Response to Economic Benchmarking RIN 2014-15

essential energy

1. Contents

Purpose

The Economic Benchmarking Regulatory Information Notice (Economic Benchmarking RIN) requires Essential Energy to prepare a Basis of Preparation. By this, the AER mean that for every variable in the Templates, Essential Energy must explain the basis upon which we prepared information to populate the input cells. The Basis of Preparation must be a separate document (or documents) that Essential Energy submits with its completed Templates. The AER will publish Essential Energy's Basis of Preparation along with the Templates.

This document is Essential Energy's Basis of Preparation in relation to the Audited Information required to be submitted to the AER on 15 November 2015.

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.

To do this, the AER recommended that Essential Energy structures its Basis of Preparation with a separate section to match each of the worksheets titled "3.1 Revenue" to "3.7.3 Service Area Factors" in the Templates.

The AER noted that Essential Energy may consider structuring these sections with subheadings for each subject matter table in each worksheet. For example, for the worksheet "3.4. Operational data", Essential Energy would explain its Basis of Preparation for the Variables under the heading "3.4.1 Energy delivery", "3.4.2 Customer numbers" and "3.4.3 System demand". Essential Energy's Basis of Preparation has followed this recommended structure.

Essential Energy must include in its Basis of Preparation, any other information Essential Energy prepares in accordance with the requirements of the Notice (including this document). For example, if Essential Energy chooses to disaggregate its RAB using its own approach in addition to the AER's standard approach, Essential Energy must explain this in its Basis of Preparation.

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

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 applied 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: (i) why an estimate was required, including why it was not possible for Essential Energy to use Actual Information; (ii) 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: (i) the nature of the change; and (ii) 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.

Structure of this document
The document is structured as follows:

- We outline our general approach to developing our response to the RIN. We identify key systems used to provide data, note issues relating to data quality, and make comments on the reliability of the data for economic benchmarking purposes.

- We set out our response to worksheets 3.1 to 3.7.3, in accordance with the AER's instructions. We note that Worksheet 1 requires no input material.

General approach

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

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

Essential Energy has explained the reliability of the information, and set out where caution should be applied by the AER in the application of the data to economic benchmarking models. We note that this issue has been raised with the AER in consultations relating to this notice.

1.1 Systems used to provide data

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

1.2 Data quality issues

In previous consultations on the RIN, Essential Energy raised significant concerns with providing some of the data in the form required by the AER. Although the RIN specifies that all data provided is to be actual (not estimated) from 2014/15 onwards, we do not have the information to be able to provide this for all tables and the cost of putting in systems to be able to provide this information is prohibitive and would require a long time to implement.

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

1.3 Approaching our obligations under the NEL

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

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

Despite this, Essential Energy has prepared and included the estimated data using "best estimates" given the resources and time available to complete the detailed templates.

1.4 Recognition by AER that "best estimates" are not robust

The AER has acknowledged that if we are compelled to provide best estimates then there is potential for the data to lack robustness. Essential Energy has addressed the

implications of using best estimates which are not robust in its Basis of Preparation to accompany the final Audited Information.

1.5 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, then information has been estimated on the basis which Essential Energy considers provides 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 variations have been identified and explained.

1.6 Reliability of applying data to economic benchmarking

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

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

Worksheet 3.1 – Revenue

3.1.1 Revenue grouping by chargeable quantity, and

3.1.2 Revenue grouping by customer type or class

Compliance with requirements of the notice

This section contains data on the revenue allocated to the Regulated Network business as shown in 2014-15's regulatory returns as per the requested groupings. The revenue has been determined on an "as billed" basis.

Source of information

Total revenue amounts have been sourced from the annual regulatory accounts with the inclusion of the miscellaneous and monopoly fees and emergency response works.

The 2014/15 Pricing Model, as provided to the AER, has been used to prorate the total revenue into the requested chargeable quantity and customer type line items.

Revenue for Connection Services DREV0111 relates to revenue from Miscellaneous and Monopoly Services (MMS) and is sourced from data used to compile the annual regulatory accounts.

Revenue for SLUOS DREV0112 (Alternative Control) is sourced from the audited annual regulatory accounts.

Revenue from other sources DREV0113 relates to Emergency Recoverable Works (ERW) and is sourced from data used to compile the annual regulatory accounts.

Revenue from Other Customers DREV0206 relates to MMS and ERW income and is linked to the tables above.

Methodology and Assumptions

Total revenue from SLUOS is taken from the annual regulatory accounts.

The 2014/15 Pricing Model, as provided to the AER, provides Distribution consumption and revenue at a segment level.

The categories requested in Table 3.1.1 are not provided in the Regulatory Accounts therefore the total dollars has been prorated on The relevant tariffs in the 2014/15 Pricing Model.

The following tables below show how the total revenue amounts from the annual regulatory accounts have been apportioned using data from the 2014/15 Pricing Model into the RIN template, for Tables 3.1.1 and 3.1.2.

Table 3.1.1

Variable Code	Variable	Standard Control Services	Alternative Control Services
DREV0101	Revenue from Fixed	Total regulatory	Not applicable

	Customer Charges	accounts prorated to Total Fixed DUOS revenue in the 2014/15 Pricing Model	
DREV0102	Revenue from Energy Delivery charges where time of use is not a determinant	Total regulatory accounts prorated to Anytime energy tariffs DUOS revenue in the 2014/15 Pricing Model	Not applicable
DREV0103	Revenue from On–Peak Energy Delivery charges	Total regulatory accounts prorated to previous years proportion and TOU tariffs DUOS revenue in the 2014/15 Pricing Model	Not applicable
DREV0104	Revenue from Shoulder period Energy Delivery Charges	Total regulatory accounts prorated to previous years proportion and TOU tariffs DUOS revenue in the 2014/15 Pricing Model	Not applicable
DREV0105	Revenue from Off–Peak Energy Delivery charges	Total regulatory accounts prorated to previous years proportion and TOU tariffs DUOS revenue in the 2014/15 Pricing Model	Not applicable
DREV0106	Revenue from controlled load customer charges	Total regulatory accounts prorated to CL tariffs DUOS revenue in the 2014/15 Pricing Model	Not applicable
DREV0107	Revenue from unmetered supplies	Total regulatory accounts prorated to Lighting tariffs DUOS revenue in the 2014/15 Pricing Model	
DREV0108	Revenue from Contracted Maximum Demand charges	Total regulatory accounts prorated to Capacity tariffs DUOS revenue in the 2014/15 Pricing Model	Not applicable
DREV0109	Revenue from Measured Maximum Demand charges	Total regulatory accounts prorated to Demand tariffs DUOS revenue in the 2014/15 Pricing Model	Not applicable
DREV0110	Revenue from	Not applicable	Not applicable

	metering charges		
DREV0111	Revenue from connection charges	Sourced from data used to compile the annual regulatory accounts	Not applicable
DREV0112	Revenue from public lighting charges	Not applicable	SLUOS charges as reported in annual regulatory accounts
DREV0113	Revenue from other Sources	Sourced from data used to compile the annual regulatory accounts	Not applicable

Table 3.1.2

Variable Code	Variable	Standard Control Services	Alternative Control Services
DREV0201	Revenue from residential Customers	Regulatory accounts proportioned to 2014/15 Pricing Model – Residential including Controlled Load	Not applicable
DREV0202	Revenue from non-residential customers not on demand tariffs	Regulatory accounts proportioned to 2014/15 Pricing Model – Business Continuous Business TOU <100 MWH Business TOU >100 MWH	Not applicable
DREV0203	Revenue from non-residential low voltage demand tariff customers	Regulatory accounts proportioned to 2014/15 Pricing Model – Low Voltage Demand	Not applicable
DREV0204	Revenue from non-residential high voltage demand tariff customers	Regulatory accounts proportioned to 2014/15 Pricing Model – Industrial (including High Voltage, Subtransmission, Site Specific, Inter Distributor Transfers)	Not applicable
DREV0205	Revenue from unmetered supplies	Regulatory accounts proportioned to 2014/15 Pricing Model – Streetlighting	Not applicable
DREV0206	Revenue from Other Customers	Revenue from Miscellaneous and Monopoly fees and Emergency Recoverable Works	Not applicable

Use of estimated information

As the 2014/15 Pricing Model and the previous year's Economic Benchmarking RIN were used to prorate the total revenue figures from the annual regulatory accounts into individual line items, the information is considered to be estimated.

