Basis of Preparation

Response to Category Analysis RIN 2017-18

essential energy

CONTENTS

1 Purpose

This document is Essential Energy's Basis of Preparation in relation to the audited Category Analysis RIN data as required by part 1.2 of Schedule 1 of the AER Regulatory Information Notice.

It explains the basis upon which information was prepared for all information in the Category Analysis RIN template. As required by the AER, this Basis of Preparation is a separate document that has been submitted with the completed regulatory templates.

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 Essential Energy has complied with the requirements of the Notice.

Essential Energy must include in its Basis of Preparation, any other information prepared in accordance with the requirements of the Notice.

The AER has set out what must be in the Basis of Preparation. This is set out in Table 1 below.

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

Table 1 – Requirements of the Basis of Preparation

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

When reporting an audit opinion or making an attestation report on the regulatory templates presented by Essential Energy, an auditor or assurance practitioner shall opine or attest by reference to Essential Energy's Basis of Preparation.

Structure of this Document

This document is structured as follows:

- Firstly, Essential Energy's general approach to developing the RIN response is explained. This includes the identification of key systems used to source data, issues relating to data quality and a general comment on the reliability of the data for benchmarking purposes.
- Secondly, the response to worksheets 2.1 to 6.3, is set out in accordance with the AER's instructions. It is noted that Worksheet 1.0 requires no input material.

2 General Approach

In this section, Essential Energy's approach to collecting and preparing information for the Category Analysis RIN is explained.

A key concern of Essential Energy is that the AER may use information which is of a poor quality to make regulatory determinations or benchmarking comparisons.

Essential Energy has identified areas where information is considered to be unreliable and once again suggests the AER use caution when applying this data for benchmarking purposes.

Systems Used to Provide Data

Where data has been sourced directly from Essential Energy's financial and other information systems, this system has been identified. Similarly where estimated data is based on data sourced from Essential Energy's systems, those systems are identified.

Data Quality Issues

In previous consultations on the RIN, Essential Energy raised significant concerns with providing some of the data in the form required by the AER. Although the RIN specifies that all data provided is to be actual (not estimated) from 2014-15 onwards, Essential Energy does not have the information to be able to provide this for all tables. The cost of implementing systems to facilitate the provision of this information is prohibitive and would require an extensive time to implement.

Essential Energy continues to stress concern in relation to the detailed templates submitted and the reliance on some of this information for benchmarking and decision making purposes.

Approaching Essential Energy's Obligations under the NEL

Essential Energy's 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 Essential Energy's systems, there is a reasonable excuse under section 28(5) of the NEL not to comply with that element of the notice. Essential Energy has strong doubts that a RIN can require the business to prepare information by way of estimate that cannot be reasonably derived from information currently held in its systems.

Essential Energy's 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. Essential Energy suggests 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.

Despite this, Essential Energy has prepared and included the 2017-18 data to the best of its knowledge.

Recognition by AER that "Best Estimates" are Not Robust

The AER has acknowledged that if Essential Energy is compelled to provide best estimates then there is potential for the data to lack robustness. Essential Energy has addressed the implications of using best estimates which are not robust in this Basis of Preparation document.

Process Used to Determine if Information is Actual or Estimated

Where actual information is not able to be derived from Essential Energy's financial and information systems, information has been estimated using the best available estimate. In circumstances where the

AER has recommended an approach for estimating, that approach has been followed as far as practicable and reasons for any variations have been identified and explained.

In compliance with the AER's definitions of actual and estimated information, as listed in the Instructions and Definitions document of the Economic Benchmarking RIN, if submitted information is materially dependent on information from historical records, it is more likely to be treated as actual information. Alternatively, data whose presentation is contingent on judgements and assumptions for which there are valid alternatives and which could lead to a materially different presentation is likely to be classified as estimated information.

Under Essential Energy's internal colour coding system, data remains un-coloured unless it is considered to be estimated, in which case it is shaded yellow.

Reliability of Applying Data to Benchmarking

Essential Energy considers the application of benchmarking to guide regulatory decision making would result in error, leading to outcomes that are detrimental to the long term interests of customers. This view is based on the following:

- As noted in the Data Quality Issues section above, there is recognition by the AER that data quality from best estimates will not be of a robust quality, and may not pass audit and reviews. This document has identified where information has been developed from best estimates and the confidence Essential Energy has in that data. In this respect models, such as Total Factor Productivity (TFP), are based on the interaction of multi-variables. If a data series is inaccurate, it can significantly alter the findings of the model and lead to misleading conclusions.
- Essential Energy is not convinced that benchmarking tools such as TFP can be used to infer relative efficiency of DNSPs over time. The models cannot adequately normalise for differences between DNSPs, and do not provide meaningful assessment of the apparent differences in productivity levels. For example, TFP will show that a firm that replaces ageing assets has declining levels of capital productivity, as the model would show higher prices for capital while maintaining existing service levels. In Essential Energy's view this would be driven by the age of the asset base which is likely to vary between DNSPs.
- Essential Energy considers that benchmarking models such as TFP do not provide the AER with guidance on how to target its review of expenditure forecasts, as the information provided is at too high a level to identify potential areas of efficiency. The models and data collected will not provide any guidance on the underlying drivers of apparent productivity, and therefore does not provide useful analysis on which areas to review in a DNSP's opex and capex forecasts.

3 Financial Data

Essential Energy has prepared an overarching Basis of Preparation relating to financial data used in the RIN tables where "as incurred" financials are requested. The Basis of Preparation below applies to expenditure data contained in the following tables:

RIN Sheet	Table Number	Table Name
2.2 Repex	Table 2.2.1	Replacement Expenditure, Volumes and Asset Failures by Asset Category
2.3(b) Augex	Table 2.3.3	Augex Data – HV/LV Feeders and Distribution Substations
2.3(b) Augex	Table 2.3.4	Augex Data - Total Expenditure
2.5 Connections	Table 2.5.1	Descriptor Metrics
2.5 Connections	Table 2.5.2	Cost Metrics by Connection Classification
2.6 Non-network	Table 2.6.1	Non-network expenditure
2.7 Vegetation management	Table 2.7.2	Expenditure Metrics by Zone
2.8 Maintenance	Table 2.8.2	Cost Metrics for Routine and Non-Routine Maintenance
2.9 Emergency Response	Table 2.9.1	Emergency Response Expenditure (Opex)
2.10 Overheads	Table 2.10.1	Network Overheads Expenditure
2.10 Overheads	Table 2.10.2	Corporate Overheads Expenditure
2.10(A) Overheads	Table 2.10.1	Network Overheads Expenditure
2.10(A) Overheads	Table 2.10.2	Corporate Overheads Expenditure
2.12 Input tables	Table 2.12.1	Input tables
4.1 Public lighting	Table 4.1.2	Descriptor Metrics Annually
4.2 Metering	Table 4.2.2	Cost Metrics
4.3 Fee-based services	Table 4.3.1	Cost Metrics
4.4 Quoted services	Table 4.4.1	Cost Metrics

High Level Approach for Financial Data

The financial information provided is in accordance with the definitions as provided by the AER.

A master file of financial data has been prepared which ensures that the Category Analysis RIN templates reconcile to the 2017-18 Regulatory Accounts as submitted to the AER.

The overarching Basis of Preparation for financial data is to use, where possible:

- The actual regulatory costs category totals that map to individual RIN sheets or tables.
- These totals are disaggregated where the RIN templates require lower levels of detail.
- The disaggregation is based on the actual Statutory and Management Accounts cost category structures.
- A cost mapping matrix is constructed using actual Statutory Accounts cost categories that aligns to the costs categories in the RIN tables.
- This matrix is then used to apportion the regulated cost totals into the RIN tables.

Thus, the financial information in the RIN templates represents adjusted actual financial information, and has used in its calculation, actual Statutory Accounts cost category splits.

Source of Financial Information

PeopleSoft 2017-18 data has been extracted and reconciled to relevant Statutory and Management Accounts to ensure its validity. The underlying cost structures in this data set have been mapped to the 2017-18 Regulatory Accounts. Cost matrices using Project Types Levels and Resource Categories have been constructed to provide the necessary breakdowns required in the RIN tables.

Methodology & Assumptions for Financial Data

Where the breakdown analysis of PeopleSoft data was not sufficient to satisfy RIN requests, additional mapping tables were requested from Subject Matter Experts (SMEs) in the appropriate operational areas.

Use of Estimated Financial Information

Some estimates have been supplied by operational Subject Matter Experts.

Reliability of financial information

The underlying 2017-18 financial information in the Category Analysis RIN is a reasonably accurate representation of the 2017-18 Regulatory Accounts based on Essential Energy's underlying cost categories and therefore considered to be reliable. Where the RIN templates do not align to either the Regulatory Accounts cost categories and/or Essential Energy's internal cost categories, SME mapping has been used. There is a risk that the aggregated or disaggregated costs mapping may not align to the true intent of the RIN categories and as such, caution should be used when using it for benchmarking or decision making purposes.

There is real risk that the financials to physical units at a line level may also not align, as unit data has not always been captured at the level of detail as required in the RIN and has been prepared using a different methodology compared to the financials. Financials to physical units analyses should not be relied upon.

Glossary of Terms

Term / Acronym	Explanation
CAM	Cost Allocation Methodology
CB	Circuit Breaker
CMDB	ICT's Configuration Management Database
COGNOS	Business reporting system that manages database information.
Diagnostic software	Radio asset database held in CMDB
EDDiS	Energy Data Distribution System
Energy	Energy Customer Information System. This is the system used by Essential Energy to maintain records of customers, meters, tariff information, consumption readings and sales.
ENI	Electricity Network Incident Failure Database
FTE	Full time employee
GIS	Geospatial Information System – also known as WASP
PeopleSoft	Essential Energy's Financial Management System including accounts payable, payroll, asset and equipment registers, and financial reporting functions.
Planning Database	• List of customer initiated projects. • Estimated unit costs for transformers based on OH/UG and kVA. Costing included estimated man hours.
PoF	Power On Fusion
Primavera	Essential Energy's project management system
ROE device list	IP asset data held in CMDB
SCADA	Essential Energy uses this system to monitor and control the network.
Service Manager	Database of asset replacement and failures
SGfleet	Fleet Management company
Smallworld	Geospatial Information System (GIS) that topographically and/or schematically maps Essential Energy network assets and connections.
STS	Subtransmission substation
TotalSAFE	TotalSAFE Safety and Incident Management System
WASP	Works, Assets, Solutions and People Database
ZS	Zone substation

Worksheet 2.1 – Expenditure summary

Table 2.1.1 – Standard control services capex

Compliance with Requirements of the Notice

This section summarises 2017-18 data for Standard Control Services Capex, broken up into various categories. It also contains a line for Capital Contributions.

Source of Information

This table is mainly a summary of Capex shown in subsequent tables of the Category Analysis RIN template, and as such, the subsequent tables in the Category Analysis RIN template are the main source of data for this table.

The 2017-18 Annual Reporting RIN has also been used to provide the total Capex figure which includes the Capital Contributions component.

Methodology & Assumptions

As most of the data shown in this table is a summary of data found in subsequent tables in the Category Analysis RIN template, the table cells represent totals of appropriate cells in other tables in the Category Analysis RIN template.

Capital Contributions were obtained from the 2017-18 Annual Reporting RIN.

Use of Estimated Information

To separate expenditure across RIN categories, submitted information is materially dependent on information from the PeopleSoft financial system. As a result this information is treated as actual information.

Reliability of Information

The data is considered to be reliable. Data sourced from other tables within the Category Analysis RIN template may be based on assumptions and estimates and should be used with caution when used for benchmarking or decision making purposes.

Table 2.1.2 – Standard control services opex

Compliance with Requirements of the Notice

This section contains summary data of the 2017-18 Opex for Standard Control Services, broken up into various categories. It also contains a Balancing Item which equals the Non-Network Expenditure (also included in Network and Corporate Overheads).

Source of Information

This table is mainly a summary of Opex shown in subsequent tables of the Category Analysis RIN template, and as such, the subsequent tables in the Category Analysis RIN template are the main source of data for this table.

The 2017-18 Annual Reporting RIN has been used to provide the total Opex figure. The balancing item is Non-Network Expenditure, which is included in Network and Corporate Overheads to avoid double-counting.

Methodology & Assumptions

As most of the data shown in this table is a summary of data found in subsequent tables of the Category Analysis RIN template, the table cells represent totals of appropriate cells in other tables in the Category Analysis RIN template.

Use of Estimated Information

To separate expenditure across RIN categories, submitted information is materially dependent on information from the PeopleSoft financial system. As a result this information is treated as actual information.

Reliability of Information

The data is considered to be reliable. Data sourced from other tables within the Category Analysis RIN template may be based on assumptions and estimates and should be used with caution for benchmarking or decision making purposes.

Table 2.1.3 – Alternative control services capex

Compliance with Requirements of the Notice

This section contains summary data of the 2017-18 Capex for Alternative Control Services, broken up into various categories.

Source of Information

This table is mainly a summary of Capex shown in subsequent tables of the Category Analysis RIN template, and as such, the subsequent tables in the Category Analysis RIN template are the main source of data for this table.

The 2017-18 Annual Reporting RIN was used to provide the total Capex figure.

Methodology & Assumptions

As most of the data shown in this table is a summary of data found in subsequent tables in the Category Analysis RIN template, the table cells represent totals of appropriate cells in other tables in the Category Analysis RIN template.

Use of Estimated Information

To separate expenditure across RIN categories, submitted information is materially dependent on information from the PeopleSoft financial system. As a result this information is treated as actual information.

Reliability of Information

The data is considered to be reliable. Data sourced from other tables within the Category Analysis RIN template may be based on assumptions and estimates and should be used with caution for benchmarking or decision making purposes.

Table 2.1.4 – Alternative control services opex

Compliance with Requirements of the Notice

This section contains summary data of the 2017-18 Opex for Alternative Control Services, broken up into various categories.

Source of Information

This table is mainly a summary of Opex shown in subsequent tables of the Category Analysis RIN template, and as such, the subsequent tables in the Category Analysis RIN template are the main source of data for this table.

The 2017-18 Annual Reporting RIN was used to provide the total Opex figure.

Methodology & Assumptions

As most of the data shown in this table is a summary of data found in subsequent tables in the Category Analysis RIN template, the table cells represent totals of appropriate cells in other tables in the Category Analysis RIN template.

Use of Estimated Information

To separate expenditure across RIN categories, submitted information is materially dependent on information from the PeopleSoft financial system. As a result this information is treated as actual information.

Reliability of Information

The data is considered to be reliable. Data sourced from other tables within the Category Analysis RIN template may be based on assumptions and estimates and should be used with caution for benchmarking or decision making purposes.

Table 2.1.5 – Dual function assets capex

Compliance with Requirements of the Notice

As Essential Energy has no dual function assets, no data has been input into this table.

Table 2.1.6 – Dual function assets opex

Compliance with Requirements of the Notice

As Essential Energy has no dual function assets, no data has been input into this table.

Worksheet 2.2 – Repex

Table 2.2.1 – Replacement Expenditure, Volumes and Asset Failures by Asset Category

Compliance with Requirements of the Notice

Asset replacement and failure quantities have been compiled in accordance (or as close as systematically possible) with the definitions and guidance outlined in the *Regulatory Information Notice* instructions issued to Essential Energy under *Division 4 of Part 3 of the NEL*.

Source of Information

Several asset management and planning systems and business reports have been used. These systems are listed below along with the asset group to which the data has been applied.

Source System	Asset Groups	Used For		
		Expenditure	Asset Replacements	Asset Failures
PeopleSoft (for estimating units only)	All	Yes	Yes	No
WASP	All	No	Yes	No
Network Planning Database (NPDB)	All	Yes	Yes	No
Pole Failure Database	Poles, Public Lighting	No	No	Yes
Electrical Network Incidents Web (ENI – Web)	Pole Top Structures, OH Conductors, UG Cables, Service Lines, Transformers, Switchgear	No	No	Yes
Electrical Network Incidents Maintenance Work Log (ENI – eMWL)	Pole Top Structures, OH Conductors, UG Cables, Service Lines, Transformers, Switchgear	No	No	Yes
GIS Smallworld	OH Conductors, UG Cables	No	Yes	No

Source System	Asset Groups	Used For		
		Expenditure	Asset Replacements	Asset Failures
Project Online	SCADA, Network Control & Protection Systems	No	Yes	Yes
Audit Sheet of ZS 11 and 22 kV arresters	Surge Diverters	No	Yes	No
Trio Diagnostics	SCADA, Network Control & Protection Systems	No	Yes	Yes
Service Manager	SCADA, Network Control & Protection Systems	No	Yes	Yes

Methodology & Assumptions

All Expenditure Categories

2017-18 actual expenditure information was sourced from Peoplesoft and NPDB project accounts and applied directly to the following Asset Categories in Table 2.2.1:

- Poles -Staking of a Wooden Pole
- Other – Zone Substation Current Transformers
- Other – Zone Substation Voltage Transformers
- Other – Zone Substation Surge Diverters

The remaining asset categories in Table 2.2.1 do not specifically exist in the project source data, therefore the amounts were apportioned to the correct asset category using a model that:

- Maps the NPBD Prioritised Investment Programme (PIP) amounts to the correct asset groups in Table 2.2.1.
- Apportions the asset group amounts to the respective asset categories based on Essential Energy replacement capital unit rates or the WASP estimating and packaging tool assembly unit rates.

For example, Peoplesoft and NPDB contain actual expenditure assigned to several pole top Repex PIPs that can be directly mapped to the Pole Top Structures asset group. The categorical expenditure of <=1kV is known to be x whereas the capital unit rate for >1kV & <11kV is known to be 1.4x and so on through to the larger voltage categories.

These apportionments mean that the values are estimated based primarily on internal adjustment ratio developed.

All Asset Replacements

Asset replacement units were mainly sourced from completed work tasks in the WASP database with the exception of Overhead Conductors and Underground Cables which are queried from GIS Smallworld.

Some values were extracted from NPDB.

All Asset Failures

Failure numbers were based on data sourced from either the Pole Failure Database, ENI - Web & ENI - Electronic Maintenance Worklog (eMWL)[1] failure records.

Only Functional[2] failures with unassisted causes have been included in accordance with the *Asset failure (repex)* definition outlined in pp 84 of the *Regulatory Information Notice* instructions issued under *Division 4 of Part 3 of the NEL*.

The primary cause recorded against each functional failure determines whether it is unassisted or not.

Poles

Staking of a Wooden Pole

- Replacement data has been based on a count of the following completed WASP work tasks in Repex projects:
    - "Pole – Reinstate"
    - "Pole reinforcement – install"
    - "Pole reinforcement – replace"

Staking Failures

- Failures have been sourced from the Pole Failure Database. The data is populated from several different sources and reviewed monthly.
- Staking failures are unassisted pole failures that occurred which had a stake installed.
- Dedicated streetlight poles or columns and private poles have been excluded from the count.

Pole Replacement

- Replacement data has been based on a count of the following completed WASP work tasks in Repex projects:
    - "Pole - Condemned – Replace"
    - "Pole - Concrete – Replace"
    - "Pole Steel/Tower – Replace"
    - "Pole - Replace - System Augmentation"
    - "Pole – Install Additional"
    - "Pole – Pole Failure"
    - "Pole – replace"
    - "Pole – upgrade"
- Dedicated streetlight poles and columns were excluded from the count and provided to the Essential Energy Streetlight team for classification into Major and Minor Road.

[1] The Electrical Network Incidents (ENI) register was under transition from a fixed to a cloud database in FY 2017 to facilitate a business wide transfer to mobile works platform, hence, data was collected and reconciled from two sources.

[2] Functional Failure - Is the term used to describe an asset that is no longer performing its primary purpose and/or role in the network.

- Private poles have been excluded except for those managed and maintained by Essential Energy.
- Bollard pole replacements are included in < 1kV voltage categories and according to their respective material.
- If pole material = “Unknown”, then classify as “Wood”.
- If pole voltage = “Unknown”, then classify as “< 1kV & <= 11 kV”.

Pole Failure

- Data has been sourced from the Pole Failure database. The data is populated from several different sources and audited monthly.
- Dedicated streetlight poles or columns and private poles have been excluded from the count.

Pole Top Structures

Pole Top Replacement

- Replacement data has been based on a count of the following completed WASP work tasks in Repex projects:
    - “Crossarm – Replace”
    - ”Crossarm – Upgrade” (for safety and compliance driven replacements).
    - “Poletop – replace construction”
    - “Crossarm – Install Longer Crossarm”
    - “Crossarm – install”
    - “Pole – Replace Pole Top Bracket”
- In addition, an estimated amount of pole top structures has been included for those that have been replaced without a work task in WASP. The estimate is calculated by using the project information provided by the Planning Database and PeopleSoft direct dollar amounts recorded against said Planning database projects for 2017-18.

Pole Top Failure

- Failure data has been based on a count of all ENI records representing unassisted crossarm failures.
- Pole top failures on private poles have been excluded.

Overhead Conductors & Underground Cables

Conductor/Cable Replacement

- Replacement data has been sourced from reconductor construction plans entered into Smallworld.
- Data includes all capitalised conductor replacements triggered by condition.

Conductor/Cable Failure

- Failure data has been based on a count (units, not km) of all ENI records representing unassisted conductor or cable failure causes.
- Conductor/Cable failures on private poles have been excluded.

Service Lines

Service Line Replacement

- Replacement data has been based on a count of the following completed WASP work tasks in Repex projects:
    - “LV service conductor – replace”
    - “Service – Replace Service”
    - “Service – Programmed Replacement”
- Essential Energy only classifies < 11 kV voltage lines connected to customers as services.
- Due to the lack of system support, replacement work tasks are applied to poles upstream of the service conductor, ie. on the parent pole or pit or pillar. Classification of the Customer Type is given by the highest ratio of customer types attached to the parent asset, eg. if there are a number of services attached to a pole and the ratio of residential customers is > = 0.5, then the Customer Type is assumed to be “Residential”, otherwise it is assumed to be of a “Business” type.
- Note: At the time of querying WASP for 2017-18, not all of the completed replacement work tasks of the Wagga Wagga and Grafton area programmed replacements had been loaded into the production environment due to compatibility errors. Therefore, a pro-rata sum of these replacements was added based on external data provided by the programme manager.

