Basis of Preparation

Category Analysis RIN 2019-20

October 2020

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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. It must be a separate document (or documents) that Essential Energy submits with its completed information templates.

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

Table 1 – Requirements of the Basis of Preparation

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.
5	For variables that contain financial information (actual or estimated) the relevant Basis of Preparation must explain if accounting policies adopted by Essential Energy have materially changed during any of the Regulatory Years covered by the Notice: > the nature of the change; and > the impact of the change on the information provided in response to the Notice. 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 Templates. In relation to providing an audit opinion or making an attestation report on the Templates presented by Essential Energy, an auditor or assurance practitioner shall provide an opinion or attest by reference to Essential Energy's Basis of Preparation.

When carrying out an audit or review, an auditor or assurance practitioner shall have reference to Essential Energy's Basis of Preparation.

Structure of this Document

This document is structured as follows:

> Essential Energy addresses the issue of data reliability, explains the general approach to developing the RIN response and the use of estimates in completing the Category Analysis RIN. A table of estimated data contained in the Category Analysis RIN templates is included – see Table 2.

> 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.

General Approach

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. Essential Energy has actual data with which to complete many of the information tables in this RIN, but where such data is not available, information templates will be completed with estimated data.

Whilst the business continues moving toward more accurate reporting for the RINs and is currently looking to update ERP and Asset Management systems which will contribute to further improvement, in the meantime 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.

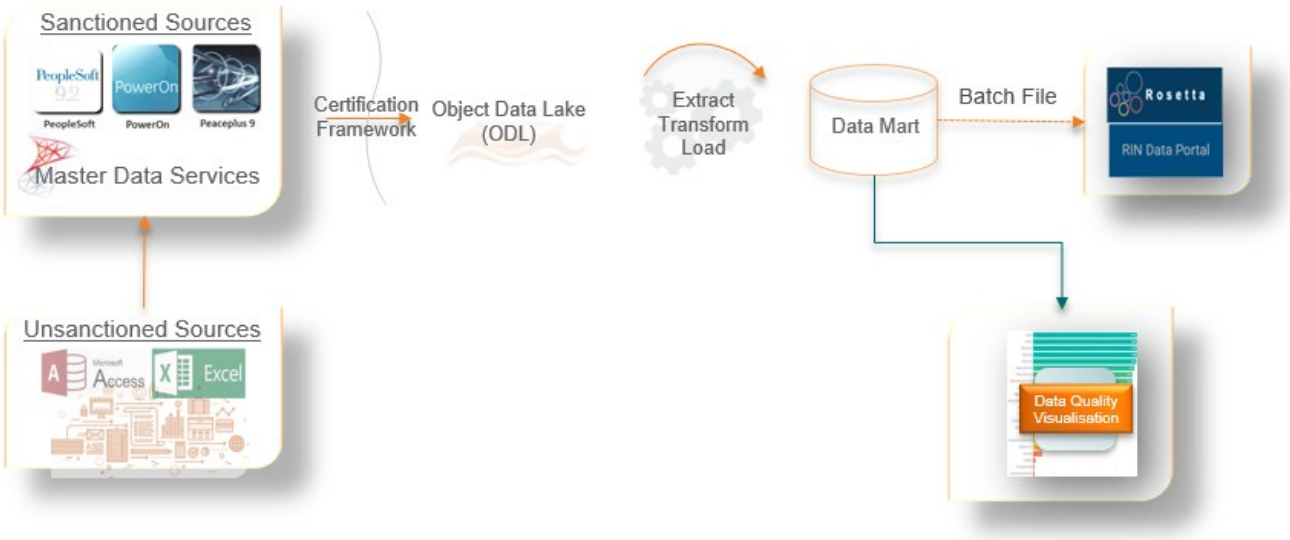
Systems Used to Provide Data

Essential Energy's RIN Optimisation project aims to automate the population of some RIN tables. During this project, the required source data was classified as one of two types, sanctioned and unsanctioned.

Sanctioned data is data available from established databases and source systems such as PeopleSoft, PEACE, WASP, etc. Unsanctioned data is sourced from Excel, Access DB, Text files, etc. Wherever a source was identified as unsanctioned, it was tagged for loading to enable certification of the data load.

This scalable automation framework will feed into a continuous improvement process seeking to build confidence in the quality of the data and minimise the risk of submitting incorrect information.

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.



The transformation logic and business rules used to populate the RINs were captured and documented by the project team. The logic and the rules applied was reviewed and signed-off on by the various data owners across the business. All data is certified during loading and no uncertified raw data inputs are used.

Once transform logic is applied to the loaded data, the results are stored in a RIN Data Mart which also tracks history, so that any updates or amendments are tracked accordingly. There is an adjustment framework to cater for any adjustments to previously loaded data, which ensures full traceability and auditing.

Data is loaded from the RIN Data Mart into Rosetta, an independent application used by Essential Energy to populate RIN tables. Data for non-automated RIN tables is entered directly into Rosetta. Rosetta has review and approval functionality, requiring organisational managers to review and approve assigned completed RIN tables.

Once all approvals have been completed, the data is exported from Rosetta into Excel RIN templates and checked for classification into actual or estimate prior to submission to the AER.

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.

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	RIN Sheet	Table Number	Table Name
CA RIN	2.2 Repex	Table 2.2.1	Replacement Expenditure, Volumes and Asset Failures by Asset Category
CA RIN	2.3(b) Augex	Table 2.3.3	Augex Data – HV/LV Feeders and Distribution Substations
CA RIN	2.3(b) Augex	Table 2.3.4	Augex Data - Total Expenditure
CA RIN	2.5 Connections	Table 2.5.1	Descriptor Metrics
CA RIN	2.5 Connections	Table 2.5.2	Cost Metrics by Connection Classification
CA RIN	2.6 Non-network	Table 2.6.1	Non-network expenditure
CA RIN	2.7 Vegetation management	Table 2.7.2	Expenditure Metrics by Zone
CA RIN	2.8 Maintenance	Table 2.8.2	Cost Metrics for Routine and Non-Routine Maintenance
CA RIN	2.9 Emergency Response	Table 2.9.1	Emergency Response Expenditure (Opex)
CA RIN	2.10(A) Overheads	Table 2.10.1	Network Overheads Expenditure
CA RIN	2.10(A) Overheads	Table 2.10.2	Corporate Overheads Expenditure
CA RIN	2.12 Input tables	Table 2.12.1	Input tables
CA RIN	4.1 Public lighting	Table 4.1.2	Descriptor Metrics Annually
CA RIN	4.2 Metering	Table 4.2.2	Cost Metrics
CA RIN	4.3 Fee-based services	Table 4.3.1	Cost Metrics
Annual RIN Addendum	2.2 Repex	Table 2.2.1	Replacement expenditure, volumes and asset failures by asset category
Annual RIN Addendum	2.5 Connections	Table 2.5.2	Cost metrics by connection classification
Annual RIN Addendum	2.6 Non-network	Table 2.6.4	Information & Communications Technology – Capex by purpose

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 RIN templates reconcile to the 2019-20 Annual 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 2019-20 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 2019-20 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 2019-20 financial information in the RINs is a reasonably accurate representation of the 2019-20 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 2019-20 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 as shown in AR RIN Tables but splitting out the overhead components using resource categories. Data has been sourced from PeopleSoft, including the GL module and the AM module. It has then been enriched to enable classification into the regulatory categories. Refer to the BOP for the AR RIN Capex schedules 8.2.1 for further details.

Methodology & Assumptions

As described above. The data model used for overall capex reporting has been applied with the overhead components separated for disclosure, based on the resource categories included in the transactional data. Refer to the BOP for the AR RIN Capex schedules 8.2.1 for further details.

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.

Table 2.1.2 – Standard control services opex

Compliance with Requirements of the Notice

This section contains summary data of the 2019-20 Opex for Standard Control Services, broken up into direct expenditure for various categories, network and corporate overheads and non-network expenditure. It also contains a balancing item which equals the Non-Network Expenditure amount as this is also included in Network and Corporate Overheads amounts.

Source of Information

This table was derived using data sourced from the Peoplesoft General Ledger, analysed and classified using a CAM methodology. Some adjustments were applied to the Peoplesoft data.

The 2019-19 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

The data is classified into business units using a CAM methodology. The amounts are then allocated to regulatory categories using the Project tree (using project types) and resource categories (to identify overhead components). Non-network data was sourced from Category Analysis RIN Table 2.6.

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.

Table 2.1.3 – Alternative control services capex

Compliance with Requirements of the Notice

This section contains summary data of the 2019-20

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. Refer to Category Analysis RIN Table 2.1.1

Methodology & Assumptions

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. Refer to Category Analysis RIN Table 2.1.1

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.

Table 2.1.4 – Alternative control services opex

Compliance with Requirements of the Notice

This section contains summary data of the 2019-20 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. Refer to Category Analysis RIN Table 2.1.2

Methodology & Assumptions

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. Refer to Category Analysis RIN Table 2.1.2

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.

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	All	Yes	No	No
WASP	All	No	Yes	No
Network Planning Database (NPDB)	All	Yes	No	No
Network Asset Failure report (A DB merger of WASP, eMWL & Pole Failure DB)	Staked Poles, Poles, Pole Top Structures, OH Conductors, UG Cables, Service Lines, Transformers, Switchgear	No	No	Yes
GIS Smallworld	OH Conductors, UG Cables	No	Yes	No
Project Online	SCADA, Network Control & Protection Systems	No	Yes	Yes
ROE Device List	SCADA, Network Control & Protection Systems	No	Yes	Yes
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

2019-20 actual expenditure information was sourced from Peoplesoft using project accounts and applied directly to the public lighting and SCADA related Asset Categories in Table 2.2.1:

The remaining asset categories in Table 2.2.1 do not specifically exist in Peoplesoft and the NPDB 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 estimated replacement capital unit rates or the WASP estimating and packaging tool assembly unit rates.

All Asset Replacements

Asset replacement units were sourced from completed Work Task records in the WASP database except for Overhead Conductors and Underground Cables which are queried from GIS Smallworld and SCADA, Network

Control & Protection Systems group replacements which are queried from a combination of Project Online, ROE Device List, Trio Diagnostics & Service Manager records.

All Asset Failures

Failure numbers were based on data records from the Network Asset Failure Report (NAFR) which is a database merger of WASP, Electronic Maintenance Worklog (eMWL) and Pole Failure DB.

Only Functional[1] failures with Unassisted causes have been included in accordance with the *Asset failure (REPEX)* definition outlined in pp 84 of the *Regulatory Information Notice*[2] instructions issued under *Division 4 of Part 3 of the NEL*. The Primary Cause recorded against each Functional failure determines whether if it is Unassisted or Assisted

For SCADA and Telecommunications, the source of Failure numbers comes from analysis of logs held in VFire

Poles

Staking Wooden Poles (Replacements)

- 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"

If Pole Voltage = "Unknown", then classify as "< 1kV & <= 11 kV".

Staking Wooden Poles (Failures)

- Due to the introduction of the *2.2 REPEX Addendum* in the CA RIN, Essential Energy has chosen not to report poles that failed whilst staked in the Staking Wooden Poles section going forward but instead in the Staked Pole Replaced With New Pole.

