and protection projects mapped to 2.2 Repex – Other. This methodology assumes that the proportional split by expense element obtained from the mappings outlined above

Table	Methodology	Assumptions
	3. Multiply the relevant total expenditure amount from tables 2.2, 2.3, 2.5, 4.1 and 4.2 by the proportion for each expense category calculated in step 2 above and populate table 2.12	represents the split of expenditure disclosed in tables 2.2, 2.3, 2.5, 4.1 and 4.2.
2.12 Input Tables - Public Lighting (opex)	1. Extract alternative control services opex at the account code / expense element level from the AER Totex by Account cube in TM1. 2. Determine the proportional split by expense category (labour, materials, contractors and other) for Public Lighting opex. 3. Multiply the total expenditure amount from table 4.1 by the proportion for each expense category calculated in step 2 above and populate table 2.12.	• 'Public Lighting – Direct, Specific, Network OH & Corporate OH' mapped to '4.1 Public Lighting'
2.12 Input Tables - Non Network	1. Extract non-network opex and capex at the account code / expense element level from the PNL cube in TM1.Map each sub activity for capex and branch for opex to one of the following categories: • IT • Land & Buildings • Motor Vehicles • Other 2. Determine the proportional split by expense category (labour, materials, contractors and other) for each of the above allocations. 3. Multiply the relevant total expenditure amount from tables 2.6 by the proportion for each expense category	• Activity 92 and 'Property Services', 'Fleet' & 'ICT' branches mapped to '2.6 Non Network'

Table	Methodology	Assumptions
	calculated in step 2 above and populate table 2.12.	

Use of estimated information

All information reported in table 2.12 consists of actual information (no estimated information required). However, the split of source data into the various expenditure categories required judgement to be applied as outlined above.

Reliability of information

All information used to split source data into the various expense types represents Actual Information extracted from Endeavour Energy's reporting systems and has been reconciled to reported figures in the Category Analysis and Annual RIN. While assumptions needed to be made in order to map the source data to the relevant categories and apply these percentages to expenditure totals from other Category Analysis tables, no valid alternatives exist which would result in a materially different outcome. Therefore the data provided is considered to be reliable.

Worksheet 4.1 – Public Lighting

4.1.1 Descriptor Metrics Over Year

Compliance with requirements of the notice
The data provided for "Current Population of Lights" (Table 4.1.1) has been reported as of 30th June 2018 to represent the current year (2017-18). The light types are broken down into individual light types (Mercury, Compact Fluorescent, T5 etc) and wattages of each light type in use.

Source of information
The number of luminaires under "Current Population of Lights" is extracted from the June 2018 Street Lighting Usage of System (SLUoS) report of the financial year 2017-18.

Methodology and assumptions
SLUoS reports are prepared by Network Revenue Analyst, Commercial Finance, Endeavour Energy, every month. The report for the month ending June 2018 was used to extract the data for 30 June 2018. The data for the assets installed and energised during the month of June 2018 are appropriated as the number of days in service in June 2018 times the asset/s installed in June 2018 divided by 30 (the total number of days in June 2018). Example: If 10 luminaires are installed in June 2018 for 27 days then the luminaire count for June 2018 will be 10X27/30=9. This methodology applies only for June 2018 as all other months have 100% active days.

Use of estimated information
Data from the SLUoS report is applied. All data on public lighting assets is held in the street lighting equipment register in the company's Ellipse database. This includes all constructed, energised and proposed new assets. This data is the basis for generating Street Lighting Use of System (SLUoS) customer bills.

Reliability of information
Ellipse database is considered reliable and is Endeavour Energy's main source of asset/financial data. Historical data is frequently applied for budgeting and forecasting.

4.1.2 Descriptor Metrics Annually

Compliance with requirements of the notice
The data provided under "Descriptor Metrics Annually" is in line with the data format provided. Where data is not available in the reporting format requested this is clearly documented in the Basis of Preparation.

Source of information
The information with "Descriptor Metrics Annually" is based upon Endeavour Energy projects/costs only and does not include any projects associated with Accredited Service Providers. The data was obtained from the following sources for the year 1 July 2017 to 30 June 2018.

Light Installation volume data
The data is arrived at by considering the exact increase in the luminaires in June 2017 over June 2018 from the Street Lighting Usage of System (SLUoS) report. This increase is split between Major and Minor in the ratio arrived from the population of lights under Table 4.1.1. Minor is considered as luminaires below 150W and Major as 150W or higher (exception 100W LED which is Major). In Table 4.1.1 Major luminaires total 58,081 and Minor add up to 147,211 thus returning a ratio of 28.3 : 71.7 corresponding to Major:Minor.

Value for “Number of Poles Installed” is the difference of total vertical supports between 30 June 2017 and 30 June 2018. This is extracted from SLUoS reports for June 2017 and June 2018.

Light Installation Total Cost
“Total Cost” associated with Light Installation have been sourced from Endeavour Energy’s Business Analyst, Commercial Finance department for the year 2017-18. These financial values include both street lighting costs associated with “Light Installation” as well as costs associated with “Light Replacement” for columns that have been replaced.

Light Replacement Total Cost comprises of Condition based maintenance (RC) and Inspection & Investigation (RI: Patrol/Routine column inspection). The Light Maintenance Total Cost comprises of Fault and Emergency (RF) and Preventive maintenance comprising of Bulk Lamp Replacement (RP). This data is also sourced from Endeavour Energy’s Business Analyst, Commercial Finance department for the year 2017-2018.

Pole numbers: The number of poles installed includes steel columns and dedicated wood poles for street light.

Light Replacement volume data:
Volume data for light replacements have been divided into four categories:
COL – Column Replacement (indicates complete new column replaced)
OMS – Outage Management System (Fault & Emergency)
BC – Bulk Change
LC – Luminaire Replacement = Luminaire replaced during OMS + Luminaires replaced during BC
For the purpose of compliance, the data under Light Replacement Volume and Light Maintenance Volume have been added as follows:
Light Replacement Volume = COL + LC
Light Maintenance Volume= OMS + BC

COL data was obtained from Network Performance & Reporting using the COGNOS 10 reporting program. The data extracted by COGNOS 10 is taken from Ellipse (the organisations asset management database).

The OMS data was obtained from the organisations Outage Management System to identify the number of fault and emergency projects associated with streetlights.

The LC comprises of Luminaire replaced during Bulk Lamp Change plus Luminaire replaced during OMS. Luminaire replaced during Bulk Change was obtained from Endeavour Energy’s Technical Support Officer Street Lights. Luminaire replaced during OMS was filtered from the OMS report received from OMS Business Analyst for the period 1 July 2017 to 30 June 2018. Luminaire replacement during OMS is not available in a major / minor road format and a ratio (of 28.3% Major, 71.7% Minor) has been applied to obtain a split. Source of the ratio is documented in “Methodology and assumptions”.

Light Replacement Total Cost:
The source of this data is as described in “Light Installation Total Cost”.

Light Maintenance Volume:
The source of this data is as described in “Light Replacement volume data”. Number of poles installed is already covered in the Installation and Replacement data above. The numbers given under Maintenance refer to the Light Columns inspected during the year.

The BC data was obtained from Endeavour Energy’s Maintenance Reporting Systems Analyst from the June 2018 report.

BC data is not available in a major / minor road format and a ratio of 28.3% Major, 71.7% Minor has been applied to obtain a split. Source of the ratio is documented in "Methodology and assumptions".

Light Maintenance Total Cost:
The source of this data is as described in "Light Installation Total Cost".

Quality of Supply:
Quality of Supply data including "Mean days to rectify/replace public lighting assets" and "Volume of Customer Complaints" was extracted from a predefined query developed for the purpose of extracting this and similar data in a controlled and consistent manner (established by Endeavour Energy's IT department) using the organisation's COGNOS 10 program. COGNOS 10 extracts this data from Ellipse (the organisations asset management database).