Service Line Failure

- Failure data has been based on a count of all ENI records representing unassisted Service Line failure failures.
- Failures on private assets have been excluded.
- Service Line failures on private poles, pits or pillars have been excluded.

Transformers

Transformer Replacement

- The following relates to the smaller category transformers known as “distribution” transformers in Essential Energy. For the larger category transformer replacements, refer to the Zone Substation section.
- Replacements have been based on a count of the following completed WASP work tasks in Repex projects:
    - "Substation - Replace Tank"
    - "Transformer - replace"
    - "Sub (Chamber) - upgrade"
    - "Sub (ground mounted) - upgrade"
    - "Sub (padmount) - install"
    - "Sub (padmount) - replace"
    - "Sub (padmount) - upgrade"
    - "Sub (pole mounted) - install"
    - "Sub (pole mounted) - upgrade"
    - "Transformer - upgrade"
    - "Substation - Replace Cubicle"
    - "Regulator - Replace Tank"
    - "Regulator - replace"
    - "Regulator - install"

In addition, an estimated amount of transformer replacements has been included for those that have been replaced without a work task in WASP. The estimation is calculated by using the project information provided by the Planning Database and PeopleSoft direct dollar amounts recorded against said Planning Database projects for 2017-18.

- Unknown distribution substation types have been assumed to be pole substations.
- Unknown distribution transformer kVA is assumed to be <= 60 kVA. Unknown phasing and SWER is assumed to be single phase.
- As regulators, pole top or kiosk transformers > 22kV do not have their own category, they have been included in "Other".

Transformer Failure

- Failure data has been based on a count of all ENI records representing unassisted Transformer failure causes.
- Transformer failures on private poles or within private installations have been excluded.

Switchgear

Switchgear Replacement

- The following relates to the smaller category switchgear known as “distribution” switchgear in Essential Energy. For the larger category switchgear replacements, refer to the Zone Substation section.
- Replacement data has been based on a count of the following completed WASP work tasks in Repex projects:
    - “Fuse – EDO Ruse Programmed Replacement”
    - “Fuse – Replace Fuse”
    - “Sub(pole mounted) – replace”
    - “Substation – Programmed Refurbishment”
    - Sub (pole mounted) – refurbishment”
    - “ABS – Replace”
    - “ABS – replace with Gas Switch”
    - “ABS – upgrade to Gas Switch”
    - “Gas Switch – Replace – Pole Top Mount”
    - “Links – Replace”
    - “OH HV fuse / link – replace”
    - “OH HV fuse / link – upgrade”
    - “OH LV ruse / link – replace”
    - “OH LV ruse / link – upgrade”
    - “OH LV fuse / link – install”
    - “UG LV fuse / link – replace”
    - “Protection Site – Replace Tank”
    - “Recloser – replace”
    - “Sub (pole mounted) – replace”
    - “Load break switch – replace”
    - “Load break switch – upgrade”
- In addition, an estimated amount of switchgear has been included for those replaced without a work task in WASP. The estimate is calculated using the project information provided by the Planning Database and PeopleSoft direct dollar amounts recorded against said Planning Database projects for 2017-18.

Switchgear Failure

- Failure data has been based on a count of all ENI records representing unassisted switchgear failure causes.
- Switchgear failures on private poles or within private installations have been excluded.

Public Lighting

These figures represent only dedicated streetlight columns. All other numbers represent all streetlights.

Asset Replacements

Asset Type	Included in Totals
Luminaires	Sum of Luminaires replacement tasks from the WASP report "Defects 2017/18", filtered for "Street light – replace", split for major or minor and based on 150 watts.
Brackets	Sum of replacement tasks from the Wasp report "Defects 2017/18" and filtered for "Street light bracket – replace".
Lamps	There are no volumes included in this section as expenditure on lamps is not considered to be Repex.
Poles	Pole replacements are sorted from a report labelled "FY18 CA RIN_REPEX Dedicated SL Pole Replacements" (which contains data extracted from WASP), using the following process; • The asset ID in the files provided ("FY18 CA RIN_REPEX Dedicated SL Pole Replacements" and "FY18 CA RIN_REPEX Dedicated SL Unassisted Failures") are matched to asset IDs in the luminaire inventory report • The inventory report contains data on luminaire size (this data is not included in the pole data file provided). • Luminaires <150 watt are "minor"; luminaires > or = 150 watt are "major" • Costs and quantities are apportioned based on this split.

Asset Failures

Asset Type	Included in Totals
Luminaires	Failures are sourced from the "Defects 2017/18" WASP report, based on work task types. All customer reported defects are considered as failures, as well as defects identified from Night Patrol inspections.
Brackets	Failures are sourced from the "Defects 2017/18" WASP report, based on work task types. Only Cat 1 and Cat 2 are considered as failures.
Lamps	There are no volumes included in this section as expenditure on lamps is not considered to be Repex.
Poles	Failure data has been based on a report (which contains data extracted from the Pole Failure Database which reconciles to WASP), titled "FY18 CA RIN_REPEX Dedicated SL Unassisted Failures".

Expenditure

Total Repex expenditure for this category is taken from the Light Replacement Total Cost calculated in Table 4.1.2. The expenditure data was then allocated to the asset groups using the following formula:

Total expenditure = Repex Luminaires + Repex Brackets + Repex Poles

To calculate replacement unit rates:

- Poles – the 2016-17 pole replacement unit rate was used.
- Brackets – the unit rate was sourced from the approved tariff model 2014-2019.
- Luminaires – the weighted average cost per replacement task was calculated based on replacement volumes

Bulk Lamp LED replacement tasks are not included in expenditure or volumes for this section as they were funded by customers.

SCADA, Network Control & Protection Systems

- Capital Expenditure was sourced from the Regulatory Accounts and apportioned into the different categories based on actual expenditure in PeopleSoft financials. Capital project data was sourced from both Peoplesoft and Project Online, which was used to apportion across the RIN sub-categories. Whilst there are currently issues with the replacement product (Project Online replaced Primavera, which was previously used), ongoing reconciliation works are undertaken on a monthly basis between the reported outcomes of both Peoplesoft and Project Online.
- Projects to deliver other network infrastructure (non-system) that has a communications component have not been reported in this section. These projects will be reported in other areas of the Category Analysis RIN depending on the specific driver for the project.
- Asset Replacement data was obtained from Service Manager and is based on capital replacement programs to replace End of Life assets or equipment deemed not fit for purpose.
- Asset Failure data was obtained from Service Manager and relates to assets that have been replaced due to unplanned failure. Incidents or faults that have been rectified by means other than an asset replacement have not been included in this section.
- In the case of Communications assets relating to SCADA, an additional source has been the use of Trio Diagnostics tools (low band radios, where used).
- Totals included in this section are an amalgam of figures from true SCADA (ZSS RTUs) and Telecommunications used for SCADA purposes.

Zone Substations

- CTs, VTs, Batteries - quantities replaced are those with a commissioning date within the 2017-18 financial year, where they are not part of an augmentation project. Failures are those where the VT failed in service and was replaced during the 2017-18 year.
- Property replaced is any site with significant spend during the 2017-18 financial year, from the planning database.
- Surge diverters replaced is the total of 132 + 66 + 33 + 22 + 11 kV surge diverters divided by 24 which is the frequency at which surge diverters are intended to be replaced.
- It is assumed that the policy of replacing surge diverters every 24 years is fully implemented.

Use of Estimated Information

Most information is based on actual data. There is some estimated information in the data splits and disaggregation of totals. The information required for the asset categorisation in this table does not exist in the PeopleSoft or Planning Database project source data. In addition, PeopleSoft and the Planning Database are not linked to the asset management datasets in WASP which are required to complete this table.Therefore the splits of financial information for some asset types have been estimated.

All non financial units are actual with the following exceptions in asset replacement categories:

- Pole Top Structures; > 22 kV & < = 66 kV (Part actual, part estimate)
- Transformers; Pole Mounted ; < = 22kV ; > 60 kVA and < = 600 kVA ; Multiple Phase (Part actual, part estimate)
- Transformers; Kiosk Mounted ; < = 22kV ; > 60 kVA and < = 600 kVA ; Multiple Phase (Part actual, part estimate)
- Transformers; Ground Outdoor / Indoor Chamber Mounted; < 22 kV ; > 60 kVA and < = 600 kVA ; Multiple Phase (Part actual, part estimate)
- Transformers; Ground Outdoor / Indoor Chamber Mounted; < 22 kV ; > 600 kVA ; Multiple Phase (Part actual, part estimate)
- Ground Outdoor/Indoor Chamber Mounted; > = 22kV & < = 33 kV; < = 15MVA

A part estimate was required for the above categories as there were some specialised capital projects completed with actual recorded Repex, without WASP work tasks to count the units.

Reliability of Information

Replacement expenditure, at an aggregate level, is considered to be reliable as it has been sourced from the 2017-18 Regulatory Accounts. Apportionment of expenditure into the different categories requested by the AER is based on assumptions and estimates so caution should be used when using this for benchmarking or decision making purposes.

Table 2.2.2 – Selected Asset Characteristics

Compliance with Requirements of the Notice

Quantities reported have been compiled in accordance (or as close as systematically possible) with the definitions and guidance outlined in the *Regulatory Information Notice* instructions issued to Essential Energy under *Division 4 of Part 3 of the NEL*.

Source of Information

Refer to “Source of Information” for Table 2.2.1, above.

Methodology & Assumptions

The methodology and assumptions for each category are outlined below.

Total Poles by Feeder Type

- Data was sourced from WASP with feeder type referenced from Smallworld.
- Data for poles in commission includes all owners (ie. all poles that Essential Energy inspects) and is limited to only those poles with a service status of “In Service”. Data for replacements is as per Table 2.2.1.

- Feeder type has been determined by mapping individual assets to the geospatial information held in Smallworld, HV feeders based on reliability categorisation, LV feeders based on their parent HV feeder, and transmission and unknowns distributed by ratio across the three categories.
- The "Asset Volumes Currently in Commission" column includes the "Staking of a Wooden Pole" asset category but excludes dedicated streetlight poles/columns.

Overhead Conductors by Feeder & Material Type and Underground Cable by Feeder Type

- Data has been sourced from GIS Smallworld.
- Data for conductor/cable in commission includes only Essential Energy owned assets and is not limited by service status. Streetlight conductors/cables have been included; however LV services have been excluded. Data for replacements is as per Table 2.2.1.
- Feeder type has been determined by mapping individual assets to the geospatial information held in Smallworld, HV feeders based on reliability categorisation, LV feeders based on their parent HV feeder, and transmission and unknowns distributed by ratio across the three categories. Essential Energy has no CBD category feeders.
- Material type has been assigned from Smallworld attributes, with unknowns spread by ratio. All covered conductors besides LV ABC (HV ABC, CCT, etc.) have been included in "Other".

Transformers by Total MVA

- Data has been primarily sourced from WASP.
- Data for transformers in commission is a sum of the maximum MVA for all distribution and zone substation power transformers. It does not include regulators, zone substation auxiliary transformers, step up transformers, or SWER isolating transformers.
- Zone substation transformer MVA has been assumed to be 5MVA for assets with an unknown rating. Distribution transformer MVA for assets with an unknown rating has been derived from the Substation Site's "Total KVA". If this is not available, then kVA has been derived as follows (note this has only occurred in 2% of cases):
    - If Substation Site "Total KVA" is blank, then use sum of children Transformer "KVA".
    - If Substation Site "Total KVA" and children Transformer "KVA" fields are blank, then use Substation Site "Phases" as follows:
        - 3 phase = 63kVA
        - 1 phase = 10kVA
    - If Substation Site "Total KVA" and children Transformer "KVA" fields are blank and Substation Site "Phases" is blank, then use Substation Site "Construction Type" as follows:
        - Pad/Kiosk Substation = 500kVA
        - Chamber Substation = 1000kVA
        - Ground Substation = 1000kVA
        - All others (eg. Pole Substation) = 10kVA
- Data for distribution transformers disposed was unavailable and hence was estimated for 2017-18, due to a problem with the new RATS data integration with WASP.
- Data for transformers replaced is based on a sum of the maximum MVA for all distribution transformers with a capitalised WASP work task ("Substation - Replace Tank" and "Transformer – replace"), the sum of the estimated MVA amount of transformers in the Planning Database as well as a sum of the

maximum MVA from transformer commissioning records for zone substation transformers (filtered to include only replacements). The same inclusions/exclusions and assumptions apply as per the In Commission transformer sum.

Use of Estimated Information

All information is actual with the exception of the following category:

- Transformers; Total MVA disposed of (Part Actual, part estimate)

A part estimate was required for the above category as the Returned Asset Tracking System (RATS) application data for recording distribution transformer disposals has returned to WASP irreconcilable. Therefore, an average of the past eight years of disposals was provided as an estimate instead.

Reliability of Information

While Essential Energy have provided their best estimate of the data, the information provided is based on assumptions and estimates and caution should be used when using it for benchmarking or decision making purposes.

Worksheet 2.3(a) – Augex

Table 2.3.1 – Augex Asset Data – Subtransmission Substations, Switching Stations & Zone Substations

Compliance with Requirements of the Notice

In the following subheadings Essential Energy demonstrates how the information provided is consistent with the requirements of this Notice.

Source of Information

Data has been sourced from PeopleSoft, Essential Energy's financial system, and cross-referenced against Project Online, Essential Energy's project management system.

Methodology & Assumptions

To extract the data, the following assumptions have been made:

- Transformer Units added - It is assumed that replacing one transformer with two transformers is the addition of one unit.
- Transformer MVA added - It is assumed that replacing a 10MVA with a 30MVA transformer is the addition of 20MVA.
- Switchgear Units added:
    - It is assumed that if you replace one circuit breaker ("CB") with another CB, there has been no addition.
    - It is assumed that replacing a CB and CT with a dead tank counts as a one for one replacement.
    - It is assumed that only ABS CT VT and CB are the primary plant.
    - Earth switches, FI gear, surge arrestors and fault throwers have not been included.
    - Analysis has been performed on single line diagrams for units, but PeopleSoft dollars for total expenditure are based on manufacturer's names.
- Installation hours are inclusive of all hours on the project including design, and project management.
- Civil works is inclusive of the major contract (and other contracts). This could not be separated out.
- Total direct expenditure and major contract expenditure equates to the total direct costs of the project.

For the purposes of preparing the information, normal conditions are defined as those which allow the element to operate within manufacturer's specifications under a standard operational state and expected typical loads.

Financial amounts that were incurred in prior years have been inflated to $2017-18 using December 4 quarter CPI.

Use of Estimated Information

There has been no use of estimated data for this table.

Reliability of Information

The data in this table is considered reliable.

Table 2.3.2 – Augex Asset Data – Subtransmission Lines

Compliance with Requirements of the Notice

In the following subheadings Essential Energy demonstrates how the information provided is consistent with the requirements of this Notice.

Source of Information

Data has been sourced from PeopleSoft, Essential Energy's financial system, and cross-referenced against Project Online, Essential Energy's project management system. Financial amounts that were incurred in prior years have been inflated to $2017-18 using December 4 quarter CPI.

Methodology & Assumptions

To extract the data, the following assumptions have been made:

- Installation hours are inclusive of all hours on the project including design, and project management.
- Civil works is inclusive of the major contract (and other contracts). This could not be separated out.
- Total direct expenditure and major contract expenditure equates to the total direct costs of the project.

For the purposes of preparing the information, normal conditions are defined as those which allow the element to operate within manufacturer's specifications under a standard operational state and expected typical loads.

Augmentation works were new lines which connected a subtransmission substation to a zone substation at 66kV.

Financial amounts that were incurred in prior years have been inflated to $2017-18 using December 4 quarter CPI.

Use of Estimated Information

There has been no use of estimated data for this table.

Reliability of Information

The data in this table is considered reliable.

Worksheet 2.3(b) – Augex

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

Descriptor Metrics

Feeder Augmentation

Compliance with Requirements of the Notice

The information provided reports a breakdown of circuit kilometres of both high voltage and low voltage feeders added and augmented in the current period.

Source of Information

System	Data
GIS Smallworld	• Cables information of augmented network as a part of projects extracted from the Network Planning Database.
Network Planning Database	• List of Augex projects completed in the financial year. • Estimated unit costs for transformers based on OH/UG and kVA. Costing included estimated man hours.

Methodology & Assumptions

Circuit kilometres added/upgraded

The yearly conductor alterations are extracted from Smallworld and rolled up for the reporting period. Conductor alterations recorded as “New” are reported for “Units Added” and “Reconductored” are reported as “Upgraded”.

The AER driver for each project is extracted from the Planning Database and only projects with an Augex driver are included.

High voltage consists of all voltages not LV or Streetlight with LV being only LV voltages.

Many capex projects are comprised of both Repex and Augex components. Due to system limitations and the resultant inability to capture the required level of detail, those projects are allocated as either Repex or Augex based on their primary driver.

Use of Estimated Information

No information has been estimated.

Reliability of Information

The data in this table is reliant on close out officers recording the information at the completion of each work pack. The quality of this data is of a reasonably high standard.

Substation Augmentation

Compliance with Requirements of the Notice

The information provided reports a breakdown of substations that have been added or augmented in the current period.

The information is divided into the following classes:

- Pole Mounted Substations
- Ground Mounted Substations
- Indoor Substations

Source of Information

System	Data
WASP	• Transformer information of Essential Energy funded transformers as a part of projects extracted from the Network Planning Database.
Network Planning Database	• List of Augex projects completed in the financial year. • Estimated unit costs for transformers based on OH/UG and kVA. Costing included estimated man hours.

Methodology & Assumptions

Distribution Substations Added/Refurbished/Upgraded

The data for the current period was sourced by categorising the transformers in the WASP report into Pole, Ground or Indoor substations based on the description of the transformer store item being ordered (an example of a description is “Transformer 25kVA 22kV 1Ph [GWD]”).

The AER driver for each project was extracted from the planning Database and only projects with a driver considered to be an Augex driver were included.

Distribution Substations included in these projects were classified as “Upgraded” if they met any of the following conditions:

- Associated with a “Substation - Programmed Refurbishment” work task that is in an Augex project as a result of a decision to augment instead of refurbish; or
- Associated with a unit assembly of “8250” (Remove Rural Transformer) or “8251” (Remove Town Transformer) indicating that the existing transformer was removed and replaced/upgraded; or
- The existing Substation Site asset was linked to the new transformer being ordered indicating that a transformer is being replaced/upgraded;
- The estimate/work pack for the project that the Distribution Substation is a part of has a description that meets one of the following conditions (where % is a wildcard):
    - like “%new sub%”
    - like “%sub%upgrade%”
    - like “%tx%upgrade%”
    - like “%transformer%upgrade%”
    - like “%upgrade%transformer%”
    - like “%upgrade%sub%”
    - like “%upgrade%tx%”

All remaining Distribution Substations from the projects identified were classified as “New”.

Many capex projects are comprised of both Repex and Augex components. Due to system limitations and the resultant inability to capture the required level of detail, those projects are allocated as either Repex or Augex based on their primary driver.

Use of Estimated Information

As described above, the transformers category was derived from the transformer description which may be misleading in some cases.

Reliability of Information

The data in this table should be used with caution if it is to be used for benchmarking or decision making purposes.

Cost Metrics

Compliance with Requirements of the Notice

Refer to section *3 Financial Data* for the overall Basis of Preparation on finance data prepared for multiple tables in the RIN. The specific methodology and assumptions made for this table are outlined below.

Source of Information

Source data was from the RSDC Regulatory Report from COGNOS. This report is used in the process of collating the data for the Annual Reporting RIN.

Methodology & Assumptions

Information was sourced from the "CARIN – AUGEX – Table 2.3.3" worksheet in the AER_CAPEX_Report workfile. A COGNOS report is run to split out Capex between Augex and Repex by various asset categories. This report is used in the collation of data for the Regulatory Accounts.

Regulatory Accounts asset categories are consistently grouped based on model parameters.

Mapping was performed to comply with the requirements of the RIN tables. The mapping is included in the AER_CAPEX_Report workfile, which was based on the judgements of SMEs.

Use of Estimated Information

Total Augex is based on actual data. Drivers have been used for the data splits and disaggregation of totals.

Reliability of Information

The data in this table is based on assumptions and estimates so some caution should be used when using this data for benchmarking or decision making purposes.

Table 2.3.4 – Augex Data – Total Expenditure

Compliance with Requirements of the Notice

Refer to section *3 Financial Data* for the overall Basis of Preparation on finance data prepared for multiple tables in the RIN. The specific methodology and assumptions made for this table are outlined below.

Source of Information

Data is sourced from the RSDC Regulatory Report from COGNOS. This report is used in collating Capex data for the Annual Reporting RIN.

Methodology & Assumptions

The figures in Table 2.3.3.2 have been used to populate Table 2.3.4. Connections is excluded from both tables, with the financial data for Connections captured in Table 2.5.1.

The other assets line is not a balancing item but picks up individual asset categories from the "CARIN – AUGEX – Table 2.3.4" worksheet in the AER_CAPEX_Report workfile.

The total of all line items reconciles back to the "CARIN – AUGEX – Table 2.3.4" worksheet, which reconciles back to the Annual Reporting RIN for 2017-18.

The expenditure shown for the "Subtransmission Substations, Switching Stations, Zone Substations" and "Subtransmission Lines" rows at the top of Table 2.3.4 do not reconcile to Tables 2.3.1 and 2.3.2, respectively. This is because Tables 2.3.1 and 2.3.2 show expenditure relating to relevant projects which have been closed out during the financial year, whilst Table 2.3.4 shows total expenditure for the financial year for those asset categories.

Many capex projects are comprised of both Repex and Augex components. Due to system limitations and the resultant inability to capture the required level of detail, those projects are allocated as either Repex or Augex based on their primary driver.

Use of Estimated Information

Total Augex is based on actual data. Drivers have been used for the data splits and disaggregation of totals.

Reliability of Information

Estimated information has been used to apportion actual Augex across RIN categories, so some caution should be used when using this data for benchmarking or decision making purposes.

Worksheet 2.5 – Connections

Table 2.5.1 - Descriptor Metrics

Compliance with Requirements of the Notice

The Notice requires the number, total MVA , total length of HV and LV augmentation and cost of new Underground and Overhead connections and distribution transformers for Rural, Commercial/Industrial & Subdivision premises for the financial period. It also requires the total number of embedded generation sites supplied by overhead/underground along with the total number of projects undertaken by Essential Energy to augment the network to facilitate the installation of embedded generation sites. These projects are broken down into MVA added, number of substations installed, HV augmentation and LV augmentation.