Poles (Replacements)

- Replacement data has been based on a count of the following completed WASP work tasks in Repex projects and did not have a pole stake component at the time of the replacement:
  - "Pole - Condemned – Replace"
  - "Pole - Replace - System Alteration"
  - "Pole – Install Additional"
  - "Pole – Install"
  - "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.
- Private poles have been excluded except for those managed and maintained by Essential Energy.
- Bollard/guy pole replacements are included in Other Poles group category
- If Pole Material = "Unknown", then classify as "Wood".
- If Pole Voltage = "Unknown", then classify as "< 1kV & <= 11 kV".

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

2 The failure of an asset to perform its intended function safely and in compliance with jurisdictional regulations, not as a result of external impacts such as: • extreme or atypical weather events; or • third party interference, such as traffic accidents and vandalism; or • wildlife interference, but only where the wildlife interference directly, clearly and unambiguously influenced asset performance; or • vegetation interference, but only where the vegetation interference directly, clearly and unambiguously influenced asset performance. Excludes planned interruptions.

Poles (Failures)

- Includes any Unassisted pole failure of a pole managed and maintained by Essential Energy that did not have a stake component at the time of failure.
- Data has been sourced from the Network Asset Failure Report. 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 (Replacements)

- Replacement data has been based on a count of the following completed WASP work tasks in Repex projects:
  - "Crossarm – Replace"
  - "Crossarm – Upgrade"
  - "Poletop – replace construction"
  - "Crossarm – Install Longer Crossarm"
  - "Crossarm – install"
  - "Pole – Replace Pole Top Bracket"

Pole Top (Failures)

- Includes any Unassisted of failure of a critical structural support holding overhead conductors atop a pole i.e. crossarm, steel brackets, vertical delta brace construction etc.
- Data has been sourced from the NAFR. The data is populated from several different sources and audited monthly.
- Private pole top failures have been excluded except for those managed and maintained by Essential Energy.

Overhead Conductors & Underground Cables

Conductor/Cables (Replacements)

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

Conductor/Cable (Failures)

- Failure data has been based on a count (units, not km) of all NAFR records representing Unassisted failure records of the conductor or cable body or critical inline joins and terminations that form part of the circuit.
- Private conductor and cable failures have been excluded except for those managed and maintained by Essential Energy.

Service Lines

Service Line (Replacements)

- 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, i.e.. 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, e.g. 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.

Service Line (Failures)

- Failure data has been based on a count (units, not km) of all NAFR records representing Unassisted service failures, both overhead and underground types.
- Private service failures have been excluded except for those managed and maintained by Essential Energy.

Transformers

Transformer (Replacements)

- 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"
- 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 assigned to *Single-Phase*.
- *Pole Mounted; Other (> 22kV); < = 60kVA; Single-Phase* transformers have been counted in the *Pole Mounted; < = 22kV ; < = 60 kVA ; Single Phase* category.
- *Pole Mounted; Other (> 22kV); > 60kVA and < = 600kVA; Single-Phase* transformers have been counted in the *Pole Mounted; < = 22kV; > 60 kVA and < = 600 kVA ; Single Phase* category.
- *Pole Mounted; Other (> 22kV); < = 60kVA; Multiple-Phase* transformers have been counted in the *Pole Mounted; < = 22kV; < = 60 kVA ; Multiple Phase* category.
- *Pole Mounted; Other (> 22kV); > 60kVA and < = 600kVA; Multiple-Phase* transformers have been counted in the *Pole Mounted ; < = 22kV ; > 60 kVA and < = 600 kVA ; Multiple Phase* category.
- Regulator Transformers have been included in *Other* category.

Transformer (Failures)

- Failure data has been based on a count of all NAFR records representing Unassisted transformer tank only failures.
- Private transformer failures have been excluded except for those managed and maintained by Essential Energy.

Switchgear

Switchgear (Replacements)

- 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”
- “Substation - Replace HV Fuse Unit”
- “Substation - Replace LV Fuse Unit”
- Sub (pole mounted) – refurbishment”
- “ABS – Replace”
- “ABS – replace with Gas Switch”
- “ABS – upgrade to Gas Switch”
- “Gas Switch – Replace – Pole Top Mount”
- “Gas Switch - Replace - Buck Arm Mount”
- “Links – Replace”
- “OH HV fuse / link – install”
- “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”
- “Recloser – install”
- “Sub (pole mounted) – replace”
- “Load break switch – replace”
- “Load break switch – upgrade”
- “RMU - Overhaul Required”
- “Switchgear (oil insulated) – replace”
- “Switchgear (resin) – replace”
- “Switchgear (SF6) – replace”

Switchgear (Failures)

> Failure data has been based on a count of all NAFR records representing Unassisted switchgear assembly failures only.

> Private switchgears failures have been excluded except for those managed and maintained by Essential Energy.

Public Lighting

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

Asset Replacements

Luminaires	Sum of luminaire replacement tasks from the WASP report “ Streetlight Task Report 2019/2020”, filtered for task types that indicate replacements respectively. Split for major or minor, LED luminaires with wattage 45 or higher and non-LED luminaires with wattage 150 or higher (This rule has been deviated from in two instances, where the Essential Energy Luminaire Replacement Matrix indicates that a 90/100W and 135W Low Pressure Sodium lamp is used on Category V3 major roads, along with the 100W and 120W High Pressure Sodium lamps used on a Category V5 major road). For Minor Road Lighting - LED Luminaires with wattage less than 45 and non-LED luminaires with wattage less than 150 (deviation from this rule per above).
Brackets	Sum of replacement tasks from the WASP report “Streetlight Task Report FY2019-20” 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 “RIN_REPEX Dedicated SL Pole Replacements” (which contains data extracted from WASP), along with task data from “Streetlight Task Report FY2019-20” using the following process; The asset ID in the files provided (“RIN_REPEX Dedicated SL Pole Replacements”) are matched to asset IDs in the Streetlighting ‘All-assets’ inventory report. The inventory report contains data on luminaire PL Load Code (this data is not included in the pole data file provided). Split for major or minor, LED Luminaires with wattage 45 or higher and non-LED luminaires with wattage 150 or higher (This rule has been deviated from in two instances, where the Essential Energy Luminaire Replacement Matrix indicates that a 90/100W and 135W Low Pressure Sodium lamp is used on Category V3 major roads, along with the 100W and 120W High Pressure Sodium lamps used on a Category V5 major road). For Minor Road Lighting - LED Luminaires with wattage less than 45 and non-LED luminaires with wattage less than 150 (deviation from this rule per above). Costs and quantities are apportioned based on this split.

Asset Failures

Asset Type	Included in Totals
Luminaires	Failures are sourced from the “Streetlight Task Report FY2019-20” WASP report, based on task types that indicate an asset failure.
Brackets	Bracket failures are determined from task description ‘streetlight bracket repair’
Lamps	There are no volumes included in this section as expenditure on lamps is not considered to be Repex.
Poles	Failure data has been taken from the NAFR where a dedicated, Essential Energy managed and maintained, street light pole has failed Unassisted.

Expenditure

Total Repex expenditure for this category is taken from the Light Replacement Total Cost calculated in Table 4.1.2. This value excludes customer-funded bulk LED upgrades.

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 –a weighted average pole replacement cost was used based on 2019-20 pole usage data and standard installation costs sourced from the approved 2019-24 AER pricing model.
- Brackets – the unit rate was sourced from the approved 2019-24 pricing model.
- Luminaires – the weighted average cost per replacement task was calculated based on replacement volumes

Bulk Lamp LED replacement tasks are included in volumes for this section .

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 2019-20 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 2019-20 year.
- Property replaced is any site with significant spend during the 2019-20 financial year, from the planning database.
- Surge diverters replaced is the total of 132 + 66 + 33 replaced + 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

All non-financial units are actual.

Although most expenditure information is based on actual data some of the data splits and disaggregation of totals has been estimated. The information required for the asset categorisation in this table does not exist in the PeopleSoft or NPDB 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 asset types have been estimated, with the exception of public lighting and SCADA related expenditure which is actual and sourced from Peoplesoft.

Reliability of Information

Replacement expenditure, at an aggregate level, is considered to be reliable as it has been sourced from the 2019-20 Annual 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 (i.e.. 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”.
- The determination of the replacement being Repex is based on the primary AER driver of the project from the Network Planning Database

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 (e.g. Pole Substation) = 10kVA
- 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 based on actual data.

Reliability of Information

This data is considered reliable although Essential Energy acknowledge that data used for this table may not be perfect and some 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,

Methodology & Assumptions

No material projects are included in the 2019-20 RIN as there were no projects with total life of project expenditure greater than $5M that were major close in 2019-20.

The close date on Subtransmission projects, which typically span across multiple years, can have minimal expenditure in forward years beyond commission of asset. The closure of the project is not hindered if there is insignificant expenditure into a forward year.

All other projects with project expenditure over the total life of less than $5M and that have been closed in 2019-20 have been included in the non-material total line.

Financial amounts that were incurred in prior years have been inflated to $2019-20 using

Use of Estimated Information

All information is based on actual data.

Reliability of Information

The data in this table is considered reliable.

The conversion of past year project costs to 2020 real dollars has been completed using the following CPI Inflator Rate table

Base Year	FY18/19
2012/13	1.1398
2013/14	1.1201
2014/15	1.0933
2015/16	1.0668
2016/17	1.0509
2017/18	1.0377
2018/19	1.0178
2019/20	1.0000

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

Methodology & Assumptions

No material projects are included in the 2019-20 RIN as there were no projects with total life of project expenditure greater than $5M that were closed in 2019-20.

The close date on Subtransmission projects, which typically span across multiple years, can have minimal expenditure in forward years beyond commission of asset. The closure of the project is not hindered if there is insignificant expenditure into a forward year.

All other projects with project expenditure over the total life of less than $5M and that have been closed in 2019-20 have been included in the non-material total line.

Financial amounts that were incurred in prior years have been inflated to $2019-20using the appropriate 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.

The conversion of past year project costs to 2020 real dollars has been completed using the following CPI Inflator Rate table

Base Year	FY18/19
2012/13	1.1398
2013/14	1.1201
2014/15	1.0933
2015/16	1.0668
2016/17	1.0509
2017/18	1.0377
2018/19	1.0178
2019/20	1.0000

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.

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

All information is based on actual data.

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 and considered reliable.

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.

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, however all information is based on actual data.

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 opening sections of this Basis of Preparation for details on our RIN Optimisation process and finance data prepared for multiple tables in the RIN. Section 3 of this Basis of Preparation discusses the sourcing of financial

information used to prepare the data. The specific methodology and assumptions made for this table are outlined below.

Source of Information

Source data was from the Operational Data Lake and is also used in the process of collating the data for the Annual Reporting RIN.

Methodology & Assumptions

Information was sourced from the ODL and split between Augex and Repex by the various asset categories. This data is also used in the collation of data for the Annual 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.

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 considered reliable.

Table 2.3.4 – Augex Data – Total Expenditure

Compliance with Requirements of the Notice

Refer to opening sections of this Basis of Preparation for details on our RIN Optimisation and finance data prepared for multiple tables in the RIN. Section 3 of this Basis of Preparation discusses the sourcing of financial information used to prepare the data. The specific methodology and assumptions made for this table are outlined below.