"Volume of GSL Breaches" data obtained from Endeavour Energy's Quality Improvement section who maintains a report of each GSL Breach which is stored in the organisation's Content Server for control and security. Total GSL breaches are based on all customer complaints. "GSL payments" data is based on "Qualified Volume of GSL Breaches" multiplied by $15.00.

Methodology and assumptions
"GSL payment" data is based on "Volume of GSL Breaches" multiplied by $15.00.

The ratio used to divide BC data during OMS into major and minor roads is based on the number of lanterns smaller than 150W (Minor) and 150W or larger (Major). This ratio was calculated for the data as on 30 June 2018 (available under 4.1.1). The ratio used was 71.7 : 28.3 for minor and major roads respectively.

Use of estimated information
All data is based on actuals or separated into Minor and Major ratio as explained above.

Reliability of information
The information within COGNOS 10/Ellipse is considered reliable and is Endeavour Energy's main source of asset/financial data. Historical data is frequently applied for budgeting and forecasting.

4.1.3 Cost Metrics

Compliance with requirements of the notice
The data provided under Cost Metrics is consistent with the requirements of this Notice. Assumptions, if any, are explained in detail below.

Source of information
"Average Cost" data for the Installation of Lights on major/minor roads for the 2017-18 financial year was obtained from Ellipse and Content Server for each of the projects used to arrive at the "Average Unit Cost" values provided.

"Average Cost" data for the replacement and maintenance of street lights on major/minor roads was obtained from Endeavour Energy's Street Light Contract Manager. This data was sourced from the Streetlight Refurbishment Report Rate (approved by finance). Material unit prices have been supplied by procurement for each of the individual light types shown.

Methodology and assumptions
Data for the "Average Unit Costs" for the installation of Street Lightings on Major and Minor roads has been obtained from a random sample of internal Street Lighting projects. The sample of projects has been used to calculate average costs for the 2017-18 financial year in the following

categories: Replaced luminaire, outreach and column (Major Road); Replaced luminaire and bracket on existing network pole/column (Major Road), Replaced luminaire, outreach and column (Minor Road); Replaced luminaire and bracket on existing pole/column (Minor Road).

The following projects/sample sizes have been used to develop an average cost per column / pole:

Project Number	Minor / Major	Installation Type
SLNA0133	Major	column
SLST0014	Major	column
SGNA0003	Major	network
SGNP0017	Major	network
SLNL0500	Major	network
SGNL0003	Major	network
SLSR0219	Major	network
SLSR0222	Major	network
SLSU0206	Major	network
SLSU0209	Major	network
SGNA0001	Minor	column
SLNP0443	Minor	column
SLNP0445	Minor	column
SGNA0002	Minor	network
SGNA0010	Minor	network
SGNA0011	Minor	network
SGNP0003	Minor	network
SGNP0004	Minor	network
SGNP0008	Minor	network
SGNP0014	Minor	network
SGNL0019	Minor	network
SGNL0020	Minor	network
SGNL0002	Minor	network
SGNL0013	Minor	network
SGNL0014	Minor	network
SGNL0016	Minor	network
SGNL0018	Minor	network
SGNL0022	Minor	network
SGNL0026	Minor	network
SGNM0012	Minor	ded. Pole
SGNM0015	Minor	network
SGNM0016	Minor	network
SLSR0220	Minor	network
SLSR0227	Minor	network

Sample sizes vary between “Light Type” / “Road Type” based on the availability of project information and the data for the “Average Unit Costs” for the installation of Street Lightings on Major and Minor roads.

Use of estimated information

Factual information has been used for the year 2017-18.

Reliability of information

The data within COGNOS 10/Ellipse is considered reliable and is Endeavour Energy's main source of asset/financial data. Historical data is frequently applied for budgeting and forecasting.

Worksheet 4.2 - Metering

4.2.1 Metering Descriptor Metrics

Compliance with requirements of the notice
The data presented in table 4.2.1 is consistent with the principles and requirements set out in Appendix E of the Category Analysis RIN.

Source of information
The volume of meters including key parameters such as number of phases and connection type was obtained from Endeavour Energy's meter asset management system (Banner and MBS) for the reporting period 2017-18.

Methodology and assumptions
Meter volumes for 2017-18 are based on actual volumes as at June 2018.

Important notes in relation to the interpretation of table 4.2.1:

- Type 4 meters disclosed in table 4.2.1 represent non-contestable franchise market meters with communication equipment. Endeavour Energy does not have any Type 5 manually read interval meters as all meters in the Type 5 energy volume range have had communications equipment installed (and are read remotely) and are therefore defined as Type 4 meters.

Use of estimated information
Nil

Reliability of information
The information provided represents Actual Information as defined in the RIN. As a result, the information contained in table 4.2.1 is considered to be reliable.

4.2.2 Cost Metrics (Expenditure)

Compliance with requirements of the notice
The data presented in table 4.2.2 (expenditure) is consistent with the principles and requirements set out in Appendix E of the Category Analysis RIN. In particular:

- The data presented in table 4.2.2 (expenditure) reflects expenditure relating to metering services in accordance with the definitions provided in Appendix F of the Category Analysis RIN.

- The Metering Service Charge model is used by Endeavour Energy to calculate charges, and an associated revenue requirement, for metering services classified as alternative control services for the 2015-19 regulatory period in accordance with the AER's Framework & Approach Paper – March 2013. Therefore, in order to present information on a consistent basis for the 2017-18 year, expenditure presented in this template reflects expenditure associated with metering services classified as alternative control services for the 2015-19 regulatory period (i.e. type 5 and 6 metering provision, maintenance, reading and data services).

- Endeavour Energy has not reported data in relation to metering services which have been classified as contestable by the AER and has only reported data for non-contestable / regulated metering services (including work performed by third parties on behalf of

Endeavour Energy). It is noted that while type 4 meters are classified as contestable in NSW, Endeavour Energy has reported expenditure related to type 4 meters. This is because Endeavour Energy has installed communications equipment on all of their type 5 meters1, converting them into remotely read interval meters with communications functionality, and therefore type 4 meters by definition. As a result, the expenditure presented for type 4 meters refers to type 5 meters with communications functionality (or non-contestable type 4 meters).

Source of information

Financial data is sourced from the AER Totex by Account and project reporting cubes in TM1. Endeavour Energy uses this OLAP tool for various purposes including budgeting and forecasting, monthly reporting and regulatory account allocations and it has been used historically to provide data for previous audited Regulatory Accounts/RINs. It is a cube based technology which allows rules to be created between cubes and within cubes.

In particular, the AER Totex by Account cube is used by Endeavour Energy to store and report annual opex into the service categories (i.e. Standard Control, Alternate Control and Unregulated categories) at the account code level. It is the primary tool used to allocate opex in accordance with Endeavour Energy's approved Cost Allocation Method.

Methodology and assumptions

The method applied to report metering services expenditure in accordance with the requirements of the RIN can be described in 5 broad steps as set out below:

1. Calculate historic capital expenditure related to regulated meters only (i.e. excluding relays and load control)

Metering capital expenditure was extracted from the general ledger by project via TM1. These projects included expenditure related to both regulated meters and load control equipment. For the purposes of populating table 4.2.2, only capital expenditure related to metering equipment is relevant, as activities related to load control remain classified as standard control for the 2015-19 regulatory period. Specific projects related to the purchase of meters the purchase of associated test equipment were identified. In addition, as there exists only one project for capitalised labour related to meters and load control replacement, the meter related component of this project was calculated based on the proportion of meter and load control material costs.

The result represents capital expenditure related to regulated meters only and each project is mapped to a specific metering service sub-category in table 4.2.2.