Material accounting policy changes

Not applicable.

Reliability of information

The total revenues provided in these tables are considered to be reliable, however the splits into different categories are based on assumptions and estimates and caution should be used when using this for benchmarking or decision making purposes.

3.1.3 Revenue (penalties) allowed (deducted) through incentive schemes

Compliance with requirements of the notice

Essential Energy has reported the penalties or rewards of incentive schemes in this table.

Revenues reported in Table 3.1.3 reflect the effect on revenues of incentive schemes in the year that the penalty or reward is applied.

Source of information

Data has been sourced from the incentive scheme payments which Essential Energy has received.

Methodology and Assumptions

This table requires data about the payments received by Essential Energy under the EBSS, STPIS, and other schemes. As the EBSS and STPIS schemes are yet to commence for Essential Energy, there is no amount to report. The only incentive scheme applicable to Essential Energy at this time is the DMIS, which provides the company with an allowance of $600,000 annually. As such, no methodology was required to arrive at this amount.

Use of estimated information

As the data provided in this table is factual, it was not necessary to make any estimations

Material accounting policy changes

Not applicable.

Reliability of information

The data provided in this table is considered to be reliable.

Worksheet 3.2 – Opex

3.2.1.1 Current opex categories and cost allocations

Compliance with requirements of the notice

This section contains data on various opex categories allocated to the Regulated Network business.

Source of information

Data has been sourced from the annual regulatory accounts and budgets.

Methodology and Assumptions

The data is the same as the figures in Table 3.2.1.2A.

Use of estimated information

Refer to Methodology and Assumptions section mentioned above.

Material accounting policy changes

Refer to Methodology and Assumptions section mentioned above.

Reliability of information

The data was sourced from the annual regulatory accounts and is therefore considered to be reliable.

3.2.1.2 A, B & C Historical opex categories and cost allocations

Compliance with requirements of the notice

This section contains data on various opex categories allocated to the Regulated Network business as shown in the regulatory returns.

Essential Energy has reported its historical Opex categories in accordance with the Opex activities within the annual reporting requirements.

Source of information

Data has been sourced from the annual regulatory accounts.

Methodology and Assumptions

The data for all opex categories was sourced from the annual regulatory accounts.

The data contained within the Alternative Control Services section of the Other Operating Expenditures line was sourced from the Public Lighting opex section of the annual regulatory accounts.

Use of estimated information

There has been no use of estimated information in the opex categories listed in this table as the numbers are ultimately sourced from opex figures disclosed in the annual regulatory accounts.

Material accounting policy changes

Essential Energy has not undertaken any material changes in accounting policies.

Reliability of information

The data used for the compilation of this expenditure was sourced from the annual regulatory accounts and is therefore considered to be reliable.

3.2.2.1 Opex consistency - current cost allocation approach

Compliance with requirements of the notice

Essential Energy believes that no material changes have occurred in either our cost allocation approach or method of preparation of the annual regulatory accounts. Therefore this table replicates Table 3.2.2.2.

3.2.2.2 Opex consistency - historical cost allocation approaches

Compliance with requirements of the notice

This section contains data on various opex categories allocated to the Regulated Network business as shown in the regulatory returns.

Essential Energy has reported Opex in accordance with the requirements of the Cost Allocation Approach (CAM) and reflects amounts reported in the annual regulatory accounts.

Source of information

Data has been sourced from the annual regulatory trial balance, as well as other tables in the Economic Benchmarking RIN, namely, Table 3.2.1.2A Historical Opex Categories and Cost Allocations.

Methodology and Assumptions

Opex for Network Services

It was assumed that all of Network Services expenditure was already captured in Table 3.2.1.2A Historical Opex Categories and Cost Allocations. As such, this row is equal to the Total Opex for Standard Control Services row in that table, less any expenditure captured in the remainder of Table 3.2.2.2 for Standard Control Services.

Opex for Metering

In preparation for type 5-6 metering to be included under Alternative Control Services from 2015-16 onwards, Type 5-6 metering costs are all now costed to projects in the finance system.

The methodology applied to capture metering opex was to extract data from the annual regulatory trial balance at a metering project type level.
Metering costs for the 2014-15 financial year appear inflated, due to the inclusion of over $14M in redundancy expense.

Opex for Connection Services
In preparation for ancillary network services to be included under Alternative Control Services from 2015-16 onwards, connection services costs are all now costed to projects in the finance system.

The methodology applied to capture connections opex was to extract data from the annual regulatory trial balance at a connections project type level.

Opex for Public Lighting
The data in this row is equal to the data in the Alternative Control Services section of the Other Operating Expenditures row in Table 3.2.1.2A Historical opex categories and cost allocations, which solely comprises public lighting costs.

Opex for amounts payable for easement levy or similar direct charges on DNSP
Essential Energy has no such amounts.

Opex for transmission connection point planning
Essential Energy has no such amounts.

Use of estimated information

There has been no use of estimated information in the opex categories mentioned above as the numbers are ultimately sourced from opex figures disclosed in the annual regulatory accounts.

Material accounting policy changes

Essential Energy has not undertaken any material changes in accounting policies around the items reported in Table 3.2.2.2 over the 2014/15 financial year.

Reliability of information

The totals used for the compilation of this expenditure were ultimately sourced from the RIN, and are therefore considered to be reliable.

3.2.4 Opex for high voltage customers

Compliance with requirements of the notice

This section contains data on the opex that would have been incurred by Essential Energy, had it owned the transformer assets owned by its high voltage customers.

Source of information

Information on the number of high voltage customers connected to the Essential Energy network was sourced from an Excel database maintained by Essential Energy's HV Network Connections Group and validated by way of a HV customer report from Essential Energy's customer management system Energy/Peace.

Historical maximum monthly demand was extracted from Essential Energy's metering database "EDDIS" which in turn supplies data for the network billing function.

HV customer connection dates were sourced from signed Customer Connection Agreements stored in Essential Energy's document database 'Objective' (copies also located in the HV Connection Group shared drive).

Methodology and Assumptions

HV customer data includes maximum kVA per connection customer.

As no data is held on private customer high voltage assets the following assumptions were made to develop an asset base for estimating costs:

1. Customers with a demand over 5,000kVA and/or a connection voltage of over 33kV have a zone substation to reduce voltages to distribution level, typically 11kV, excluding generators.

2. Customers with a demand less than 5000kVA and connection voltage of 33kV or less have no zone substation to reduce voltages for connection to distribution substations.

3. The number of zone substations as per assumption 1 above is one per connection.

4. The number of distribution substations is one per 500kVA of demand or part thereof.

5. No allowance has been made for overhead or underground circuits or switchgear as there is no basis on which to determine this.

Whilst there is no detail of the asset types, condition or required maintenance, a simple estimate of an assumed annual maintenance cost has been developed for the quantities that were derived in the assumptions above. This estimate is of direct costs only, and excludes overhead costs.

Internal costing estimates, covering Labour, Fleet, Materials and Travel costs were used to estimate the costs of sites falling under and over 5MVA. Maintenance and running costs for HV sites over 5 MVA are significantly higher than for those which are under 5 MVA. As this covered only direct costs, overhead costs have been excluded.