Source of Information

System	Data
Energy	• Premise with Creation Date. • Premise with Residential/Commercial flag. • All embedded generation sites with Application Date and Installation Date.
Smallworld	• Premises with Underground/Overhead flag. • Return premises supplied by substations affected by projects reported from WASP.
WASP	• Substations with Underground/Overhead flag. • List of projects where Essential Energy has financially contributed during the reporting period. Extract included kVA, number of transformers, total Essential Energy cost for the project and project completion date. • List of projects partially funded by a customer during the reporting period.
Network Planning Database	• List of customer initiated projects. • Estimated unit costs for transformers based on OH/UG and kVA. Costing included estimated man hours.

Methodology & Assumptions

The main assumptions are:

- Essential Energy has no Subdivision assets based on the definition “is intended to capture expenditure in connecting un-reticulated lots or areas.”
- The ratio of known projects is the same as the ratio of unknown projects.
- The ratio of known embedded generation is the same as the ratio of unknown embedded generation.
- Embedded generation with no installed date were installed in the same financial year as the application date.
- Where practical, the determination of Underground/Overhead was derived from GIS Smallworld, otherwise WASP was used.

Number of Connections

Total new connections were determined by the number of premises with a creation date in the financial period.

Expenditure

This is based on the standard methodology adopted for all finance expenditure data in the Category Analysis RIN. Refer to section *3 Financial Data* for the overall Basis of Preparation on finance data prepared for multiple tables in the RIN. The specific methodology and assumptions made for this table are also outlined below.

Specifically, the connections capex expenditure was derived from the PIP4 - Customer Connections portfolio as opposed to unit rate estimations previously utilised. This expenditure falls within the larger Repex/Augex/Connections finance expenditure data described above.

Overhead/Underground Totals

The Residential/Commercial flag was derived from Energy.

Distribution Substations Installed – for Residential/Commercial and Subdivision Connections

The list of projects from the planning database combined with the customer funded projects from WASP make up the considered projects for these figures. For these projects, WASP is used to determine if Essential Energy or an external party paid for the transformer.

For each project, a ratio of Residential to Commercial premises affected by the project was assigned. This ratio was then used to determine the portion of the kVA, number of transformers and costs that would be reported as Residential and Commercial. Total cost is an estimate of the cost to install the transformers plus the estimated man hours to install.

For all projects where the Commercial\Residential status could not be determined, these were deemed "Unknown". The Unknowns were distributed across all categories based on the ratio of the known projects.

Augmentation HV/LV

The list of projects from the planning database combined with the customer funded projects from WASP make up the considered projects for these figures.

For each project, GIS Smallworld provided the amount of network added or reconductored as a part of the project. A ratio of Residential to Commercial premises affected by the project was also assigned. This ratio was then used to determine the portion of the line length that would be classified as Residential and Commercial.

For all projects where the Commercial/Residential status could not be determined, these were deemed "Unknown". The Unknowns were distributed across all categories based on the ratio of the known projects.

Embedded Generation

Energy embedded generation data was used as the basis for this data. Where the installation date was blank, the application date was used.

Mean days to connect residential customer with LV single phase connection (0's)

- Not reported as done by Accredited Service Providers under Power of Choice and outside our control.

Reliability of Information

The data used for determining the overall quantities has been provided previously and has been categorised based on assumptions and estimates.

The data used for determining the quantities has come from three major Essential Energy data repositories where the data is considered reasonably reliable. There were a number of projects that did not exist in GIS Smallworld which had to be averaged, based on assumptions and estimates.

This information should be used with caution for benchmarking or decision making purposes.

The assumptions were made in the best effort to optimise the information at Essential Energy's disposal without compromising the reliability of the figures.

Table 2.5.2 - Cost Metrics by Connection Classification

Compliance with Requirements of the Notice

The Notice requires the total number of embedded generation sites supplied by overhead/underground along with the total number of projects undertaken by Essential Energy to augment the network to facilitate the installation of embedded generation sites. These projects are broken down into MVA added, number of substations installed, HV augmentation and LV augmentation.

Source of Information

System	Data
Energy	• Premise with Creation Date. • Premise with Residential/Commercial flag. • All embedded generation sites with Application Date and Installation Date.
Smallworld	• Premises with Underground/Overhead flag. • Return premises supplied by substations affected by projects reported from WASP.
WASP	• Substations with Underground/Overhead flag. • List of projects where Essential Energy has financially contributed during the reporting period. Extract included kVA, number of transformers, total Essential Energy cost for the project and project completion date. • List of projects partially funded by a customer during the reporting period.
Network Planning database	• List of customer initiated projects. • Estimated unit costs for transformers based on OH/UG and kVA. Costing included estimated man hours.

Methodology & Assumptions

The main assumptions are:

- Essential Energy has no Subdivision assets based on the definition "is intended to capture expenditure in connecting un-reticulated lots or areas".
- The ratio of known projects is the same as the ratio of unknown projects.
- The ratio of known embedded generation is the same as the ratio of unknown embedded generation.
- Embedded generation with no installed date was installed in the same financial year as the application date.
- Essential Energy has no complex services.

Expenditure

This is based on the standard methodology adopted for all finance expenditure data in the Category Analysis RIN. Refer to section *3 Financial Data* for the overall Basis of Preparation on finance data prepared for multiple tables in the RIN. The specific methodology and assumptions made for this table are also outlined below.

The expenditure in Table 2.5.2 reflects Connections capital expenditure, with Connections operating expenditure captured within corporate and divisional overheads (non-direct expenditure). Specifically, the connections capital expenditure was derived from the PIP4 - Customer Connections portfolio as opposed to unit rate estimations previously utilised. This expenditure falls within the larger Repex/Augex/Connections finance expenditure data described above.

Residential/Commercial & Subdivision Connections

The Residential/Commercial flag was derived from Energy. Essential Energy has deemed it has no complex services.

Embedded Generation

Energy embedded generation data was used as the basis for this data. Where the installation date was blank, the application date was used.

Use of Estimated Information

Essential Energy has used estimated information for embedded generation where Residential/Commercial could not be determined.

Reliability of Information

The data used for determining the overall quantities has been provided previously and has been categorised based on assumptions and estimates. Caution should therefore be used when using this information for benchmarking or decision making purposes.

Worksheet 2.6 – Non-network

Table 2.6.1 - Non-network expenditure

Compliance with Requirements of the Notice

In the following sub-headings, Essential Energy demonstrates how the information provided is consistent with the requirements of this Notice.

Source of Information

Capex data was sourced from the 2017-18 Regulatory Accounts, with the expenditure attributed to Standard Control Services derived from the FY18_YTD_03_Data_Model_RegReporting model.

Opex data was sourced from PeopleSoft.

Methodology & Assumptions

This is based on the standard methodology adopted for all finance expenditure data in the Category Analysis RIN. Refer to section *3 Financial Data* for the overall Basis of Preparation on finance data prepared for multiple tables in the RIN. The specific methodology and assumptions made for this table are also outlined below.

Motor vehicles – Opex & Capex

Data was sourced from PeopleSoft to obtain total Fleet operating costs. The CAM was used to identify the regulated Fleet expenditure. Actual operating costs are not captured by RIN categories in the general ledger. As a proxy, the SG Fleet list which details vehicles types and forms the basis for the Fleet Hire Charge, was used to apportion the actual Fleet operating costs across RIN categories.

Total Capex for 2017-18 was sourced from the 2017-18 Regulatory Accounts workfiles. A listing of fleet capex by project (vehicle type) was utilised to allocate the Regulatory Accounts figures into the RIN categories.

Motor vehicles Capex and Opex categories relating to trailers and other fleet are not included in the RIN categories but have been used to reconcile to the total in the Regulatory Accounts.

Buildings and Property – Opex & Capex

2017-18 Opex data was sourced from PeopleSoft. Property operating costs were based on expenditure within the Property division (department structure). Capex data was sourced from the 2017-18 Regulatory Accounts workfiles.

Furniture & Fittings – Capex

Data was sourced from the 2017-18 Regulatory Accounts workfiles.

ICT – Opex & Capex

2017-18 Opex data was sourced from PeopleSoft. ICT operating costs were based on expenditure within the IT division plus the Tech Transformation department. The CAM was used to identify regulated ICT expenditure. Figures were mapped to RIN categories based on mapping provided by SMEs. Attribution to CA RIN categories was as follows:

- Operating expenditure line items were reviewed and an assessment made as to whether the costs within the line item were predominately client device, recurrent or non-recurrent expenditure;

- Staff-related costs were apportioned with reference to FTEs based on position title and the predominant function of the position as client device, recurrent, or non-recurrent expenditure;
- Temporary staff costs were considered non-recurrent.

Capex data was sourced from the 2017-18 Regulatory Accounts, with the expenditure attributed to Standard Control Services derived from the PNSRDC report. Expenditure was mapped to the Category Analysis RIN based on mapping provided by SMEs. The category splits were based on project data from COGNOS.

Use of Estimated Information

Although total information is considered actual some estimated information has been used to apportion actual non-network expenditure across RIN categories.

Reliability of Information

Given the underlying assumptions and methods used to derive this data, caution should be exercised when using this for benchmarking or decision making purposes.

Table 2.6.2 - Annual Descriptor Metrics – IT & Communications Expenditure

Compliance with Requirements of the Notice

In the following sub-headings, Essential Energy demonstrates how the information provided is consistent with the requirements of this Notice.

Source of Information

System/Source	Used for
ICTs Configuration Management Database (CMDB)	Extract used for determining number of devices as at 30 June 2018.
Extract from PeopleSoft HR for 30/6/2018	Determining employee numbers
Extract from PeopleSoft HR for 30/6/2018	Determining user numbers

Methodology & Assumptions

The following method and assumptions have been used when compiling this data:

Employee Numbers

Standard Control Services FTEs were derived by taking the year end number of Essential Energy's FTEs from PeopleSoft (no agency or external contractors) and multiplying them by the Standard Control Services percentage, with the Standard Control Services percentage arrived at by reference to the instructions in the CAM.

User Numbers

The number of active IT system log in accounts used for Standard Control Services is based on the number of employees recorded in PeopleSoft that were active as at 30 June 2018. This number reflects the number of IT system log in accounts, as Essential Energy's standard practice is to allocate system access accounts

to all employees as they are engaged. This also includes agency staff and contractors. The total user number was then multiplied by the Standard Control Services percentage.

Number of Devices

The in-use device numbers include laptops, desktops, tablets, mobile phones, satellite phones and smartphones. and are based on information within the ICT Configuration Management Database (CMDB).

The 30 June 2018 total has been multiplied by the Standard Control Services percentage.

Steps for obtaining data

- At 5:30pm Saturday 30 June, a scheduled asset report was run and emailed to Change Team members.
- The data was saved to the shared drive as ASSETS_RIN_30062018_1730.csv.
- People data report from 1am Monday 2 July will be used. No hires or terminations occur over the weekend and scheduled people reports do not run, so this should be the same as data captured after 5:30 on Saturday 30 June.
- The people data was saved to PEOPLE_RIN_02072018_0100.csv.

Manipulating Data

- Data was copied from both exported csv files into separate tabs of a new worksheet in 2018_RIN_Data.xls, labelled "RIN Asset Data" and "RIN People data".

Pivot Tables and Numbers

- A pivot table was created from all data in RIN Asset Data in a new worksheet and named "Device Count".
    - Physical Status was added to the filter section of the pivot table and "In Use" only was selected.
    - Employee ID was added to the filter section and excluded instances where the ID is less than 5 characters, blank or starts with a "-".
    - Assets Type was added to "rows" section of table and asset types of mobile broadband or integrated broadband were removed as these are SIMs, not devices.
    - The serial number was added to the "values section of pivot table".
    - Grand Total should = 7755 devices ("number of devices" determined).
- A pivot table was created from all data in the “RIN people data” worksheet called User Count.
    - Employee IDs were added to the values section and the calculation method was changed to count.
    - 3433 was the result.
- A pivot table was created from all data in the "RIN people data” worksheet in a new worksheet and named "Employee Count".
- All final numbers were collated in the “summary” worksheet and the standard control percentage was added.

Further Explanation

- Employee IDs from the RIN asset data, where the ID is negative or not of 5 characters are asset groups such as Kiosk machines, stock groups, etc.
- User count only includes assets that are "in use". On Loan or stock assets or mobile devices that are being terminated or returned to stock are not included in the user count and were also not included in 2016-17.
- Asset data comes from the CMDB and although the data is "actual data", the data could contain errors.
- A PC fleet refresh was in progress at the time the data needed to be captured. Many new computers were being issued and others being returned to stock, so there was considerable asset movement at the time of data capture.
- The CMDB is very fluid, with new devices being allocated or returned frequently. Numbers therefore change on a regular basis.

Use of Estimated Information

The underlying data which provides total company numbers for employees, users and devices is actual, and as such, the data provided for this table is considered actual.

Reliability of Information

The data is considered to be reliable.

However, given the underlying assumptions and methods used to derive this data, caution should be exercised when using this for benchmarking or decision making purposes.

Table 2.6.3 - Annual Descriptor Metrics – Motor Vehicles

Compliance with Requirements of the Notice

In the following sub-headings, Essential Energy demonstrates how the information provided is consistent with the requirements of this Notice.

Source of Information

- SGfleet (Fleet Intelligence)

Methodology & Assumptions

- Opening odometer readings were taken from the current odometer from 30/6/17 fleet list.
- Closing odometer readings were taken from the current odometer from 30/06/18 fleet list.
- Utilisation was annualised for those units which entered or exited the fleet during the period.
- The return date and in service dates were taken from the fleet list as at 30/06/18 and used to determine those units that entered or exited the fleet.
- Data table was pivoted and calculated average utilisation, count of in service date (units purchased) and count of registration (unit count).
- The Standard Control Percentage was supplied by the Finance team.
- Items of fleet that do not fit within the RIN categories have been excluded.
- Fleet Intelligence shows plant and carrier as separate assets. Plant and carrier were joined to determine utilisation.

Use of Estimated Information

The information reported in this table was based on actual data.

Reliability of Information

The data is considered to be reliable.

Worksheet 2.7 - Vegetation management

Table 2.7.1 - Descriptor Metrics by Zone

Compliance with Requirements of the Notice

This section demonstrates how the information provided is consistent with the requirements of this Notice.

Source of Information

- VIMS
- WASP
- LIDAR aerial surveys from 2016 and 2017
- Smallworld

Background

Statutory obligations in NSW

This section demonstrates that in NSW, minimum vegetation clearance standards are mandated via the statutory instruments and the Code of Practice Electricity transmission and distribution asset management, February 20095[3], as shown in Figure 1-1.

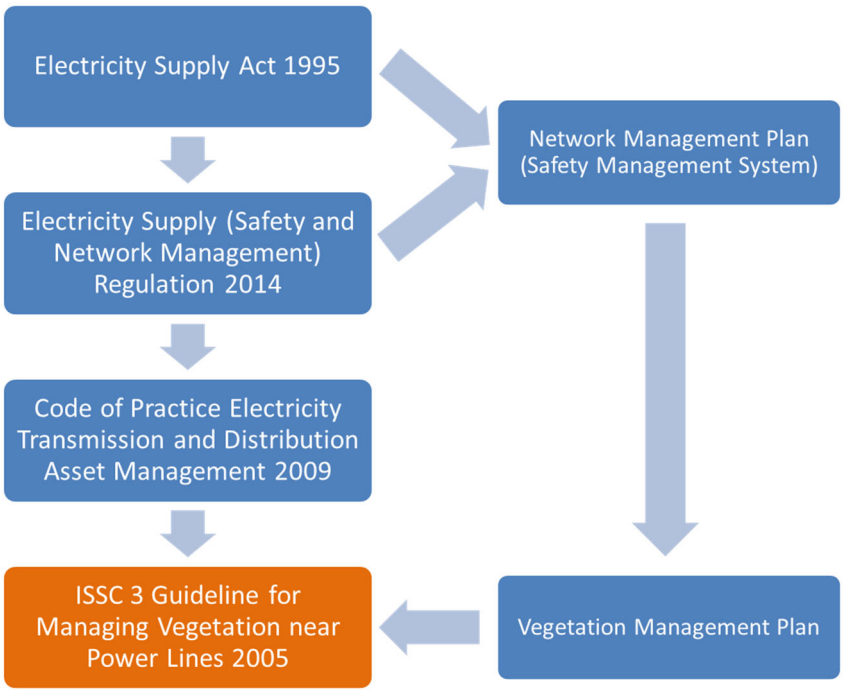

Figure 1-1: Statutory obligations – path to ISSC 3

The Electricity Supply Act 1995 (NSW) obligates Essential Energy "to deliver a safe and reliable supply of electricity" (clause 3(a)) and "to promote and encourage the safety of persons and property in relation to the generation, transmission, distribution and use of electricity" (clause 3(b)). The Act states that it may make regulations in relation to "the development and implementation by network operators of plans

[3] NSW Resources and Energy, *Code of Practice Electricity transmission and distribution asset management*, February 2009

designed to ensure the safe operation of their transmission or distribution systems" (clause 191(g1)) and "the removal or trimming of trees by distribution network service providers" (clause 191(h)).

The Electricity Supply (Safety and Network Management) Regulation 2014 (NSW) obligates Essential Energy to "take all reasonable steps to ensure that the design, construction, commissioning, operation and decommissioning of its network (or any part of its network) is safe" (clause 5). The regulation requires Essential Energy to prepare a safety management system that relates to vegetation management, in particular the "management of bushfire risk relating to electricity lines and other assets of the network operator's network that are capable of initiating bushfire" (clause 7(1)(b)(iv)). The safety management system must be "in accordance with AS 5577 or with any other code or standard that the Secretary may, by written notice given to the network operator, nominate" (clause 7(1)(a)).

The 2014 regulation replaced the Electricity Supply (Safety and Network Management) Regulation 2008 on 1 September 2014. The 2008 regulation similarly required Essential Energy to prepare a network management plan that relates to vegetation management and to "take into account such codes, standards or guidelines as the Director-General, by notice in writing to the network operator, requires to be taken into account in the development and implementation of the chapter" (clause 13(1)).

In 2010, the Director-General directed that Essential Energy is required to incorporate the Code of Practice - Electricity transmission and distribution asset management, February 2009 in its network management plan. Although this directive was issued while the 2008 Regulation was in place, the obligation to comply continues under the 2014 regulation: "Any act, matter or thing that, immediately before the repeal of the Electricity Supply (Safety and Network Management) Regulation 2008, had effect under that Regulation continues to have effect under this Regulation" (clause 44(1) – 2014 regulation).

The Code of Practice - Electricity transmission and distribution asset management, February 2009 is intended to:

- … promote common practices in electricity transmission and distribution to embed in the State's electricity supply infrastructure, its operation and maintenance, features which are generally accepted as appropriate for meeting the needs of the public in terms of safety, access and network impacts.[4]
- support the streamlining of the regulatory regime under The Act by providing guidance on achieving the minimum standard of electrical safety to customers, the public and industry workers, contractors and their employees. This Code shall be followed unless there is an alternative course of action which achieves the same or better outcomes.[5]

The Code sets out the maintenance requirements for the network including requirements for vegetation management:

A system of maintenance for overhead lines, their structures and components shall consider: … tree management programmes designed to:

- ensure public safety,
- minimise the risk of fires caused by contact between trees and overhead lines,
- reduce the number of interruptions to supply caused by trees, and
- protect the electricity distributor's assets from damage[6].

The Code references ISSC 3 Guideline for Managing Vegetation near Power Lines 2005 (ISSC 3) for detailed guidance on vegetation management maintenance works.

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[4] NSW Resources and Energy, *Code of Practice Electricity transmission and distribution asset management*, February 2009, p. 5

[5] NSW Resources and Energy, *Code of Practice Electricity transmission and distribution asset management*, February 2009, p. 5

[6] NSW Resources and Energy, *Code of Practice Electricity transmission and distribution asset management*, February 2009. p. 20

ISSC 3 was developed for application in NSW and "seeks to provide guidance to network operators and the community generally in the safe and environmentally responsible management of vegetation near power lines by integrating community, safety and environmental values"[7]. ISSC 3 specifies minimum vegetation clearances, as well as additional allowances and "clear to sky" requirements for bushfire prone areas.

To comply with the Act, the Regulations and the Code, Essential Energy developed appropriate Network Management Plans (now referred to as the Safety Management Systems in the 2014 regulation) and its Vegetation Management Plan (CEOP8008), based on ISSC 3, is a requirement of those plans. The Vegetation Management Plan is a key instrument in the Bushfire Risk Management Plan required by statute. Essential Energy's forecast vegetation management expenditure is based on maintaining vegetation in accordance with the Vegetation Management Plan and is, therefore, considered to be related to delivering a prudent volume of work activities.

Methodology & Assumptions

VIMS Source Data Verification

In 2017-18, the majority of network data relating to vegetation has been drawn from the Vegetation Information Management system (VIMS). To ensure the background data within the VMA table reflects the latest changes to the network, a full update was run by the Field & Engineering Systems (FES) Business Systems Manager prior to running the analysis. The methodology used to update each field is detailed below.

VIMS FIELD NAME	NEW FME DATA (Post 23/08/2017)
NAME	All VMAs in Smallworld, except "Not Applicable", which were left in the table and not updated.
TYPE	VMA type in Smallworld.
DEPOT	The depot that the VMA is in. If the VMA is of Type "Sub-Transmission", use the existing value because some cross depots (therefore the correct one cannot be determined).
REGION	The region that the VMA is in. If the VMA is of Type "Sub-Transmission", the region should remain the same (provided it is Northern, Southern or North Coast), otherwise update to the new region.
POLE_COUNT	Uses poles grouped by the Pole VMA value (some subtransmission poles incorrectly have the name of the distribution VMA).
SPAN_COUNT (Bays using current terminology)	For the Span_Count table, duplicate Spans were discarded (based on the Span Asset Label & VMA name), then grouped by the Spans VMA value. Privately owned were not included. Services were not included.
SPAN_LENGTH (Total Bay Length, or Route Length)	Duplicate Spans were discarded based on the Span Asset Label & VMA name, then grouped by the Spans VMA value. Privately owned were not included.