2. Calculate historic direct operating expenditure associated with scheduled meter reading

Scheduled meter reading activities are performed by the former Market Operations branch in Endeavour Energy. In order to calculate the direct operating expenditure associated with scheduled meter reading, service order volumes and task time-to-complete estimates provided by the Market Operations Manager were used to split total 2017-18 Market Operations branch operating expenditure between its relevant functions (one of which is scheduled meter reading). These relevant costs are journalled into the general ledger and extracted via TM1 for reporting.

3. Extract historic direct operating expenditure associated with metering services (excluding scheduled meter reading)

[1] Given the small number of type 5 meters in Endeavour Energy's network area, it was decided that installing communications equipment on each of these meters (and therefore converting them into type 4 meters) represented the most cost effective method of reading the meter data.

All other metering services (excluding scheduled meter reading activities) are performed by the Metering Information branch in Endeavour Energy. In order to calculate the direct operating expenditure associated with the metering services performed by the Metering Information branch, the following steps were performed:

i. Operating expenditure for 2017-18 was extracted from the general ledger for the Metering Information branch at the activity and sub-activity level via TM1;

ii. Based on the activity and sub-activity combination, specific metering service sub-categories are identified in accordance with the categories required in table 4.2.2 of the Category Analysis RIN;

The above steps resulted in the identification of Metering Information branch expenditure related to regulated metering and the disaggregation of this operating expenditure into the metering service sub-categories required by table 4.2.2.

Endeavour Energy has not reported any expenditure or volumes associated with special meter reading and franchise CT meter installation in table 4.2.2. Given these were classified as Ancillary Network Services in the 2015-19 regulatory period.

4. Calculate network and corporate overheads associated with metering services

The operating expenditure extracted above only relates to direct operating expenditure. In order to allocate a reasonable portion of network and corporate overheads to each metering service, the network and corporate overhead amount derived from the Cost Allocation Methodology (CAM) model for 2017-18, were apportioned to the sub-categories based on the respective balances.

This resulted in metering service operating expenditure at the sub-category level inclusive of network and corporate overheads.

5. Split expenditure (operating and capital) between meter types 4 and 6

The expenditure was split between meter types 4 and 6 based on the ratio of type 4 and 6 meters from table 4.2.1.

Use of estimated information

The expenditure reported in table 4.2.2 is materially dependent on information recorded in Endeavour Energy's accounting records. In addition, although a number of assumptions have been applied to calculate and report metering services expenditure in accordance with metering service sub-categories (as outlined above), there are no valid alternatives to the assumptions applied which could lead to a materially different presentation.

As a result, the expenditure information presented in table 4.2.2 represents Actual Information as defined in the Category Analysis RIN.

Material accounting policy changes

Endeavour Energy have not undertaken any material changes in accounting policies which would impact the expenditure data contained in table 4.2.2.

Reliability of information

The expenditure information contained in table 4.2.2 represents Actual Information as defined in the Category Analysis RIN. While a number of assumptions have been applied in order to report

the figures in accordance with the requirements of the Category Analysis RIN, Endeavour Energy considers these assumptions to be reasonable and result in reliable information.

4.2.2 Cost Metrics (Volumes)

Compliance with requirements of the notice
The data presented in table 4.2.2 (volumes) is consistent with the principles and requirements set out in Appendix E of the Category Analysis RIN.

Source of information
The volume of meter purchase was obtained from Endeavour Energy's meter asset management system (MBS) for the reporting period 2017-18. The volume of metering services was obtained from Endeavour Energy's metering work management system (Banner) for the reporting period 2017-18.

Methodology and assumptions
The volume for the meter purchase subcategory for the reporting period 2017-18 is based on actual meter installation volumes from MBS.

The total volume for the meter testing, meter investigation, special meter reading, meter replacement and meter maintenance subcategories for the reporting period 2017-18 are based on actual service orders completed as of 30 June 2018 from Banner. The volume for each subcategory is then assigned to a meter type based on the meter type installed at the site.

The total volume for the scheduled meter reading subcategory for the reporting period 2017-18 is based on actual volumes from data used to validate our meter reading contractor's invoice.

The total volume for the remote meter reading subcategory for the reporting period 2017-18 is based on actual meters from MBS.

The total volume for the new meter installation subcategory is calculated by summing the total of both the meter replacement and meter maintenance, then multiply this with the NMI to meter ratio and then subtracting it away from the total meter purchase.

Important notes in relation to the interpretation of table 4.2.2 (volumes):

- Type 4 meters disclosed in table 4.2.2 represent non-contestable franchise market meters with communication equipment. Endeavour Energy does not have any Type 5 manually read interval meters as all meters in the Type 5 energy volume range have had communications equipment installed (and are read remotely) and are therefore defined as Type 4 meters.

- The new meter installation subcategory is nil for type 4 meters because type 4 meters are not installed at new metering installations, instead they are meter changes from type 6 to type 4 once the consumption breaches the type 6 consumption threshold.

- The remote meter re-configuration subcategory is nil because Endeavour Energy does not perform this task.

Use of estimated information
Nil

Reliability of information

The volume information contained in table 4.2.2 represents Actual Information as defined in the Category Analysis RIN. While a number of assumptions have been applied in order to report the figures in accordance with the requirements of the Category Analysis RIN, Endeavour Energy considers these assumptions to be reliable.

Worksheet 4.3 – Ancillary Services (Fee-based Services)

4.3.1 Cost Metrics for Fee-Based Services

Compliance with requirements of the notice

The data presented in tables 4.3.1 and 4.4.1 is consistent with the principles and requirements set out in the Category Analysis RIN. In particular:

- The data presented in tables 4.3.1 and 4.4.1 reflects operating expenditure and volumes relating to Ancillary Network Services for either "fee-based services" or "quoted services" in accordance with the definitions provided in the Category Analysis RIN. Specifically, fee-based services have been identified as those where a fixed fee is charged to the customer for the provision of the service (i.e. the fee charged to the customer is either fixed per job or fixed per item/activity and not charged on a per hour basis). Quoted services have been identified as those where a quoted fee is provided based on a fixed hourly rate. Quoted services have fees which are charged on an hourly basis as the nature and scope of these services are specific to individual customers' needs and vary from customer to customer.

- The fee-based services and quoted services listed in tables 4.3.1 and 4.4.1 respectively include all the services identified as Ancillary Network Services in Appendix D of the AER's Framework and Approach Paper (March 2013). This includes all fee-based and quoted services listed in the annual tariff proposal, as well as new fees for services which Endeavour Energy have not previously charged a fee for, but commenced charging a fee from 2015-16 onwards (in accordance with the AER's Framework and Approach Paper).

- A description of each Ancillary Network Service (which covers all fee-based and quoted services listed in templates 4.3 and 4.4), is included in the Service Description page of each Ancillary Network Service Fee Methodology document provided as an attachment to the Substantive Regulatory Proposal ('SRP'). The purpose of each service and the activities which comprise each service are outlined in the Service Descriptions.

- Endeavour Energy has not distinguished expenditure for fee-based and quoted services between standard or alternative control services in regulatory templates 4.3 and 4.4. It is noted that for Endeavour Energy, Ancillary Network Services (which covers all fee-based and quoted services) are classified as standard control services for the 2009-14 regulatory period and alternative control services for the 2015-19 regulatory period.

- Endeavour Energy has not distinguished expenditure for fee-based and quoted services as either capital expenditure or operating expenditure in regulatory templates 4.3 and 4.4. However, it is noted that all expenditure related to fee-based and quoted services is operating expenditure.

Source of information

Information relating to fee-based and quoted services was extracted from a variety of sources as listed below. This information was used to calculate expenditure and volumes for fee-based and quoted services presented in tables 4.3.1 and 4.4.1 respectively.