The rationale for showing direct costs only and excluding overhead costs is that Essential Energy should only be reflecting the incremental costs to the business.

Use of estimated information

A very high level estimate has been used to prepare the table of costs. This table of costs has been applied to an assumed asset base in circumstances where neither

the quantity, type, age nor condition of the components is known to Essential Energy. The type of equipment used by each HV site was estimated based on maximum demand and the costs associated with each site was estimated based on estimates of Essential Energy's own running costs for such equipment.

Material accounting policy changes

Essential Energy has not undertaken any material changes in accounting policies.

Reliability of information

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

The data used for the compilation of this expenditure is highly unreliable and it is not advised that it can be used for any purpose with any degree of certainty. It should not be used for the purposes of any benchmarking activity. Essential Energy cannot report with any level of accuracy, on the private equipment owned by its high voltage customers, or the operating and maintenance costs of equipment which it does not own or manage.

Worksheet 3.2.3 – Provisions

3.2.3 Provisions

Compliance with requirements of the notice

This section contains data on provisions allocated to the Regulated Network business as shown in the 2015 Economic Benchmarking RIN.

Essential Energy has performed the following:

- reported financial information on provisions for Standard Control Services in accordance with the requirements of the Cost Allocation Method and the Annual Regulatory Accounts that were in effect for the current Regulatory Year,
- reported financial information for each of its individual provisions,
- specified the name of the provision and added Variable codes for line items,
- reported provisions in accordance with the principles and policies within the Annual Reporting Requirements for the current Regulatory Year.

Financial information on provisions reconcile to the reported amounts for provisions in the Annual Regulatory Accounts. Immaterial differences in opening and closing values were noted due to the rounding of numbers.

Source of information

Data has been sourced from workpapers used in the preparation of the 2015 statutory financial statements, and workpapers used in the preparation of the 2015 Annual Regulatory Accounts.

Methodology and Assumptions

The sign convention applied is consistent with the Annual Regulatory Accounts where provision values are expressed as negatives, with provision increases also expressed as negatives.

The methodology and assumptions employed for 2015 are similar to those applied in the previous Economic Benchmarking RIN. The Standard Control portion of the movement in the respective provision was estimated, and an estimated component relating to capital expenditure was calculated on labour related provisions.

The assumption has been applied that a portion of the increase in employee related provisions (employee entitlements, workers' compensation, and defined benefit superannuation) directly feeds through into capital projects from the labour overhead process. This process allocates various labour overheads (eg. leave provision increases, superannuation expense, etc.) across operating expenditure and capital expenditure. No allowance has been made for any indirect form of capital allocation of the operating expenditure component of these provisions. For 2015 other provision types, as a general rule, would have had increases/decreases applied against an account range within mostly corporate departments (eg. Department 130, "General Counsel"). The corporate allocation process would then have shifted these costs within operating expenditure with no direct capital impact. For the purpose of the 2015 return, and similar to labour oncosts, no allowance has been made for any indirect capital allocation process.

For the 2015 Economic Benchmarking RIN, data on the increase in the provision over time (interest unwinding) and the effect of any change in discount rate have been split out for employee entitlements and the defined benefit superannuation provision. In reference to the defined benefit superannuation provision, this data has been provided by the actuary for the EISS, which is the major component of this provision. The employee entitlement data has been estimated by the senior commercial accountant responsible for payroll.

Use of estimated information

- Where the provision does not relate wholly to the Regulated Network, Essential Energy has used estimated information for the Standard Control business' share of provision movements, and the component of provision increases/decreases in the employee related provisions directly transferred to capital projects.

  An approach consistent with that applied in the 2011 to 2014 Economic Benchmarking RINs was adopted to derive the required movement data. This methodology has been subject to external audit in those years and has been re-applied for 2015. Please note that for 2015, Essential Energy is not required to provide a regulatory balance sheet.

- The component of labour related provisions estimated to have been directly transferred to capital projects as part of the labour overhead allocation process is based upon the rate of labour overheads transferred to capital from the 2015 Board Labour report.

Material accounting policy changes

There were no material accounting policy changes during 2015.

Reliability of information

Data used for the initial provision tables has been sourced from workpapers that support both the statutory accounts and the Annual Regulatory Accounts for 2015. Therefore the information provided in this table is considered to be reliable.

Worksheet 3.3 – Assets (RAB) Standard Approach

3.3.1 Regulatory Asset Base Values,

3.3.2 Asset Value Roll Forward,

3.3.3 Total Disaggregated RAB Asset Values, and

3.3.4 Asset Lives

Compliance with requirements of the notice

In the following subheadings we demonstrate how the information provided is consistent with the requirements of this Notice.

Essential Energy has:

- Reported its RAB assets in line with the asset input categories for economic benchmarking.
- Excluded Metering Services from the Network Services data.
- Reported its RAB values in accordance with the standard approach in section 4.1.1 and the assets (RAB) Financial Reporting Framework in box 7 of the Economic Benchmarking RIN for DNSPs Instructions and Definitions document.
- Included Substation land in the Substation categories.
- Reported capital contributions as DRAB13.
- No dual function assets.
- Reconciled the data between tables 3.3.1 and 3.3.2.
- Reported an Easements value as this data has been previously recorded.
- Used an average of the opening and closing RAB values for each category in completing Table 3.3.3.
- Reported asset lives in accordance with the category definitions provided in Chapter 9 of the Economic Benchmarking RIN for DNSPs Instructions and Definitions document.
- Calculated residual asset lives by weighting the lives of individual assets within that category.
- Whilst Substation Land is included in the RAB values for Substations, it has been assumed to have an indefinite life. As such, it has not formed part of the residual life calculations.

Glossary:

Term	Meaning
ACS	Alternative Control Services
PTRM	Post Tax Revenue model
RAB	Regulatory Asset Base
RFM	Roll Forward Model
RIN	Regulatory Information Notice
SCS	Standard Control Services

Source of information

There are ten main sources used to obtain the information for the RAB workings:

1. The **2014-15 annual regulatory accounts** and associated capex workpapers.
2. The **2014-19 Final Determination PTRM for Standard Control** – used for determining 2015 opening RAB values, standard lives and carried forward residual asset lives in the SCS RFM 2014-19 model.
3. The **2014-19 Final Determination PTRM for Metering** – used for Metering asset opening RAB values, standard lives and carried forward residual asset lives in the ACS RFM 2014-19 model.
4. The **2014-19 Final Determination Meter Pricing Model** from the AER – this has been used to derive the relevant portions of assets to be moved from SCS to ACS, ie. 84% of Metering & Load Control Assets and 1.4% of non-system assets. The RFM amounts from this model have also been used in creating the ACS RFM 2014-19 model as they contain a better breakdown of the opening ACS RAB than the 2014-19 Final Determination Metering PTRM (which had just two types of assets – Meters (which included non-system assets) and Equity Raising Costs).
5. The **SCS RFM 2014-19** – based on the final determination PTRM, the RFM for 2014-19 has been built and the 2014-15 actuals for capex, disposals and capital contributions entered to obtain the associated inflation addition and straight line depreciation amounts.
6. The **ACS RFM 2014-19** – based on the final determination PTRM for Metering and the Final Determination Meter Pricing Model, the RFM for 2014-19 has been built and the 2014-15 actuals for capex, disposals and capital contributions entered to obtain the associated inflation addition and straight line depreciation amounts.
7. The **System assets Fixed Asset Register (FAR) as at 30 June 2015**. This contains the asset financial information by asset class as well as the depreciated cost base at that date. It has been used to determine the percentages to disaggregate RAB categories in the RFM that could not be directly apportioned. It has been assumed that the asset splits in the FAR are consistent with the asset splits in the RAB. The rates for 2015 were compared to the rates used for 2014 and 2013 and found to be materially consistent. On this basis, the 2015 FAR derived rates have been used for 2015 disaggregated data splits.
8. **Economic Benchmarking RIN sheet 3.2.3 Provisions**, for the details of workers comp and employee entitlements provision movements to determine the adjustments to capex for any non-cash provision movements during the year (in line with the AER's 2014-19 Final Determination for Essential Energy).