[7] Industry Safety Steering Committee, *ISSC 3 Guideline for managing vegetation near power lines*, December 2005, p. 1

VIMS FIELD NAME	NEW FME DATA (Post 23/08/2017)
	Services were not included. Included Out of Service.
TOTAL_KM (Total Span Length, or Circuit Length)	Sum of span lengths grouped by the VMA value on the span. Will not include dual circuits because they currently are not modelled as spans. Services are not included.

Route Length with Zone (Actual)

Through Spotfire, there is a live data link to the VMA table within VIMS. The data feed is "VM_WORKPACK_VW" and lists all active Vegetation Management Areas across the Essential Energy network. Against each of these VMAs there are a number of fields populated with aggregated data from the SmallWorld GIS system. One of the fields is route length and using Spotfire, this number was pivoted against the vegetation zone to produce the Route Length within Zone.

Number of Maintenance Spans (Estimated)

Using Spotfire and a live data link into VIMS, all vegetation defects created within the relevant year were extracted. Using "pole from" and "pole to" data, a unique identifier for the spans to which the defects referred was created and using Spotfire, unique instances of these spans for the relevant year were counted. This data was pivoted within Spotfire to consolidate against the vegetation zone.

Total Length of Maintenance Spans (Estimated)

The number of maintenance spans in the relevant year within a given zone were divided by the total spans in the same zone to derive a ratio. This was applied to the total route line length for those same zones.

Length of Vegetation Corridors (Estimated)

Using Spotfire and a direct data link into the WASP system, all vegetation defects created since 1/7/2010 (1,472,651 defects) were extracted. Using the Asset ID value as a unique identifier for the span, total spans worked on within a given VMA during the period from 1/7/2010 to the present were counted. The assumption is that if a span is not referenced within this period, then the span is either not vegetated or contains vegetation that does not or will not encroach within the clearance zone. Taking the total number of spans worked on during the aforementioned period and dividing it by the total spans in the VMA provided a ratio which was then applied to the total route line length for the VMA. These VMA values were then pivoted within Spotfire to arrive at length of vegetation corridors per zone.

Average number of trees per urban and CBD vegetation maintenance span (Estimated)

This utilised tree counts based on shape files provided by LiDAR contractors. Shape files from the LiDAR data were extracted, including A1 to A4 and C1 to C7, from years 2014 to 2016. This data included data points that described vegetation on the Essential Energy network. Data used was A1 to A4 and C1 incursion data (shapes). The reduction was a compromise between trees and those observations that may not become trees, ie. shrubs picked up as category C7. The subset shape files included complimentary meta data attached to the shape file. This meta data was used as counts of individual trees. These unique

counts, in addition to the unique span counts within depot, were calculated for each of the rural and urban classifications.

Average frequency of the cutting cycle (Estimated)

Using Spotfire with a direct link into WASP, all vegetation defects for the last 8 years (from 2011) were extracted. This data was pivoted in Spotfire to provide a data table with each row representing a VMA and the total number of defects cut within that VMA for each of the 8 years. If, in a given year, more than 10 defects were cut, then that year would score a one. A cyclic frequency could then be derived for that VMA as per the below. Again in Spotfire, this data was pivoted against the “Master Zone” (shown in the table below), to arrive at an average cycle time per zone.

13 columns from WASP Veg Defects Pivot

Veg Area	2011 count	2012 count	2013 count	2014 count	2015 count	2016 count	2017 count	2018 count	Total Years	Number of Years that received cyclic cut	Average Cycle Time	Master Zone
[Deleted Assets]	1	1	1	1	0	0	0	0	8	4	2.00	
Not Applicable - Armidale Depot	0	0	0	0	0	0	0	0	8	0		
Not Applicable - Ballina Depot	0	1	1	0	0	0	0	0	8	2	4.00	
Not Applicable - Bathurst Depot	0	0	0	0	0	0	0	0	8	0		
Not Applicable - Cootamundra Depot	0	0	0	0	0	0	0	0	8	0		
Not Applicable - Cowra Depot	0	0	0	0	0	0	0	0	8	0		
Not Applicable - Dubbo Depot	1	1	0	0	0	0	0	0	8	2	4.00	
Not Applicable - Ewingsdale Depot	0	0	0	0	0	0	0	0	8	0		
Not Applicable - Grafton Depot	0	0	0	0	0	0	0	0	8	0		
Not Applicable - Lismore Depot	0	0	0	0	0	0	0	0	8	0		
Not Applicable - Maclean Depot	0	0	0	0	0	0	0	0	8	0		
Not Applicable - Tamworth Depot	0	0	0	0	0	0	0	0	8	0		
Not Applicable - Tweed Heads Depot	0	0	0	0	0	0	0	0	8	0		
V-101 - Upper Rollands Plains	1	1	1	0	1	0	1	0	8	5	1.60	Rural Zone 2 - MNC
V-102 - Rollands Plains	0	1	1	0	1	1	1	0	8	5	1.60	Rural Zone 2 - MNC
V-103 - Ballengarra	0	1	1	0	0	1	1	1	8	5	1.60	Rural Zone 2 - MNC
V-104 - Cornberry Pk	0	1	1	0	1	1	1	1	8	6	1.33	Rural Zone 2 - MNC
V-105 - Red Hill	0	0	1	0	1	1	0	1	8	4	2.00	Rural Zone 2 - MNC
V-106 - Haydons Wharf	1	1	1	0	1	1	1	1	8	7	1.14	Rural Zone 2 - MNC
V-107 - Maria River PMQ	1	0	1	0	1	1	1	1	8	6	1.33	Rural Zone 2 - MNC
V-108 - Blackmans Pt	1	0	1	0	0	0	1	0	8	3	2.67	Rural Zone 2 - MNC
V-109 - Pembrooke	0	1	1	0	0	1	1	0	8	4	2.00	Rural Zone 2 - MNC
V-110 - Redbank	0	1	1	0	0	1	1	0	8	4	2.00	Rural Zone 2 - MNC
V-111 - Rawdon Is	0	1	0	0	0	1	1	1	8	4	2.00	Rural Zone 2 - MNC
V-112 - Bellangry	0	1	1	0	0	1	0	0	8	3	2.67	Rural Zone 2 - MNC
V-113 - Mortons Ck	0	1	1	0	1	1	0	0	8	4	2.00	Rural Zone 2 - MNC
V-114 - Beechwood	0	1	0	0	0	1	0	1	8	3	2.67	Rural Zone 2 - MNC
V-115 - Koree Is	0	0	1	1	0	0	1	1	8	4	2.00	Rural Zone 2 - MNC
V-116 - Pappinbarra Jn	1	1	1	0	0	1	1	0	8	5	1.60	Rural Zone 2 - MNC
V-117 - Lwr. Pappinbarra	0	1	1	1	0	0	1	0	8	4	2.00	Rural Zone 2 - MNC
V-118 - Brombin	1	1	1	1	0	0	1	0	8	5	1.60	Rural Zone 2 - MNC
V-119 - Birdwood Port	0	1	0	0	1	0	1	0	8	3	2.67	Rural Zone 2 - MNC
V-120 - Yarras Creek	0	1	0	0	1	1	0	0	8	3	2.67	Rural Zone 2 - MNC

Use of Estimated Information

This data is estimated as explained in the Methodology and Assumptions section above with the exception of route line length data which is considered actual as explained in the Methodology and Assumptions section above..

Reliability of Information

Caution should be used when using this data for benchmarking or decision making purposes.

Table 2.7.2 – Expenditure Metrics by Zone

Compliance with Requirements of the Notice

This is based on the standard methodology adopted for all finance expenditure data in the Category Analysis RIN. Refer to section *3 Financial Data* for the overall Basis of Preparation on finance data prepared for multiple tables in the RIN. The specific methodology and assumptions made for this table are also outlined below.

Source of Information

Data was sourced from the 2017-18 Regulatory Accounts. PeopleSoft data was used to split expenditure across RIN categories. During FY18 (January) we consolidated the six zones into three regions within Peoplesoft to align with the current organisation structure. The result from this point onwards was that all expenses were coded to the relevant region which resulted in expenses per zone being skewed favourable to one zone over the other.

Expenses relating to the following branches (Vegetation Operations, Strategy & Compliance, Vegetation Delivery Performance, Network Services Management, Network Design, North Coast, Northern, Southern, Transmission Services and Works Delivery & Enablement), were proportionately allocated across Zones 1 to 6 based on the length of each zone's vegetation corridor. The overall cost of $5.8M is deemed immaterial.

Methodology & Assumptions

- Geographical areas have been split from Zone 1 to Zone 6 via a mapping exercise, ie. from RIN categories to geographical zones.
- Service subcategories have been extracted from PeopleSoft for 2017-18.
- Project types provided for the zone split were on a direct cost basis.
- Vegetation Operations, Strategy & Compliance, Vegetation Delivery Performance, Network Services Management, Network Design, North Coast, Northern, Southern, Transmission Services and Works Delivery & Enablement were proportionately allocated across Zones 1 to 6 based on the length of each zone’s vegetation corridor.
- Hazard Tree and Ground Clearance in the financials were based on a percentage of those tasks that were completed as a proportion of all vegetation defects that were completed in 2017-18.

Use of Estimated Information

Submitted information is materially dependent on actual financial information from PeopleSoft to separate expenditure across RIN categories. As a result this information is treated as actual information.

Reliability of Information

Some estimated information has been used to apportion actual vegetation expenditure across RIN categories but is deemed immaterial. Caution should be used when using this data for benchmarking or decision making purposes.

Table 2.7.3 – Descriptor Metrics Across All Zones – Unplanned Vegetation Events

Compliance with Requirements of the Notice

The following sections outline how Essential Energy has ensured that the information provided is consistent with the requirements of the Notice.

Source of Information

- TotalSAFE
- Microsoft Excel
- Tableau

Methodology & Assumptions

Vegetation Caused Fire Data

On the Fire Report Form in the TotalSAFE system, the available options can be selected from the drop down list for Secondary Cause & Contributory Cause.

There are a set group of options for Vegetation fires to identify whether the offending vegetation was in all probability inside or outside clearances at the time.

For consistency, the investigation officer completes the form on behalf of field staff and selects the appropriate code details from discussions with field staff and photos, where provided.

Data from TotalSAFE is exported to a Microsoft Excel Master register of all fire incidents. This register is used to complete analysis and reporting on a monthly and yearly basis.

A sample of the 2017-18 data from Tableau software is used to analyse data in the Microsoft Excel exported file from TotalSAFE.

Use of Estimated Information

The information in this table is considered to be based on actual data but with some judgement applied to derive the splits of the data into “cause”.

In some cases, classification of the data into “cause” types can be somewhat subjective. On occasions, the distance of vegetation to conductors is clear but on other occasions it is less clear and requires personal judgement based on available evidence. For example, in the case of a fallen tree on the line, one can be confident of the distance the tree was standing from conductors prior to falling. In the case of windborne branches and debris, it is an estimate at best.

Reliability of Information

Confidence in the data is moderate. The data in this table includes estimates, so caution should be used when using it for benchmarking or decision making purposes.

Worksheet 2.8 – Maintenance

Table 2.8.1 – Descriptor Metrics for Routine and Non-Routine Maintenance

Compliance with Requirements of the Notice

The following sections outline how Essential Energy has ensured that the information provided is consistent with the requirements of the Notice.

The information provided is based on all assets owned by Essential Energy as well as privately owned assets where they are managed and maintained by Essential Energy.

Data has then been filtered to only include those assets that are “in service”.

Source of Information

Several systems and planning documents have been queried. These systems and documents are listed below along with the data sets obtained from those systems.

Maintenance Activity	System	Data set
Numerous	PeopleSoft Financial System	
Numerous	WASP	• Count of year end assets from the Asset Register and maintenance events from the work scheduling module. • Streetlight volume data from COGNOS Report Studio.
Numerous	GIS Smallworld	Route length of overhead and underground assets
Numerous	TotalSAFE	
Numerous	Electricity Network Incident Failure Database (ENI)	
Public lighting maintenance	Asset Strategy Development	Average pole replacement cost
SCADA & Network Control Maintenance	Primavera PeopleSoft	Capital project data OPEX, M&R and F&E
SCADA & Network Control Maintenance	Service Manager	Historic Asset Replacements/Asset Failure
SCADA & Network Control Maintenance	Diagnostic Software	Historic & current radio asset data
SCADA & Network Control Maintenance	ROE device list	Historic & current IP asset data
Zone Substation maintenance	GLG Schedule of property visits	Number of property visits
Zone Substation maintenance	Chubb Record of Fire System maintenance 16-17	Number of inspections/maintenances of fire-fighting equipment

Maintenance Activity	System	Data set
Zone Substation maintenance	CEOP8011	Technical Maintenance Plan

Methodology & Assumptions

The asset quantity for most asset types is based on information from WASP and Smallworld.

Accurate age data within the various asset systems is considered incomplete at best. For this reason current average age data has been assessed based on the best available data. It is assumed that historical replacement and growth rates have not been sufficient to suspend the average age of most assets ensuring a gradual increase in average age dependant on the individual asset. A basic calculation has been used to estimate the historical average age. Data for this algorithm is approximate and should not be considered accurate.

Pole Top, Overhead Line & Service Line Maintenance

Pole Tops & Overhead Lines

- Assets at year end are based on a WASP count of poles (both distributor owned and distributor maintained private poles) that were recorded in WASP.
- The quantity inspected/maintained represents a count of all corrective maintenance tasks (which are not covered in this table) that have been completed as operating expenditure outside the normal zone substation boundary fencing.
- Average age has been estimated as pole average age. Data for this algorithm is approximate and should not be considered accurate.
- The maintenance cycle is assumed to be the inspection cycle as required. Corrective maintenance is normally carried out within nine months of inspection.

Service Lines

- Assets at year end are based on a count of customers. The average customer count was determined by calculating the average at the start and end of the financial year, as requested in the Economic Benchmarking RIN Instructions and Definitions guidance issued by the AER. This is different to Essential Energy's process which determines total billed days for the financial year and divides by the days in the year or alternatively provides a count at the end of the period. Data has been sourced from an internal reporting system and existing query, via Spotfire, which extracts data from the Energy/Peace billing system. Unmetered customers have been extracted from the Energy/Peace system through internal reports.
- Quantity inspected/maintained provides a count of all service related corrective maintenance tasks that have been completed as operating expenditure.
- Average age has been determined using a number of factors, including pole age, premise start date and service cable estimated age. Data for this algorithm is approximate and should not be considered accurate.

Pole Inspection & Treatment

- Assets at year end are based on a WASP count of distributor owned and distributor maintained private poles designated as "in service".
- Assets inspected include all WASP pole inspection tasks that were completed for the year. Each task includes the required activities based on pole age and condition. This may include excavation, drilling, visual inspection and routine treatment of decay or termites.

- Average age has been based on pole average age from the age profile in Table 5.2.1. Data for this algorithm is approximate and should not be considered accurate.

Overhead Asset Inspection

- Assets at year end are taken from the GIS Smallworld system and represent the total route length of the overhead network excluding LV services (but including streetlighting). All service statuses have been included.
- The asset quantity inspected is reported as the total route length. This has been calculated based on a quarter of total route length being inspected by the asset inspector each year, plus urban assets being inspected as part of the thermovision program, rural overhead assets being inspected by aerial patrols every year, as well as subtransmission live line inspection on rural radial feeders. The inspections include visual inspection of conductors, crossarms, insulators, transformers, and other overhead equipment.
- The average age is based on assumed conductor age from the age profile in Table 5.2.1. Data for this algorithm is approximate and should not be considered accurate.
- Subtransmission Live Line Inspection - this program targets rural radial subtransmission feeders and allows for close approach pole top inspection using an elevated work platform and specialised live line practices.
- Annual Thermovision Inspection - a detailed thermovision inspection of targeted urban high voltage network is completed each year. Although accurate recording of completed inspections has been sporadic in the past, approximately 100,000 pole top connections are assessed annually. Inspection numbers documented in the table are taken from WASP but are considered unreliable due to past reporting issues.

Network Underground Cable Maintenance: by Voltage

- Assets at year end are taken from the Smallworld system and cover the total circuit length of the underground network (excluding underground services as these are generally maintained by the customer).
- Assets maintained includes a count of all corrective work tasks involving underground assets that were recorded and completed in the respective year, then grouped by voltage.
- The maintenance cycle is shown as four years to correspond with the inspection cycle. Although work tasks are prioritised to various timeframes for completion, the lodgement and scheduling is performed in conjunction with the inspection.
- Average age is based on assumed cable age from the age profile in Table 5.2.1. Data for this algorithm is approximate and should not be considered accurate.

Network Underground Cable Maintenance: By Location

- Assets at year end are taken from the Smallworld system and cover the total circuit length of the underground network (excluding underground services as these are generally maintained by the customer). Total circuit length is shown for non CBD as Essential Energy does not have any underground in any areas classified as CBD.
- Assets maintained includes all corrective work tasks involving underground assets that were recorded and completed in the respective year, then grouped by voltage.
- The maintenance cycle is shown as four years to correspond with the inspection cycle. Although work tasks are prioritised to various timeframes for completion, the lodgement and scheduling is performed in conjunction with the inspection.
- Average age is based on assumed cable age from the age profile in Table 5.2.1. Data for this algorithm is approximate and should not be considered accurate.

Distribution Substation Equipment & Property Maintenance

Distribution Substation Transformers

- Assets at year end in this category include all distribution substation transformers and regulators (both overhead and enclosed).
- Quantity inspected/maintained includes a count of corrective work tasks ("Substation - Replace Tank" and "Regulator - Replace Tank").
- Average age is based on a weighted average of the estimated transformer and regulator ages.
- The maintenance cycle is shown as four years to correspond with the inspection cycle. Although work tasks are prioritised to various timeframes for completion, the lodgement and scheduling is performed in conjunction with the inspection.

Distribution Substation Switchgear

- Assets at year end in this category include all distribution substation switches (both for overhead and enclosed substations). Where actual substation switch information was not available, a consistent algorithm was used to assess the number. This allowed 2.5 switches per overhead substation and 6 switches per enclosed substation. This conservative assumption was based on 1 high voltage switch and an average of 1.5 low voltage units per overhead substation, while enclosed substations allowed for 2 high voltage switches and 4 low voltage units.
- Average age has been estimated as the average of the substation and the transformer age. Data for this algorithm is approximate and should not be considered accurate.

Distribution Substation Other Equipment

Earth Integrity Testing - this four-yearly program ensures the integrity of both high and low voltage earthing systems supporting those assets not available for the regular asset inspection program.

Distribution Substation Property

- Assets at year end in this category represent a count of all distribution substations (both overhead and enclosed).
- Quantity inspected/maintained is a count of all distribution substation corrective tasks (excluding transformer, regulator and switchgear tasks included above).
- Average age is based on the estimated substation site age. Data for this algorithm is approximate and should not be considered accurate.

Zone Substation Equipment Maintenance

Transformers – Zone Substation

- Asset quantity at year end represents all Essential Energy owned zone substation power transformers and similar equipment.
- Quantity maintained/inspected represents the sum of the number of minor/major preventative work tasks completed during the financial year and the number of zone substations recorded as inspected in WASP, multiplied by the number of transformers and divided by the number of zone substations.
- Inspection cycle (as for all other assets) – Power Transformers are not "Inspected" as an entity. Inspection is a whole-of-substation exercise relevant to all assets. Zone substations are inspected either monthly, bi-monthly or quarterly, depending on various substation attributes. The figure represents the average zone substation inspection interval.
- Maintenance cycle – six years is the current minor maintenance interval for power transformers.

Other Equipment

- Asset quantity at year end represents a simple sum of all “In Service” assets across all asset categories apart from Power Transformers and tap changers.
- Quantity maintained/inspected represents the sum of the number of minor/major preventative work tasks completed during the financial year and the number of zone substations recorded as inspected in WASP, multiplied by the number of other assets and divided by the number of zone substations.
- Average age represents a weighted average of the individual asset category average ages. Individual category averages were taken as the average age of “In Service” assets, calculated from the commissioning date (where known). The fact that a large number of records in some categories do not have a commissioning date recorded means that the averages will be skewed to a slightly newer figure, given that the older sites would, as a general rule, be the ones missing a commissioning date.
- Inspection cycle represents the average zone substation inspection frequency. Zone substations are inspected either monthly, bi-monthly or quarterly, depending on various substation attributes.
- Maintenance cycle represents the typical maintenance frequency for other equipment.

Zone Substation Property Maintenance

- Asset quantity represents the number of zone substation site records from WASP with a service status of “In Service” and a type of either “Zone Substation”, “Switching Station” or “Subtransmission”, but not “Regulator” or “FI Plant”.
- Asset quantity inspected/maintained represents the sum of the quantity of zone substations recorded as inspected in WASP, the quantity of zone substations where fire equipment maintenance was recorded, the property maintenances recorded and the number of zone substation property inspections based on the property maintenance contract.
- Average age is based on the substation ages calculated from commissioning dates (where present). The fact that a large number of site records do not have a commissioning date recorded means that the average will be skewed to a slightly newer figure, given that the older sites would, as a general rule, be the ones missing a commissioning date.
- The inspection cycle figure represents the average of the weighted average zone substation inspection interval by electrical staff, and routine property inspections by contractors.
- The maintenance cycle is shown as six years to correspond with typical major maintenance cycles for Zone Substations.

- The number of fire-fighting equipment inspections was not available, thus the count from 2016-17 was used.

Public Lighting Maintenance

- Assets at Year End - Data was taken from the end of year asset inventory WASP extract. These reports include all devices except metered and/or quarantined devices. These devices were excluded for the following reasons:
    - Quarantined lights do not contain enough information to determine the luminaire size.
    - Metered lights are the responsibility of the owner for maintenance and replacement, and the energy consumption is not calculated using the Type7 Unmetered Billing System.

- The 150watt rule was used to determine the Major/Minor split of assets.

- Assets Inspected/Maintained - This number is the sum of all routine and non-routine streetlight maintenance tasks in 2017-18, including:

- Spot luminaire maintenance
- Bulk luminaire maintenance
- Category V night patrol inspections
- Dedicated streetlight column inspections
- Instructions were as follows:

    - All night patrol inspections work tasks were used from the Inspections 2017-18 report.
    - Repairs 2017-18 report - SL Globe & SL Globe Replacements, PE Bulk Replacements, Minor Maintenance, Standard Maintenance, and Repair tasks were used.
    - Split between Minor/Major using the 150watt rule .