- Customer Application Management System (CAMS) – A company developed database used for the management of contestable works projects. This system was used to extract volume data (where available) for certain services and service sub-categories.

- Banner – Endeavour Energy's corporate customer information and billing system. Banner contains revenue information as well as service order[2] information which has been used to extract volume data (where available) for certain services.

- Ellipse – Endeavour Energy's primary IT management system utilised for a variety of functions throughout the company. Ellipse contains Endeavour Energy's general ledger and has been used to extract and/or calculate expenditure and volumes related to fee-based and quoted services. Ellipse contains work orders which are reporting tool used to capture costs/revenue associated with a particular task.

- MBS (Metering Business System) – IT system which supports basic meter data management and market interactions with other market participants and AEMO. MBS includes service order[1] information which has been used to extract volume data (where available) for certain services.

Methodology and Assumptions

The specific methodology and assumptions applied to calculate expenditure and volumes varies slightly between each Ancillary Network Service.

Presented below is a high level summary of the methodology and assumptions applied in order to calculate expenditure and volumes for each Ancillary Network Service. The methodology applied includes five broad steps:

1. Calculate volumes for each Ancillary Network Service at the fee sub-category level;
2. Calculate direct expenditure for each Ancillary Network Service at the fee sub-category level;
3. Estimate network and corporate overheads for each Ancillary Network Service at the fee sub-category level;
4. Identify the driver for each Ancillary Network Service fee at the fee sub-category level and categorise as either a fee-based service or a quoted service; and
5. Aggregate expenditure and volume data for each Ancillary Network Service and populate tables 4.3.1 and 4.4.1 in accordance with the Category Analysis RIN.

These steps are described in further detail below.

1. Calculate volumes associated with each Ancillary Network Service at the fee sub-category level.

As outlined above, the specific methodology applied to calculate volumes varies slightly between each Ancillary Network Service. Presented below is a summary which outlines how volumes have been calculated for each Ancillary Network Service.

Ancillary Network Service Fee	Volume Calculation Method
Administration Fee	Method 1
Design Information Fee	Method 1
Design Certification Fee	Method 1
Design Recertification Fee	Method 1
Notification of Arrangement	Method 1
Compliance Certificate	Method 1
Inspection of service work (Level 1 work)	Method 1

[2] A service order is a tool used by Endeavour Energy to initiate work to be carried out for a customer.

Ancillary Network Service Fee	Volume Calculation Method
Reinspection Fee (Level 1 & 2 work)	Method 1
Inspection of service work (Level 2 work)	Method 1
Provision of Access (Standby)	Method 1
Access Permits	Method 1
Contestable Substation Commissioning	Method 1
Authorisation of ASP's	Method 1
Site Establishment Fee	Method 1
Conveyancing Information	Method 1
Planning studies relating to distribution connection applications - SIMPLE JOBS	Method 1
Planning studies relating to distribution connection applications - COMPLEX JOBS	Method 1
Connection Offer Service (Basic)	Method 1
Connection Offer Service (Standard)	Method 1
Customer Interface co-ordination for contestable works	Method 1
Inv, rev & impl of remedial actions associated with ASP's connection work	Method 1
Preliminary Enquiry Service - SIMPLE JOBS	Method 1
Preliminary Enquiry Service - COMPLEX JOBS	Method 1
Services involved in obtaining deeds of agreement	Method 1
Clearance to Work	Method 1
Rectification Works	Method 1
Disconnections / Reconnections (Pole Top / Pillar Box)	Method 1
Excluded Distribution Services	Method 1
Meter Test Fee	Method 1
Off Peak Conversions	Method 2
Disconnections / Reconnections (Meter Box)	Method 2
Disconnections / Reconnections (Meter Load Tail)	Method 2
Disconnections / Reconnections (Site Visit)	Method 2
Special Meter Reads	Method 2
Move in / Move out meter reads	Method 2
Recovery of debt collection costs	Method 1
Types 5-7 nonstandard meter data services	Method 1
Franchise CT Meter Install	Method 1

Method 1 – These services generally represent Ancillary Network Services for which Endeavour Energy is charging a fee (i.e. Miscellaneous or Monopoly Fees). As a result, volume data is available from Endeavour Energy business systems (i.e. CAMS, Banner or Ellipse), or able to be calculated based on dividing revenue by current fees. Initially, volume data was extracted from business systems, or derived based on actual revenue. These volumes have also been used to populate tables 4.3.1 and 4.4.1 for these services.

Method 2 – Each of these services are predominantly carried out by the former Market Operations branch (currently S620- Field Operations) in Endeavour Energy, with the services initiated by service orders issued by Retailers or through internal processes. Service order volumes were extracted for the financial year from MBS to allocate operating expenditure.

2. Calculate direct expenditure for each Ancillary Network Service at the fee sub-category level.

As outlined above, the specific methodology applied to calculate expenditure varies slightly between each Ancillary Network Service. Presented below is a summary which outlines how direct operating expenditure has been calculated for each Ancillary Network Service.

Ancillary Network Service Fee	Opex Calculation Method
Administration Fee	Method 1
Design Information Fee	Method 1
Design Certification Fee	Method 1
Design Recertification Fee	Method 1
Notification of Arrangement	Method 1
Compliance Certificate	Method 1
Inspection of service work (Level 1 work)	Method 1
Reinspection Fee (Level 1 & 2 work)	Method 1
Inspection of service work (Level 2 work)	Method 1
Provision of Access (Standby)	Method 1
Access Permits	Method 1
Contestable Substation Commissioning	Method 1
Authorisation of ASP's	Method 1
Site Establishment Fee	Method 1
Conveyancing Information	Method 1
Planning studies relating to distribution connection applications - SIMPLE JOBS	Method 1
Planning studies relating to distribution connection applications - COMPLEX JOBS	Method 1
Connection Offer Service (Basic)	Method 1
Connection Offer Service (Standard)	Method 1
Customer Interface co-ordination for contestable works	Method 1
Inv, rev & impl of remedial actions associated with ASP's connection work	Method 1
Preliminary Enquiry Service - SIMPLE JOBS	Method 1
Preliminary Enquiry Service - COMPLEX JOBS	Method 1
Services involved in obtaining deeds of agreement	Method 1
Clearance to Work	Method 1
Rectification Works	Method 1
Disconnections / Reconnections (Pole Top / Pillar Box)	Method 1
Excluded Distribution Services	Method 1
Meter Test Fee	Method 1
Off Peak Conversions	Method 2
Disconnections / Reconnections (Meter Box)	Method 2
Disconnections / Reconnections (Meter Load Tail)	Method 2
Disconnections / Reconnections (Site Visit)	Method 2
Special Meter Reads	Method 2
Move in / Move out meter reads	Method 2

Ancillary Network Service Fee	Opex Calculation Method
Recovery of debt collection costs	Method 1
Types 5-7 nonstandard meter data services	Method 1
Franchise CT Meter Install	Method 1

Method 1 – Some of the Ancillary Network Services processes have already been developed to capture direct operating expenditure at the work order level (costed to activity 60 in the GL). Costs are captured by either of the methods outlined below:

- Costs are booked directly to the work orders by the relevant staff involved in the service; or
- Costs are calculated based on resource requirement (labour hours) and labour rates provided by internal stakeholders and then journalled to the relevant work order.

Each individual work order is mapped directly to an Ancillary Network Service category. For those services that have various sub categories, operating expenditure was allocated based on revenue received for each sub category.

Method 2 – Each of these services are predominantly carried out by the former Market Operations branch in Endeavour Energy, with some involvement from Network Operations (for off peak conversions).

Operating expenditure for Network Operations (for off peak conversions) was extracted from the relevant work orders that were set up for this service.