9. **Development of weighting factors for mapping of average age workbook** – this sheet has been prepared by the Asset Management Team to roll forward unit rates from the Reset RIN (to ensure the relevance of asset weightings when determining asset ages).
10. **Table 5.2 Average Asset Age** from the 2014-15 Category Analysis RIN - this has been used to determine the average asset age by asset category.

Methodology and Assumptions

In this section we explain the methodology Essential Energy applied to provide the required information, including any assumptions Essential Energy made.

The main assumptions are:

- FAR splits at 30 June 2015 are representative of the RAB asset splits for assets requiring disaggregation. The rates are materially consistent with the splits from 2013 and 2014.
- Other long life assets comprise: Furniture, Fittings, Plant & Equipment, Buildings, Land (non-system), Other non-system assets and Equity raising costs.
- Other short life assets comprise: Communications, IT systems and Motor Vehicles.
- WIP, Emergency Spares, RAB adjustment and Deferred depreciation asset categories are no longer relevant to Essential Energy, in line with the 2014-19 Final Determination.
- 2015 starting RAB values for Standard Control and Network Services do not equal the 2014 closing balances as the 2015 opening amounts have been adjusted for capitalised provisions in line with the 2014-19 Final Determination.
- The calculated regulatory period end adjustments to capex, ie. the difference between actual and forecast net capex and the return on difference of net capex have been included in the 2015 RAB addition amounts.
- **The Final Determination Metering PTRM was modified to split non-system assets from Meter assets,** ie in the Final Determination Metering PTRM the RAB was just one value against the asset class “Meters”. This has been split to encompass each asset class identified in the Metering Model opening RAB value. The opening 2014-15 standard lives and residual asset lives for non-system assets have been aligned with the SCS PTRM as these assets are shared assets. The total opening book and tax values were fully reconciled to the Final Determination Metering PTRM. This adjustment will ensure that the opening metering RAB is correctly classified and depreciated accordingly.
- **Actual additions reported in the RAB from 2015 onwards differ from those reported in the Annual Financial Statements by the amount of any capitalised provisions adjustments.** This is consistent with the AER’s Final Determination for 2014-19 and its retrospective adjustments to the RFM for 2009-14. The amounts also differ as a result of the WACC inflation applied to disposals and additions in the RFM.

Scope of services

As specified in section 9 of the AER Economic Benchmarking Instructions and Definitions for Essential Energy, Fee Based and Quoted Services are already excluded from Essential Energy’s 2015 RAB values.

Alternative Control numbers

Alternative Control RAB numbers are from the ACS RFM and apply to Metering only.

Network Services & Standard Control numbers

Network Services numbers are identical to the Standard Control numbers and come from the SCS RFM.

Allocating the RFM asset category data to the RAB worksheet asset categories

As in prior years, some RAB financial information was able to be directly allocated to a group of RAB assets, whilst other information required disaggregation. These classes are summarised in the two tables below.

Table 1. RAB categories that have been directly apportioned

OLD RAB category	New RAB category	Assumptions
Customer Metering and Load Control	Meters	Assumed load control is part of Meters category
Easements	Easements	
Communications	Other assets with short lives	
Motor Vehicles	Other assets with short lives	Assumed to be a short life asset as standard life is <10 years*
IT systems	Other assets with short lives	
Furniture, fittings, plant & equipment	Other assets with long lives	Assumed to be a long life asset as standard life is >10 years*
Land	Other assets with long lives	
Buildings	Other assets with long lives	
Land	Other assets with long lives	Land is assumed to not depreciate
Other non-system assets	Other assets with long lives	Assumed to be a long life asset as standard life is >10 years*
Equity raising costs		Assumed to be a long life asset as standard life is >10 years*

* In line with section 9 of the AER Economic Benchmarking Instructions and Definitions for Essential Energy.

Table 2. RAB categories that required disaggregation

Old RAB categories	New AER categories
1. Low voltage lines and cables 2. Distribution lines and cables 3. Sub transmission lines and cables	1. Overhead network assets <33kV 2. Underground network assets <33kV 3. Overhead network assets 33kV and above 4. Underground network assets 33kV and above
1. Substations 2. Transformers 3. Land related to Substations	1. Distribution substations including transformers 2. Zone substations including transformers

The data for directly apportioned RAB categories could be taken directly from the relevant RFMs. The disaggregated RAB categories, however, required disaggregation. This has taken place in a consistent manner with prior year approaches and is described below.

Disaggregating RAB values

- **For opening RAB value, inflation, depreciation and disposals**
  To disaggregate the RAB categories noted in Table 2 above, a breakdown of the system assets Fixed Asset Register by asset class as at 30 June 2015 was obtained. The (more detailed) existing asset classes on this register were then mapped to the new AER RAB categories. The results of this mapping were then summarised in a pivot table to give the depreciated

replacement cost by new AER RAB category. The proportions of this analysis were then applied to the 2014-15 opening balances, inflation, depreciation and disposals data in the 2014-19 SCS RFM.

- **For additions**
  Additions data for system assets was sourced from the Regulatory capex working papers. These workpapers have the annual system capex broken down into project types. By aligning the project type to the new RAB categories, Essential Energy was able to restate additions under the 3.3 Assets (RAB) worksheet categories.

Table 3.3.1 Regulatory Asset Base Values

This table is a summation of the asset data contained in Table 3.3.2 Asset Value Roll Forward. Formulas have been entered accordingly. The data in this table reconciles to the total of the relevant 2014-19 RFMs, ie. Network Services and Standard Control Services equal the SCS RFM and Alternative Control Services equals the ACS RFMS.

Table 3.3.2 Asset Value Roll Forward

As described above, once the proportions for asset categories that required disaggregation had taken place, it was just a case of linking the data from the relevant RFM into the relevant sections of Table 3.3.2. A brief explanation for each line follows:

OPENING RAB VALUE

- The 2015 opening RAB values were taken directly from the relevant 2014-19 RFM(s) for assets that were directly apportioned or were multiplied by the relevant percentage for assets that required disaggregation.

INFLATION ADDITIONS

- The 2015 inflation additions were taken directly from the relevant 2014-19 RFM(s) for assets that were directly apportioned or were multiplied by the relevant percentage for assets that required disaggregation.

STRAIGHT LINE DEPRECIATION

- The 2015 straight line values were taken directly from the relevant 2014-19 RFM(s) for assets that were directly apportioned or were multiplied by the relevant percentage for assets that required disaggregation.

REGULATORY DEPRECIATION

- The sum of the inflation addition and the straight line depreciation rows equals the regulatory depreciation amount for each asset category.

DISPOSALS

- The 2015 disposals were taken directly from the input sheet in the RFM for assets that were directly apportioned or were multiplied by the relevant percentage for assets that required disaggregation.
- All disposal values have been multiplied by (1+the relevant vanilla WACC rate)^0.5 in line with their treatment within the RFM model.

ADDITIONS

- These numbers are net of customer contributions and were either taken directly from the annual RIN (non-system assets) or from the Regulatory capex workpapers aligned to the new RAB categories.

- The system amounts have been adjusted to remove the non-cash portion of capitalised provisions in line with the AER's 2014-19 Final Determination.
- For each category the resulting dollars have been inflated by (1+the relevant vanilla WACC rate)^0.5 to align with the RFM model.
- Note: the adjustments made at the end of the 2009-14 period have been adjusted for in the additions line for each asset class in 2014, ie. they have not impacted the 2015 data.

CLOSING RAB VALUE

- The 2015 closing RAB values were then calculated using the inputs above and cross checked to the relevant RFM(s) results to ensure accuracy.