Source of Information

Data is sourced from the ODL which includes enriched capital expenditure transactions through a RIN Optimisation process (Section 2), and which attaches relevant attributes relating to the expense journal item. This allows each expense item to be classified by RIN Purpose and RIN asset category (which is based on the asset profile). Asset profiles are mainly derived from project types assigned to each project, or estimates (WASP) which split the planned work into the assets to be created, or Activities for Project on Line projects and where the project type does not apply to a specific expense type within the project. The approach is consistent with that used for 2.1 and collating Capex data for the Annual Reporting RIN.

Methodology & Assumptions

All direct expenditure on network system projects which have a project justification type that relates to augmentation are included in the total of table 2.3.4. The RIN asset categories are derived through mapping of the asset profiles (lowest asset classification within our fixed asset register) to the RIN Asset categories relevant to the table. The total of all line items to the Annual Reporting RIN for 2019-20

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, resource categories and derived asset profiles have been used for the data splits and disaggregation of totals.

Reliability of Information

The data in this table is considered reliable.

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 Residential, 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
PEACE	> Premise's with Creation Date in the Financial Year > Premise's Residential/Commercial flag. > All embedded generation sites with Application Date and Installation Date I the financial year
Smallworld	> Premises connection to the Underground or Overhead network. > 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 an attribute against the Premise in Peace.

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

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

Use of Estimated Information

Essential Energy has used estimated information for premises where Residential/Customer or Overhead/Underground could not be determined.

An estimate was required in the following cases:

- Where Residential/Commercial could not be determined. Premise data is historical where status data is current. Premises may have become extinct, but exist historically, therefore no Residential/Commercial value can be determined.
- Premises have no network connect therefore no Overhead/Underground value can be determined.
- The project was not found in GIS Smallworld.
- All premises where the Overhead/Underground or Commercial/Residential status could not be determined were deemed "Unknown". The Unknowns were distributed across all categories based on the ratio of the known premises.
- 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.

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

Source of Information

System	Data
Salesforce	HV Customer details – connection type, size, and connection date

Methodology & Assumptions

The information in this table is a summation of table 2.5.1 and therefore uses the same underlying methodology and assumptions.

HV Connections – standard control services

Total new HV Connections were determined by the number of premises by size and type of connection with a creation date in the financial period.

Use of Estimated Information

Essential Energy has used estimated information for this table.

Reliability of Information

The data used for determining the overall quantities into categories is 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 Peoplesoft and workfiles prepared for the 2019-20 Annual RIN.

Opex data was sourced from PeopleSoft.

Methodology & Assumptions

Refer to opening sections of this Basis of Preparation for details on our RIN Optimisation and finance data prepared for multiple tables in the RIN. Section 3 of this Basis of Preparation discusses the sourcing of financial information used to prepare the data.

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 2019-20 was sourced from the 2019-20 Annual RIN. A listing of fleet capex by project (vehicle type) was utilised to allocate the figures into the RIN categories.

Trailers and other fleet items that do not meet the Motor Vehicle categories are included in the Other Expenditure RIN category

Buildings and Property – Opex & Capex

2019-20 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 2019-20 Annual Regulatory Accounts.

Furniture & Fittings – Capex

Data was sourced from the 2019-20 Annual Regulatory Accounts.

ICT – Opex & Capex

2019-20 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;

Capex data was sourced from the 2019-20 Annual RIN. Expenditure was mapped to the Category Analysis RIN based on mapping provided by SMEs and the category splits were based on project data in Peoplesoft.

Use of Estimated Information

Information is based on actual information, with best practise methodology used to apportion actual non-network expenditure across some RIN categories.

Reliability of Information

This information is considered reliable.

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 5.30pm 30 June 2020.
Finance provided final number	Determining employee numbers
Finance provided final number	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 2020. 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 2020 total has been multiplied by the Standard Control Services percentage.

Steps for obtaining data

- At 5:30pm 30 June, a scheduled asset report was run and emailed to Change Team members (saved as ASSETS_RIN_300620_1730.csv).
- Finance provided the final numbers for the FTE data, saved as PEOPLE_RIN_02072018_0100.csv.

Pivot Tables and Numbers

A pivot table was created;

- 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 equal 7824 devices ("number of devices" determined).
- Standard control percentage applied.

Finance provide the numbers for fields relating to people

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.
- Device 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 2017-18.
- Asset data comes from the CMDB and although the data is "actual data", the data could contain errors.
- 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 comes from source systems, and as such, the data provided for this table is considered actual.

Reliability of Information

The data is considered to be reliable.

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 30/6/19 fleet list.
- Closing odometer readings were taken from the current odometer from 30/06/20 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 30/06/20 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.

All vegetation management is reported as one zone for the whole of Essential Energy for 2019-20, in line with our 2019-24 Regulatory Proposal and how are financials are recorded.

Source of Information

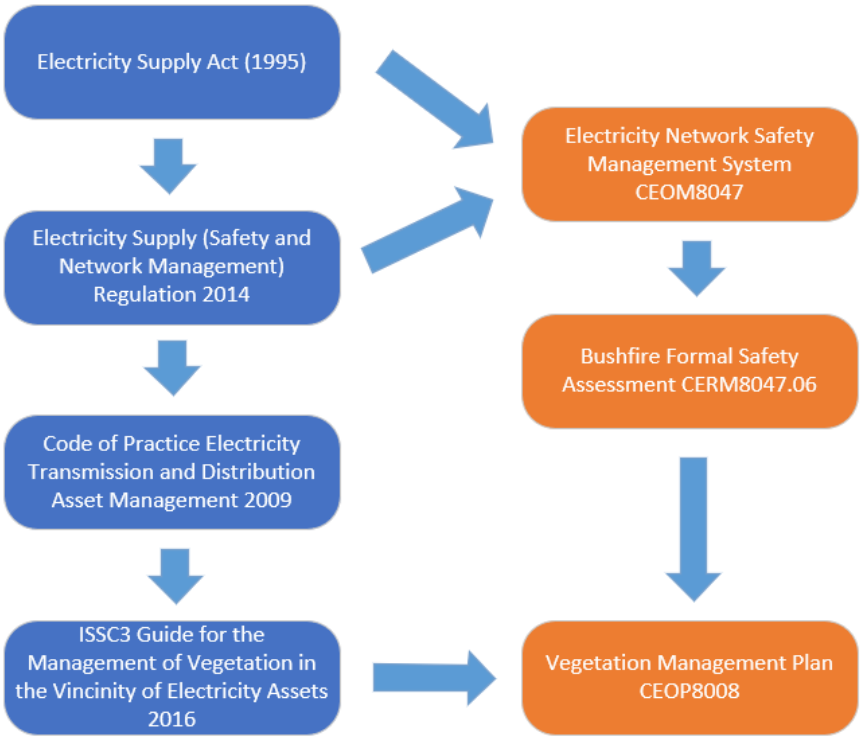
- VIMS
- WASP
- Smallworld
- 2018 LiDAR Incursion Data

Background

Vegetation management 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 2009[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

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

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 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.

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.

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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

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

To comply with the Act, Regulations and the Code, Essential Energy developed the Electricity Network Safety Management System (ENSMS). The ENSMS provides direction on the development of Formal Safety Assessments (FSAs) that detail the risk assessment methodology and identifies critical controls and the effectiveness of those critical controls in managing the risk to:

- Public
- Network Workers
- Property and network assets
- The environment including network initiated bushfire
- Safety aspects arising from loss of supply

The Bushfire FSA identifies vegetation as a threat scenario and the management of vegetation as a critical control. The Vegetation Management Plan describes how Essential Energy will manage vegetation in the vicinity of network assets to:

- Minimise danger to the public posed by trees in close proximity to powerlines.
- Improve system reliability by reducing vegetation related interruptions to the electricity supply.
- Reduce the risk of fires caused by trees coming into contact with electricity wires.
- Minimise environmental impact.
- Reduce the risk of vegetation causing damage to or interfering with powerlines.
- Provide an approach consistent with industry practices and legal requirements.

Methodology & Assumptions

VIMS Source Data Verification

For the reporting period, the majority of network data relating to vegetation has been drawn from the Vegetation Information Management system (VIMS).

The supporting background data is derived from the GIS. An extract run based on the data capture in the GIS as of July 1. 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)	Span count is calculated using the Span object in Smallworld filtering out any span where the “Is Underbuilt?” value is set to Yes. Spans are only included if: Owner is Essential Energy or Private or Unknown and the Span is In Service, Out of Service or Unknown The number of spans is then grouped by VMA name
SPAN_LENGTH (Total Bay Length, or Route Length)	Span length is calculated using the Span object in Smallworld filtering out any span where the “Is Underbuilt?” value is set to Yes. Spans are only included if: Owner is Essential Energy or Private or Unknown and the Span is In Service, Out of Service or Unknown

VIMS FIELD NAME	NEW FME DATA (Post 23/08/2017)
	The length of each span is then grouped by VMA name
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

Route Length with Zone (Actual)

Total number of spans is generated from running a script out of SmallWorld. This data is supplied as an Excel file.

(From FY20 onwards the script will include LV Service Lines and De-Commissioned parts of the network, these were excluded in prior years. This will increase the overall bay count and route length of each VMA compared to years prior to FY20. This change will reduce the calculated find rate for each VMA in the model but will increase the total span count for the network. The change will also increase the overall route length for the network, but as the extra spans added are typically short in length the degree of change will not be as significant as the change in span count when viewed as a percentage of the total)

Number of Maintenance Spans (Actual)

We run an extract from VIMS of all pre-list veg defects created since 1/9/2015. We create a field that uniquely identifies the span (normally Pole1 and Pole2 concatenated). We then pivot this data against the VMA which gives us a unique treated span count per VMA. We add a column which represents the full span count for each VMA in the extract. We then pivot this new table against the urban/rural designation. We then end up with a table that gives us total cut spans (unique spans) against total spans for all cut urban and rural VMAs. If we divide the cut span count by the total span count it gives us a find rate. We then add a new column that represents total spans across the network (this might include VMAs that are not yet cut). We create a new calculated field which takes the find rate and multiplies this by the total span count which gives us the number of maintenance spans. *Please refer to note "Route Length within Zone" for changes to the script which generates the supporting background VMA data.* VIMS data is used in this instance as we only need to see the numbers of spans that might be cut in a single cycle and therefore there is not the need to capture those spans that are cut infrequently and that might only exist in cycles occurring prior to 2015. The VIMS data set also has the advantage of including the asset labels for both poles that delineate the span making it more accurate when counting unique instances of any given span in the overall data set.

Total Length of Maintenance Spans (Actual)

Using the same method as Number of Maintenance Spans to derive the zone find rate we multiply the find rate by the Route Length and arrive at Total Length of Maintenance Spans for each zone. *Please refer to note "Route Length within Zone" for changes to the script which generates the supporting background VMA data.*

Length of Vegetation Corridors (Estimate)

We extract all pre-list veg defects created in WASP since the start of 2011. We create a field that uniquely identifies the span (normally AssetID). We then pivot this data against the VMA which gives us a unique span count per VMA. We add a column which represents the full span count for each VMA in the extract. We then pivot this new table against the urban/rural designation. We then end up with a table that gives us total cut spans (unique spans) against total spans for all cut urban and rural VMAs. If we divide the cut span count by the total span count it gives us the find rate. We then add a new column that represents total spans across the network (this might include VMAs that are not yet cut). We create a new calculated field which takes the find rate and multiplies this by the route line length which gives us the Length of Vegetation Corridors. *Please refer to note "Route Length within Zone" for changes to the script which generates the supporting background VMA data.* WASP data is used in this instance as it gives us a broader stretch of time (back to 2010) and so will highlight spans that might be cut infrequently and which the VIMS data (which starts in 2015) might miss. The idea being to uncover all spans within a VMA that might at some point in time require treatment.