3. Estimate network and corporate overheads for each Ancillary Network Service at the fee sub-category level.

The expenditure calculated in step 2 above only relates to direct operating expenditure. In order to allocate a reasonable portion of network and corporate overheads to each Ancillary Network Service, the average network and corporate overhead factor derived from the Cost Allocation Methodology (CAM) model for 2017-18 (specific to Ancillary Network Services) was applied to direct costs for 2017-18.

4. Identify the driver for each Ancillary Network Service fee at the fee sub-category level and categorise as either a fee-based service or a quoted service.

The driver for each Ancillary Network Service fee was identified as either being on a per unit basis (i.e. per job, project, lot, pole etc.) or a per hour basis. Based on the identified fee driver, each fee sub-category was identified as either a fee-based service (charged on a per unit basis) or a quoted service (charged on a per hour basis).

5. Aggregate expenditure and volume data for each Ancillary Network Service and populate tables 4.3.1 and 4.4.1 in accordance with the Category Analysis RIN.

Expenditure and volume data for each Ancillary Network Service was aggregated into a single worksheet and the data for each fee sub-category was populated into tables 4.3.1 and 4.4.1 based on the identification performed in step 4 above.

Use of estimated information

Endeavour Energy has not used estimated Information in completing table 4.3.1 and 4.4.

Material accounting policy changes

Endeavour Energy have not undertaken any material changes in accounting policies which would impact the data contained in tables 4.3.1 and 4.4.1.

Reliability of information

While a number of assumptions have been applied in order to derive expenditure and volume data for 2017-18, for certain Ancillary Network Fees and at the fee sub-category level required by tables 4.3.1 and 4.4.1, Endeavour Energy considers these assumptions to be reasonable and without valid alternatives and therefore the resulting information to be reliable.

Worksheet 4.4 – Ancillary Services (Quoted Services)

4.4.1 Cost Metrics for Quoted Services

Compliance with requirements of the notice

The data presented in tables 4.3.1 and 4.4.1 is consistent with the principles and requirements set out in the Category Analysis RIN. In particular:

- The data presented in tables 4.3.1 and 4.4.1 reflects operating expenditure and volumes relating to Ancillary Network Services for either "fee-based services" or "quoted services" in accordance with the definitions provided in the Category Analysis RIN. Specifically, fee-based services have been identified as those where a fixed fee is charged to the customer for the provision of the service (i.e. the fee charged to the customer is either fixed per job or fixed per item/activity and not charged on a per hour basis). Quoted services have been identified as those where a quoted fee is provided based on a fixed hourly rate. Quoted services have fees which are charged on an hourly basis as the nature and scope of these services are specific to individual customers' needs and vary from customer to customer.

- The fee-based services and quoted services listed in tables 4.3.1 and 4.4.1 respectively include all the services identified as Ancillary Network Services in Appendix D of the AER's Framework and Approach Paper (March 2013). This includes all fee-based and quoted services listed in the annual tariff proposal, as well as new fees for services which Endeavour Energy have not previously charged a fee for, but commenced charging a fee from 2015-16 onwards (in accordance with the AER's Framework and Approach Paper).

- A description of each Ancillary Network Service (which covers all fee-based and quoted services listed in templates 4.3 and 4.4), is included in the Service Description page of each Ancillary Network Service Fee Methodology document provided as an attachment to the Substantive Regulatory Proposal ('SRP'). The purpose of each service and the activities which comprise each service are outlined in the Service Descriptions.

- Endeavour Energy has not distinguished expenditure for fee-based and quoted services between standard or alternative control services in regulatory templates 4.3 and 4.4. It is noted that for Endeavour Energy, Ancillary Network Services (which covers all fee-based and quoted services) are classified as standard control services for the 2009-14 regulatory period and alternative control services for the 2015-19 regulatory period.

- Endeavour Energy has not distinguished expenditure for fee-based and quoted services as either capital expenditure or operating expenditure in regulatory templates 4.3 and 4.4. However, it is noted that all expenditure related to fee-based and quoted services is operating expenditure.

Source of information

Information relating to fee-based and quoted services was extracted from a variety of sources as listed below. This information was used to calculate expenditure and volumes for fee-based and quoted services presented in tables 4.3.1 and 4.4.1 respectively.

- Customer Application Management System (CAMS) – A company developed database used for the management of contestable works projects. This system was used to extract volume data (where available) for certain services and service sub-categories.

- Banner – Endeavour Energy's corporate customer information and billing system. Banner contains revenue information as well as service order[3] information which has been used to extract volume data (where available) for certain services.

- Ellipse – Endeavour Energy's primary IT management system utilised for a variety of functions throughout the company. Ellipse contains Endeavour Energy's general ledger and has been used to extract and/or calculate expenditure and volumes related to fee-based and quoted services. Ellipse contains work orders which are reporting tool used to capture costs/revenue associated with a particular task.

- MBS (Metering Business System) – IT system which supports basic meter data management and market interactions with other market participants and AEMO. MBS includes service order[1] information which has been used to extract volume data (where available) for certain services.

Methodology and Assumptions

The specific methodology and assumptions applied to calculate expenditure and volumes varies slightly between each Ancillary Network Service.

Presented below is a high level summary of the methodology and assumptions applied in order to calculate expenditure and volumes for each Ancillary Network Service. The methodology applied includes five broad steps:

1. Calculate volumes for each Ancillary Network Service at the fee sub-category level;
2. Calculate direct expenditure for each Ancillary Network Service at the fee sub-category level;
3. Estimate network and corporate overheads for each Ancillary Network Service at the fee sub-category level;
4. Identify the driver for each Ancillary Network Service fee at the fee sub-category level and categorise as either a fee-based service or a quoted service; and
5. Aggregate expenditure and volume data for each Ancillary Network Service and populate tables 4.3.1 and 4.4.1 in accordance with the Category Analysis RIN.

These steps are described in further detail below.

1. Calculate volumes associated with each Ancillary Network Service at the fee sub-category level.

As outlined above, the specific methodology applied to calculate volumes varies slightly between each Ancillary Network Service. Presented below is a summary which outlines how volumes have been calculated for each Ancillary Network Service.

Ancillary Network Service Fee	Volume Calculation Method
Administration Fee	Method 1
Design Information Fee	Method 1
Design Certification Fee	Method 1
Design Recertification Fee	Method 1
Notification of Arrangement	Method 1
Compliance Certificate	Method 1
Inspection of service work (Level 1 work)	Method 1

[3] A service order is a tool used by Endeavour Energy to initiate work to be carried out for a customer.

Ancillary Network Service Fee	Volume Calculation Method
Reinspection Fee (Level 1 & 2 work)	Method 1
Inspection of service work (Level 2 work)	Method 1
Provision of Access (Standby)	Method 1
Access Permits	Method 1
Contestable Substation Commissioning	Method 1
Authorisation of ASP's	Method 1
Site Establishment Fee	Method 1
Conveyancing Information	Method 1
Planning studies relating to distribution connection applications - SIMPLE JOBS	Method 1
Planning studies relating to distribution connection applications - COMPLEX JOBS	Method 1
Connection Offer Service (Basic)	Method 1
Connection Offer Service (Standard)	Method 1
Customer Interface co-ordination for contestable works	Method 1
Inv, rev & impl of remedial actions associated with ASP's connection work	Method 1
Preliminary Enquiry Service - SIMPLE JOBS	Method 1
Preliminary Enquiry Service - COMPLEX JOBS	Method 1
Services involved in obtaining deeds of agreement	Method 1
Clearance to Work	Method 1
Rectification Works	Method 1
Disconnections / Reconnections (Pole Top / Pillar Box)	Method 1
Excluded Distribution Services	Method 1
Meter Test Fee	Method 1
Off Peak Conversions	Method 2
Disconnections / Reconnections (Meter Box)	Method 2
Disconnections / Reconnections (Meter Load Tail)	Method 2
Disconnections / Reconnections (Site Visit)	Method 2
Special Meter Reads	Method 2
Move in / Move out meter reads	Method 2
Recovery of debt collection costs	Method 1
Types 5-7 nonstandard meter data services	Method 1
Franchise CT Meter Install	Method 1

Method 1 – These services generally represent Ancillary Network Services for which Endeavour Energy is charging a fee (i.e. Miscellaneous or Monopoly Fees). As a result, volume data is available from Endeavour Energy business systems (i.e. CAMS, Banner or Ellipse), or able to be calculated based on dividing revenue by current fees. Initially, volume data was extracted from business systems, or derived based on actual revenue. These volumes have also been used to populate tables 4.3.1 and 4.4.1 for these services.