- Average Age of Asset Group - the current average age of the streetlight asset group has been calculated as follows:
    - Extract from WASP providing a count of streetlights by road categorisation, grouped by year.
    - This data was then used to calculate the average age of installed lights:

      sum of installed age / number of lights installed.

    - The date connected column was used in the All Assets report to determine average age of streetlights and 150watt rule was used for the Major/Minor split for number of lights installed.
- The inspection and maintenance cycle reflects the period between inspections or planned maintenance activities (four years for public lighting maintenance).

SCADA & Network Control Maintenance

- Asset quantity at year end - Assets captured in this category are those which have a sole purpose of providing SCADA & Network Control functionality to Zone Substations. Assets used to provide communication services to pole top devices have not been included in this section and will be captured elsewhere.
- Asset quantity inspected/maintained - Essential Energy has included all assets in this category that have either been physically inspected or maintained via remote diagnostic systems. Many assets are not physically inspected, but their condition is continually assessed via remote diagnostics software, alerting to any degradation in service or asset condition.
    - Average age of asset group - Data is based on year of purchase for the asset and averaged across all asset categories.
    - In the case of RTUs (field devices), the methodology for the current reporting period differs slightly to that used in previous RIN reports. The basis of calculation has now been modified to include the firmware version of the older devices, thus attaining a more reflective age profile for these largely legacy devices. Newer devices have much better records with respect to purchase/commissioning dates.
- In the case of SCADA RTUs, whilst the number of in-service devices is accurate, the use of firmware versions/dates of commissioning remains an indicative age of the device for the older units remaining in service.

Protection Systems Maintenance

- Asset quantity represents all “in service” distribution reclosers owned by Essential Energy.
- Quantity inspected/maintained represents those tasks directly related to maintaining distribution recloser sites and was taken from WASP.

- Average age is based on the recloser or the recloser site estimated age. Data for this algorithm is approximate and should not be considered accurate.

Use of Estimated Information

The data in this table is largely estimated using the various assumptions noted above.

Reliability of Information

Assumptions and estimates underlie aspects of the data in this table. This is partially due to maintenance activities often spanning more than one of the asset groups contained in Table 2.8.1. As such, caution should be applied when using this data for benchmarking or decision making purposes.

Table 2.8.2 – Cost Metrics for Routine & Non-Routine Maintenance

Compliance with Requirements of the Notice

The following sections outline how Essential Energy has ensured that the information provided is consistent with the requirements of the Notice.

Source of Information

This is based on the standard methodology adopted for all finance expenditure data in the Category Analysis RIN. Refer to section *3 Financial Data* for the overall Basis of Preparation on finance data prepared for multiple tables in the RIN. Individual maintenance activities have been captured through relevant management reports and estimated where necessary. Total expenditure has been reconciled back to the 2017-18 Regulatory Accounts. Any specific methodology and assumptions utilised for this table are outlined below.

Splitting the high level financial categories down to individual activities is done by utilising task and project type mapping from the Opex model used to develop Essential Energy's annual Opex Statement of Works.

Methodology & Assumptions

- The 2017-18 Regulatory Accounts associated with Essential Energy's maintenance expenditure were used as the base data.
- These accounts were then sorted into either routine or non-routine expenditure and were then mapped to corresponding maintenance activities in the RIN table.
- Where an account covered multiple maintenance activities, a pro-rata system was used to assign the expenditure based on the directly mapped accounts and the quantity of units maintained.
- Where maintenance activities contained units for both inspections and maintenance, the routine versus non-routine expenditure was applied pro-rata based on those units.
- It shall be noted that the figures supplied for "SCADA & Network Control" include those costs associated with ZSS SCADA along with the necessary Telecommunications costs associated with these ZSS RTU's (Telecommunications associated with SCADA). It does not include such costs associated with non-related, or indeed, non-system Telecommunication costs.
- Public lighting routine maintenance expenditure is calculated based on expenditure in the following activities:
    - Bulk lamp replacement program
    - Pole inspections for dedicated
    - Category V Night Patrol Inspections

- Public lighting non-routine maintenance expenditure is calculated based on expenditure in the following activities:
    - Spot luminaire maintenance

Use of Estimated Information

Wherever possible, the data splits within this table are based on actual financial management reporting. Where this is not possible, high level assumptions and estimation have been used to provide a relatively accurate response to the required tables.

Reliability of Information

Maintenance expenditure at a total level aligns to the 2017-18 Regulatory Accounts, however the split into the various categories is based on assumptions and estimation. Caution should be applied when using this information for decision making or benchmarking purposes.

Worksheet 2.9 - Emergency Response

Table 2.9.1 – Emergency Response Expenditure (Opex)

Compliance with Requirements of the Notice

This information is based on all transactions associated with Emergency Response and major event days Essential Energy has encountered. The data relates to Fault & Emergency (F&E) expenditure only.

The Threshold for Major Event Days (TMED) for 2017-18 was applied as per the definition.

Source of Information

Data has been sourced from:

- 2017-18 Regulatory Accounts
- PeopleSoft Query for expenditure against project type Fault & Emergency (excluding overheads)
- Chart of Accounts with COA Mapping – from EssentialNet

Major Event Day data is sourced from PowerOn Fusion and calculations managed in an Access database. PowerOn makes up the central modules of Essential Energy's power Distribution Management and Outage Management Systems (DMS/OMS).

The spreadsheet used to collate data is titled “RIN Tables Workpapers 17-18”.

Methodology & Assumptions

In the RIN Access Database 2017-18, the following query was generated for the financial year:

- Major Event Day Summary by Date – AER
- This collates all unplanned outages and rolls up customers affected and customer minutes lost by date.
- Uses the average customer base to calculate daily SAIDI.
- Where the daily SAIDI exceeds the 2017-18 TMED, this date is classed as a Major Event Day and will be excluded where defined.
- Details of the cause for the major event day are sourced from the outages within the Access Database.
- Total Fault & Emergency costs were sourced from the Annual Regulatory Accounts.
- Coding was cross-checked with the Annual Regulatory Accounts to ensure a consistent approach.
- Major Events Days Costs are based on day of incident and two days after incident, as major event days would usually take longer than a 24-48 hour period to resolve.

Once a major event day (MED) is triggered it applies to the entire network, rather than just a particular area or areas of the network. As such, all unplanned interruptions are included in the MED. Accordingly, all emergency response expenditure incurred across the network in relation to the MED has been included in parts (B) and (C) of this table.

Use of Estimated Information

The data splits within this table are based on high level assumptions and the data is, therefore, considered to be estimated.

Reliability of Information

Expenditure at the total level is considered reliable. However, the allocation of costs to specific Major Event Days is based on assumptions and estimates, so caution should be used when using this for benchmarking or decision making purposes.

Worksheet 2.10 – Overheads

Table 2.10.1 – Network Overheads Expenditure & Table 2.10.2 – Corporate Overheads Expenditure

These tables do not require any inputs.

Worksheet 2.10(A) – Overheads

Table 2.10.1 – Network Overheads Expenditure & Table 2.10.2 – Corporate Overheads Expenditure

Compliance with Requirements of the Notice

The following sections outline how Essential Energy has ensured that the information provided is consistent with the requirements of the Notice.

Essential Energy capitalises a component of its overhead expenditure. Capitalisation of overheads is governed by CEOP2416 – Operational Procedure: Asset Capitalisation. There have been no material changes in capitalisation policy from the prior year.

Source of Information

The data in this table is based on the standard methodology adopted for all finance expenditure data in the Category Analysis RIN. Refer to section *3 Financial Data* for the overall Basis of Preparation on finance data prepared for multiple tables in the RIN. The specific methodology and assumptions made for this table are also outlined below.

Methodology & Assumptions

- Master file of financial data is prepared as described in section *3*.
- PeopleSoft dataset of operating expenditure has been extracted and reconciled to relevant management accounts to ensure its validity.
- Overheads were split into the required categories using PeopleSoft project type data broken down into resource categories.
- Aggregate Overheads were allocated across the mandatory categories disclosed within the table proportionately based on the Total Network Overhead and Total Corporate Overhead expenditure sourced from PeopleSoft project type data.

We note that the swing from Corporate overheads to Network overheads is due to Fleet and Property support costs being considered as Network overhead in FY18 whereas it was reported as Corporate overhead in prior years.

Use of Estimated Information

To separate expenditure across RIN categories, submitted information is materially dependent on information from the PeopleSoft financial system. As a result this information is treated as actual information.

Reliability of Information

Given the underlying assumptions and use of estimated data in this table, caution should be exercised when using it for benchmarking or decision making purposes.

Worksheet 2.11 – Labour

Table 2.11.1 - Cost Metrics per Annum

Compliance with Requirements of the Notice

The following sections outline how Essential Energy has ensured that the information provided is consistent with the requirements of the Notice.

Source of Information

Data has been sourced from:

- The Labour Opex and Capex file from the Budgeting and Forecasting team which details by department, the split of labour costs by direct and overhead, as well as the split by Standard Control Services, Alternative Control Services, Unregulated Services and Water. This file uses the 2017-18 CAM rates.
- FTE Reports for June 2018 and June 2017.
- Personal Data files for June 2018 and June 2017, showing annual remuneration and hourly rate data per employee.
- Agency Staff reports for June 2018 and June 2017 showing labour hire staff.
- The Monthly Overtime Report for June 2018, showing year to date overtime dollars and hours.
- The 2018 Working Hours file from Finance, showing available working hours calculated as part of the budgetary process.
- The RIN classification file from the Human Resources team ("HR"), showing FTEs classified by categories required in Tables 2.11.1 and 2.11.2.
- The 2018 Stand Down Occurrences file from HR.

Methodology & Assumptions

Main Assumptions

- The 2017-18 ASL number is assumed to be the average of the 2016-17 and 2017-18 year end staff numbers converted to Standard Control Services numbers by way of department percentages derived from the Labour Opex and Capex file.
- It is assumed that the average productive work hours for Ordinary Time labour is standard per ASL. This data is not calculated at a more detailed ASL-specific level. It equates to the available hours as calculated in the Working Hours file. The average productive work hours per ASL equates to average productive work hours for Ordinary Time plus average overtime hours per ASL.
- A Standard Control Services percentage has been calculated for each department using the Labour Opex and Capex file and this has been applied to the labour costs and units.

Total Labour Cost

- The 2017-18 Ordinary Time labour cost per department was taken from the Labour Opex and Capex file and split into Corporate, Network Overheads and Direct Network Standard Control Services labour costs using the departmental splits derived from this file.
- Other staff-related costs by department were taken from the Labour Opex and Capex file. Redundancy and Temp Agency costs were removed. The remaining costs were then multiplied by the relevant percentage to convert to the Standard Control Services amounts.

- Overtime wages and oncosts were calculated from the Labour Opex and Capex file. Overtime hours were taken from the Monthly Overtime Report for June 2018.These were multiplied by the relevant percentages to convert to the Standard Control Services amounts by department.

Calculation of Costs and Hours Split Between the Different Labour Categories in the RIN

- Total ordinary labour costs and overtime costs by department were calculated.
- The average remuneration per FTE was pivoted to derive the remuneration by department and RIN labour category.
- The total labour costs by department were split into RIN labour categories using the weighting of the remuneration by department and RIN category analysis.
- The applicable ordinary time hourly rate per ASL was used as the hourly rate for labour hire.

RIN Classification

Each employee was assigned their RIN classification by the HR (Workforce Planning and Analytics) team.

Employees were categorised into RIN categories using mapping logic based on organisational hierarchy and remuneration code (for Executive and Senior Managers on Contract), Employee class (Apprentices) and Workforce Planning Categories as used in Essential Energy's Public Sector workforce planning external reporting. The results were reviewed and results aligned to the RIN categories where required.

The following table outlines the logic used by the HR team:

WFP Categories	RIN	Mapping Logic	Rule
Admin	Support	Job Family	WFP Category
Apprentice	Apprentice	Empl Class	Employee Class
Executive Manager	Exec Manager	L2 & L3 & CONEMP	Hierarchy + Contract
Management	Manager	Job Family	WFP Category
Non Trade	Unskilled Worker	Job Family	WFP Category
Prof Spec	Professional	Job Family	WFP Category
Senior Manager	Senior Manager	L4 & L5 & CONEMP	Hierarchy + Contract
Technical	Skilled Electrical	Job Family	WFP Category
Trades	Skilled Electrical	Job Family	WFP Category

ASL Numbers

- The year end FTEs for 2017-18 were taken from the FTE report for June 2018. Using the RIN classification file from HR, FTEs were assigned their applicable labour classification.
- The average FTE numbers were calculated by deriving an average of the closing balance of June 2017 and June 2018 by department.
- The applicable departmental Standard Control Services percentage was applied to the average numbers to derive the Standard Control Services ASL numbers.
- The average year end labour hire data was calculated by deriving an average of the closing balance of June 2017 and June 2018 by department.

Stand Down Occurrences

Data for the 2018 year regarding stand down occurrences was obtained from HR. The data was analysed by employee ID, labour classification and department. The applicable Standard Control Services percentage per department was applied to give the number of stand down occurrences by labour category.

Use of Estimated Information

The information in this table is considered to be based on actual data but with estimated splits applied to derive the required information.

Further details regarding estimation are described in the Methodology & Assumptions section above.

Reliability of Information

Given the underlying assumptions and estimates made in this data, caution should be applied if using the data in the table for benchmarking or decision making purposes.

Table 2.11.2 - Descriptor Metrics

Compliance with Requirements of the Notice

The following sections outline how Essential Energy has ensured that the information provided is consistent with the requirements of the Notice.

Source of Information

Data has been sourced from:

- Table 2.11.1.
- Monthly Overtime Report for June 2018, showing year to date overtime dollars and hours

Methodology & Assumptions

Average Productive Work Hours Ordinary Time per ASL and Hourly Rate per ASL

- It is assumed that average productive work hours per ASL equates to the available working hours as shown in the Working Hours file for 2018.
- The total Standard Control Services cost for ordinary time and labour hire was divided by the total productive work hours for ordinary time to calculate the hourly rate per ASL per labour category.
- It is assumed that employee and labour hire have the same costs.

Average Productive Work Hours Overtime per ASL and Hourly Rate per ASL

- Overtime hours per FTE was taken from the Monthly Overtime Report for June 2018. The overtime cost was taken from the Labour Opex and Capex file.
- The Standard Control Services percentage per department was applied to extract the Standard Control Services element.
- The RIN labour categories were added to the analysis.
- The data was then pivoted to show the total overtime dollars and hours per labour category.
- The average productive overtime work hours per ASL was derived by dividing overtime hours by the ASL numbers as per Table 2.11.1.
- The hourly rate per ASL was calculated by dividing the overtime dollars by overtime hours.

Use of Estimated Information

The information in this table is considered to be based on actual data but with estimated splits applied to derive the required information.

Further details regarding estimation are described in the Methodology & Assumptions section above.

Reliability of Information

Given the underlying assumptions and estimates made in this data, caution should be applied if using the data in the table for benchmarking or decision making purposes.

Worksheet 2.12 - Input tables

Table 2.12.1 – Input tables

Compliance with Requirements of the Notice

The following sections outline how Essential Energy has ensured that the information provided is consistent with the requirements of the Notice.

Source of Information

The data in this table is based on the standard methodology adopted for all finance expenditure data in the Category Analysis RIN. Refer to section *3 Financial Data* for the overall Basis of Preparation on finance data prepared for multiple tables in the RIN. The specific methodology and assumptions made for this table are also outlined below.

Methodology & Assumptions

- Vegetation Management was split into the requested cost categories using PeopleSoft project type data broken down into resource categories and zones.
- Routine Maintenance was split into the requested cost categories using PeopleSoft project type data broken down into resource categories and RIN subcategories.
- Non Routine Maintenance was split into the requested cost categories using PeopleSoft project type data broken down into resource categories and RIN subcategories.
- Overheads were split into the requested cost categories using PeopleSoft project type data broken down into resource categories and RIN subcategories. Overheads have been lumped into “Other” cost categories based on the time and resources available to dissect the data.
- Augmentation was sourced from the Annual Reporting RIN and split into the cost categories using PeopleSoft project type data broken down into resource categories and RIN subcategories.
- Connections were split into the requested cost categories using PeopleSoft project type data broken down into resource categories and RIN subcategories.
- Major event days (within Emergency Response) were split into the requested cost categories using PeopleSoft project type data broken down into resource categories and RIN subcategories, and sourced from Table 2.9.1 of the Category Analysis RIN. Major storms was used as the balancing item for the remaining Emergency Response spend.
- Public Lighting was split into the requested cost categories using PeopleSoft project type data broken down into resource categories and RIN subcategories.
- Metering was split into the requested cost categories using PeopleSoft project type data broken down into resource categories and RIN subcategories.
- Replacements was sourced from the Annual Reporting RIN and split into the cost categories using PeopleSoft project type data broken down into resource categories and RIN subcategories.
- Non Network Expenditure has been lumped into “Other” costs. Data was sourced from Worksheet 2.6 of the Category Analysis RIN.

Use of Estimated Information

The data splits within this table are based on assumptions and the data is, therefore, considered to be estimated.

Reliability of Information

Given the underlying assumptions and methods used to derive this data, caution should be exercised when using this for benchmarking or decision making purposes.

Worksheet 4.1 - Public lighting

Table 4.1.1 - Descriptor Metrics Over Year

Compliance with Requirements of the Notice

The following sections outline how Essential Energy has ensured that the information provided is consistent with the requirements of the Notice.

Source of Information

- Data was extracted from WASP as at 1 July 2018.
    - This data was filtered to exclude Metered, Private and Quarantined lights and to only include In Service lights. These devices were excluded for the following reasons:
    - Data on Quarantined lights does not contain enough information to determine the luminaire size.
    - Metered and Private lights are the responsibility of the owner for maintenance and replacement.
- Unique values based on Type were extracted and the number of lights corresponding to each category were counted.

Methodology & Assumptions

The individual device types were counted from the WASP installed data as at 1 July 2018, based on the AEMO load table classification for each light.

Use of Estimated Information

All information has been sourced from WASP and is considered to be actual data. Unknown luminaire types were categorised to be 42W CFL as this is the largest install base for Essential Energy.

Reliability of Information

The data in this table is considered to be reliable.

Table 4.1.2 - Descriptor Metrics Annually

Compliance with Requirements of the Notice

The following sections outline how Essential Energy has ensured that the information provided is consistent with the requirements of the Notice.

Source of Information

- The streetlight data was sourced from WASP extracts.
- GSL Breaches, Payments & Customer Complaints volume data was obtained from the Customer Affairs Business Unit. The data was extracted from the CMS database for 2017-18.
- Cost data in this table is based on the standard methodology adopted for all finance expenditure data in the Category Analysis RIN. Refer to section *3 Financial Data* for the overall Basis of Preparation on finance data prepared for multiple tables in the RIN. The specific methodology and assumptions made for this table are also outlined below.

Methodology & Assumptions

The following assumptions have been made to classify the devices and task types for the purpose of this reporting:

Description	Definition
Major Road Lighting	Luminaires with wattage 150 or higher
Minor Road Lighting	Luminaires with wattage less than 150
Routine Maintenance/Replacement	Work of a planned nature (routine inspections, bulk programs, night patrols)
Non-Routine Maintenance/Replacement	Unplanned work performed by Essential Energy
Public Lighting	Installed Type 7 unmetered lights that are billed through the Unmetered Billing System

Light Installation Volume & Expenditure

- Volumes were extracted from the WASP Asset History for 2017-18.
- The streetlight data was categorised between Major and Minor Road using the wattage assumption above.
- There are no costs associated with new light or pole installations as these are customer funded and deemed as gifted assets.
- Instructions - compare the Asset Inventory from the previous financial year and only consider assets that are not on the previous year's report. Use the 150watt rule to arrive at the Major/Minor split.

Light Replacement Volume & Expenditure

- Replacement volumes were extracted from the WASP Work Task records for 2017-18. Volumes will include internally and externally funded replacements where the asset is an Essential Energy asset.
- The streetlight data was categorised between major and minor road using the wattage assumption above.
- Total cost for light replacement includes only internally funded work, representing Essential Energy funded replacement expenditure. Customer funded program expenditure has been excluded.
- Instructions – Use the "Defects 2017-18" report, filter for "Streetlight-replace" and "SL Luminaire-bulk replacement" work tasks and use the 150watt rule to arrive at the Major/Minor split.

Light Maintenance Volume & Expenditure

- Maintenance volumes were extracted from WASP Work Task records for 2017-18. This will include inspections, spot maintenance work, and bulk lamp replacement programs.
- The streetlight data was categorised between Major and Minor Road using the wattage assumption above.
- Number of poles installed includes the volume of dedicated streetlight pole inspections completed during the period.
- Total cost is the direct operating expenditure associated with maintenance programs for streetlights.
- Instructions – Poles – source number of poles maintained from "Poles Streetlights and Inspections_1718FY" report and use value for "Total Dedicated Inspected Poles".
- Instructions – Lights - Use "Inspections 2017-18" report and filter for Night Patrol Inspections (note: 64 duplicate work tasks were identified and were eliminated from final count. The process for recognising

duplications is to concatenate date completed and type of assets and filter out all duplicates because each asset should only be inspected once a day).

Quality of Supply

Mean Days

- This number was derived from COGNOS report PR25 YTD Customer Reported June 2017 Graph. This report identifies the total number of customer reported tasks received, calculates the total number of days taken to repair between the reported date and the completed date (excluding weekends and public holidays), and then provides the average.
- Instructions – Use the value from ARR Table 3.6.7.2, “Street lights – average number of days to repair”.

Volume of GSL Breaches, Payments & Customer Complaints

This data was obtained from the Customer Affairs Business Unit and the data was extracted from the CMS Database.

- Instructions – GSO Breaches – source from “GSL payments FY18”, number of records.
- Instructions – GSL Payments – source from “GSL payments FY18”, sum of the amounts in the “PRT_AMOUNT” column.
- Instructions – Customer Complaints – source from the “Export GCSS from CMS” report, number of records. Ensure that it is filtered only for streetlighting data.

Use of Estimated Information

All volume information has been sourced from WASP and is considered to be actual data. The data contains no estimates.

Reliability of Information

The data in this table is considered to be reliable.