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

We take LiDAR incursion data where the clearance category runs from A1 to C1. We round the Latitude and Longitude values to 4 decimal places. We then concatenate the rounded Latitude and Longitude into a single field which represents a tree (approx. a 10m square). We then count unique instances of these Lat Long values against a zone and divide that value by the total maintenance span count in the same zone to arrive at the average number

of trees per maintenance span. Please note that this process provides an estimate only and is based on data collected in 2018 with no new data being generated since that time.

Average frequency of the cutting cycle (Estimate)

We run an extract out of WASP for all veg defects created since 2011. We pivot this data against the VMA and generate new columns which represent total veg defects created per year. We then add new calculated columns (1 per year) which generate a value of 1 if the total count of defects > 10. If the value is less than 10 then it scores a 0. We then create a calculated column that takes the total number of years and divides this by the total score from all years. Therefore, in a 9 year period if we see a score of 4 (i.e. 4 years where the total defect count is > 10 for each year) then we would derive a frequency of 2.25 (i.e. VMA cut on average every 2.25 years). We then pivot this data table against the urban/rural designation which gives us an average frequency of cutting for urban and rural VMAs.

Use of Estimated Information

The methodology used relies on establishing a find rate based on historical cutting data in VIMS and this represents the numbers of spans that would typically need to be actioned in a given vegetation cycle. The numbers of spans that would need to be cut would be influenced by a number of factors that are impossible to predict such as weather and contractor issues. Additionally, we are using route line length and bay/span counts derived from Small World circuit data using various scripts. The degree of accuracy cannot be determined when converting circuit/conductor data into distance data therefore it would need to be regarded as an estimate.

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

See the overarching Basis of Preparation in the Financial Data section of the BpP. In addition, the following comments apply.

Source of Financial Information

PeopleSoft 2019-20 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 2019-20 Regulatory Accounts. Cost matrices using Project Types Levels have been used to identify Inspection type costings within the breakdown. A breakdown of non-inspection-based activities (Ground and Trimming) has been achieved through sourcing VIMS (Vegetation Information Management System) based data to apportion costs through a volume-based approach. Hazard tree clearance costings have been sourced from the Spotfire based Veg Costing Model v9 where the hazard tree identified VIMS defects are first identified and then a unit rate applied from an Accounts Payable or DSA Register based lookup table.

Methodology & Assumptions for Financial Data

1. An Excel extract was made from VIMS representing all vegetation tasks completed in the reporting period. Three columns were added named "Hazard Tree Flag", "Ground Flag" and "Tree Trimming" and a formula was used to identify whether the VIMS task meets the required criteria to be identified as hazard tree, ground or tree trimming. A final column is added to assign a category to the VIMS defect depending on the results of the preceding three columns. (Estimated)
2. The Finance Combined Data model data was filtered in a pivot to derive total direct costs for "Vegetation Management" in the fiscal year where Project Level 4 = "Vegetation Management". The pivot is divided across the various Project Type Descriptions that make up that total value.
3. Project types 11435, 11436, 11440, 11441 and 11442 are related to Inspection activities. (Actual)
4. Using a combination of data sets from VIMS, Peoplesoft and the DSA Register the total cost for hazard trees treated during the reporting period could be extracted. (Actual)
5. The costs from step 4 were subtracted from the result of step 2 to identify the remaining vegetation management costs to be allocated.

6. Using the data extract from VIMS detailed (step 1) above, a pivot against the category was derived to arrive at a set of volume ratios for Ground, Tree Trimming, Hazard Tree and Other. The ratios for Ground and Tree Trimming were applied to the remaining costs from step 5 to give those associated costs. (Estimate)
7. The remaining amount is attributed to "Vegetation Corridor Clearance" as defined in the RIN. (Estimate)

Use of Estimated Financial Information

Some estimates have been arrived at through a volume-based approach using data derived from the VIMS system.

Reliability of financial information

Financials to physical units' analyses are not considered to be reliable.

Table 2.7.3 – 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 fiscal years 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 based on actual data and is sourced from our TotalSAFE system.

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 may be less clear and requires personal judgement based on available evidence. For example, in the case of a fallen tree on the line, one can not 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.

However, data is recorded based on best information available using considered judgement and is considered to be actual.

Reliability of Information

This information is considered reliable.

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
Pole top, overhead line & service line maintenance; Pole inspection and treatment; Network underground cable maintenance: by voltage; Network underground cable maintenance: by location; Distribution substation equipment & property maintenance; Protection systems maintenance (Distribution)	WASP	Count of year end assets from the Asset Register and a count of maintenance & inspection Work Tasks from the Work Scheduling and Task Management module.
Numerous	GIS Smallworld	Route length of overhead and underground assets
Public lighting maintenance	WASP	Count of year end assets extracted from ‘In Service’ Street Light asset category records. Inspected/Maintained units are a count of completed, streetlight related, Inspection & Maintenance (OPEX) Work Tasks from the Work Scheduling and Task Management module.
SCADA & Network Control Maintenance	PeopleSoft	Capital project data OPEX, M&R and F&E
SCADA & Network Control Maintenance	Service Manager, VFire	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 18-19	Number of inspections/maintenances of fire- fighting equipment
Zone Substation maintenance	CEOP8011	Technical Maintenance Plan
Broken Hill Gas Turbines	WASP	Number of inspections
Emergency Recoverable Works	PeopleSoft	Number of events

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 all poles (incl. dedicated street light poles and 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 that have been completed as operating expenditure outside the normal zone substation boundary fencing.
- Average age is a weighted average based on the Pole & Public Lighting poles/columns 5.2 Asset Age Profile figures.

Service Lines

- Qty at year end is taken directly from the total customer count in EB RIN Table 3.4.2.1. Please refer to said table BoP for more detail.
- Quantity inspected/maintained provides a count of all service related corrective maintenance tasks that have been completed as operating expenditure.
- The age of each line 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 all poles (incl. dedicated street light poles and both distributor owned and distributor maintained private poles) that were recorded in WASP.
- 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 usually includes excavation, drilling and visual inspection
- Average age is a weighted average based on the Pole & Public Lighting poles/columns 5.2 Asset Age Profile figures.

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.

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 inspection and maintenance cycle is shown as 10 years to correspond with Essential Energy's current policy.
- Average age is based on assumed cable age from the age profile in Table 5.2.1.

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 inspection and maintenance cycle is shown as 10 years to correspond with Essential Energy's current policy.
- Average age is based on assumed cable age from the age profile in Table 5.2.1.

Distribution Substation Equipment & Property Maintenance

Distribution Substation Transformers

- Assets at year end in this category include all distribution substation transformers and regulating transformers (both overhead and enclosed/underground).
- Quantity inspected/maintained includes a count of corrective work tasks on transformers and regulating transformers.
- Average age is based on a weighted average of the estimated transformer and regulator ages.

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.

Distribution Substation Other Equipment

Earth Integrity Testing - this program ensures the integrity of both high and low voltage earthing systems supporting those assets.

Distribution Substation Property

- Assets at year end in this category represent a count of all distribution substations (both overhead and enclosed/underground).
- 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.

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 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.

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 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.

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 fire equipment maintenances 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.

Public Lighting Maintenance

Assumptions:

- Luminaires: major road is defined as LED streetlights with a wattage >= 45 or non-LED streetlights with a wattage >= 150. This rule has been deviated from in two instances, where the Essential Energy Luminaire Replacement Matrix indicates that a 90/100W and 135W Low Pressure Sodium lamp is used on Category V3 major roads, along with the 100W and 120W High Pressure Sodium lamps used on a Category V5 major road. All remaining luminaires are classified as a minor road.
- Non-routine tasks - Fault and Emergency tasks, repair tasks, change tasks, replace tasks (including change luminaire tasks) and Maintenance and Rectification tasks are classified as Non-Routine, where all other tasks have been classified as Routine. Routine tasks include minor maintenance, bulk replacements, upgrade, inspection, standard maintenance, audit and glare shield tasks.
- The 'luminaire effective date' represents the date of installation of a luminaire and as such is assumed to be new as at the time of installation and the age of the asset is calculated from this date.
- Where there was no 'luminaire effective date' recorded the 'bracket effective date' was used. Where neither of these were available the 'support effective date' was used for the 'bracket effective date' and 'luminaire effective date.'
- Where none of the above was available in terms of dates and where the status of an asset was 'new' or 'proposed' it was assumed these would be installed or have been installed post 30 July 2020.

Methodology:

- Assets at Year End - The data used to populate the number of public lighting luminaires and poles was extracted from WASP on 1 July 2020. The 'All Assets' report as at 30 June 2020 excluding; security lighting 'SCL' category, 'out of service assets, private 'Asset Owner' and 'metered lights' represent the total number of public lighting assets owned and maintained or only maintained by Essential Energy for FY20. These were then categorised per the above assumptions into minor and major roads to ascertain the volume of assets at year end.
- Assets Inspected/Maintained - The data used for this field was extracted from WASP on 21 August 2020 for streetlight tasks completed for the period 1 July 2019 to 30 June 2020. The following parameters were set for

data extraction; wt.task_code in (select task_code from work_task_codes where group_code in ('LGHT', 'STLT', 'SL01', 'SL02')). The number of assets Inspected/Maintained is the sum of all routine and non-routine streetlight maintenance tasks in 2019-20 per the assumptions outlined above.

- Average Age of Asset Group - the current average age of the streetlight asset group has been calculated as follows:
  - An 'All Asset Report' extract from WASP was used (per above) providing a count of streetlights by road categorisation, grouped by year. This data was reconciled against the task report (also described above)
  - This data was then used to calculate the average age of installed assets by adding the installed age (per the above data assumptions) divided by the number of lights installed for each road category.

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 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 and zone substation reclosers owned by Essential Energy.
- Quantity inspected/maintained represents those tasks directly related to maintaining 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.

For 2019-20 this category also includes Zone substation protection systems, which were not included in prior years.

All inspection and maintenance cycles are performed in line with asset inspection policies.

An improved methodology has been used to report mean life of these assets.

Broken Hill Gas Turbines

The two gas turbines at Broken Hill are used for N-1 back-up supply.

In prior years the costs for this equipment have been included in overheads, simply because the Category Analysis RIN does not contain the "Other Network costs" operating category that is included in the Annual RIN. These costs have been reclassified this year as they are not overheads and so are better aligned as a new category in both the maintenance tables.

- The assets were installed on site in 1990 but have 1985 manufacture dates. On this basis they have been assessed as being 35 years old.
- Inspection cycle – a site inspection is performed every 8-12 weeks to do cursory visual checks, readings and general housekeeping. Whilst on site, staff start a machine and run it up to Synchronous speed, occasionally placing on-line with the grid. On this basis, the inspection cycle has been set to 0.25 (i.e. quarterly).
- Maintenance Cycle – because of the very low hours for which the machines run, the original equipment manufacturer OEM requirements cannot be applied. On top of this, there are subsets of equipment which do and are required to be maintained at much shorter intervals. These vary from 3 yearly (Battery Maintenance), CB Maintenance (4-6 yearly), air filters (max 5 years), Lube filters (3 years) Protection Maintenance (6 yearly), Fuel farm Maintenance/inspection (10 yearly).