Method 2 – Each of these services are predominantly carried out by the former Market Operations branch (currently S620- Field Operations) in Endeavour Energy, with the services initiated by service orders issued by Retailers or through internal processes. Service order volumes were extracted for the financial year from MBS to allocate operating expenditure.

2. Calculate direct expenditure for each Ancillary Network Service at the fee sub-category level.

As outlined above, the specific methodology applied to calculate expenditure varies slightly between each Ancillary Network Service. Presented below is a summary which outlines how direct operating expenditure has been calculated for each Ancillary Network Service.

Ancillary Network Service Fee	Opex Calculation Method
Administration Fee	Method 1
Design Information Fee	Method 1
Design Certification Fee	Method 1
Design Recertification Fee	Method 1
Notification of Arrangement	Method 1
Compliance Certificate	Method 1
Inspection of service work (Level 1 work)	Method 1
Reinspection Fee (Level 1 & 2 work)	Method 1
Inspection of service work (Level 2 work)	Method 1
Provision of Access (Standby)	Method 1
Access Permits	Method 1
Contestable Substation Commissioning	Method 1
Authorisation of ASP's	Method 1
Site Establishment Fee	Method 1
Conveyancing Information	Method 1
Planning studies relating to distribution connection applications - SIMPLE JOBS	Method 1
Planning studies relating to distribution connection applications - COMPLEX JOBS	Method 1
Connection Offer Service (Basic)	Method 1
Connection Offer Service (Standard)	Method 1
Customer Interface co-ordination for contestable works	Method 1
Inv, rev & impl of remedial actions associated with ASP's connection work	Method 1
Preliminary Enquiry Service - SIMPLE JOBS	Method 1
Preliminary Enquiry Service - COMPLEX JOBS	Method 1
Services involved in obtaining deeds of agreement	Method 1
Clearance to Work	Method 1
Rectification Works	Method 1
Disconnections / Reconnections (Pole Top / Pillar Box)	Method 1
Excluded Distribution Services	Method 1
Meter Test Fee	Method 1
Off Peak Conversions	Method 2
Disconnections / Reconnections (Meter Box)	Method 2
Disconnections / Reconnections (Meter Load Tail)	Method 2
Disconnections / Reconnections (Site Visit)	Method 2
Special Meter Reads	Method 2

Ancillary Network Service Fee	Opex Calculation Method
Move in / Move out meter reads	Method 2
Recovery of debt collection costs	Method 1
Types 5-7 nonstandard meter data services	Method 1
Franchise CT Meter Install	Method 1

Method 1 – Some of the Ancillary Network Services processes have already been developed to capture direct operating expenditure at the work order level (costed to activity 60 in the GL). Costs are captured by either of the methods outlined below:

- Costs are booked directly to the work orders by the relevant staff involved in the service; or
- Costs are calculated based on resource requirement (labour hours) and labour rates provided by internal stakeholders and then journalled to the relevant work order.

Each individual work order is mapped directly to an Ancillary Network Service category. For those services that have various sub categories, operating expenditure was allocated based on revenue received for each sub category.

Method 2 – Each of these services are predominantly carried out by the former Market Operations branch in Endeavour Energy, with some involvement from Network Operations (for off peak conversions).

Operating expenditure for Network Operations (for off peak conversions) was extracted from the relevant work orders that were set up for this service.

3. Estimate network and corporate overheads for each Ancillary Network Service at the fee sub-category level.

The expenditure calculated in step 2 above only relates to direct operating expenditure. In order to allocate a reasonable portion of network and corporate overheads to each Ancillary Network Service, the average network and corporate overhead factor derived from the Cost Allocation Methodology (CAM) model for 2017-18 (specific to Ancillary Network Services) was applied to direct costs for 2017-18.

4. Identify the driver for each Ancillary Network Service fee at the fee sub-category level and categorise as either a fee-based service or a quoted service.

The driver for each Ancillary Network Service fee was identified as either being on a per unit basis (i.e. per job, project, lot, pole etc.) or a per hour basis. Based on the identified fee driver, each fee sub-category was identified as either a fee-based service (charged on a per unit basis) or a quoted service (charged on a per hour basis).

5. Aggregate expenditure and volume data for each Ancillary Network Service and populate tables 4.3.1 and 4.4.1 in accordance with the Category Analysis RIN.

Expenditure and volume data for each Ancillary Network Service was aggregated into a single worksheet and the data for each fee sub-category was populated into tables 4.3.1 and 4.4.1 based on the identification performed in step 4 above.

Use of estimated information

Endeavour Energy has not used estimated Information in completing table 4.3.1 and 4.4.

Material accounting policy changes

Endeavour Energy have not undertaken any material changes in accounting policies which would impact the data contained in tables 4.3.1 and 4.4.1.

Reliability of information

While a number of assumptions have been applied in order to derive expenditure and volume data for 2017-18, for certain Ancillary Network Fees and at the fee sub-category level required by tables 4.3.1 and 4.4.1, Endeavour Energy considers these assumptions to be reasonable and without valid alternatives and therefore the resulting information to be reliable.

Worksheet 5.2 – Asset Age Profile

5.2.1 Asset Age Profile

Compliance with requirements of the notice

Age profiles were developed from Endeavour Energy's asset base and therefore comply with the requirements of the Notice.

Source of information

- Ellipse/Cognos
- GIS/Network Statistics (June 2018)

Methodology and assumptions

- The profiles were carried over from the Category Analysis RIN for 2016-17.
- Mean life was left unchanged from the 2017-18 Category Analysis RIN.
- A number of age profiles (where the profile creation was straightforward) were recreated from bottom up data.
- Some commissioning dates were modified due to either incorrect entries in Ellipse or to reflect updates in the assets.
- New quantities were added to existing profiles by examining changes in the Network Statistic quantities from year to year.
- Decommissioned assets were removed from existing profiles.

Use of estimated asset age information

For some asset categories, commissioning dates were not available for individual assets. In these situations the age profiles were scaled to match total quantities reported by Ellipse or GIS Network Statistics. Scaling was either carried out across the whole profile or across specific sections of the profile on the basis of the eras in which particular technology was installed in that asset category.

Reliability of the asset age information

The asset age information was principally based on corporate data available at the time of preparation. Age profiles were developed based on available data and existing profiles. Estimation was carried out to allocate quantities of assets with unknown commissioning dates to the profiles as noted above.

Poles

Reinstatement (staking) of wooden poles

- The age profiles were developed from completed work orders from Ellipse.

Wood, Concrete and Steel Poles

- New quantities were added in the past year based on a combination of Ellipse and GIS data.
- Poles with missing dates - material and voltages were proportionally allocated to the known data (the profile was scaled to match the known quantities).
- The pole age profile has been scaled to align with total volumes.

Overhead Conductors

- Latest year installed quantities estimated using past years average.
- The age profiles were updated and where necessary scaled to match the total quantities against the 2017-18 Network Statistics.
- 22kV lines are included in the > 1kV & < = 11kV category.

Underground Cables

- Latest installed quantities estimated by examining difference between 2016-17 and 2017-18 total volumes.
- Profile quantities were scaled to align with 2017-18 Network Statistics.