Table 4.1.3 - Cost Metrics

Compliance with Requirements of the Notice

The following sections outline how Essential Energy has ensured that the information provided is consistent with the requirements of the Notice.

Source of Information

- The number of Replacement and Maintenance work tasks for 2017-18 were obtained from WASP work task records.
- Financial information was provided at a transaction level for the relevant public lighting project types. This data was provided by the Finance team.

Methodology & Assumptions

The main assumptions for this table are:

- Average unit rates are applied as financial information is not available at a light type.

Light Installation – Major & Minor Road

There are no costs associated with any light or pole installations as these are deemed as gifted assets.

Light Replacement – Major & Minor Road

- Replacement Work Task records by light type and road type for 2017-18 were extracted from WASP.
- Material costs were sourced from a number of areas being Procurement Inventory Listing and both the Capex and PTRM SLUoS models.
- Internal labour costs were derived from the PTRM SLUoS model and include plant and labour.
- Contractor maintenance and replacement rates were advised by the Project Manager at the commencement of the new contract period.
- A calculation table was built that automatically calculates average unit cost of replacement and maintenance for different work types. Labour, material and contractor costs should be verified each year to ensure that they are still up to date.
- Replacement tasks considered:

    - Spot Replacement
    - Street light – replace Lighting – Change Luminaire
    - Bulk Replacement
    - Streetlighting – Luminaire Bulk Replacement

Light Maintenance

- Maintenance Work Task records by light type and road type for 2017-18 were extracted from WASP.
- Contractor maintenance and replacement rates were advised by Project Manager at the commencement of the new contract period.
- All material costs were sourced from either the Procurement Inventory Listing, Capex or PTRM SLUoS models.
- Where material costs were not available, the costs of similar size materials were used.
- The calculation spreadsheet for Light Replacement also holds information for Light Maintenance.
- Maintenance tasks considered:

    - Spot Maintenance
    - Lighting – Standard Maintenance
    - Lighting – Investigation Only
    - Street light – investigate
    - Street light – repair
    - Lighting – Minor Maintenance
    - Lighting – Energise Luminaire
    - Lighting – De-energise Luminaire
    - Lighting – Fit Glare Shield
    - Lighting – Remove Luminaire
    - Street light bracket – repair
    - Street light control point – repair
    - Street light glare shield – install
    - Lighting – Replace Wiring
    - Lighting – Fit Wire Guard
    - Light Not Working
    - Night watch luminaire – repair
    - Street light vandal guard – install
    - Street light glare shield – replace
    - Bulk Maintenance
    - Cat V Night Patrols

Use of Estimated Information

The data in this table contains assumptions and estimates. As works are completed from two separate streams, being bulk contractor works and internal spot works, the estimated cost provides a hybrid weighted average of the two.

Reliability of Information

Given the underlying assumptions and estimates made in this data, caution should be applied if using the data in the table for benchmarking or decision making purposes.

Worksheet 4.2 – Metering

Table 4.2.1 – Metering Descriptor Metric

Compliance with Requirements of the Notice

In the following sub-headings, Essential Energy seeks to demonstrate how the information provided is consistent with the requirements of this Notice.

Source of Information

- EDDiS - This system is used by metering services, in its capacity as an accredited Meter Provider and Meter Data Provider in the NEM, to store and process meter readings and meter registry information pertaining to chapter 7 of the NER.

Methodology & Assumptions

- Meter population volumes for 2017-18 have been produced through a query from the EDDiS database, with the query providing total number of meters by type and categories required for the completion of this table.
- Some assumptions have been made regarding whether some meters are single phase or 3 phase, due to the Meter Type being unknown.
- Note: Meter population numbers are duplicated in the RIN template with details provided by subcategory of Single Phase and Multi Phase Meter Populations and also by subcategory of Current Transformer and Direct Connect Meter Populations. The sum of Single Phase and Multi Phase meters should equal the sum of Current Transformer and Direct Connect Meter populations.

Use of Estimated Information

The data in this table is considered to be actual data, other than the duplication of meter numbers noted above.

Reliability of Information

Given the data duplication within this table, caution should be applied if using the data for benchmarking or decision making purposes.

Table 4.2.2 - Cost Metrics

Compliance with Requirements of the Notice

In the following sub-headings, Essential Energy seeks to demonstrate how the information provided is consistent with the requirements of this Notice.

Source of Information

- EDDiS - This system is used by metering services to store and process meter readings and meter registry information pertaining to chapter 7 of the NER.
- Reports and budgetary information from PeopleSoft. This data was aligned to the Annual Reporting RIN based on mapping provided by SMEs.

Methodology & Assumptions

Reporting for Metering is in line with how the alternative control data for Type 5 & 6 meters will be recorded in the future.

Meter Purchase

- Volume information for Meter Purchases has been derived from delivery information from Essential Energy's two meter suppliers.
- Meter Purchase financials are zero, as the meters are sold to ASPs and gifted back to Essential Energy's network.

Meter Testing

- Meter testing includes the regulatory compliance testing of meters undertaken by Essential Energy in accordance with the NER. Meter testing figures have come from EDDiS for all works orders raised and completed for Meter Testing activities.
- Information for 2017-18 is based on financial reports from PeopleSoft. This data was aligned to the Annual Reporting RIN based on mapping provided by SMEs.

Meter Investigation and Special Meter Reading

- These are all zero as they have been covered by Network Operation in Section 4.3 Fee Based Services.

Scheduled Meter Readings

- Information for Type 6 readings for 2017-18 is based on financial reports from PeopleSoft. Information for Type 5 readings is based on the number of type 5 meters being read remotely on a fortnightly basis. This data was aligned to the Annual Reporting RIN based on mapping provided by SMEs.
- Volume figures come from a count of reads from EDDiS.

New Meter Installs

- All data for this section is zero as new meter installs are either conducted by Accredited Service Providers or where an installation of metering with Current Transformers is performed by Metering Services on a quote for service basis and therefore not included.

Meter Replacement

- Meter replacement includes the pro-active replacement of meters that have failed to meet compliance under the NER. There is no information for 2017-18, as the program was suspended in the lead up to the Power of Choice initiative.

Meter Maintenance

- Meter maintenance includes the routine maintenance of meters, including replacement of meters that have failed in service. Volume figures are based on the amount of works orders raised and completed for meter maintenance activities.
- Data for 2017-18 is based on Metering project type data in PeopleSoft, reconciling back to the Annual Regulatory Accounts.

Remote Meter Reading

- Remote meter reading costs are included in the Type 5 meter reading costs provided under Scheduled Meter Reading. While these meters are set up as Type 5 meters, they are read remotely due to the technical difficulties in probe reading these meters. These costs are estimated based on the volume of sites and the reading frequency. This data was aligned to the Annual Reporting RIN based on mapping provided by SMEs.

Other Metering

- Other metering includes redundancies for Meter Reading and Meter Provision, with the balance being costs incurred in the Meter Data Agency section. These costs were obtained from PeopleSoft reports.

Use of Estimated Information

This table contains estimated information as noted in the Methodology & Assumptions section above.

Reliability of Information

Given the assumptions underlying the data in this table, caution should be applied if using the data for benchmarking or decision making purposes.

Worksheet 4.3 - Fee-based services

Table 4.3.1 – Cost Metrics for Fee-Based Services

Compliance with Requirements of the Notice

Essential Energy has provided 2017-18 costs and volumes for each of the Ancillary Service Fees it has charged.

Source of Information

Special Meter Read

Move In Move Out Meter Read

Meter Test – 1st Meter

Off peak conversion

Disconnect / Reconnect – Disconnect Complete

Disconnect – Pillar / Pole

Site Establishment per NMI

Disconnect – Disco Non Payment

- Metering Volume Data is extracted from Essential Energy's Peace system. Expenditure data is extracted from PeopleSoft.

Authorisation of ASPs – initial

Authorisation of ASPs - renewal

- Authorisation Volume Data is maintained using Excel spreadsheets. Expenditure data is extracted from PeopleSoft.

Connection offer service – basic

Connection offer service – standard

- Connection Application Data is sourced from Essential Energy's Peace, PeopleSoft and Secure Web Forms systems. Expenditure data is extracted from PeopleSoft.

Connections Interface – Customer Interface Co-ordination

Connections Interface – Relocation Process Facilitation

Connections Interface – Obtaining deeds of agreement

Design Information

Design Certification

Design Rechecking

Inspection Level 1

Reinspect (level 1 and 2 Work)

Access Permit

Substation Commissioning

Administration (Contestable Works)

Notice of Arrangement

Access to network assets (standby)

Planning studies for new connection applications

Install remove HV lv line link

- Connections Data is sourced from Essential Energy's Peace system.
- Contestable Works Management System (CWMS). Expenditure data is extracted from PeopleSoft.
- Note - Reinspect Level 1 data is from CWMS. Reinspect Level 2 is from Secure Web Forms (SWF).

Connections Interface – Preliminary Enquiry Service

- Physical printouts of Job Sheets taken from Essential Energy's Peace system. Expenditure data is extracted from PeopleSoft.

Conveyancing information desk inquiry

- For cases where Land Registry Services (LRS) conducts the Searches on Essential Energy's behalf, data comes from the invoices LRS sends.
- For cases where Essential Energy conducts its own Searches', data comes from Essential Energy's Lotus Notes system.
- Expenditure data is extracted from PeopleSoft.

Inspection of service work (level 2)

- Level 2 Accredited Service Provider inspection data is sourced from Essential Energy's Secure Web Forms (SWF) system. Expenditure data is extracted from PeopleSoft.

Fitting of Tiger Tails

- Volume and expenditure data is sourced from Essential Energy's PeopleSoft system.

Methodology & Assumptions

Special Meter Read

Move In Move Out Meter Read

Meter Test – 1st Meter

Off peak conversion

Disconnect / Reconnect – Disconnect Complete

Disconnect – Pillar / Pole

Site Establishment per NMI

Disconnect – Disco Non Payment

- Volumetric Meter Data from Peace is downloaded using the Spotfire reporting tool into an Excel worksheet. The download is based on Market Service Order Transactions.
- The extracted Volumetric Meter Data from Excel is summarised using pivot tables and used to populate the RIN template.
- The Finance team extracts all spend data from PeopleSoft into an Excel worksheet and sends to respective RIN authors.
- The RIN authors conduct a line-by-line reconciliation for the financial figures and populate the RIN tables.

Authorisation of ASPs – initial

Authorisation of ASPs - renewal

- For each Authorisation processed, a record is entered into an Excel spreadsheet.
- At the time of RIN population, data is cleansed and summarised before loading into the RIN template.
- The Finance team extracts all spend data from PeopleSoft into an Excel worksheet and sends to respective RIN authors.
- The RIN authors conduct a line-by-line reconciliation for the financial figures and populate the RIN tables.
- Volume and Charges may not match as some applications come in as Initials but are only charged as Renewals, where the customer would have already paid for Initials under a different category.

Connection offer service – basic

Connection offer service – standard

- Connection Application data is downloaded from corporate systems via a SSRS report on a weekly basis.
- The report data is cleansed to remove any possible duplicates and populate missing information.
- The weekly reports are summarised monthly and annually to populate the RIN tables.
- The Finance team extracts all spend data from PeopleSoft into an Excel sheet and sends to respective RIN authors.
- The RIN authors conduct a line-by-line reconciliation for the financial figures and populate the RIN tables.

Connections Interface – Customer Interface Co-ordination

Connections Interface – Relocation Process Facilitation

Connections Interface – Obtaining deeds of agreement

Design Information

Design Certification

Design Rechecking

Inspection Level 1

Reinspect (level 1 and 2 Work)

Access Permit

Substation Commissioning

Administration (Contestable Works)

Notice of Arrangement

Access to network assets (standby)

Planning studies for new connection applications

Install remove HV lv line link

- An extract of contestable work is taken from CWMS into an Excel worksheet on a weekly basis.
- Weekly worksheets are consolidated into an annual summary and summary pivot tables are created to derive volume summary information.
- The weekly reports are summarised monthly and annually to populate the RIN template.
- The data is cleansed to remove any possible duplicates and populate missing information.
- The Finance team extracts all spend data from PeopleSoft into an Excel worksheet and sends to respective RIN authors.
- The RIN authors conduct a line-by-line reconciliation for the financial figures and populate the RIN tables.
- Expenditure with Project Activity IND has been allocated evenly between Design Certification and Design Information due to line item descriptions related to both categories.

Connections Interface – Preliminary Enquiry Service

- Manually count the printouts and enter volume into the RIN template.
- The Finance team extracts all spend data from PeopleSoft into an Excel worksheet and sends to respective RIN authors.
- The RIN authors conduct a line-by-line reconciliation for the financial figures and populate the RIN tables.

Conveyancing information desk inquiry

- Consolidate data from LRS and Lotus Notes into an Excel worksheet and populate the RIN template.
- The Finance team extracts all spend data from PeopleSoft into an Excel worksheet and sends to respective RIN authors.
- The RIN authors conduct a line-by-line reconciliation for the financial figures and populate the RIN tables.

Inspection of service work (level 2)

- The SWF Reporting function produces an export of Billing data into an Excel spreadsheet monthly.
- The data is cleansed to remove any possible duplicates and populate missing information.
- Monthly data is then consolidated annually to populate the RIN template.
- The Finance team extracts all spend data from PeopleSoft into an Excel worksheet and sends to respective RIN authors.
- The RIN authors conduct a line-by-line reconciliation for the financial figures and populate the RIN tables.

Fitting of Tiger Tails

- Data is sourced from the Finance team, and number of Chargeable Works Dockets processed with charge codes 318 and 104.

Use of Estimated Information

The financial data in this table is chiefly comprised of actual information from the PeopleSoft source system.

Reliability of Information

Given the assumptions and estimations underpinning the data in this table, caution should be applied if using the data for benchmarking or decision making purposes.

Worksheet 4.4 - Quoted services

Table 4.4.1 – Cost metrics for quoted services

Compliance with Requirements of the Notice

Essential Energy has provided 2017-18 costs and volumes for each of the Ancillary Service Fees it has charged.

Source of Information

High Load Escorts

- High Load Escort data is maintained in an Excel spreadsheet.

CT Installs

- This service was active until 1 December 2017. However, there have not been any jobs or volume in the last two years.

Rectification of Illegal Connection

- Rectification of Illegal Connection data is sourced from Essential Energy's Revenue Risk Database.

Methodology & Assumptions

High Load Escorts

- As each High Load Escort job is processed, a record is created in an Excel spreadsheet. This data is collated annually to populate RIN tables.
- The Finance team extracts all spend data from PeopleSoft into an Excel worksheet and sends to respective RIN authors.
- The RIN authors conduct a line-by-line reconciliation for the financial figures and populate the RIN tables.

CT Installs

- This service was active until 1 December 2017. However, there have not been any jobs or volume in the last two years.

Rectification of Illegal Connection

- Each record for a rectification of illegal connection is recorded with a note to advise of an illegal connection in the Revenue Risk Database.
- This data is counted, and volume is populated in the RIN template.
- The Finance team extracts all spend data from PeopleSoft into an Excel worksheet and sends to respective RIN authors.
- The RIN authors conduct a line-by-line reconciliation for the financial figures and populate the RIN tables.

Use of Estimated Information

The financial data in this table is chiefly comprised of actual information from the PeopleSoft source system.

Reliability of Information

Given the assumptions and estimations underpinning the data in this table, caution should be applied if using the data for benchmarking or decision making purposes.

Worksheet 5.2 - Asset Age Profile

Table 5.2.1 – Asset Age Profile

Poles

Compliance with Requirements of the Notice

The information provided lists the number of poles owned by Essential Energy as well as privately owned poles which are maintained by Essential Energy.

Source of Information

This data has been obtained from Essential Energy's WASP database using SQL and grouping of data in Excel.

Methodology & Assumptions

SQL Logic:

- Both Essential Energy and privately owned poles have been included. Private assets are included as these are poles that Essential Energy inspects and in some cases maintains.
- Includes assets categorised in WASP as "Poles".
- In Service poles only have been included.
- Staked Poles have been determined by those In Service poles that have had a completed "Pole – Reinstate" work task recorded against them (excluding those poles that have been replaced since reinstatement), as well as those poles with a reinforcement attribute but prorated from 1990-91 to 2004-05.
- Staked poles have only been recorded in their own specified row and have not been included in the other pole voltage/material groupings.
- Dedicated street lights have not been included in the pole counts.
- Age is determined from the pole's "Date Installed". Those Poles that do not have a "Date Installed" have been prorated across the existing asset age profile.
- Pole Material is determined from the pole's "Pole Material" and "Pole Type" attributes as follows:

Pole Material	Pole Type	Material
Blank	Blank	Wood
Blank	Copper Chrome Arsenic	Wood
Blank	Low Temperature Creosote	Wood
Blank	Pigment Emulsified Creosote	Wood
Blank	Pressure Impregnated	Wood
Unknown	Blank	Wood
Unknown	Copper Chrome Arsenic	Wood
Unknown	Low Temperature Creosote	Wood
Unknown	Pigment Emulsified Creosote	Wood
Unknown	Pressure Impregnated	Wood

Pole Material	Pole Type	Material
Timber	Blank	Wood
Timber	Copper Chrome Arsenic	Wood
Timber	Copper Chrome Napthenate	Wood
Timber	Low Temperature Creosote	Wood
Timber	Pigment Emulsified Creosote	Wood
Timber	Pressure Impregnated	Wood
Concrete		Concrete
Steel		Steel
Tower		Steel
Aluminium		Steel
Stobie		Concrete
Composite		Other

- Voltage is determined from the pole's "Highest Voltage" and "Pole Function" attributes as follows:

Pole Function	Highest Voltage	Voltage
Bollard Pole	Blank	Bollard - None
HV/LV Pole	Blank	11kV
HV Pole	Blank	11kV
LV Pole	Blank	<=1kV
Street Light Column	Blank	<=1kV
Transmission/HV Pole	Blank	66kV
Transmission/HV/LV Pole	Blank	66kV
Transmission/LV Pole	Blank	66kV
Transmission Pole	Blank	66kV
	Bollard – None	Bollard - None
	6.35	11kV
	6.6	11kV
	11	11kV
	22	22kV
	12.7	12.7kV
	19.1	19.1kV
	33	33kV
	66	66kV
	132	132kV

- If the asset voltage is blank or "Unknown", then the asset's maintenance area primary voltage is used instead (determined from Smallworld data).
- If the asset voltage is "Bollard – None", it has been included in "Other".
- If the pole material is "Composite", it has been included in "Other".

Use of Estimated Information

Essential Energy has used estimated information for the pole material when there is no material listed for the pole. The estimation of using the pole type and pole function gives a fairly accurate estimation. Any poles without a “Date Installed” have been prorated across the existing asset age profile.

Staked Poles have been determined using a combination of work tasks and attributes against the pole; however, this data is only available after 2004. Prior to this, data has been prorated from 1990-91 to 2004-05.

Reliability of Information

The reliability of the data in this table is dependent on the accuracy of the data within the WASP database as well as the accuracy of the assumptions and estimations that have been used. Caution should be applied if using this data for benchmarking or decision making purposes. In particular, the reliability of the ages of staked poles is questionable due to the lack of data.

Overhead Conductors

Compliance with Requirements of the Notice

The data in this table has been prepared in accordance with the requirements of the Notice.

Source of Information

A snap of the GIS Smallworld data was taken as at 1st July. From this snapshot, service cables are extracted using scripts.

Methodology & Assumptions

Smallworld Cables used in the analysis were filtered by:

- Purpose = Overhead
- Owner = Essential Energy
- Operating Voltage equal to “Srvice”.

The Date Installed was converted into financial year. Lengths were summed by financial year and regulatory voltage category, ie. 1kV, and entered into the “quantity by year” cells of the table.

- An estimate date installed was unachievable for a total of 14,100 services – these were spread across the age classes prior to 2004 according to the age distribution for each voltage category.

Use of Estimated Information

Date Installed (Smallworld Cable)

Essential Energy has used a combination of actual and estimated information for the Date Installed attribute of lines. The probability of a record having a valid Date Installed value is greater in the years from 2003 onwards. Although legacy data has been used to fill in these values, valid dates are less likely to be available for lines installed by pre-amalgamation distributors. The collection of this information in the field is extremely difficult.

Assumptions:

- Various aging techniques have been undertaken by the business to age unknown sections of the network. These undertakings have been adopted in an effort to age the network as accurately as possible.

Reliability of Information

The reliability of the data in this table is dependent on the accuracy of the data within the GIS Smallworld database and the assumptions and estimations that have been used. Caution should be applied if using this data for benchmarking or decision making purposes.

Underground Cables

Compliance with Requirements of the Notice

The data in this table has been prepared in accordance with the requirements of the Notice.

Source of Information

System	Data
WASP	• Substations Site - Asset label, Date Constructed
Smallworld	• Cable - Date Installed, Purpose, Operating Voltage, Service Status, Owner, Nominal Length, Geometry (both Centreline and Actual Centreline combined), LV Service Type, Parent Substation • Substation Site – Asset Label, Location

Methodology & Assumptions

Smallworld Cables used in the analysis were filtered by:

- Purpose = Underground
- Owner = Essential Energy
- LV Service type not equal to “Service”
- Service Status = all

The Date Installed was converted into financial year. Lengths were summed by financial year and regulatory voltage category, ie. ≤1kV, and entered into the “quantity by year” cells of the table.

- An estimate date installed was unachievable for a total of 1,189km of line – this length was spread across the age classes prior to 2004 according to the age distribution for each voltage category.

Use of Estimated Information

Date Installed (Smallworld Cable)

Essential Energy has used a combination of actual and estimated information for the Date Installed attribute of lines. The probability of a record having a valid Date Installed value is greater in the years from 2003 onwards. Although legacy data has been used to fill in these values, valid dates are less likely to be available for lines installed by pre-amalgamation distributors. The collection of this information in the field is extremely difficult.

Assumptions:

- Various aging techniques have been undertaken by the business to age unknown sections of the network. These undertakings have been adopted in an effort to age the network as accurately as possible.

Reliability of Information

The reliability of the data in this table is dependent on the accuracy of the data within the GIS Smallworld database and the assumptions and estimations that have been used. Caution should be applied if using this data for benchmarking or decision making purposes.

Service Lines

Compliance with Requirements of the Notice

The data in this table has been prepared in accordance with the requirements of the Notice.