On this basis the measure has been set to the minimum 3 yearly but noting the asset class has subset classes whose maintenance regimes will vary.

Use of Estimated Information

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

Reliability of Information

Maintenance expenditure at the total level aligns to the 2019-20 Annual Regulatory Accounts, however the split into the various categories is based on assumptions and estimation. 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 the overall Basis of Preparation on finance data prepared for multiple tables in the RIN.

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 Regulatory Accounts (as summarised in Table 2.1) 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 no accounts were able to be directly mapped to inspection/maintenance activities, a unit rate system was used to assign expenditure based on like-activities with known expenditure.
- Where maintenance activities contained units for both inspections and maintenance, the routine versus non-routine expenditure was applied pro-rata based on those units.

Public Lighting

Assumptions:

- When determining a dedicated streetlight pole - All 'Shared' and 'no-pole' were excluded from the "All assets report," the dedicated support types of 'steel pole' and 'wood pole' were included and pole function of 'streetlight pole' and 'wood pole' were the only inclusions.
- Maintenance costs for all maintenance types excluding dedicated streetlight pole inspections and night patrol inspections have been allocated to major roads at 1.62 times the minor road costs as its more expensive to maintain lights on major roads, typically due to traffic control costs. This assumption is based on a comparison of annual SLUOS charges for major and minor roadway lighting in the 2019-24 Regulated pricing model.
- Night Patrol and Dedicated Streetlight pole inspection costs have been pro-rated according to the number of major and minor road tasks.
- Where tasks cannot be directly mapped to a major/minor classification they have been allocated as 50% major and 50% minor.

Methodology:

- Public lighting routine maintenance expenditure is calculated by Finance based on expenditure in the following activities:
  - Bulk Streetlight Luminaire Rep
  - Public Light Pole Inspection
  - Public Lighting Patrols
  - Streetlight Bulk Upgrade
- Public lighting non-routine maintenance expenditure is calculated by Finance based on expenditure in the following activities:
  - Public Lighting F&E
  - Public Lighting M&R

Note: Routine maintenance costs have reduced where LED replacement has been performed in lieu of bulk lamp replacement works.

Use of Estimated Information

The definition for most of the categories in table 2.8.2 require high level assumptions and estimation to be used. We believe these assumptions provide a relatively accurate response, however the definitions for each data point are not adequate to consider the data actual.

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. Estimation has been developed based on actual tasks undertaken and a derived unit rate.

Reliability of Information

Maintenance expenditure at a total level aligns to the Annual 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 2019-20 was applied as per the definition.

Source of Information

Data has been sourced from:

- 2019-20 Regulatory Accounts
- PeopleSoft Query for expenditure against project type Fault & Emergency (excluding overheads) plus the costs associated with emergency recoverable works and providing support to other distributors during emergency events.
- 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 19-20”.

Methodology & Assumptions

In the RIN Access Database 2019-20, 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 2019-20 TMED, this date is classed as a Major Event Day and will be excluded where defined.
- Run Monthly Feeder Reliability Reports – forms the base for this table query.
  - This query collates outages by feeder.
- Run MED Impact RIN 1-3, TMed Day, Avg Cust Base RIN queries:
  - #1 filters outages on Major Event flag “Y”.
  - #2 collates and creates a table of the MED date, number of outages, customers affected, and customer minutes lost.
  - #3 collates MED date, cause comments, number of outages, customers affected, customer minutes lost, and uses Avg Cust Base RIN to calculate SAIDI and SAIFI.
- 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.

Emergency recoverable works and support provided to other distributors during emergency events

Both these services were reclassified from an Unregulated service to Standard Control Services in the 2019-24 Determination. See Page 4 of Attachment 12 of Essential Energy's Final Determination for 2019-24 https://www.aer.gov.au/system/files/AER%20-%20Final%20decision%20-%20Essential%20Energy%20distribution%20determination%202019-24%20-%20Attachment%2012%20-%20Classification%20of%20services%20-%20April%202019.pdf

This means these costs are now shown in this table as they meet the definition of Emergency Response. The costs are direct from PeopleSoft.

Use of Estimated Information

Total amounts reported at (A) are balanced to the general ledger and considered actual.

Amounts for Major Event O&M Expenditure (B) and Major Event Days O&M Expenditure (C) are estimates, as all expenditure related to emergency works incurred on these days are recorded on the date, however they may not relate just to those events. Total expenditure reported for emergency work on the date, is for costs incurred on that date and for the subsequent two days.

Reliability of Information

This information is considered reliable, noting that some estimation is included in (B) and (C).

Worksheet 2.10 – Overheads

Table 2.10.1 – Network Overheads Expenditure and

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. The policy specifies that for internally funded assets, the cost of these assets may include directly attributable overheads up to the stage when the asset is ready for use in the location and condition intended by management.

Source of Information

Refer to opening sections of this Basis of Preparation for details on our RIN Optimisation and finance data prepared for multiple tables in the RIN. Section 3 of this Basis of Preparation discusses the sourcing of financial information used to prepare the data.

The specific methodology and assumptions made for this table are also outlined below.

Methodology & Assumptions

- Data sourced from PeopleSoft Financials
- Expenditure classified as ‘Indirect” based on the project resource category, “OHCO” Corporate Overhead and “OHNW” Network Overhead.
- Expenditure split by business unit based on Project Type Level 3 and Project Type Level 4.
- Other items which were not allocated to projects in the management accounts have been classified as ‘Corporate’ or ‘Network’ on a case by case basis. These manual adjustments are included in ‘Control.4_Overheads’ tab

Use of Estimated Information

As reported information is materially dependent on information from the PeopleSoft financial system it is considered as actual information for 2019-20.

Reliability of Information

This information is considered reliable.

Worksheet 2.11 – Labour

Table 2.11.1 - Cost Metrics per Annum

Source of Information

- Data has been sourced from:
- CA_RIN_Labour_V1_2020_08_31 is a data model which is used to power pivot information derived from the sources listed below. The summary result provides information in the format required for the CA RIN tables derived from Peoplesoft and HR – these include:
- FTE Reports for June 2019 and June 2020 showing head count at year end.
- Agency Staff reports for June 2019 and June 2020 showing labour hire staff.
- The 2020 Working Hours file, 'Working_hours_FY20' 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 the categories required in Tables 2.11.1 and 2.11.2.
- The 2020 Stand Down Occurrences file from Payroll 'Standdown_Query_2020'.
- HR Data representing pay register data from PeopleSoft

Methodology & Assumptions

- Data from PeopleSoft HR is used as the basis for categorising expenditure across RIN Categories. Ordinary, overtime, allowances, back-pay and bonuses (i.e labour costs excluding on-costs) sourced from PeopleSoft HR. The remaining standard control labour (predominantly oncosts/redundancies) is allocated proportionately across the RIN categories. This is consistent with the method used in the general ledger for allocating oncosts, whereby total ordinary and overtime by department will drive the allocation of oncosts. Consistent approach to FY19
- The 2019-20 ASL number is assumed to be the average of the 2018-19 and 2019-20 year end staff numbers converted to Standard Control Services numbers by way of department percentages derived from the CAM methodology.
- 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. This correlates with the allocation of on-costs in actuals ledger. The average productive work hours per ASL equates to average productive work hours for Ordinary Time plus average overtime hours per ASL where average overtime hrs per ASL is calculated as total overtime hours from global payroll divided by number of ASL.
- A Standard Control Services percentage has been calculated for each department using the CAM methodology and this has been applied to the support labour costs and units.

Total Labour Expenditure

- The 2019-20 Ordinary, overtime, allowances, back-pay and bonuses information is sourced from Peoplesoft HR and reconciles back to the global payroll journals in general ledger. The labour data was then split out across the RIN classifications based on individual employee IDs, with mapping provided by HR (refer 'RIN Classification' below for detail)
- Labour costs identified above were split between direct and support based on the AER project tree. Project Level 3 – Standard Control used to capture the direct expenditure. Support costs (Project Level 2 – Support and non-project) split between Corporate and Network Overheads based on the CAM (by department)
- Remaining standard control costs excluding temps (which were calculated separately) were prorated across direct/support labour and corporate/network to equal the total Annual RIN internal labour reported amounts. These amounts are primarily made up of on-costs and redundancy costs. The allocation across categories was based on the same allocation proportion as the above ordinary and overtime elements. This correlates to the method in general ledger for allocating on-costs whereby total ordinary and overtime by dept will drive the allocation of on-costs.
- Temp costs as per the annual RIN was allocated as follows (Executive and Senior Manager at actual cost as singular and hight hrly rate. Balance proportionately applied. The number of agency within each row category as

a proportion of total agency the driver to allocate within each of corporate overhead, network overhead and Direct network labour.

- Overtime wages were derived from HR overtime information provided from Peoplesoft HR and global payroll. The CAM was applied to departments to provide the Standard Control Services component.

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. Roles are “further aligned in consideration of qualification requirements, hierarchy, number of reports, position title and employment type e.g. where employees have WFP Category (job family) ‘Admin’ but are leaders of teams (number of reports) and on an enterprise agreement, RIN category = ‘Manager’;

Agency staff (labour hire) were mapped to RIN Classification using vlookups of role descriptions aligned to the mapping used for internal personnel listing. Where a job title did not match an internal personnel role previously mapped professional judgement was applied.

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 2019-20 were taken from the RIN classification file from HR, which had assigned FTEs their applicable labour classification.
- The average FTE numbers were calculated by deriving an average of the closing balance of June 2020 and June 2019 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 2019 and June 2020 by department.

Stand Down Occurrences

Data for the 2020 year regarding stand down occurrences was obtained from payroll. 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.
- Peoplesoft HR Payroll data
- These elements are housed in CA_RIN_V1_2020_08_31 data model

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 2020. This file is prepared and used as part of budgeting processes using historical actual information and expected outcomes.
- The total Standard Control Services cost for ordinary time was divided by the total productive work hours for ordinary time and further divided by number of ASL to derive a unit rate. This number is then uplifted into a full year rate by multiplying total hours over productive hours to calculate the hourly rate per ASL per labour category before on-costs. Superannuation (15%), workers compensation (1%) and payroll tax (5%) is then applied to derive the hourly rate per ASL inclusive of on-costs.
- 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 HR payroll report for 2020. The overtime cost was taken from the HR payroll file.
- The Standard Control Services percentage per department (from the CAM) was applied to extract the Standard Control Services element.
- The RIN labour categories were added to the analysis.
- 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 with best practise methodology used to estimated the splits required.

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

Reliability of Information

This information is considered reliable. Total Average Productive Work hours from table 2.11.1 is reconciled to table 2.11.2 sum of Ordinary time per ASL and overtime per ASL.

Total Labour from 2.11.1 is reconciled to total labour per Annual RIN table (Sum of 2.11.3.1 and 2.11.3.2).

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

Refer to opening sections of this Basis of Preparation for details on our RIN Optimisation and finance data prepared for multiple tables in the RIN. Section 3 of this Basis of Preparation discusses the sourcing of financial information used to prepare the data.