CAPITAL CONTRIBUTIONS

The RAB additions noted are exclusive of capital contributions. The capital contributions Essential Energy has have been reported accordingly. The values have been taken directly from the Annual RIN.

The Metering and Load Control capital contributions were apportioned between ACS and SCS using the 84% / 16% split derived in creating the opening RAB in the Meter Pricing model. All other capital contributions have been reported in the Standard Control (and Network Services) tables.

As such, the ACS related portion has been removed in reporting the Network Services figures, which is consistent with RIN instructions.

Table 3.3.3 Total Disaggregated RAB Asset Values

This table is a direct feed of the average opening and closing RAB values by asset category derived in Table 3.3.2. Formulas have been entered accordingly.

Table 3.3.4.1 Asset Lives – Estimated Service Life of New Assets

- The Estimated Service Life of New Assets for Standard Control and Network Services assets remain unchanged from prior year workings. This is considered reasonable on the basis that the assets comprising each category would remain in fairly constant proportion over time.
- The initial service lives were based on 2013 RIN data and, as further evidence of reasonability, are comparable to the asset lives within the PTRM models.

Table 3.3.4.2 Asset Lives – Estimated Residual Service Life

For the disaggregated asset categories:

- The asset data for the five categories of Poles, Overhead Conductors, Underground Cables, Transformers,and Switchgear was taken from Category Analysis RIN Table 5.2 Asset Age Profile.
- Each line item within these asset categories was aligned to the appropriate RAB category.
- The Average Age of each line item, based on its installation year, was calculated, along with the Total Asset Quantity.
- The Unit Cost for each item was taken from a combination of Essential Energy's 2009-10 to 2013-14 Unit Costs, Essential Energy's forecast 2014-15 to 2019-20 Unit Costs and the Benchmarked Average NEM Unit Costs used as part of Essential Energy's 2014-19 Determination.
    - Essential Energy's 2014-15 to 2019-20 Unit Costs were assigned first, followed by the Benchmarked Average NEM unit costs where the Unit Costs did not represent Essential Energy's expected costs due to low forecast replacement volumes.

- The same principle was then applied for Essential Energy's 2009-10 to 2013-14 Unit Costs where the Benchmarked Average NEM unit cost did not represent Essential Energy's expected costs.
- Management discretion was then applied to determine the appropriate Unit Cost to use. Using a combination of Unit Cost data is considered to best represent the weighting of asset classes within Essential Energy's network whilst also managing the impact of categories with minimal reported or forecast replacements.
- The resulting universal set of Unit Cost rates is considered to be representative of all replacement categories.

- The total Replacement Cost and the Weighted Average Age Replacement Cost were then calculated for each line item by multiplying the Unit Cost by the Total Asset Quantity and the Average Age by the Total Replacement Cost.
- The sum of the Weighted Average Age Replacement Cost was then divided by the sum of the Total Replacement Costs for each RAB asset category to give the categories Average Asset Age (based on depreciated replacement cost).
- The Estimated Residual Service Life for each category was then calculated by subtracting the Average Asset Age from the Estimated Service Life of New Assets.
- This approach is consistent with the calculations carried out in AER request 053 in the 2014-19 Regulatory Determination.

  Note: Whilst Substation Land is included in the RAB values for Substations, it has been assumed to have an indefinite life. As such, it has not formed part of the residual life calculations.

For Meters, Other Long Life assets and Other Short Life assets:

- The opening residual life at the beginning of 2014-15 was taken from the Input sheet in the RFM (based on the Final Determination PTRM). This became the starting point for establishing the residual life of each asset class.
- The proportionate value of the opening 2014-15 RAB values and additions amounts for each asset class from the RFM was then calculated.
- The 2015 end of year residual life for each asset class was then established by weighting the RAB proportions for the asset class against the relevant standard life of additions and the rolled forward opening residual life from the RFM.
- Where there is more than one class of asset comprising a RAB category, ie. for Other Long Life and Short Life Assets, the resulting residual lives were weighted against the proportionate value of the opening 2014-15 RAB values and additions amounts for each asset class within the entire asset category.

Use of estimated information

As described above, most of the information in the RAB is estimated, generally using the proportions derived from the 2015 FAR or data from the RFMs. Only where assets could be directly apportioned to RAB categories is the data considered to be fairly reliable.

Given that the RAB rolls forward from year to year, as soon as one year contains estimated data, the following year necessarily contains estimates.

In addition, based on an SKM valuation undertaken as at 30 June 2007, Essential Energy's RAB values are significantly lower than what its assets are actually worth.

As a result of all these factors, Essential Energy considers the individual RAB values to be generally unreliable if used for any benchmarking comparisons.

There was no other source of data available for this RAB exercise other than what was utilised.

The assumptions made for each row are included in the section above.

Material accounting policy changes

Essential Energy has not undertaken any material changes in accounting policies.

Reliability of information

See “Use of estimated information” section above.

Worksheet 3.4 – Operational Data

3.4.1 Total energy delivered

Compliance with requirements of the notice

This section contains the total energy delivered by Essential Energy to the customer based on the customer's metered consumption as per their invoice and relevant financial year.

Source of information

Total energy delivered has been sourced from the Finance Gross Margin report and includes Accruals. The Finance report takes into account the invoice data that is still outstanding through the accrual process.

Methodology and Assumptions

Table 3.4.1 shows total energy delivered as reported in the Finance Gross Margin report and includes Accruals. Data for the 2014-15 year has not been audited.

The Finance Gross Margin report including Accruals is provided by Finance as part of the end of year Board report and is subject to statutory audit.

Table 3.4.1

Variable Code	Variable	Tariffs included
DOPED01	Total energy delivered	Sum of single and ToU consumption for all tariffs

Use of estimated information

The accrual process is an estimate of outstanding invoices for the period, however this is as provided to the Board and audited so is considered reliable.

Material accounting policy changes

Not applicable.

Reliability of information

The data provided in this table is considered to be reliable.

3.4.1.1 Energy grouping - delivery by chargeable quantity

Compliance with requirements of the notice

This section contains the total energy delivered by Essential Energy to the customer based on the customer's metered consumption as per their invoice and relevant financial year.

Source of information

Total energy delivered has been sourced from the Finance Gross Margin report and includes Accruals. The Finance report takes into account the invoice data that is still outstanding through the accrual process.

Data for the 2014-15 year has not been audited to date.

Methodology and Assumptions

Data provided in Table 3.4.1.1, was sourced from the Finance Gross Margin report and includes Accruals. This report is provided by Finance as part of the end of year Board report and is subject to statutory audit.

The Finance Gross Margin report provides the Distribution consumption at a segment level.

Peak, shoulder and off- peak periods relate to Essential Energy's own charging periods and are not split out in the Finance Gross Margin report, therefore have been prorated on invoice data run in the period 2014/15. As seen in Table 3.4.2 below, history shows there is minimal movement between previous years.

Table 3.4.2

	2011	2012	2013	2014	2015
Energy Delivery at On-peak times	16.1%	16.0%	16.0%	16.0%	15.9%
Energy Delivery at Shoulder times	34.3%	33.7%	33.3%	33.3%	33.1%
Energy Delivery at Off-peak times	49.6%	50.3%	50.7%	50.7%	51.0%

Table 3.4.3 shows how data has been aggregated from the Finance Gross Margin report into the RIN template.