Source of Information

System	Data
WASP	• Substations Site - Asset label, Date Constructed
Smallworld	• Cable - Date Installed, Purpose, Operating Voltage, Service Status, Owner, Nominal Length, Geometry (both Centreline and Actual Centreline combined), LV Service Type, Parent Substation • Service Point – Premise Join

Methodology & Assumptions

Cables used in the analysis:

- Purpose = all
- Operating Voltage = LV
- Owner = Essential Energy
- LV Service type = Service
- Service Status = all

In GIS Smallworld, premises are located at an object known as a Service Point. The Smallworld Cable (underground or overhead) connecting the Service Point to the network is attributed as “Service”.

- For each Service Point find the following information:
    - Date Installed of Service Cable (estimated if required – see below)
    - Customer Type Residential or Business
- Convert the date installed into financial years. Count the cables by financial year and enter into the “quantity by year” cells of the table for the appropriate category.

NOTE:

Essential Energy does not have any Services that are not low voltage.

Essential Energy does not have any Services that are complex.

Essential Energy does not have any Services of type subdivision.

All Essential Energy Commercial & Industrial customers are low voltage and are therefore connection complexity = Simple.

Use of Estimated Information

Date Installed (Smallworld Cable)

Essential Energy has estimated the Date Installed value for services. The location of services has not been uniformly populated in the system until recent years. The Customer, Premise, Substation group has been connecting the Service Point to the network in bulk over the past decade – date installed information was not included as part of this process. The collection of this information in the field is both difficult and practically impossible.

Date installed determined the dates in the below categories and if found, assigned the date in the order of priority below:

- Known Service Cable Date
- Land Parcel Registration Date
- Service Pole Installation Date
- Substation Installation Date

Any Service Cable that could not be allocated a date was spread across the age classes according to the age distribution.

Assumptions:

- The land parcel registration date is the date the service was installed and has not been subsequently replaced.
- The service pole installation date is the date the service was installed and has not been subsequently replaced.
- The substation installation date is the date the service was installed and has not been subsequently replaced.

Customer Type

Information regarding the customer type that the cable is servicing is not maintained against the cable object in GIS Smallworld. Therefore this information was obtained from the premise information in Peace. If a Service Point in GIS Smallworld had at least one residential Premise joined to it, it was considered residential.

Reliability of Information

The reliability of the data in this table is dependent on the accuracy of the data within the GIS Smallworld database and the assumptions and estimates that have been used. Caution should be applied if using this data for benchmarking or decision making purposes.

Transformers

Compliance with Requirements of the Notice

The information provided includes distribution transformers owned by Essential Energy that are currently in use.

Source of Information

This data has been obtained from Essential Energy's WASP database using SQL and grouping of data in Excel.

Methodology & Assumptions

SQL Logic:

Total = [Distribution Transformers] + [Zone Substation Auxiliary Transformers] + [Zone Substation Power Transformers] + [Distribution Regulating Transformers] + [Zone Substation Regulators (single phase)], as determined below:

Distribution Transformers

- Only Substation Sites with an Owner = “Essential Energy”.
- All Transformers that are currently In Service (in use).
- Includes SWER Isolators and Step Up/Down Transformers. This varies to the method for completion of EB RIN Section 3.5 Physical Assets.
- Voltage has been determined from the asset’s “Primary Voltage”.
- kVA has been obtained from the Substation Site's “Total kVA”. If this is not available, then kVA has been derived as follows (note this has only been required in approximately 2% of cases):
    - If Substation Site “Total kVA” is blank, then use sum of children Transformer “kVA”.
    - If Substation Site “Total kVA” and children Transformer “kVA” fields are blank, then use Substation Site “Phases” as follows:

      3 phase = 63kVA

      1 phase = 10kVA

    - If Substation Site “Total kVA” and children Transformer “kVA” fields are blank and Substation Site “Phases” is blank, then use Substation Site “Construction Type” as follows:

      Pad/Kiosk Substation = 500kVA

      Chamber Substation = 1000kVA

      Ground Substation = 1000kVA

      All others (eg. Pole Substation) = 10kVA

    - If kVA is still undetermined then kVA is estimated as:

Ground or Chamber Substation < 22kV	<=60kVA
Ground or Chamber Substation >= 22kV	<=15MVA
All Others	<=60kVA

    - For larger transformers (Ground and Chamber >= 22kV), the kVA determined above has been converted to MVA by dividing by 1000 for input into the RIN template.

- Mounting Type was determined based on “Construction Type” as follows:
    - “Pole Substation”,”2 Pole Platform Substation”, ”Supported Platform Substation” = Pole Mounted
    - “Ground Substation”, ”Chamber Substation” = Ground Outdoor/Indoor Chamber Mounted
    - “Pad/Kiosk Substation” = Kiosk Mounted

If “Construction Type” is blank, then “Pole Mounted” was assumed (note this was only required in < 0.5% of cases).

- Phases was determined based on the asset Phases attribute as follows:

- "HV1" = Single Phase
- Else Multiple Phase

- Year has been obtained from the most recent "Date Manufactured" from the Substation Site's associated children transformer(s). If this is not available, then Year has been derived as follows:
  - Substation Site "Date Constructed".
  - Those Substation Sites that do not have a "Date Constructed" or a transformer with a "Date Manufactured" have been prorated across the existing asset age profile.

- Distribution transformers in stores have not been included.

Zone Substation Auxiliary Transformers

- ZS Auxiliary Transformers with a Service Status of "In Service".
- Only ZS Auxiliary Transformers with an Owner = "Essential Energy".
- All ZS Auxiliary Transformers have been categorised as "Ground Outdoor/Indoor Chamber Mounted".
- All ZS Auxiliary Transformers have been categorised as "Multiple Phase".
- Voltage has been obtained from the ZS Auxiliary Transformer's "Primary Voltage". If "Primary Voltage" is blank, then "<22kV" has been assumed. This was only required in < 0.5% of cases.
- kVA has been obtained from the ZS Auxiliary Transformer "Rating (kVA)". If this is not available, then kVA has been derived as follows:
  - If ZS Auxiliary Transformer "Rating (kVA)" is blank, then use "Primary Voltage" as follows:

    < 22kV = ">60kVA and <=600kVA"

    >= 22kV = "<=15MVA"

  - If "Primary Voltage" is blank or "Unknown", then a kVA of ">60kVA and <=600kVA" has been assumed.
  - For larger transformers (Ground and Chamber >= 22kV), the kVA determined above has been converted to MVA by dividing by 1000 for input into the RIN template.

- Year has been obtained from the ZS Auxiliary Transformer's "Year of Manufacture". If this is not available, then Year has been derived as follows:
  - If ZS Auxiliary Transformer "Year of Manufacture" is blank, then use the "Commissioning/Install Date".
  - Those ZS Auxiliary Transformers that do not have a "Year of Manufacture" or "Commissioning/Install Date" have been prorated across the existing asset age profile.

Zone Substation Power Transformers

- ZS Power Transformers with a Service Status of "In Service".
- Only ZS Power Transformers with an Owner = "Essential Energy".
- Excludes ZS Power Transformers with a Type of "Regulator" or a Usage of "Spare" (these are included in "Other").
- All ZS Power Transformers have been categorised as "Ground Outdoor/Indoor Chamber Mounted".
- All ZS Power Transformers have been categorised as "Multiple Phase".

- MVA has been obtained from the “Maximum Rating (MVA)” attribute. If blank, it is assumed to be 5 MVA (note that this has occurred in <1% of cases).
- Year has been obtained from the ZS Power Transformer’s “Year of Manufacture”. If this is not available, then Year has been derived as follows:
    - If ZS Power Transformer “Year of Manufacture” is blank, then use the “Date Installed” attribute from the ZS Power Transformer.
    - If ZS Power Transformer “Date Installed” is not available, they were prorated across the existing asset age profile.

Distribution Regulating Transformers

- Recorded in “Other”.
- Only Regulating Transformers with an Owner = “Essential Energy”.
- Regulating Transformers with a Service Status of “In Service”.
- Year has been obtained from the Regulating Transformer’s “Date Manufactured”. If this is not available, then Year has been derived as follows:
    - If Regulating Transformer “Date Manufactured” is blank, then use the “Date Constructed” attribute from the Regulator Site.
    - If Regulator Site “Date Constructed” is not available then they were prorated across the existing asset age profile.
- Voltage has been determined from the asset’s “Primary Voltage”. If blank, it is assumed to be <22kV.
- Phases are determined as:
    - HV1, LV1, SWER = Single Phase
    - HV3, LV2, LV3 = Multiple Phase

Zone Substation Regulating Transformers (Single Phase)

- Recorded in “Other”.
- ZS Regulating Transformers (Single Phase) with a Service Status of “In Service”.
- Only ZS Regulating Transformers (Single Phase) with an Owner = “Essential Energy”.
- All ZS Regulating Transformers (Single Phase) have been categorised as “Ground Outdoor/Indoor Chamber Mounted”.
- All ZS Regulating Transformers (Single Phase) have been categorised as “Single Phase”.
- Year has been obtained from the ZS Regulating Transformer’s “Year of Manufacture”. If this is not available, then Year has been derived as follows:
    - If ZS Regulating Transformer’s “Year of Manufacture” is blank, then use the “Date Installed” attribute from the ZS Power Transformer.
    - If ZS Regulating Transformer’s “Date Installed” is not available, they were prorated across the existing asset age profile.

Use of Estimated Information

- Essential Energy has used estimated information when there is no “Date Constructed” for the Substation Site or “Date Manufactured” on the child Transformer(s) for Distribution Substations.

- Essential Energy has used estimated information when there is no “Year of Manufacture” or “Commissioning/Install Date” for the ZS Auxiliary Transformers as per the existing age profile.
- Essential Energy has used estimated information when there is no “Total kVA” for the Substation Site as per the logic detailed above. This only occurred in 2% of cases. The methodology used to estimate the kVA in these instances is considered to provide a reasonable approximation and was determined using averages and most common kVA by Substation Type.
- Essential Energy has used estimated information when there is no “Rating (kVA)” for the ZS Auxiliary Transformers as per the logic detailed above. This only occurred in approximately 17% of cases. The methodology used to estimate the kVA in these instances is considered to provide a reasonable approximation and was determined using averages and most common kVA by Voltage.

Reliability of Information

The reliability of the data is dependent on the accuracy of the data within the WASP database as well as the accuracy of the assumptions and estimations that have been used. It has been determined that the data is reasonably reliable for all items, however caution should be applied if using this data for benchmarking or decision making purposes.

Switchgear

Compliance with Requirements of the Notice

The information provided lists Switchgear assets that are owned by Essential Energy and are currently in use. Switchgear includes Reclosers, Sectionalisers, Disconnecting Links, Fuses, Air Break Switches, Load Break Switches, Fuses/Switches that are part of Substations and Zone Substation Circuit Breakers.

Source of Information

This data has been obtained from Essential Energy’s WASP database using SQL and grouping of data in Excel.

Methodology & Assumptions

These figures were determined in four parts:

1. Extract data/age profile for Distribution Switchgear currently recorded in WASP.
2. Extract data/age profile for Zone Substation Circuit Breakers recorded in WASP.
3. Extract data/age profile for Zone Substation Switches recorded in WASP.
4. Estimate the number of Fuses/Switches that are part of Substations (both pole mounted and ground/enclosed substations) that are not discretely recorded in WASP.

The results from these queries/estimations were then combined. The logic for each of these three parts is detailed below:

1. Extract data/age profile for Distribution Switchgear currently recorded in WASP

SQL Logic:

- Circuit Breakers = assets with a category of “Recloser Site”.
- Switches = assets with a category of “Sectionaliser Site”, “Disconnecting Link”, “Air Break Switch”, “Load Break Switch Site”.
- Fuse = assets with a category of “Fuse - O/H”.
- When the fuse’s voltage > 11kV, it is included in the category of “Switches”.

- Only assets with an owner of “Essential Energy”.
- Service Status = “In Service”.
- Year has been determined by the asset’s “Constructed Date”. If this is not available, then Year has been derived as follows:

    - If the “Constructed Date” is blank, then use the parent pole’s “Date Installed” if available or applicable.
    - Those assets that do not have a “Constructed Date” or a parent pole with a “Date Installed” have been prorated across the existing asset age profile.

- Voltage has been determined from the asset’s “Primary Voltage”. If the asset voltage is blank or “Unknown”, then the Voltage has been derived as follows:

    - If no asset Voltage is available, the parent pole’s “Highest Voltage” is used if available or applicable.
    - If the parent pole’s Highest Voltage is unknown, then the asset’s Maintenance Area primary voltage is used instead (determined from Smallworld data).

2. Extract data/age profile for Zone Substation Circuit Breakers recorded in WASP

SQL Logic:

- ZS Circuit Breakers with a Service Status indicating it is in service or will be in future (“In Service”, “Open Point”, “System Spare”, “Under Construction”, “Out of Service”, “Not Applicable”, or “Under Repair”).
- Only ZS Circuit Breakers with an Owner = “Essential Energy”.
- All ZS Circuit Breakers have been categorised as “Circuit Breaker”.
- Voltage has been obtained from the ZS Circuit Breaker’s “Primary Voltage”. If “Primary Voltage”’ is blank, then “<=11kV” has been assumed.
- Year has been obtained from the ZS Circuit Breaker’s “Year of Manufacture”. If this was not available, then Year has been derived as follows:

    - If ZS Circuit Breaker “Year of Manufacture” is blank, then use the ZS Circuit Breaker’s “Commissioning/Install Date”.
    - If the ZS Circuit Breaker’s “Year of Manufacture” and “Commissioning/Install Date” is blank, then the parent Zone Substation’s “Year of Manufacture” was used.
    - Those ZS Circuit Breakers that do not have a “Year of Manufacture” or “Commissioning/Install Date” and whose parent Zone Substation does not have a “Year of Manufacture” have been prorated across the existing asset age profile.

3. Extract data/age profile for Zone Substation Switches recorded in WASP

SQL Logic:

- ZS Switches with a Service Status indicating it is in service or will be in future (“In Service”, “Open Point”, “System Spare”, “Under Construction”, “Out of Service”, “Not Applicable”, or “Under Repair”).
- Excludes Fault Throwers and Capacitor Discharge Switches.
- Only ZS Switches with an Owner = “Essential Energy”.
- All ZS Switches have been categorised as “Switch”.
- Voltage has been obtained from the ZS Switch’s “Primary Voltage”. If “Primary Voltage” is blank, then “<=11kV” has been assumed.

- Year has been obtained from the ZS Switch's "Year of Manufacture". If this was not available, then Year has been derived as follows:

    - If ZS Switch's "Year of Manufacture" is blank, then use the ZS Switch's "Commissioning/Install Date".
    - If the ZS Switch's "Year of Manufacture" and "Commissioning/Install Date" is blank, then the parent Zone Substation's "Year of Manufacture" was used.
    - Those ZS Switches that do not have a "Year of Manufacture" or "Commissioning/Install Date" and whose parent Zone Substation does not have a "Year of Manufacture" have been prorated across the existing asset age profile.

4. Estimate the number of Fuses/Switches that are part of Substations and are not discretely recorded in WASP

Fuses/Switches that are part of substation sites (both pole mounted and ground/enclosed) are not typically discreetly recorded in WASP. These were estimated as follows:

Pole mounted Substation Sites:

- The quantity of pole mounted Substation Sites was determined from WASP. It was determined that there are approximately 130,792.
- The average quantity of fuses for overhead/pole mounted Substation Sites was determined. Based on the existing configuration of Substation Sites across Essential Energy's network it was determined that on average there are 2.5 fuses per Substation Site; 1.5 LV fuses and 1 HV fuse per Substation Site.
- The estimated quantity of fuses for overhead/pole mounted Substation Sites was determined by multiplying steps 1 and 2:

    - LV Fuses = 1.5 x 130,792 = 196,188
    - HV Fuses = 1 x 130,792 = 130,792

- The profile of Primary Voltage for existing pole mounted Substation Sites was determined from WASP as follows:

Voltage	Count	Percentage	Mapping
11kV	87,305	67%	<=11kV
12.7kV	3,438	2%	>11kV and <=22kV
19.1kV	5,053	4%	>11kV and <=22kV
22kV	33,605	26%	>11kV and <=22kV
33kV	1,364	1%	>22kV and <=33kV

- These percentages were applied to the estimated counts in step 3 to determine the quantities per voltage group:

    - LV Fuses

        - LV = 100% x 196,188 = 196,188

    - HV Fuses

- <=11kV = 67% x 130,792 = 87,389
- >11kV and <=22kV = 32% x 130,792 = 41,853
- >22kV and <=33kV = 1% x 130,792 = 1,308

- All of these were categorised as “Fuse”.

Ground Mounted/Enclosed Substation Sites:

- The quantity of ground mounted/enclosed Substation Sites was determined from WASP. It was determined that there are approximately 6,846.
- The average quantity of fuses/switchgear for ground mounted/enclosed Substation Sites was determined. Based on the existing configuration of these Substation Sites across Essential Energy’s network it was determined that on average there are 6 fuses/switches per Substation Site; 4 LV fuses and 2 HV fuses per Substation Site.
- The estimated quantity of fuses for ground mounted/enclosed Substation Sites was determined by multiplying steps 1 and 2:
    - LV Fuses = 4 x 6,846 = 27,384
    - HV Fuses = 2 x 6,846 = 13,692
- The profile of Primary Voltage and categorisation (fuse, circuit breaker or operational switch) for existing ground mounted/enclosed Substation Sites was determined from WASP as follows:

LV Switchgear

Split	
LV Circuit Breaker	11%
LV Fuse	89%
	100%

HV Switchgear

Split	
11kV Circuit Breaker	35%
22kV Circuit Breaker	5%
11kV Fuse	41%
22kV Fuse	3%
11kV Operational Switch	10%
22kV Operational Switch	6%
	100%

- These percentages were applied to the estimated counts in step 3 to determine the quantities per voltage group:

- LV Switchgear
  - LV Circuit Breaker = 11% x 27,384 = 3,012
  - LV Fuse = 89% x 27,384 = 34,372
- HV Switchgear
  - <=11kV Circuit Breaker = 35% x 13,692 = 4,792
  - <=11kV Fuse = 41% x 13,692 = 5,614
  - <= 11kV Operational Switch = 10% x 13,692 = 1,369
  - >11kV and <=22kV Circuit Breaker = 5% x 13,692 = 685
  - >11kV and <=22kV Fuse = 3% x 13,692 = 411
  - >11kV and <=22kV Operational Switch = 6% x 13,692 = 822

- The age profile of the equivalent category of the existing switchgear was then applied to each of these estimated counts to determine year/age.

Use of Estimated Information

Essential Energy has estimated information for:

- Distribution Switchgear currently recorded in WASP as follows:
  - The asset's age when there is no "Construction Date" for that asset. The estimation uses the parent pole's "Date Installed" if available which gives a fairly accurate estimation. If neither of these dates were available to determine age, then the assets were aged as per the existing age profile.
  - The asset's voltage when there is no voltage listed for that asset. The estimation uses the parent pole's voltage or the Maintenance area's primary voltage which gives a fairly accurate estimation.

- Zone Substation Circuit Breakers recorded in WASP as follows:
  - the asset's age when there is no "Year of Manufacture" for that asset. The estimation uses the asset's "Commissioning/Install Date" for the ZS Circuit Breaker. If neither of these dates were available to determine age then the assets were aged as per the existing age profile.
  - the asset's voltage when there is no voltage listed for that asset. The estimation assumes <=11kV in < 0.05% of cases.

- Distribution Switchgear that is considered part of Substation Sites and is not discretely recorded in WASP has been entirely estimated based on knowledge of the network and existing data in WASP.

Reliability of Information

The reliability of this data is dependent on the accuracy of the data within the WASP database as well as the accuracy of the assumptions and estimations that have been used.

Public Lighting

Compliance with Requirements of the Notice

The information provided reports the number of public lighting luminaires and public lighting poles. Assets owned by Essential Energy and assets operated and maintained but not owned by Essential Energy have been included.

Source of Information

This data has been obtained from Essential Energy's WASP database using SQL and grouping of data in Excel.

Methodology & Assumptions

SQL Logic:

- For the luminaire count - only Streetlights with an Owner = "Essential Energy" or "RTA" (which Essential Energy maintains) are included.
- For the dedicated streetlight pole count – only Streetlights that are owned by Essential Energy or Privately Owned but maintained by Essential Energy. No RTA poles.
- Only Streetlights with a Service Status = "In Service".
- Streetlights with a Lighting Category = "Quarantined" were excluded.
- Streetlights with a wattage >= 150 are assumed to be Major Road. All else are classified as Minor Road.
- Assets with a category of "Nightwatch Light" were excluded.
- Age is determined from the parent pole's "Date Installed" attribute.
    - If this does not exist then the streetlight's "Connection Date" attribute is used to determine the age.
    - Those assets that do not have a "Date Installed" or a "Connection Date" have been prorated across the existing asset age profile.

Use of Estimated Information

Essential Energy has used some estimated information for the streetlight's age when there is no install date for the parent pole. When there is no install date, the streetlight's "Connection Date" is used which gives a fairly accurate estimation. Those assets that do not have a "Date Installed" or a "Connection Date" have been prorated across the existing asset age profile.

Reliability of Information

The reliability of this data is dependent on the accuracy of the data within the WASP database as well as the accuracy of the assumptions and estimations that have been used.

SCADA and Network Control

Compliance with Requirements of the Notice

The information provided shows the number of Essential Energy owned zone substation SCADA Remote Terminal Units ("RTU"s) that are currently in use, along with the number of AFLC plants installed.

Source of Information

This data has been obtained from:

- Essential Energy's WASP database using SQL.

- Firmware version dates, where WASP data has attracted a lower level of confidence.
- Grouping of data in Excel.

Assets captured in this category are those which have a sole purpose of providing SCADA and Network Control functionality to zone substations. Also included in this category are the AFLC plant assets which also reside in the ZSS environment. Assets used to provide communication services to pole top devices have not been included in this section and will be captured elsewhere.

Methodology & Assumptions

SQL logic:

- Includes assets categorised in WASP.
- Only Essential Energy assets included.
- Only In Service assets included.
- No age data is available for asset category, thus the Firmware version is utilised to obtain the installation date of the RTU.
- Actual dates of commissioning of AFLC plant where available, otherwise dates of manufacture of equipment, such as plant components or oldest surviving AFLC Relays deployed in the area, are used.