The specific methodology and assumptions made for this table are also outlined below.

Methodology & Assumptions

- The enriched income and expenditure and capital expenditure data includes the 'resource category' which identifies the nature of the expense and which map to broader expense types. The expenses at the lowest level of the RIN category, e.g. Routine Maintenance, are summarised into labour, materials, contractors, plant, property expenses, allocations and other. The percentage that each of the expense categories (by nature) after combining plant and other and excluding allocations were determined for each of the broad RIN categories.
- The completed CA RIN tables for Vegetation Management, Routine and Non-Routine Maintenance, Augmentation, Replacements, Connections, Non-Network Expenditure, Emergency Response, Quoted services, Fee based Services, Metering and Public Lighting were extracted. Where required the expenses in the tables were summarised to match the required 2.12.1 categories. These expenses were then apportioned between direct labour, direct materials, contractors and other. The overheads and Non-Network expenditure was all classed as other – consistent with previous years.
- 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.

The information provided reports the number of public lighting luminaires and public lighting assets on poles within Essential Energy's distribution area.

Source of Information

The data used to populate the number of public lighting luminaires and poles was extracted from WASP as at 1 July 2020. The 'All Assets' report as at 30 June 2020 excluding; security lighting 'SCL' category, 'out of service assets, private 'Asset Owner' and 'metered lights' represent the total number of public lighting assets owned and maintained or only maintained by Essential Energy for FY20.

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 30 June 2020, based on the AEMO load table classification for each light.

Assumptions:

- 'Asset Owner' denotes the responsibility to maintain the public lighting asset.
- Assets with the same 'Asset Label' are unique poles in different vicinities.

Use of Estimated Information

All information has been sourced from WASP and is considered to be actual data.

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 data used to populate components of the light installation section of this table was extracted from WASP on 1 July 2020. The 'All Assets' report as at 30 June 2020 excluding; security lighting 'SCL' category, 'out of service' assets, private 'Asset Owner' and metered lights represent the total number of public lighting assets owned and maintained or only maintained by Essential Energy for FY20.

The data used for components of the light replacement and maintenance section of this table was extracted from WASP on 21 August 2020 for streetlight tasks completed for the period 1 July 2019 to 30 June 2020 "Streetlight Task Report FY2019-20". The following parameters were set for data extraction; wt.task_code in (select task_code from work_task_codes where group_code in ('LGHT', 'STLT', 'SL01', 'SL02')) which generates a full list of streetlight categorised tasks completed during FY20.

The data to inform the Quality of Supply section, specifically GSL breaches and GSL payment figures were sourced from the Market Data Analyst in the Market Liaison team for the period 1 July 2019 to 30 June 2020. This

data was extracted in a payment report from PeopleSoft. The data to inform the Customer complaints figure was sourced from the Market Data Analyst in the Market Liaison team for the period 1 July 2019 to 30 June 2020. The data was extracted from ServiceNow based on the category "Streetlighting" and a separate extract was provided based on the category "GSL+CSS" which was filtered further by subcategory "streetlighting."

Cost data in this table is based on the standard methodology adopted for all finance expenditure data in the Category Analysis RIN. Data was extracted from PeopleSoft and the direct spend for each project reported. The specific methodology and assumptions made for this table are also outlined below.

Methodology & Assumptions

The methodology for this table has changed this financial year in line with the changes made to the data in WASP this financial year to move to component billing which breaks the data in WASP down into luminaires, brackets and poles/columns.

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

Description	Definition
Major Road Lighting	LED Luminaires with wattage 45 or higher and non-LED luminaires with wattage 150 or higher (This rule has been deviated from in two instances, where the Essential Energy Luminaire Replacement Matrix indicates that a 90/100W and 135W Low Pressure Sodium lamp is used on Category V3 major roads, along with the 100W and 120W High Pressure Sodium lamps used on a Category V5 major road).
Minor Road Lighting	LED Luminaires with wattage less than 45 and non-LED luminaires with wattage less than 150 (deviation from this rule per above).
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 unmetered lights (excluding tariff 6/Private lights that are owned and maintained by the customer) that are billed through the Unmetered Billing System

Assumptions:

- 'Asset Owner' denotes the responsibility to maintain the public lighting asset.
- Assets with the same 'Asset Label' are unique poles in different vicinities.

Light Installation Volume & Expenditure

- The 'All Assets' report as at 30 June 2020 with exclusions noted above was used to compare to the 'All Assets' report as at 30 June 2019 with the same exclusions noted above, based on a comparison of unique asset ID to determine the installations for FY20. These assets were then broken down into minor and major road per the definitions above.
- There are no costs associated with new light or pole installations as these are customer funded and deemed as gifted assets.

Light Replacement Volume & Expenditure

- 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.

Light Maintenance Volume & Expenditure

- The streetlight data was categorised between Major and Minor Road using the wattage assumption above.
- The "number of poles installed" represents the number of poles inspected. There was an error in the wording. The data 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. Maintenance programs include; public light pole inspections, fault and emergency, maintenance and repair, patrols, bulk luminaire upgrade and replacement.
- Instructions - Poles - number of poles maintained - from the "Streetlight Task Report FY2019-20" report and use value for poles investigated, removed, repaired and replaced.
- Instructions - Use the "Defects 2019-20" report, filter for Bulk tasks and Spot tasks separately as they attract different maintenance costs. Apply the Major or Minor ruling to all assets.

Quality of Supply

Mean Days

- This number was derived from WASP report “Streetlight Task Report FY2019-20” for 2019-2020 financial year. 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)
- Average days to repair is calculated manually by dividing total days by number of tasks.
- Instructions - use the value from AR RIN Table 3.6.7.2 "Street lights - average number of days to repair".

Volume of GSL Breaches, Payments & Customer Complaints

- The “GSL+CSS” categorised data extracted from ServiceNow cannot be used to inform GSL breaches and payments as PeopleSoft is the source of truth regarding payments made for GSL for Streetlights. This data from ServiceNow has be only used to inform the number of customer complaints that occurred in FY20.
- The sum of the "PRT_AMOUNT" column from the payment report extracted from PeopleSoft was used to determine the GSL payments total.
- In August 2019 the GSL payment increased from $15 per claim to $25 per claim.
- ServiceNow is not the source of truth for GSL payments. The contact centre are required to raise a request in PeopleSoft for a GSL payment to be paid, as such reliance on ServiceNow data would be inaccurate for the GSL payments.

Use of Estimated Information

All volume information has been sourced from WASP and considered to be actual data.

Reliability of Information

The data in this table 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

Data was obtained from the current public lighting pricing model. This model was reviewed in FY19 for the FY20-24 regulatory submission and contained the most up to date information and pricing to be able to estimate unit rates by luminaire type. All unit rates are exclusive of overheads.

Methodology & Assumptions

The pricing model builds up costs using actual materials, labour, plant, and traffic control cost inputs.

Lighting Installation costs have been entered as $0. This assumes that all new installations have been installed through the contestable process and are not funded by Essential Energy.

Light Replacement cost are built up on an assumed amount of time required to replace a luminaire on a spot basis.

Light Maintenance costs are built up based on performing both planned and unplanned maintenance tasks. Planned maintenance incudes the bulk lamp replacement and night patrols. These costs are relatively constant and

known. Unplanned maintenance are all other task that are performed when lights are reported to be not working. Historical failure rates for each individual technology are utilised to estimate the unit rate for unplanned maintenance.

Unit rates provided are directly from the public lighting pricing model.

Use of Estimated Information

The data in this table is estimated from a cost build up perspective and is based on cost to replace going forward. Essential Energy have interpreted the requirements of the RIN on this basis and deem this forward looking approach reasonable.

The amount of time spent for installations and replacements and frequency of spot maintenance are estimated based on past failure data, however material and labour inputs are actual.

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 2019-20 have been produced through queries from the EDDiS database, with the queries providing total number of meters by type and categories required for completion of this table

- Type 4 meters single phase or multi phase (Actual) - Type 4 meters single phase or multi phase numbers were calculated using meter phases data
- Type 4 meters current transformer number (Actual) - Type 4 meters current transformer numbers were calculated using meter amps data
- Type 5 meters single phase or multi phase (Actual) - Type 5 meters single phase or multi phase numbers were calculated using meter phases data.
- Type 5 meters current transformer (Actual) - Type 5 meters current transformer numbers were calculated using meter amps data
- Type 6 meters single phase or multi phase (Estimated) - Type 6 meters single phase or multi phase was calculated using the meter model. Each distinct model has a known number of phases. See assumptions
- Type 6 meters current transformer (Estimated) - Type 6 meters current transformer numbers were calculated using a combination of meter model, amps and multiplier. See assumptions
- Type 6 meters direct connect (Estimated) - Type 6 meters direct connect numbers were calculated using a total number of meters minus number of current transformer meters

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.

Some assumptions have been made on type 6 meters to whether some meters are single phase or multi phase due to the Meter Type being unknown

Some assumptions have also been made on type 6 meters to whether meters are current transformer or direct connect due to minimal data on very old meter model's current ranges.

Unknown meter models would be distributed similar to the known models.

According to ring fencing rules Essential Energy should not be the Meter Provider for Type 1-4 meters. Essential Energy has not been successful in convincing Retailers to transfer these sites away from Essential Energy and as a result still have contestable Type 4 meters installed. Essential Energy is reporting to the AER on its progress transferring these sites away.

Use of Estimated Information

The data is an apportionment of approximately 86,000 meters into the reported splits based on known meter types. This apportionment is not considered material and the data can be considered as actual.

Reliability of Information

This information is considered reliable.

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 and PAECE. This data was aligned to the Annual Reporting RIN based on mapping provided by SMEs.
- The data supplied from EDDiS and PeopleSoft are considered actuals.

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

- There have been no meter purchases for Type 5&6. Any meters required for meter maintenance were old stock.

Meter Testing

Volumes and Expenditure

- 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 and are considered actual numbers.
- Information Expenditure for 2019-20 is based on financial reports from PeopleSoft. This data has been allocated based on Projects that relate to Meter Testing and are thus considered to be actual information.

Meter Investigation and Special Meter Reading

Volumes for Meter Type 5 and Meter Type 6

- The volumes for the Scheduled Meter Readings are sourced from EDDIS and are considered actual. A report is run and the readings after 30 June 2020 has been removed.
- Type 6 meter reads are actually charged per premise rather than per read. Unit costs are increasing as shown in the table below. This is not evident in table 4-2-2 as it documents the actual type 6 meter read count.

	Premises paid	Cost	Avg cost per premise
FY20	3,070,378	$9,000,641	$2.93
FY19	3,366,183	$9,669,450	$2.87
FY18	3,269,098	$9,209,723	$2.82

Expenditure for Meter Type 5

- Information for Type 5 readings is based on the number of Type 5 meters being read remotely on a fortnightly basis. These costs are apportioned based on the volume of sites and the reading frequency. 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.
- Scheduled meter reading type 5 assumes 26 reads a year per meter with an estimated a cost of $300 per meter per year and are considered estimated.
- Estimated cost per meter was calculated using average cost of remotely reading meter and processing data. This includes communications costs and the labour to process the data including validation and forwarding data to MSATS, the Retailer and Network Billing.

- Note: CPI has been applied to uplift the costs of Type 5 meter reading from 2015/16 $s to 2019/20 $s.
- Expenditure for Meter Type 5 Reading should be considered estimated.