Service Lines

- Latest installed quantities estimated using linear regression.
- Profile quantities were scaled to align with total number of services provided by Asset & Metering Data Branch.

Transformers

- The age profile was developed by adding new equipment records that were non-existent in the 2016-17 Category Analysis RIN to the 2016-17 Profile. In addition, units were removed from the age profile which were no longer in service.

Switchgear

Circuit Breakers

- The age profile was developed by adding new equipment records that were non-existent in the 2016-17 Category Analysis RIN to the 2016-17 Profile. In addition, units were removed from the age profile which were no longer in service.

Distribution Mains Switchgear

- The age profile was developed by adding new equipment records that were non-existent in the 2016-17 Category Analysis RIN to the 2016-17 Profile. In addition, units were removed from the age profile which were no longer in service.

Transmission Mains Switchgear

- The age profile was developed from Ellipse date of manufacturing or commissioning data.
- Units with unknown dates where proportionally allocated to the profile of known dates.

LV Links

- New quantities were estimated using a calculated LV link growth rate based on 2016-17 and 2017-18 Network Statistics.
- The existing age profile was scaled to align with 2017-18 Network Statistics quantities.
- LV links profile information is included in the “Other” Category.

< = 11kV; Fuse

- < = 11kV Fuse category includes both 11kV and 22kV Fuses.

Streetlighting

- The age profile was developed from Ellipse commissioning data.
- The existing age profile was scaled to match 2017-18 Network Statistics quantities.

Steel sub-transmission towers

- The age profile was developed by adding new equipment records that were non-existent in the 2016-17 Category Analysis RIN to the 2016-17 Profile. In addition, units were removed from the age profile which were no longer in service.
- The tower age profile is included in the “Other” Category under “Poles”

Substation Establishments

- The age profile was developed by adding new equipment records that were non-existent in the 2016/17 Category Analysis RIN to the 2016-17 Profile. In addition, units were removed from the age profile which were no longer in service.

Pilot Cables

- Latest installed quantities estimated by examining difference between 2016-17 and 2017-18 total volumes.
- The existing age profile was scaled to the 2017-18 Network Statistics quantities.

Distribution Substations

- The age profile was developed by adding new equipment records that were non-existent in the 2016-17 Category Analysis RIN to the 2016-17 Profile. In addition, units were removed from the age profile which were no longer in service.

SCADA

- Asset quantities were provided by the EE Telecommunication Section from their own records.

Capacitor Banks

- Capacitor Banks have been included in the DNSP DEFINED category.
- The age profile was developed by adding new equipment records that were non-existent in the 2016-17 Category Analysis RIN to the 2016-17 Profile. In addition, units were removed from the age profile which were no longer in service.

Worksheet 5.3 – Maximum Demand at Network Level

5.3.1 Raw and Weather Corrected Coincident MD at Network Level

Compliance with requirements of the notice
All data supplied complies with the requirements of the Regulatory Information Notice. Data has been entered into the spreadsheet by following the instructions set out in the RIN.

Source of information
Network Load History (NLH) database – Raw data, SDF2019-2028 – Weather Correction

Methodology and assumptions
Actual Data (Raw & Co-incident) requested for 2017-18 was taken from NLH.

Network total refers to the summation of all the Bulk Supply Points (BSP) and all the known embedded generation.

Embedded Generation has been included in the figures provided.

Embedded Generation data has been included in the table where generators are above 5MW and are registered with AEMO.

See Basis of Preparation (Worksheet 5.4) for short description of forecasting methodology and weather correction.

Use of estimated information
No estimations were provided in this worksheet.

Reliability of information
Network load information is sourced from measured values and is considered reliable.

Worksheet 5.4 – Maximum Demand and Utilisation at Spatial Level

5.4.1 Non-Coincident and Coincident Maximum Demand

Compliance with requirements of the notice
All data supplied complies with the requirements of the Regulatory Information Notice. Data has been entered into the spreadsheet by following the instructions set out in the RIN.

Source of information
- Network Load History (NLH) database – Raw data
- Summer Demand Forecast (SDF2019-2028) – Used to obtain the substation capacity (N) to calculate the Firm Capacity Ratings (N-1). Weather Correction was also obtained from the Forecast Document.
- Endeavour Energy Transmission Network Cyclic Rating Report July 2016 - Cyclic Ratings Report.

Methodology and assumptions
For 2017-18 the network peak demand occurred in summer. All substation data within the RIN refers to Summer 2017-18.

Subtransmission substations refer to the Bulk Supply Points (BSP) owned by TransGrid.

Actual Data (Raw & Co-incident) requested for 2017-18 was taken from NLH.

Coincident weather normalised values in the RIN – These are calculated from a ratio based on the Endeavour Energy weather normalised demand divided by the Endeavour Energy Actual. This ratio is subsequently multiplied by the coincident substation demand to obtain the coincident weather normalised value. i.e:

- 10% PoE Coincident Weather Normalised = Coincident peak of Zone Substation or Transmission Substation * (ZS or TS 10% PoE weather normalised/ZS or TS actual)
- 50% PoE Coincident Weather Normalised = Coincident peak of Zone Substation or Transmission Substation * (ZS or TS 50% PoE weather normalised/ZS or TS actual)

Embedded Generation
Embedded Generation data has been included in the tables where generators are above 5MW and are registered with AEMO. Generators that have been included in the calculations for connection point are semi-scheduled and scheduled.

BSP non-coincident embedded generation is the MW at the equivalent time of BSP non-coincident peak demand date and period

BSP coincident embedded generation is the MW at the equivalent time of EE Network season peak demand date and period

Further details can be found below:

Substransmission Level:

- Dapto BSP – Scheduled Generation
- Holroyd BSP - Scheduled Generation
- Macarthur BSP – Non-Scheduled Generation
- Sydney West BSP - Non-Scheduled Generation

Substation Cyclic Ratings (MVA):

Substation Ratings – All substation ratings in the RIN refer to the substations firm capacity (N-1). The Summer Demand Forecast Report is used to obtain the substation capacity (N). The firm rating (N-1) is then calculated by subtracting the largest transformer from the installed substation capacity (N).

The only known cyclic ratings for zone substations can be found below. There are also a small number of zones listed below that have only one transformer and the substation capacity in the RIN is shown as (N).

Cyclic Ratings:

- Albion Park as at February 2014 - 13.04(trf1) & 11.93 (trf2) & 11.93 (trf3)
- Arndell Park as at February 2014 - 42.31(trf1) & 42.31 (trf2)
- Bonnyrigg as at July 2015 – 38.11(trf1) & 38.11 (trf2) & 38.11 (trf3)
- Culburra as at February 2014 - 10.53(trf1) & 10.53(trf2)
- Kangaroo Valley as at February 2014 - 5.72(trf1) & 2.73(trf2)
- Nepean Zone as at February 2014 - 38.11(trf6) & 38.11(trf7)
- Robertson as at February 2014 - 3.81(trf1) & 3.81(trf2)
- Schofields as at February 2014 - 47.63(trf1) & 47.63(trf2)
- South Granville as at February 2014 - 26.57(trf1) & 26.57(trf2)

Substations which only have one transformer:

- Appin 1 x 15MVA
- Berrima Junction 1 x 20MVA
- Bolong Road 1 x 12.5MVA
- Glenorie 1 x 15MVA
- Ilford Hall 1 x 2.5MVA
- Jamberoo 1 x 3.75MVA
- Meadow Flat 1 x 2.5MVA
- South Leppington 1 x 45MVA
- The Oaks 1 x 15MVA
- Wentworth Falls 1 x 10MVA
- Wisemans 1 x 12.5MVA
- Yatte Yattah 1 x 6.5MVA

Short Description of the Weather Correction Process and forecasting methodology:

Weather correction is applied to the peak demands at substations where there is a strong relationship between demand and temperature. Summer demands at zone substations in the Blue Mountains and demands of all high voltage customers are not subject to any weather normalisation.