Table 3.4.3

Variable Code	Variable	Segments included
DOPED0201	Energy Delivery where time of use is not a determinant	Residential Continuous and Business Continuous
DOPED0202	Energy Delivery at On-peak times	Residential TOU, Business TOU <100 MWH, Business TOU >100 MWH, Low Voltage Demand, Industrial (incl High Voltage, Subtransmission, Site Specific, Inter Distributor Transfers) – prorated based on 2014/15 invoice run date split
DOPED0203	Energy Delivery at Shoulder times	Residential TOU, Business TOU <100 MWH, Business TOU >100 MWH, Low Voltage Demand, Industrial (incl High Voltage, Subtransmission, Site Specific, Inter Distributor Transfers) – prorated based on 2014/15 invoice run date split

DOPED0204	Energy Delivery at Off-peak times	Residential TOU, Business TOU <100 MWH, Business TOU >100 MWH, Low Voltage Demand, Industrial (incl High Voltage, Subtransmission, Site Specific, Inter Distributor Transfers) – prorated based on 2014/15 invoice run date split
DOPED0205	Controlled load energy deliveries	Controlled Load 1 and Controlled Load 2
DOPED0206	Energy Delivery to unmetered supplies	Streetlighting

Use of estimated information

The accrual process is an estimate of outstanding invoices for the period, however this is as provided to the Board and audited so is considered reliable.

Material accounting policy changes

Not applicable.

Reliability of information

The data provided in this table is considered to be reliable.

3.4.1.2 Energy - received from TNSP and other DNSPs by time of receipt, and

3.4.1.3 Energy - received into DNSP system from embedded generation by time of receipt

Compliance with requirements of the notice

This section contains the total energy input into Essential Energy's network and as measured by Bulk Supply points.

Source of information

Data has been sourced from an internal reporting system, EDDIS Cognos cube for 2014-15.

Methodology and Assumptions

Data was extracted from the Internal EDDIS Cognos cube report at a half hourly level and aggregated to total Bulk Supply point. This includes internal categories of BSP, cross border and TUOS pass through.

Based on the Essential Energy definition of Peak, Shoulder and Off Peak, as seen in Table 3.4.4 below, the half hourly data was aggregated into Peak, Shoulder and Off Peak buckets in Excel to determine the totals to report in the table.

Table 3.4.1.2 is not total network load as generation load has not been added back on.

Off peak readings in the spreadsheet exclude Public holidays and DST as this is how the majority of our small customers are billed, as detailed below.

Table 3.4.4 Essential Energy Time Periods

Peak	7am to 9am and 5pm to 8pm on weekdays
Shoulder	9am to 5pm and 8pm to 10pm on weekdays
Off Peak	all other times

The EDDIS Cognos cube also contains the embedded generation data and this was extracted along with the Bulk Supply point data and calculated in the same spreadsheet for Table 3.4.1.3.

Table 3.4.1.3 also includes residential embedded generation. This information is only available through the invoicing of customers and was derived through the Finance SBR (Subsequent Billing Report) Accrual process. Due to the impact of NSW and QLD solar bonus schemes and the significant increase in export GWh since its inception in 2010, the solar units are required to provide total purchase units.

Use of estimated information

All information for these tables was based on actual metered information from the EDDIS Cognos cube at the time of extraction, with the exception of DOPED0408 which was provided through the SBR report.

Material accounting policy changes

Not applicable.

Reliability of information

The data provided is considered reliable.

3.4.1.4 Energy grouping - customer type or class

Compliance with requirements of the notice

This section contains the total energy delivered by Essential Energy to the customer based on the customer's metered consumption as per their invoice and relevant financial year.

Source of information

Total energy delivered has been sourced from the Finance Gross Margin report and includes Accruals. The Finance report takes into account the invoice data that is still outstanding through the accrual process.

Methodology and Assumptions

Data provided in Table 3.4.1.4 was sourced from the Finance Gross Margin report and includes Accruals.

The Finance Gross Margin report including Accruals is provided by Finance as part of the end of year Board report and is subject to statutory audit.

The Finance Gross Margin report provides the Distribution consumption at a segment level.

Table 3.4.5 below shows how data has been aggregated from the Finance Gross Margin report into the RIN template.

Table 3.4.5

Variable Code	Variable	Segments included
DOPED0501	Residential customers energy deliveries	Sum of all Residential tariffs including Controlled Load tariffs
DOPED0502	Non-residential customers not on demand tariffs energy deliveries	Business Continuous, Business TOU <100 MWH, Business TOU >100 MWH, Low Voltage Demand, Streetlighting
DOPED0503	Non-residential low voltage demand tariff customers energy deliveries	Low Voltage Demand
DOPED0504	Non-residential high voltage demand tariff customers energy deliveries	Industrial (incls High Voltage, Subtransmission, Site Specific, Inter Distributor Transfers)
DOPED0505	Other Customer Class Energy Deliveries	Not applicable

Use of estimated information

The accrual process is an estimate of outstanding invoices for the period, however this is as provided to the Board and audited so is considered reliable.

Material accounting policy changes

Not applicable.

Reliability of information

The data provided in this table is considered to be reliable.

3.4.2.1 Distribution customer numbers by customer type or class

Compliance with requirements of the notice

This section contains the average number of customers by required grouping. The average was determined by calculating the average of the numbers at the start of the regulatory period and the end of the regulatory period, as requested in the Economic Benchmarking RIN Instructions and Definitions guidance issued by the AER. This is different to Essential Energy's process which determines total billed days for the financial year and divides by the days in the year or alternatively provides a count at the end of the period.

Note that there are no unmetered connections in Essential Energy's data that have not been reported in the customer numbers. It appears that none of Essential Energy's unmetered customers have a National Meter Identifier (NMI) for them to be excluded in the total count.

Source of information

Data has been sourced from an internal reporting system and existing query, via Spotfire, which extracts data from the Energy/Peace billing system.

Methodology and Assumptions

The Tariff count query provides the number of connected premises by tariff class, month and financial year.

In order to determine the tariff class required to be reported the spreadsheet was linked to the internal Annaj tables which determines Network Description and relevant grouping.

Certain criteria and exclusions are required to ensure the correct categories are met. These are:

- All export tariffs are removed,
- All zero network code tariffs are removed as these are pre-existing retail customers,
- Gas tariffs are removed, network code 500+,
- Tariff 23000 is removed as this is a Remote Metering Fee,
- Only Anytime and Peak Energy tariffs are included as these are the primary tariffs and will not result in duplicate premises being counted.

Table 3.4.6 shows the internal groupings aligned with requested Customer type in Table 3.4.2.1.

Table 3.4.6

Internal Groupings	Requested Customer Type
HV Demand	High voltage demand tariff customer numbers
LV Business Continuous	Non-residential customers not on demand tariff customer numbers
LV Controlled Load 1	Excluded
LV Controlled Load 2	Excluded
LV Demand	Low voltage demand tariff customer numbers
LV Residential Continuous	Residential customer numbers
LV Residential TOU	Residential customer numbers
LV TOU over 100 MWh/yr	Non-residential customers not on demand tariff customer numbers
LV TOU under 100 MWh/yr	Non-residential customers not on demand tariff customer numbers
Site Specific	High voltage demand tariff customer numbers
Sub transmission	High voltage demand tariff customer numbers

A count is determined for the first month of the regulatory year and also for the last month of the regulatory year to then calculate the average number of Distribution

Customers as per the Economic Benchmarking RIN Instructions and Definitions guidance issued by the AER.

The above count has then been used to pro rata the total for each year as provided in Table 3.4.2.3 into the requested variables.

Unmetered customers have been extracted from the Energy/Peace system through internal reports.

The guidance also required de-energised customer numbers. Unfortunately these numbers are not accounted for in this report. The de-energised numbers have been provided through another system, PowerOn Fusion. These numbers have been included in the table under the header “Other Customer Numbers” (DOPCN0106).

Use of estimated information

All information for this table was based on information from the Energy billing system.

Material accounting policy changes

Essential Energy has not undertaken any material changes in accounting policies.

Reliability of information

These reports were set up solely for the ability to report for Table 3.4.2.1.

The information provided in these tables is based on assumptions and estimates and caution should be used when using it for benchmarking or decision making purposes.