Expenditure for Meter Type 6

- This information has been sourced from PeopleSoft. The data has been extracted based on Projects that relates to Meter Readings and is considered actual data.

New Meter Installs

- All data for this section is zero as Essential Energy is no longer authorised to install new meters. New meter installs are conducted by Accredited Service Providers.

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 2019-20, as the program was suspended as a result of the Power of Choice initiative.

Meter Maintenance

Volumes and Expenditure

- Meter maintenance includes the routine maintenance of meters, including investigation of meters that have suspected to have failed in service. Volume figures are based on the amount of works orders raised and completed for meter maintenance activities. These have been extracted from PEACE and the maintenance activities actioned after 30 June 2020 have been removed. The data is therefore considered to be actuals.
- Essential Energy has no separation between Type 5 and Type 6 maintenance costs with Type 5 costs being included in Type 6 maintenance costs.
- Expenditure Data for 2019-20 has been sourced from PeopleSoft and is allocated based on Metering Projects that relate to maintenance. The data reconciles back to Regulatory accounts and is therefore considered actual information.

Expenditure for Other Metering

Other Metering

- Other metering includes redundancies for Meter Reading and Meter Provision, with the balance being costs incurred in the Meter Data Agency section.
- Other metering expenditure is the remaining expenditure after removing all other expenditures listed in 4.2.2.
- Expenditure for meter type 5 reading being estimated has a non-material effect on the accuracy of other metering expenditure as the overall actual metering costs are actuals, supplied by PeopleSoft. Other metering expenditure should be considered actual.
- As there are very few type 4 meters installed and maintained these costs have been included in other metering costs.

Use of Estimated Information

The totals come from the general ledger, PEACE and EDDiS and are considered actual. Best practice methodology has been applied to determine some splits as noted in the Methodology section above.

Reliability of Information

The totals are considered reliable however caution should be applied if using the specific 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 2019-20 costs and volumes for each of the Ancillary Service Fees it has charged.

Source of Information

- Metering Volume Data is extracted from Essential Energy's Peace system. Expenditure data is extracted from PeopleSoft.
- Authorisation Volume Data is maintained using Authorisations Management System (AMS). Expenditure data is extracted from PeopleSoft.
- Connection Application Data is sourced from Essential Energy's Peace, PeopleSoft and Secure Web Forms systems. Expenditure data is extracted from PeopleSoft.
- Connections Data is sourced from Essential Energy's corporate 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).
- Physical printouts of Job Sheets taken from Essential Energy's Peace system. Expenditure data is extracted from PeopleSoft.
- 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.
- Level 2 Accredited Service Provider inspection data is sourced from Essential Energy's Secure Web Forms (SWF) system. Expenditure data is extracted from PeopleSoft.
- Volume and expenditure data is sourced from Essential Energy's PeopleSoft system.
- High Load Escort data is maintained in an Excel spreadsheet.
- Rectification of Illegal Connection data is sourced from Essential Energy's corporate system Revenue Risk Database.

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 AMS.
- 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 Connection Offers Fees Management System (COF) weekly
- 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 and Connections Interface – Relocation Process Facilitation

- Volumes taken from expenditure due to no fee being oncharged in CWMS for service provided so some estimation is included but not considered material.

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.

- Volumes taken from expenditure due to no fee being oncharged in CWMS for service provided so some estimation is included but not considered material

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 CRR 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.

Warning Markers

- Data is sourced from the Finance system, and number of Chargeable Works Dockets processed with charge codes 318 and 104. Volumes are taken from expenditure due to no fee being oncharged in CWMS for service provided and therefore include some estimation, but not considered material.

The sum of Volume and Expenditure for 'Move In / Move out Meter Reads' and 'Disconnect - Disco Non Payment' combined is similar to last period however the splitting of the expenditure for this period is reversed. The expenditure allocation is based directly off the receipting of skilltech invoices to product codes

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.

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

All Volumes & Expenditure are considered as actual.

Reliability of Information

This data is considered reliable with the minor exceptions noted above.

A full listing of all Ancillary Network Services can be viewed here;

https://www.essentialenergy.com.au/-/media/Project/EssentialEnergy/Website/Files/Our-Network/PriceScheduleForAncillaryNetworkServices1July2019.pdf?la=en&hash=F2FA10C5F956760DA540429A408AA1ACF477F725

Worksheet 4.4 - Quoted services

Table 4.4.1 – Cost metrics for quoted services

Two of the services previously noted in this table (High Load Escorts and Rectification of Illegal Connection) are now classified as Ancillary Network Services and so are reported in table 4.3.1.

The third service previously reported in this table (CT Installs) is no longer undertaken by Essential Energy.

As a result, there is no data reported in this table anymore.

Worksheet 5.2 - Asset Age Profile

Table 5.2.1 – Asset Age Profile

Total volumes are considered to be actual, and reliable. However we note that some volumes in the more past years may not be entirely accurate and the age may have been estimated for these early years.

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
Timber	Blank	Wood
Timber	Copper Chrome Arsenic	Wood

Pole Material	Pole Type	Material
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

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 exclude services only
- The Date Installed was converted into financial year. Lengths were summed by financial year and regulatory voltage category, i.e.. 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 Service Point – Premise join

Methodology & Assumptions

Smallworld Cables used in the analysis were filtered by:

- Purpose = Underground
- Owner = Essential Energy
- Operating Voltage exclude services only

The Date Installed was converted into financial year. Lengths were summed by financial year and regulatory voltage category, i.e. ≤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.
- Data from WASP is used for other date and label information.

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

Some 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.
- Data from WASP is used for other date and label information.

NOTE:

Essential Energy does not have any Service lines that are not low voltage.

Essential Energy does not have any Service lines that are complex.

Essential Energy does not have any Service lines 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

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

Although this data is considered reliable, some 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 and Smallworld databases using SQL and grouping of data in Excel.

Methodology & Assumptions

These figures were determined in four parts:

8. Extract data/age profile for Distribution Switchgear currently recorded in WASP.
9. Extract data/age profile for Zone Substation Circuit Breakers recorded in WASP.
10. Extract data/age profile for Zone Substation Switches recorded in WASP.
11. 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 four 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:

- **Step 1:** The quantity of pole mounted substation sites was determined from WASP.
- **Step 2:** 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 the following:
  - LV Fuses = 1.5 x qty of pole mounted substations
  - HV Fuses = 1 x qty of pole mounted substations
- **Step 3:** The profile split of Primary Voltage for existing pole mounted substation sites was determined from WASP as follows:

Split	
Voltage	
<=11kV	67%
>11kV <= 22kV	32%
>22kV and <=33kV	1%
	100%

- **Step 4:** The percentages in Step 3 were applied to the estimated counts in step 2 to determine the quantities per voltage group:
  - LV Fuses
    - LV = 100% x (1.5 x pole mounted substations)
  - HV Fuses
    - <=11kV = 67% x (1 x pole mounted substations)
    - >11kV and <=22kV = 32% x (1 x pole mounted substations)
    - >22kV and <=33kV = 1% x (1 x pole mounted substations)

All of these were categorised as "Fuse".Ground Mounted/Enclosed Substation Sites:

- **Step 1:** The quantity of ground mounted/enclosed substation sites was determined from WASP.
- **Step 2:** 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 step 1 and 2:
    - LV Fuses = 4 x ground mounted/enclosed substation sites
    - HV Fuses = 2 x ground mounted/enclosed Substation Sites
- **Step 3:** 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	38%
22kV Circuit Breaker	5%
11kV Fuse	45%
22kV Fuse	2%
11kV Operational Switch	3%
22kV Operational Switch	7%
	100%

- **Step 4:** The percentages in step 3 were applied to the estimated counts in step 2 to determine the quantities per voltage group:
  - LV Switchgear
    - LV Circuit Breaker = 11% x (4 x ground mounted/enclosed substation sites)
    - LV Fuse = 89% x (4 x ground mounted/enclosed substation sites)
  - HV Switchgear
    - <=11kV Circuit Breaker = 38% x (2 x ground mounted/enclosed substation sites)
    - <=11kV Fuse = 45% x (2 x ground mounted/enclosed substation sites)
    - <= 11kV Operational Switch = 3% x (2 x ground mounted/enclosed substation sites)
    - >11kV and <=22kV Circuit Breaker = 5% x (2 x ground mounted/enclosed substation sites)
    - >11kV and <=22kV Fuse = 2% x (2 x ground mounted/enclosed substation sites)
    - 11kV and <=22kV Operational Switch = 7% x (2 x ground mounted/enclosed substation sites)
  - 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

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

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

The data used to populate this table was extracted from WASP on 1 July 2020. The 'All Assets' report as at 30 June 2020 excluding; security lighting 'SCL' category, 'out of service' assets, private 'Asset Owner' and metered lights represent the total number of public lighting assets owned and maintained or only maintained by Essential Energy for FY20.

Methodology & Assumptions

The methodology for this table has changed this financial year in line with the changes made to the data in WASP this financial year to move to component billing which breaks the data in WASP down into luminaires, brackets and poles/columns.

Assumptions:

> 'Asset Owner' denotes the responsibility to maintain the public lighting asset.
> Assets with the same 'Asset Label' are unique poles in different vicinities.
> Luminaires: major road is defined as LED streetlights with a wattage >= 45 or non-LED streetlights with a wattage >= 150. This rule has been deviated from in two instances, where the Essential Energy Luminaire Replacement Matrix indicates that a 90/100W and 135W Low Pressure Sodium lamp is used on Category V3 major roads, along with the 100W and 120W High Pressure Sodium lamps used on a Category V5 major road. All remaining luminaires are classified as a minor road.
> The 'luminaire effective date' represents the date of installation of a luminaire and as such is assumed to be new as at the time of installation and the age of the asset is calculated from this date.
> The 'bracket effective date' represents the date of installation of a bracket and as such is assumed to be new as at the time of installation and the age of the asset is calculated from this date.
> The 'support effective date' represents the date of installation of a dedicated pole/column and as such is assumed to be new as at the time of installation and the age of the asset is calculated from this date.
> Where there was no 'bracket effective date' recorded, the 'luminaire effective date' was used. Where there was no 'luminaire effective date' recorded the 'bracket effective date' was used. Where neither of these were available the 'support effective date' was used for the 'bracket effective date' and 'luminaire effective date.'
> Where there was no 'support effective date', the 'bracket effective date' was used in the first instance, where this was not available, the 'pole installed date' was used.

- Where none of the above was available in terms of dates and where the status of an asset was ‘new’ or ‘proposed’ it was assumed these would be installed or have been installed post 30 July 2020.

  Additional filtering must be applied to bracket data to ‘Lighting Category’ to exclude ‘Under-Awning’ lighting, and also under ‘Support Type’ to exclude ‘Suspension’ lighting, as these types of support do not require the use of a Bracket.

The volume of luminaires: major road, brackets: major road and poles/columns: major road for 2019-2020 has been calculated by summing the unique asset identifier ‘Key’ for all LED streetlights with a wattage >= 45 or non-LED streetlights with a wattage >= 150.

The volume of luminaires: minor road, brackets: minor road and poles/columns: minor road for 2019-2020 has been calculated by summing the unique asset identifier ‘Key’ for all LED streetlights with a wattage < 45 or non-LED streetlights with a wattage < 150.