A new improved weather normalisation method based on a simulation approach has been developed and adopted. This will be used to normalise peak demands for the EE network area. Two reference weather stations were employed for temperature correction of the maximum demand (TCMD) for summer. One weather station at Nowra is used for the South Coast area which covers the Dapto BSP Region and the other weather station at Richmond is used for the remaining EE areas. The temperature correction method is basically divided into the following steps:

- To develop/update a regression model for estimating the relationship of demand, weather and periodic patterns (calendar effects) of demand.
- To simulate the demand using multi-years of historical weather data to produce 10% and 50% normalised demand.

For summer, the regression model used the most recent six years of daily maximum demand and temperature to determine the relationship between demand, weather and periodic patterns of demand. Various input parameters were employed for the model. Day of the week variables accounted for the difference between daily peak by day of the week and workday/non-workday. A set of holiday variables were included to describe the load reductions associated with holidays.

Separate variables were used for the following days: New Year's Day, Australia Day, and Christmas. In addition, a school holiday variable was introduced to capture the reduced loads (increased loads in some south coast zone substations) occurring during the school holiday period in December and January. Monthly and bimonthly variables captured some of the seasonal demand variations. Year variables described the changes in base load level for each year. Previous hot day effect variables were included to explain the impacts of the successive hot days on daily peak demand.

From the regression model, daily demands were estimated using 24 years of daily weather data available at the reference weather stations. Annual seasonal maximum demands were derived from the calculated daily demands. The 10% and 50% demand values were computed from the distribution of annual seasonal maximum demands to give the 10% and 50% PoE TCMD values. Error adjustment was applied to the 10% and 50% PoE TCMD values using the error simulation results for zone substations in western Sydney region and the South Coast. The final TCMD values for the latest year are the starting points of the peak demand forecasts.

Peak demand forecast considers the growth from the existing customers as well as the new customer connections. The forecasting process can be divided into two major steps. The first step is to estimate the organic growth at the zone substation which specifies the internal growth from its existing customers likely to be experienced over the forecast period. The organic growth for each zone substations was taken from the results of the NIEIR report[4] prepared for EE on post model adjustments for peak demand forecasts. The reports estimated the demand impacts from different state and national energy policies and programs, such as Minimum Energy Performance Standards (MEPS), NSW Energy Savings Scheme (ESS), change of building codes and NSW Solar Bonus Scheme (SBS). This growth at the zone substation was used to establish the base level of the 10-year forecast.

The second part of the forecast process involves incorporating the planner's inputs to the base level forecast. The inputs include new developments planned to occur (lot releases), new load increases expected from customer applications (spot loads) and also information regarding the transfer of load from one zone or subtransmission substation to another (load transfers). The final forecast at a zone substation is derived from the base level forecast after adjustment for planned load transfers, spot loads, land releases and re-development within the zone substation load catchment area.

The final forecasts for all zone substations were presented to the Network Planners for review and confirmation of the expected demand growth. The Network Planners' local knowledge is vital in determining load transfer, embedded generation, proposed spot-loads and predicted lot release information. This feedback also provides an audit trail for quality purposes.

[4] NIEIR(2013): Post-modelling adjustments of forecasts to 2024-25 for Endeavour Energy. National Institute of Economic and Industry Research

The forecast at transmission substations and bulk supply points is based on the rolled up zone substation forecast and calculated using the corresponding historical diversity factors.

Use of estimated information

Estimations and assumptions

For each substation where no actual MVA information was available for the financial years required, an MVA estimate was calculated by dividing the substations historical average power factor by the actual recorded peak MW value.

If the explanation above is not valid for a particular substation it will be identified below with reasons for the estimation and the approach used to obtain the estimation.

Subtransmission:

- Ilford BSP – For FY2017-18 an assumed PF of 0.970 was used for the conversion to MVA
- Marulan BSP – For FY2017-18 an assumed PF of 0.947 was used for the conversion to MVA
- Regentville BSP – For FY2017-18 an assumed PF of 0.967 was used for the conversion to MVA
- Sydney North BSP – For FY2017-18 an assumed PF of 0.995 was used for the conversion to MVA
- Wallerawang BSP 132kV – For FY2017-18 an assumed PF of 0.979 was used for the conversion to MVA

Zone Substation:

- Hazelbrook – For FY2017-18 an assumed PF of 1.000 was used for the conversion to MVA
- Huskisson – For FY2017-18 an assumed PF of 0.988 was used for the conversion to MVA
- Hinchinbrook - For FY2017-18 an assumed PF of 0.963 was used for the conversion to MVA
- Minto – For FY2017-18 an assumed PF of 1.000 was used for the conversion to MVA
- Russell Vale – For FY2017-18 an assumed PF of 1.000 was used for the conversion to MVA
- Springwood – For FY2017-18 an assumed PF of 0.967 of was used for the conversion to MVA
- West Castle Hill – For FY2017-18 an assumed PF of 0.942 was used for the conversion to MVA

Reliability of information

Network load information is sourced from measured values and is considered reliable.

Worksheet 6.3 – Sustained Interruptions to Supply

6.3.1 Sustained Interruptions to Supply (for 2017-18)

Compliance with requirements of the notice

Reported SAIDI/SAIFI complies with the requirements of the RIN. The following aspects are noted:

1. **Excluded incidents have been determined in accordance with the requirements of the STPIS (3.3a)**

Major Event Days (MED's) have been determined in accordance with the requirements of the STPIS (3.3b) – and as per Endeavour Energy distribution determination 2015−16 to 2018−19 Attachment 11 – Service target performance incentive scheme April 2015.

The determination allows for the alternative Box cox methodology. The process is described in WPB 1012 – Calculation of Major Event Day Threshold.

Therefore, the 2017-18 MED SAIDI threshold is 4.79 minutes and any day in the period that exceeded this threshold was classified as a MED.

Outages affecting single premises – Single premise outages that occur as a result of a fault on Endeavour Energy's network are included in the 2017-18 reliability result.

Subsequent interruptions caused by network switching during fault finding, in general switching operations associated with an unplanned incident may include subsequent interruptions to customers that are associated with fault finding. Current systems do not have any facility to identify these operations and therefore exclude them from reliability calculations. It should be noted that removing these operations from reliability calculations would result in an inaccurate record of actual customer experience.

Unplanned interruptions are sustained interruptions greater than one minute in accordance with the SAIDI definition in appendix A of the STPIS.

Source of information

1. **Base outage data (customers interrupted and CMI)**

2017-18 – Data sourced from OMS. All records in this database were validated and checked in accordance with a Work Place Instruction WPB1014.

Reporting tool – Cognos 10

2. **Customer numbers for calculation of SAIDI and SAIFI**

Customer numbers used to calculate SAIDI and SAIFI were average customer numbers for the relevant reporting period and were sourced from customer numbers in the OMS Archive database

Methodology and assumptions

MED days – MED day threshold of 4.79 minutes (2017-18 threshold) was applied, therefore any day in the period that exceeded this threshold was classified as a MED.

Excluded interruptions – Reporting tool Cognos 10 identifies excluded interruptions based on a cause that is assigned to each interruption in accordance with STPIS 3.3a.

Allocation of Reason for Interruptions and detailed Reason for Interruption

Interruption cause information in the OMS does not record causes in the same way as the RIN. Therefore, causes in OMS were mapped to the RIN causes in an external mapping table.

Reliability of information

All the information provided represents actual information extracted from Endeavour Energy's reporting systems and reconciled to reported figures in previous audited RINs. As a result, the information contained is considered to be reliable cognisant of the comments made above.

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