3.4.2.2 Distribution customer numbers by location on the network

Compliance with requirements of the notice

Essential Energy has reported customer numbers in accordance with the Economic Benchmarking RIN Instructions and Definitions guidance issued by the AER.

Source of information

Data has been sourced from PowerOn Fusion and an Access database.
PowerOn makes up the central modules of Essential Energy's power Distribution Management and Outage Management Systems (DMS/OMS). To that information has been added the unmetered account information which came from Table 3.4.2.1 (DOPCN0105).

Methodology and Assumptions

The data has been collected and collated in line with the Economic Benchmarking RIN Instructions and Definitions guidance issued by the AER. The unmetered account numbers have been obtained from Table 3.4.2.1 (DOPCN0105) and added on to the total number of customers for each year (DOPCN02). They have then been prorated across the feeder classes (DOPCN0202, DOPCN0203 & DOPCN0204).

Customers are attached to distribution substations in PowerOn Fusion. This data is updated nightly from Peace. Essential Energy has a trace that pulls back the customer

numbers from each distribution substation and also the network connectivity. This links the distribution substations to a feeder segment and then to a distribution feeder. Feeders are categorised based on the guidance issued by the AER.

A count is determined at the start of the regulatory year and also at the end of the regulatory year to then calculate the average number of Distribution Customers as per the Economic Benchmarking RIN Instructions and Definitions guidance issued by the AER.

The spreadsheet used to collate data is named: “RIN Tables v2”.

Use of estimated information

All information for this table was based on information from the Energy billing system.

Material accounting policy changes

Essential Energy has not undertaken any material changes in accounting policies.

Reliability of information

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

3.4.3 System Demand, and

3.4.3.1 – 3.4.3.5 System Demand

Compliance with requirements of the notice

In order to provide the actual loads for 2014/15, the winter of 2014 and the summer of 2014/15 was used, which included loads from April 1st 2014 to March 31st 2015. 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.

The AER definition of a zone substation is “a substation on a distribution network that transforms any voltage above 33kV to levels at or below 33kV but above 1kV”. Only forecast demands from zone substations that meet the AER definition have been included.

Source of information

The network level maximum demand is sourced from demand meters (via IMDR).

For DOPSD0107 and DOPSD0110, the transmission connection point data was obtained from demand meters.

Methodology and Assumptions

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

- **DOPSD0101 and DOPSD0106** – MW measures in Table 3.4.3.1 “Annual system maximum demand characteristics at the zone substation level” - These are summations of the data from Table 5.4 of the Category Analysis RIN.

- **DOPSD0107 and DOPSD0110** – MW measures in Table 3.4.3.2 “Annual system maximum demand characteristics at the transmission connection point” – These are sourced from raw data obtained from transmission connection points.

- **DOPSD0108 and DOPSD0109** – MW measures in Table 3.4.3.2 “Annual system maximum demand characteristics at the transmission connection point” – These are calculated using the nationally consistent methodology of regression with historical local temperature data.

- **DOPSD0111 and DOPSD0112** – MW measures in Table 3.4.3.2 “Annual system maximum demand characteristics at the transmission connection point” – MW measure, table 3.4.3.2 which are based on the ratio of non-coincident peak demand to non-coincident weather corrected peak demand. (I.e DOPSD0107 , DOPSD0108 and DOPSD0109)

- **DOPSD0201 to DOPSD0206** – MVA measures in Table 3.4.3.3 “Annual system maximum demand characteristics at the zone substation level” – These are summations of the data from Table 5.4 of the Category Analysis RIN.

- **DOPSD0207 and DOPSDO210** – MVA measures in Table 3.4.3.4 “Annual system maximum demand characteristics at the transmission connection point” – These are calculated using data obtained from transmission connection points and the values obtained in DOPSD0107 and DOPSD0110.

- **DOPSD0208 and DOPSD0209** – MVA measures in Table 3.4.3.4 “Annual system maximum demand characteristics at the transmission connection point” – These are calculated using the nationally consistent methodology of regression with historical local temperature data.

- **DOPSD0211 and DOPSD0212** – MVA measures in Table 3.4.3.4 “Annual system maximum demand characteristics at the transmission connection point” – These are based on the ratio of non-coincident peak demand to non-coincident weather corrected peak demand.

- **DOPSD0301** – Factor measure in Table 3.4.3.5 “Power factor conversion between MVA and MW” - This is calculated from DOPSD0104 and DOPSD0204.

- **DOPSD0302 to DOPSD0311** – Factor measure in Table 3.4.3.5 “Power factor conversion between MVA and MW” – These have been estimated based on historical power factors for each network voltage level.

Use of estimated information

Where data has not been recorded, historical data is used to estimate the expected loads and power factors for the current year.

Material accounting policy changes

Not applicable.

Reliability of information

As per the Methodology and Assumptions section above.

3.4.3.6 – 3.4.3.7 Demand supplied (for customers charged on this basis) – MW & MVA measure

Compliance with requirements of the notice

This section contains the total energy delivered by Essential Energy to the customer based on the customer's metered consumption as per their invoice.

Source of information

Data has been sourced from the billing system as per what was invoiced to the relevant customer.

Methodology and Assumptions

All data provided came from Invoice data from the Billing system as these customers are monthly billed.

Tables 3.4.7 and 3.4.8 below show how the data has been aggregated into the RIN templates.

Table 3.4.7

Variable Code	Variable	Tariffs included
DOPSD0401	Summated Chargeable Contracted Maximum Demand MW	Essential Energy does not have contracted Demand
DOPSD0402	Summated Chargeable Measured Maximum Demand MW	Sum of the Demand billed in MW for all CRNP tariffs

Table 3.4.8

Variable Code	Variable	Tariffs included
DOPSD0403	Summated Chargeable Contracted Maximum Demand MVA	Essential Energy does not have contracted Demand, however Essential Energy do have Capacity Billed tariffs which are based on the Max KVA for the prior 12 months, these tariffs are recorded here.
DOPSD0404	Summated Chargeable Measured Maximum Demand MVA	Sum of the Demand billed in MVA for all relevant Demand tariffs

Use of estimated information

All information for this table was based off actual invoiced information.

Material accounting policy changes

Not applicable.

Reliability of information

The data provided in this table is considered to be reliable.

Worksheet 3.5 – Physical Assets

3.5.1.1 – 3.5.1.2 Overhead and underground network length of circuit at each voltage

Compliance with requirements of the notice

The Economic Benchmarking RIN Instructions and Definitions guidance issued by the AER requires the circuit length of every in service overhead and underground sub transmission and distribution circuit to be determined for the 2014-15 financial year. For Tables 3.5.1.1 and 3.5.1.2, this “circuit length” has been determined by considering each circuit (regardless of voltage) as a separate entity. This is different to route length used in Table 8.3, which, in effect, disregards the number of circuits that span between two poles. The file “Route length examples.jpg” demonstrates the difference between circuit length (used for these tables) and route length (used for Table 8.3).

Final connections to the mains have been excluded (ie. overhead service lines and underground service cables), as well as overhead lines and underground cables for public street lighting.

Source of information

Overhead line and underground cable data (ie. “Cables”) were exported from GIS Smallworld using scripts.

Methodology and Assumptions

The Script filtered out all cables that were not owned by Essential Energy but Service Status was ignored. Any LV cables that had an LV Service Type of “Service” were considered as Service; any that had an LV Service Type of “Consumer Mains” or “Sub-mains” were ignored. The Nominal Length attribute on the cable was used for the length of each cable. The results were then summarised.

The Category Analysis RIN definition of “Route Line Length” and “Circuit Line Length” specifically says not to include service lines, therefore overhead and underground service lines has been excluded.

Figures obtained from GIS Smallworld are assumed to be actual, even though it is acknowledged that the data may have been incomplete or duplicated.

Use of estimated information

As described above.