The mean of luminaires: major road and luminaires: minor road has been calculated by using the volume of 2019-2020 luminaires: major road and luminaires: minor road and categorising the volumes between LED and non-LED luminaires. The LED volume is multiplied by 10 years which is the economic life of an LED and the non-LED volume is multiplied by 20 years which is the economic life of a non-LED. The LED and non-LED totals are added together for the major roads divided by the total luminaires on major roads and the same process for minor roads.

The mean of brackets: major road and brackets: minor road has been calculated by using the volume of 2019-2020 brackets: major road and brackets: minor road. The bracket volume is multiplied by 35 years which is the economic life of a bracket then divided by the total brackets: major road and total brackets: minor road to obtain the average age.

The mean of poles/columns: major road and poles/columns: minor road has been calculated by using the volume of 2019-2020 poles/columns: major road and poles/columns: minor road. The poles/columns volume is multiplied by 35 years which is the economic life of a pole/column then divided by the total poles/columns: major road and total poles/columns: minor road to obtain the average age.

The standard deviation has been calculated using the square root of the mean for each of the asset categories above.

Use of Estimated Information

This data has been extracted from WASP. Estimated data was used for asset effective dates as described above where the data was not available.

Reliability of Information

Although this data is considered reliable, some caution should be applied if using this data for benchmarking or decision-making purposes.

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.
- Frequency Injection Relay age data based on similar baseline techniques used for baseline AFLC Plant. Moving from that point to the present; known failure rates (natural attrition), increasing Controlled Load Customer Base data, Bulk Replacement Program data and Stores Movement data have been used to determine the provided Age/SD profiles.

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.

Age profiles for Frequency Injection relays have been based on the same baseline approach used for AFLC plant. However, the progression from that initial point to the current Age/STD profile has been based on additional, separate estimations work based on known failure rates of relays, as well as known increases in Controlled Load population. New equipment installed figures are now supplied from 2010, based on available information sourced from Bulk Replacement program data, along with Stores inventory movements.

Reliability of Information

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

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

This is actual data from WASP and 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

This data is considered reliable.

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

This is actual data from WASP and 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

Although this data is considered reliable, some caution should be applied if using this data for benchmarking or decision-making purposes.

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

This is actual data from WASP and 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

Although this data is considered reliable, some caution should be applied if using this data for benchmarking or decision-making purposes.

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

This is actual data from WASP and 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

Although this data is considered reliable, some caution should be applied if using this data for benchmarking or decision making purposes..

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 merging Essential Energy's WASP database data with data from a previous audit as well as some estimation.

Methodology & Assumptions

SQL Logic:

- Includes assets categorised in WASP as "ZS Surge Diverter".
- Only EE 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 population age.

Use of Estimated Information

This is actual data from WASP combined with results from a surge diverter audit and 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

Although this data is considered reliable, some caution should be applied if using this data for benchmarking or decision-making purposes.

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

This is actual data from WASP and where the age of the of the Zone Substation Protection Relays is not known it is based on knowledge of the network and existing data in WASP.

Reliability of Information

Although this data is considered reliable, some caution should be applied if using this data for benchmarking or decision making purposes.

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

This data has been obtained from:

- Essential Energy's EDDiS database using SQL.
- Grouping of data in Excel.
- Assets captured in this category are those which have a purpose of providing billing consumption. Assets used to provide power quality information and not used for billing consumption information have not been included in this section.

Methodology & Assumptions

SQL logic:

- Only Essential Energy assets included.
- Meters are connected to a current market NMI.
- The meters have a meter install code of MRIM or Basic.

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

Type 6 meters have only been tracked in EDDiS since 2002. Before 2002 limited meter standing data was held in Essential Energy's and its predecessors billing systems.

Since 2002 all meters purchased have been loaded into EDDiS with their standing data upon receipt. One of the fields populated is the year of manufacture. When the meter was installed by the ASP the meter change would be updated in PEACE which would automatically update EDDiS where the meter standing data would be matched up with the meter installation details.

As a result, the year of manufacture data for meters installed since 2002 is complete and accurate, but the dates for meters installed before 2002 has been estimated.

The estimation of year of manufacture dates were calculated utilising data supplied by the meter manufacturers. The manufacturers supplied the years each of the meter models were manufactured. Each meter model was then evenly distributed within those years. EDDiS meter records were permanently update with this data to allow reporting from a common data set.

When reporting on these meters the UNKNOWN meter model meters are distributed in the same proportions as the known meter model meters.

As result of this estimation the year of manufacture is only accurate to the level of the period of each model's manufacture. Data at any lower resolution is affected by chance.

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. This data remains relevant with the RFM for the 2019-24 regulatory period.

For overhead conductors and underground cables a more refined methodology has been used to establish the mean life of the assets.

For public lighting calculations are based on the current economic lives of 10, 20 and 35 years for LED, non-LED luminaires and poles/columns respectively.

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.

The standard deviation for SCADA has been calculated using base data points.

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 201/20, the Winter of 2019 and the Summer of 2019/20 were used, which included the periods from April 1st 2019 to March 31st 2020. This method takes into account 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 and 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).

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.

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 based on best practise methodology in line with AER guidelines and although some calculations are performed it is considered to meet the requirements of actual information.

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 and individual zone substation data was obtained from demand meters (via IMDR) and from SCADA (via TrendSCADA). The calculation of weather corrected POE values requires weather station daily maximum temperatures.

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 2019/20, the winter of 2019 and the summer of 2019/20 was used, which included loads from April 1st 2019 to March 31st 2020. 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 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 2019/20 year was extracted from each site after it has been 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. 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.

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.

Table 5.4.1 Subtransmission and Zone Substations with MVA Peak different to MW Peak

Substation	Non-Coincident MVA Peak	Date and Time of MVA Peak
Alstonville	12.441	3/02/2020 17:00
Bundarra	1.304	7/03/2020 16:00
Bourke 22kV	5.457	29/03/2020 17:30
Bourke 33kV	2.795	11/09/2019 7:00
Bendick Murrell	1.754	31/01/2020 18:00
Bourkelands	12.834	1/02/2020 18:00
Bellata	1.002	5/01/2020 19:30
Russell Street	68.607	18/12/2019 13:00
Cobar CSA	21.453	8/01/2020 16:30
Colly Blue	1.312	4/01/2020 19:00
Captains Flat	3.806	1/02/2020 17:30
Clinton Street	16.059	31/01/2020 16:30
Dubbo 132/66kV	60.628	31/01/2020 15:00
Forest Hill	6.065	30/01/2020 14:30
Gundagai South	6.389	31/01/2020 18:30
Gunnedah 22kV	23.043	30/01/2020 18:30
Googong Dam	2.614	2/11/2019 12:30
Ginkgo	6.795	24/09/2019 6:00
Hanwood	12.418	31/01/2020 17:00
Jerilderie	3.260	31/01/2020 20:00
Jugiong	1.878	10/01/2020 14:00
Kootingal	6.601	2/02/2020 18:00
Manildra	45.170	1/12/2019 13:30
Menindee	0.915	29/12/2019 20:00
Maclean 66/11kV	10.072	19/02/2020 18:00
Moruya North	31.393	8/06/2019 18:00
Mt Gipps 6.6kV	0.947	3/05/2019 4:30
Nericon	2.146	21/12/2019 9:00
Providence Portal	0.390	31/08/2019 12:00
Raglan	24.002	31/01/2020 18:30
Ringwood Road	2.675	10/01/2020 12:30
Snowy Adit 11kV	0.043	28/04/2019 9:00
Steeple Flat 132/66kV	5.943	1/08/2019 8:30

Substation	Non-Coincident MVA Peak	Date and Time of MVA Peak
Talbingo	1.233	25/07/2019 12:00
Tumbarumba	8.830	16/08/2019 0:30
Warrawidgee	1.403	31/01/2020 21:30
Woolgoolga	18.129	28/01/2020 11:30
Wingham	11.314	23/01/2020 17:00
Widgelli	0.375	31/01/2020 22:30
West Jemalong	2.589	22/12/2019 19:00
Wallangra	0.308	21/02/2020 8:00
Walcha South 66/22kV	1.931	11/08/2019 18:30
Wenna	6.285	15/09/2019 14:30
Woodlawn	10.636	23/01/2020 18:00

Changes to sites reported

Current Year;

- Boundary Street has been decommissioned.
- Maher Street has changed its configuration to now include both 33kV and 11kV outgoing feeders, still supplied from the 66kV network. The Maher Street site reported in previous RINs is now Maher Street 11, and Maher Street 33 has been added.

2018/19 changes;

- There are no changes that affect the number of sites reported in this year.

2017/18 changes;

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

2016/17 changes;

- Junee Zone Substation changed its configuration to now be supplied from the 132kV network, with both 66kV and 11kV outgoing feeders. The Junee site reported in previous RINs is now Junee 11kV, and Junee 66kV has been added.
- Shannon Creek was identified as an eligible zone substation, so it is now included in this table.
- Steeple Flat 22kV has been reported in prior RINs, however it has now been removed as it does not satisfy the zone substation definition.
- Thredbo had previously been reported as two separate sites - the snowmaker and the village. The site is now combined in line with the forecasting performed by Essential Energy, as there was no benefit in performing the weather correction and load forecasting separately.

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

Data is actual.

The Weather corrected 10% and 50% POEs are based on best practise methodology in line with AER guidelines and although some calculations are performed it is considered to meet the requirements of actual information.

Reliability of Information

Most data for the 2019/20 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 19-20".

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 1-8".

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.

In the RIN Access Database 2019-20 run the following query for the financial year:

- Run and View Monthly Reliability Reporting Data – forms the base for this table query.
  - This query collates outages by feeder.
- Using the group of RESET RIN Interruptions List 1-8, and Avg Cust Base RIN 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 Detailed Reason for Interruption where:
    - Cause = Asset failure; Equipment Type = 'includes *LV*, then Detailed Reason = LV
  - RESET RIN Interruptions List 4: updates Reason for Interruption and Detailed Reason for Interruption where:
    - Outage Type = Planned, then Cause = Planned and Detailed Reason = blank
  - RESET RIN Interruptions List 5: updates Reason for Interruption where:
    - Outage Type = Unplanned; Cause = Planned, then Reason = Other
  - RESET RIN Interruptions List 6: updates Reason for Interruption where:
  - TransGrid = Y, then Detailed Reason = 5 - STPIS Exclusion (3.3)(a)

- RESET RIN Interruptions List 6_1: updates Reason for Interruption where -
  - TFB NFF = Y: 7 - STPIS Exclusion (3.3)(a), then Detailed Reason = blank
- RESET RIN Interruptions List 6_2: updates Reason for Interruption where –
  - DDE = Y: 8 – STPIS Exclusion (3.3)(a), then Detailed Reason = blank
- 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 Avg Cust Base RIN.

- Effect on SAIDI and SAIFI can be cross-referenced with sheet “19-20 Data”:
  - Total Unplanned when filtered by Feeder Classification
  - Normalised when filtered by Feeder Classification, MED = N, Reason for Interruption <> 5 – STPIS Exclusion (3.3)(a), Reason for Interruption <>7 – STPIS Exclusion (3.3)1), and Reason for Interruption <> 8 – 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

This information is considered actual.

Reliability of Information

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