Use of Estimated Information

The age of the zone substation SCADA has been entirely estimated based on knowledge of the Firmware version dates and existing data in WASP.

In the case of AFLC plant, the age of the plant is based on known actual dates of commissioning as well as an estimated date of commissioning where records no longer exist. Estimated dates used are concurrent with any manufacturers' records, date stamping of equipment in service, and make/model/serial number series of the oldest AFLC Field relays deployed in the area covered by the AFLC plant in question.

In the case of AFLC plant, this has been successfully acknowledged previously and represents no departure from the methodologies used in previous RINs. In reality, as time progresses and new plant replaces these legacy plants, the variability in these estimations diminishes.

Reliability of Information

The reliability of this data is dependent on the accuracy of the data within the WASP database as well as the accuracy of the assumptions and estimations that have been used.

Other - Zone Substation Property

Compliance with Requirements of the Notice

The information provided shows the number of Essential Energy owned Zone Substation Sites that are currently in use.

Source of Information

This data has been obtained from Essential Energy's WASP database using SQL and grouping of data in Excel.

Methodology & Assumptions

SQL Logic:

- Includes assets categorised in WASP as “ZS 3 Site”.
- All owners are included.
- Only In Service assets included.
- Excludes types = Regulators, FI Plant, 11kV Switching Stations, Privately Owned, Other.
- Age is obtained from site’s commissioning year. If this is not available, then the year was estimated from either site drawings or child asset age.
- Those assets where age cannot be estimated are distributed across the existing asset age profile.

Use of Estimated Information

Where the age of the of the Zone Substation Sites is not recorded in WASP, it has been estimated based on knowledge of the network and existing data in WASP.

Reliability of Information

The reliability of this data is dependent on the accuracy of the data within the WASP database as well as the accuracy of the assumptions and estimations used.

Other - Zone Substation Batteries

Compliance with Requirements of the Notice

The information provided shows the number of Zone Substation Batteries that are currently in use.

Source of Information

This data has been obtained from Essential Energy’s WASP database using SQL and grouping of data in Excel.

Methodology & Assumptions

SQL Logic:

- Includes assets categorised in WASP as “ZS Battery”.
- All owners are included.
- Only In Service assets included.
- Age is obtained from site’s “Year of Manufacture”. If this is not available, then the Zone Substation Site’s “Commissioning Year” is used.
- Those assets with unknown ages are distributed across the existing asset age profile.

Use of Estimated Information

Where the age of the of the Zone Substation Battery or the Zone Substation Site is not recorded in WASP, it has been estimated based on knowledge of the network and existing data in WASP.

Reliability of Information

The reliability of this data is dependent on the accuracy of the data within the WASP database as well as the accuracy of the assumptions and estimations used.

Other - Zone Substation Current Transformers

Compliance with Requirements of the Notice

The information provided shows the number of Zone Substation Current Transformers that are currently in use.

Source of Information

This data has been obtained from Essential Energy's WASP database using SQL and grouping of data in Excel.

Methodology & Assumptions

SQL Logic:

- Includes assets categorised in WASP as "ZS Current Transformer".
- All owners are included.
- Only In Service assets included.
- Age is obtained from site's "Year of Manufacture". If this is not available, then the Zone Substation Site's "Commissioning Year" is used.
- Those assets with unknown ages are distributed across the existing asset age profile.
- Exclude those with Type = "LV Typroid".

Use of Estimated Information

Where the age of the of the Zone Substation Current Transformer or the Zone Substation Site is not recorded in WASP, it has been estimated based on knowledge of the network and existing data in WASP.

Reliability of Information

The reliability of this data is dependent on the accuracy of the data within the WASP database as well as the accuracy of the assumptions and estimations used.

Other - Zone Substation Voltage Transformers

Compliance with Requirements of the Notice

The information provided shows the number of Zone Substation Voltage Transformers that are currently in use.

Source of Information

This data has been obtained from Essential Energy's WASP database using SQL and grouping of data in Excel.

Methodology & Assumptions

SQL Logic:

- Includes assets categorised in WASP as "ZS Voltage Transformer".
- All owners are included.
- Only In Service assets included.
- Age is obtained from site's "Year of Manufacture". If this is not available, then the Zone Substation Site's "Commissioning Year" is used.
- Those assets with unknown ages are distributed across the existing asset age profile.

Use of Estimated Information

Where the age of the of the Zone Substation Voltage Transformer or the Zone Substation Sites is not recorded in WASP, it has been estimated based on knowledge of the network and existing data in WASP.

Reliability of Information

The reliability of this data is dependent on the accuracy of the data within the WASP database as well as the accuracy of the assumptions and estimations used.

Other - Zone Substation Surge Diverters

Compliance with Requirements of the Notice

The information provided shows the number of Zone Substation Surge Diverters that are currently in use.

Source of Information

This data has been obtained from Essential Energy's WASP database as well as some estimation.

Methodology & Assumptions

SQL Logic:

- Includes assets categorised in WASP as "ZS Surge Diverter".
- All owners are included.
- Only In Service assets included.
- Age is obtained from Surge Diverter's "Commissioning/Install Date".
- Those assets with unknown ages are distributed across the first 24 years of the existing asset age profile (based on replacement every 24 years).
- 11 and 22kV arresters are not kept in WASP as ZS Surge Diverters but instead are determined by the number of outdoor ZS Circuit Breakers.

Use of Estimated Information

Where the age of the of the Zone Substation Surge Diverter is not recorded in WASP, it has been estimated based on knowledge of the network and existing data in WASP.

Reliability of Information

The reliability of this data is dependent on the accuracy of the data within the WASP database as well as the accuracy of the assumptions and estimations used.

During 2017-18, an audit and asset cleanse was undertaken for ZS Surge Diverters, resulting in the change in trend from previous years.

Other - Zone Substation Protection Relays

Compliance with Requirements of the Notice

The information provided shows the number of Essential Energy owned Zone Substation Protection Relays that are currently in use.

Source of Information

This data has been obtained from Essential Energy's WASP database using SQL and grouping of data in Excel.

Methodology & Assumptions

SQL Logic:

- Includes assets categorised in WASP as "ZS 4 PC Circuit".
- Only Essential Energy assets included.
- Only In Service assets included.
- No age data is available for asset category, thus the age profile for >33kV Switchgear has been used to estimate age.

Use of Estimated Information

The age of the Zone Substation Protection Relays have been entirely estimated based on knowledge of the network and existing data in WASP.

Reliability of Information

The reliability of this data is dependent on the accuracy of the data within the WASP database as well as the accuracy of the assumptions and estimations used.

Other - Type 5 & 6 Meters Installed

Compliance with Requirements of the Notice

The information provided shows the number of Essential Energy owned Type 5 & 6 Meters Installed.

Source of Information

Data has been sourced from Essential Energy's EDDiS database using SQL and grouping of data in Excel.

Methodology & Assumptions

Age profiles for metering equipment are useful in determining potential replacement or maintenance activities and resultant expenditure.

Type 5 & 6 Meters Installed provides Essential Energy's best estimate of the age profile of Essential Energy's installed metering assets based on the year of installation. Estimation is required due to some data losses during the amalgamation of legacy organisations over such a long period of time.

Installation information on years >2002 is accurate due to information being available in systems.

The meter install data shows meters installed by calendar year, eg. 2017-18 shows meters installed in the 2018 calendar year.

Use of Estimated Information

This table contains estimated information.

Reliability of Information

The reliability of the data in this table is dependent on the accuracy of the data within the EDDiS database and the assumptions and estimations that have been used. Caution should be applied if using this data for benchmarking or decision making purposes.

Economic Life (years)

Mean

The data compiled in this column represents the economic life of the assets reported upon in this table. It is based on the data reported in the 2013-14 Category Analysis RIN, which in turn came from Essential Energy's Revenue Roll Forward Model as approved by the AER. Essential Energy believes that the data is reliable and will be updating it for the next regulatory period.

Standard Deviation

The data in this column represents the square root of the data in the "Mean" column. This method of deriving the standard deviation was noted as one possible method in section 5 "Replacement capex" (page 51) in the AER's Explanatory Statement to the Category Analysis RIN, issued March 2014.

Worksheet 5.3 - MD - Network level

Table 5.3.1 – Raw and Weather Corrected Coincident MD at Network Level (Summed at transmission connection point)

Compliance with Requirements of the Notice

In order to provide the actual loads for 2017-18, the Winter of 2017 and the Summer of 2017-18 were used, which included the periods from April 1st 2017 to March 31st 2018. An example of the reasoning behind this method is where there is a very high load Winter, with a large peak in June and another in July. A financial year split will count these events as occurring in two separate years, such that the data misses the previous and next Summer peaks. Essential Energy does not consider the use of financial years to be adequate for use in forecasting.

Source of Information

The data is based on the maximum network demand as per the Annual Regulatory Accounts and what was reported in the Economic Benchmarking RIN.

The network level maximum demand is sourced from the half hourly Bulk Supply Point and Embedded Generator NMIs (from EDDiS via Spotfire).

Methodology & Assumptions

The maximum network demand is determined by the sum of Essential Energy's Bulk Supply Points, Cross Border Supplies, and the inclusion of the Embedded Generators load at a half hourly level. From the half hourly data, the Maximum Demand is determined with the date and time recorded. The actual dates and times of the occurrence have been reported in this table.

Private zone substation loads were not included in the zone substation figures.

The figures provided for the Weather Corrected 10% and 50% POEs network coincident MDs is as per EB RIN Table 3.4.3.2 "Annual system maximum demand characteristics at the transmission connection point – MW measure", rows DOPSD0111 and DOPSD0112, which are based on the ratio of non-coincident peak demand to non-coincident weather corrected peak demand (ie. DOPSD0107, DOPSD0108 and DOPSD0109).

Use of Estimated Information

Actual data was used for determining the maximum demand, generation and applicable dates.

The Weather corrected 10% and 50% POEs are defined as estimated due to the input requirements of the calculations performed. The main variables that influence the POE calculation for each site include:

- The number of years of historical data used – some sites use less than the full dataset due to network configuration changes.
- The primary weekdays used – many sites have a variation between their weekday and weekend loads, others are consistent every day.
- The weather station used – most sites use the closest weather station, but some correlate better to stations further away and some station data is unreliable.
- The data points used – each site has a unique list of data points used to calculate the site totals. These can change each year due to metering issues or site reconfiguration.

- Outliers – days that include switching or poor metering data are excluded.

Reliability of Information

The maximum demand information is considered reliable.

Worksheet 5.4 - MD & utilisation-Spatial

Table 5.4.1 - Non-Coincident & Coincident Maximum Demand

Compliance with Requirements of the Notice

Substation Definition
Any substation (or a part of a substation) that transforms voltages that supply subtransmission networks (33kV and above), have been included as a subtransmission substation ("STS"). Any substation that transforms voltages (from 33kV and above) that supply distribution networks (33kV and below) have been included as a zone substation ("ZS").

Substation Rating
The AER definition of "Normal cyclic rating (for substations)" is "The maximum peak daily loading based on a given load cycle that a substation can supply each day of its life under normal conditions resulting in a normal rate of wear".

Essential Energy defines the rating of a substation to meet the above definition to be 110% in Summer and 120% in Winter of the combined nameplate rating of all transformers within the substation. For example, based on a Summer peak load, if the substation only has one transformer the substation rating will be 110% of the nameplate rating of that transformer, or if it has two or more transformers that can be used simultaneously to supply the load, the substation rating will be 110% of the combined nameplate rating of all the transformers.

Source of Information

The individual STS data was obtained from demand meters (via IMDR). The individual zone substation data was obtained from demand meters (via IMDR) and from SCADA (via TrendSCADA).

Methodology & Assumptions

MW and MVA
There is a simple relationship between components of supplied electrical power, including MW, MVAr, MVA and pf. Some of these components include MW, MVAr, MVA and pf. These values can be calculated when two or more components are known by using fundamental equations for electrical properties. MW is the real power supplied, MVAr is reactive power, MVA is apparent power and pf is the power factor. The two most relevant equation for this section are to calculate the pf and determining MVA from MW and MVAr
The equation for determining pf is:

$$\frac{MW}{MVA} = pf$$

In this equation power factor equals a value between 0 and 1, so MVA is always equal to or greater than MW.
To calculate MVA from MW and MVAr, the equation is:

$$MVA = SQRT(MW^2 + MVAr^2)$$

The data measured is typically MW and MVAr, so this equation is used to determine the MVA for each site. The summation of MVA also uses this equation, where the sum of MW and sum of MVAr are determined. This equation is then used to calculate the MVA sum.

Change to timing arrangements
In order to provide the actual loads for 2017-18, the Winter of 2017 and the Summer of 2017-18 was used, which included loads from April 1st 2017 to March 31st 2018. An example of the reasoning behind this method is where there is a very high load Winter, with a large peak in June and another in July. A financial year split will count these events as occurring in two separate years, so the data misses the previous and next Summer peaks. Essential Energy does not consider the use of financial years to be adequate for use in forecasting.

Raw Adjusted MD

- **Non – coincident Maximum Demand**
  The vast majority of STSs and ZSs have reliable data recording devices. A minor number of the very small ZSs have limited methods to record the peak demand such as recloser data or maximum demand indicators from which maximum demand has been derived. The raw data from each substation is collated into a common format and is compared against network configuration changes and filtered where an absence or abnormality is present. The peak demand is then screened and further cleansed if required to eliminate abnormal peaks to determine the true peak demand.
- **Coincident Maximum Demand**
  The raw coincident maximum demand for the 2017-18 year was extracted from each site after it was compiled into the common format required for screening the non-coincident maximum demand.
- **Adjustments – Embedded Generation**
  Only discrete embedded generation units that impact the demand of the STSs or ZSs are included in the table. Rooftop photovoltaic generation is not shown as its impact is included in the actual and forecast demand of the individual ZSs. There are other discrete generation units that connect via Essential Energy's subtransmission network to a TNSP's connection point but they have no impact on the demand of Essential Energy owned STSs or ZSs.
- **Non-Coincident Weather Corrected MD**
  The weather corrected data for 50% POE or 10% POE has been calculated for the vast majority of STSs and ZSs based on the nationally consistent methodology of using regression with historical local temperature data. A very small number of sites did not have sufficient history of demand data to accurately produce POE values. The raw adjusted MD was used where POE data could not be produced.
- **Coincident Weather Corrected MD**
  Coincident weather correction is based on the ratio of non-coincident peak demand to non-coincident weather corrected peak demand.
- **Date MD Occurred**
  The date and time of the coincident and non-coincident peak demands were identified during data extraction, where the peak MW and corresponding MVA demand was recorded in this table. Several sites have been identified where the raw adjusted MVA maximum demand occurred at a different time to the raw adjusted MW maximum demand. These situations occur when the site is not quite at the MW peak and the loads have a worse total power factor than at the peak MW time, resulting in a higher MVA than at the peak MW time.

Subtransmission and Zone Substations with MVA Peak different to MW Peak		
Substation	**Non-Coincident MVA Peak**	**Date and Time of MVA Peak**
Ballina 132kV	22.776	10/10/2017 18:00
Bundarra	1.224	23/08/2017 7:00
Bethungra	0.997	31/08/2017 17:00

Subtransmission and Zone Substations with MVA Peak different to MW Peak		
Substation	**Non-Coincident MVA Peak**	**Date and Time of MVA Peak**
Burren Junction	2.3	19/12/2017 19:00
Burren Junction	2.3	17/12/2017 18:00
Bourke 33kV	2.927	10/01/2018 19:00
Bombala	4.771	8/08/2017 8:30
Boorowa	3.236	7/01/2018 17:00
Brogo	0.713	8/02/2018 19:30
Bellata	1.02	10/01/2018 18:30
Byabarra	1.541	8/01/2018 16:30
Cobar CSA	22.466	11/01/2018 15:00
Cobar Elura	10.395	23/03/2018 9:30
Cobar Peak	13.106	17/02/2018 20:30
Cooma 11kV	12.735	27/06/2017 9:30
Cudgen 33kV	10.344	14/02/2018 19:00
Darlington Point	4.467	19/12/2017 19:30
Eucumbene	0.704	31/08/2017 15:00
Ginkgo	6.529	7/06/2017 7:00
Grafton North	32.594	20/04/2017 15:30
Kywong	0.679	31/08/2017 16:00
Leeton	19.623	8/02/2018 16:00
Murgha	0.685	19/03/2018 15:00
Morrow St	14.041	19/12/2017 14:00
Mt Gipps 33kV	1.113	10/02/2018 19:30

Subtransmission and Zone Substations with MVA Peak different to MW Peak		
Substation	**Non-Coincident MVA Peak**	**Date and Time of MVA Peak**
Murrami	1.266	17/05/2017 8:30
Oura 66/11kV	3.768	23/01/2018 18:00
Providence Portal	0.32	18/02/2018 8:00
Prince St	9.074	14/02/2018 14:00
Paytens Bridge	5.145	7/01/2018 17:30
Quirindi 66/11kV	6.703	22/01/2018 18:00
Ringwood Road	2.208	23/01/2018 11:30
Talbingo	1.292	26/03/2018 12:00
Thredbo	14.562	12/07/2017 8:00
Tweed Heads South	14.509	2/01/2018 13:30
Uranquinty	5.025	23/01/2018 17:00
Willbriggie	1.964	17/03/2018 16:00
Woodburn	6.601	14/02/2018 18:30
Woodlawn	11.935	16/05/2017 18:30
Wee Waa	9.772	9/01/2018 18:00
Yanco 33/11kV	2.482	20/01/2018 19:00
Yarrandale	8.058	12/01/2018 14:00

Changes to sites reported

Marulan South is a new zone substation to replace the old Marulan South zone substation.

Winter/Summer Peaking

Essential Energy defines the seasons as between 1st April and 30th September for Winter, and 1st October to 31st March in the following year for the Summer period.

Use of Estimated Information

Refer to the Methodology and Assumptions section above for the use of estimated information.

The Weather corrected 10% and 50% POEs are defined as estimated due to the input requirements of the calculations performed. The main variables that influence the POE calculation for each site include:

- The number of years of historical data used – some sites use less than the full dataset due to network configuration changes.
- The primary weekdays used – many sites have a variation between their weekday and weekend loads, others are consistent every day.
- The weather station used – most sites use the closest weather station, but some correlate better to stations further away and some station data is unreliable.
- The data points used – each site has a unique list of data points used to calculate the site totals. These can change each year due to metering issues or site reconfiguration.
- Outliers – days that include switching or poor metering data are excluded.

Reliability of Information

Most data for the 2017-18 year has been gathered from raw metering data and is therefore considered to be reliable.

Worksheet 6.3 - Sustained interruptions

Table 6.3.1 – Sustained interruptions to supply

Compliance with Requirements of the Notice

Data has been reported in accordance with the definitions provided in the Category Analysis RIN and the AER's Service Target Performance Incentive Scheme (STPIS) unless otherwise specified in the Methodology & Assumptions section below.

Source of Information

Data is sourced from PowerOn Fusion and calculations managed in an Access database. PowerOn makes up the central modules of Essential Energy's power Distribution Management and Outage Management Systems (DMS/OMS).

The spreadsheet used to collate the data is named "RIN Tables Workpapers 17-18".

The mapping of the Essential Energy cause list to the AER RIN cause list is contained in the APR database table "ENA Cause List". Additional updates for Detailed Reasons are through queries "RESET RIN Interruptions List 1-7".

Methodology & Assumptions

The data has been collected and collated in line with the Category Analysis RIN Instructions and Definitions guidance issued by the AER. Customer numbers include active NMIs with an active or inactive account. This is the way data has been collected and stored since PowerOn Fusion went live in November 2012.

The procedure is as follows:

- Run Monthly and View SCS Summary Report 3/4 Regions – forms the base for this table query.
    - This query collates outages by feeder.
- Using the group of RESET RIN Interruptions List 1-8 queries:
    - RESET RIN Interruptions List 1: collates all outages by feeder and maps interruption cause data to the AER RIN cause list.
    - RESET RIN Interruptions List 2: updates the Detailed Reason for Interruption where:
        - Cause = Asset failure; Network Type = Zone Sub, then Detailed Reason = Zone substation
        - Cause = Asset failure; Network Type = Distribution - HV, then Detailed Reason = HV
        - Cause = Asset failure; Network Type = Distribution - LV, then Detailed Reason = LV
        - Cause = Asset failure; Network Type = Sub Transmission, then Detailed Reason = Subtransmission
        - Cause = Asset failure; Transgrid = Y, then Detailed Reason = blank
        - Cause = Asset failure; Equipment Type = Transformer – Distrib Failed, then Detailed Reason = Distribution substation
        - Cause = Asset failure; Equipment Type = Transformer – Distribution, then Detailed Reason = Distribution substation
        - Cause = Asset failure; Zone Sub = Y, then Detailed Reason = Zone substation
        - Cause = Asset failure; Subtransmission = Y, then Detailed Reason = Subtransmission

- RESET RIN Interruptions List 3: updates Reason for Interruption where:
    - Transgrid = Y, then Detailed Reason = 5 - STPIS Exclusion (3.3)(a)
- RESET RIN Interruptions List 4: updates Detailed Reason for Interruption where:
    - Cause = Asset failure; Equipment Type = ‘includes *LV*, then Detailed Reason = LV
- RESET RIN Interruptions List 5: updates Reason for Interruption and Detailed Reason for Interruption where:
    - Outage Type = Planned, then Cause = Planned and Detailed Reason = blank
- RESET RIN Interruptions List 6: updates Reason for Interruption where:
    - Outage Type = Unplanned; Cause = Planned, then Reason = Other
- RESET RIN Interruptions List 7: rolls up customers affected and customer minutes lost by outage and feeder.
- RESET RIN Interruptions List 8: calculates SAIDI and SAIFI per outage and feeder based on feeder categories using the average customer base.
- Effect on SAIDI and SAIFI can be cross-referenced with sheet “17-18 Data”:
- Total Unplanned when filtered by Feeder Classification
- Normalised when filtered by Feeder Classification, MED = N and Reason for Interruption <> 5 – STPIS Exclusion (3.3)(a)

Please note, in column F of the table, detailed descriptions of reasons for interruptions with a reason of “Other” are not able to be entered as the template does not allow it.

Use of Estimated Information

Not applicable, as only actual information has been used.

Reliability of Information

Information has been sourced from current systems and management is comfortable that the information is reliable.