Material accounting policy changes

Essential Energy has not undertaken any material changes in accounting policies.

Reliability of information

The data that has been used for the quantities in Tables 3.5.1.1 and 3.5.1.2 has primarily come from Essential Energy’s GIS Smallworld system. The accuracy of the information presented in the tables was directly affected by the accuracy of the data in GIS Smallworld at the time. Contributing factors to accuracy are listed below.

Data Quality:
The quality of the cable information stored in GIS Smallworld has been steadily improving over many years, however the following points describe some of the known data quality issues:

- Data quality checks regularly highlight data quality issues, however certain issues cannot be resolved without field visits, which in many cases are not warranted due to the nature of the issue and the distance needed to be travelled;
- There is further work to do to identify LV that has been incorrectly called LV service, particularly with underground. This may significantly increase the length of LV mains and decrease the length of LV services;
- There is further work to do to capture services that go from the LV mains to the Smallworld Service Point;
- Some underground cables may be missing or drawn in the incorrect location, and may not be detected because it is difficult to know exactly where they are.

The data provided in these tables is based on assumptions and estimates and caution should be used when using this data for benchmarking or decision making purposes.

3.5.1.3 – 3.5.1.4 Estimated overhead and underground network weighted average MVA capacity by voltage class

Compliance with requirements of the notice

Essential Energy has, in accordance with the requirements of the Regulatory Information Notice completed Tables 3.5.1.3 and 3.5.1.4 and the Basis of Preparation for the forementioned tables which explains for each variable, the basis upon which Essential Energy prepared information to populate the input cells.

Source of information

Essential Energy's information regarding Tables 3.5.1.3 and 3.5.1.4 was obtained from the following sources:

- Smallworld – Specifically for Tables 3.5.1.3 and 3.5.1.4, data was sourced on:
  - feeder lengths
  - feeder phase lengths (ie. single phase, three phase or SWER)
  - feeder linkages to fault level information
  - feeder first segment conductor type
  - feeder underground and overhead lengths
  - feeder voltage
- Sincal - Specifically for Tables 3.5.1.3 and 3.5.1.4, data was sourced on:
  - fault levels
- EE Subtransmission Feeder Ratings Version X.xlsx – Specifically for Tables 3.5.1.3 and 3.5.1.4, data was sourced on:
  - feeder section lengths
  - feeder section ratings
  - underground and overhead lengths
  - feeder voltage

- Operational Manual: Standard Overhead Conductor: Current Rating Guide CEOM7011 – Specifically for Tables 3.5.1.3 and 3.5.1.4, data was sourced on:
    - Conductor and Cable ratings
- The Handbook, 2013 Edition, Olex - Specifically for Tables 3.5.1.3 and 3.5.1.4, data was sourced on:
    - Conductor and Cable ratings

Methodology and Assumptions

In this section we explain the methodology Essential Energy applied to provide the required information, including any assumptions Essential Energy made.

Essential Energy has used the following methodologies and assumptions in determining the estimated overhead and underground network weighted average MVA capacity by voltage class.

Background:
It should be noted that, as the outcome of this table is a km capacity, the methods used below determine the capacity of the line with respect to the line only.

For example: A feeder is connected to a Zone Substation breaker with a rating of 100A. The feeder is made up of 3 segments - 2 segments with a thermal capacity of 200A, 10km in total, and 1 segment with a thermal capacity of 150A, 5km in total. There are no voltage constraints on the feeder capacity.

Under the weighted average capacity methodology, the feeder capacity is calculated as:

(200 x 10 + 150 x 5) / 15 = 183A, even though the surrounding infrastructure is not capable of supplying this level of current.

Methodology Part 1:
For the subtransmission network, relatively accurate information is held on feeder sections which includes:

- Region
- Area
- Feeder Number
- From Sub/Tee
- Section Number
- To Sub/Tee
- Operating Voltage (kV)
- Is this the Minimum conductor on the feeder section?
- Summer Day Rating
- Winter Day Rating
- Summer Day Emergency Rating (1.0 m/s wind)
- Winter Day Emergency Rating (1.0 m/s wind)
- Wind and Ambient Temperature Condition
- Alias in ENMAC
- Conductor
- Design Temperature of Line Section (degrees C)
- Section Length (km)
- Construction Type

- Configuration
- Year Line Section Constructed
- OHEW type
- OHEW Dist (km)
- Summer Ambient Temp C
- Winter Ambient Temp C
- Summer Wind Average (m/s)
- Winter Wind Average (m/s)
- Summer Day (A)
- Winter Day (A)
- Summer Day (MVA)
- Winter Day (MVA)
- Diam (mm)
- Rdc 20C (ohm/km)
- 0C k (m Rac/Rdc)
- Coeffic dc resist
- Summer Day (A)
- Winter Day (A)
- Summer Day (MVA)
- Winter Day (MVA)

Derivation of ratings for Subtransmission Feeders

- Overhead conductor ratings are calculated using formulas defined in ESAA D(b)5-1988.
- Underground cable ratings are defined by the cable manufacturer.

Assumptions under Methodology Part 1:

- All subtransmission feeders are to be treated as summer constrained and therefore summer ratings have been used, as the minority of winter constrained feeders will have an insignificant effect on the results.
- All subtransmission feeders are to be treated as thermally constrained, as the minority of voltage constrained subtransmission feeders will have an insignificant effect on the results.
- Some subtransmission feeder section ratings or lengths were unavailable and hence were not used in the calculations, it has been assumed that the minority of feeders with missing data will not have a significant effect on the results.

Methodology Part 2:

Relatively poor information is kept on HV feeders and their ratings, particularly when considering the non-uniform rating of HV feeders along their length. For the derivation of the “weighted average MVA capacity” on HV feeders for a given voltage the following data was obtained;

- the maximum fault level along the feeder has been taken from Sincal simulations
- the minimum fault level along the feeder has been taken from Sincal simulations
- the length of the three phase, single phase, and SWER feeder sections for both overhead and underground have been obtained from Smallworld
- the first conductor in the feeder has been taken from Smallworld

Derivation of ratings

The following calculations were performed on the forementioned data to determine the rating of each feeder:

- Averaging the minimum and maximum fault levels, to determine the average fault level along the feeder (as an alternative to determining the fault level along every finite section of the HV feeder)
- Taking the voltage based rating for all available HV feeders as 10% of the averaged fault current (if a single phase to earth fault results in a voltage of zero at the location of the fault, 10% of the single phase to earth fault will result in a 10% reduction in voltage – a 10% reduction in voltage being approximately the limit for HV feeders)
- Taking the thermal rating for all available HV feeders as the rating of the first conductor out of the substation based on the conductor type and a 50 degree Celsius rating
- Taking the voltage based rating for all available SWER sections as 10% of the averaged fault current on the SWER section (if a single phase to earth fault results in a voltage of zero at the location of the fault, 10% of the single phase to earth fault will result in a 10% reduction in voltage – a 10% reduction in voltage being approximately the limit for HV feeders)
- Taking the actual rating for the feeder as the minimum of the thermally based rating and the voltage based rating

Assumptions under Methodology Part 2:

- The fault current is a reasonable surrogate for determining maximum current based on voltage, however large variations in the X/R ratio of the fault away from unity will see true current carrying capacity vary according to the power factor of the load.
- HV feeders have a linear reduction in fault level.
- All HV feeders have a 50 degree Celsius rating, whilst this is most likely not the case, Essential Energy believes it to be a reasonable assumption based on the limited data available.

Methodology Part 3:

LV Feeder ratings are virtually non-existent and many LV feeders will be voltage constrained. Based on the limited data available, Essential Energy has provided LV Feeder ratings based solely on the thermal rating of LV conductors. Essential Energy is aiming to improve the methodology for future submissions.

Assumptions under Methodology Part 3:

- All bare OH LV feeders have a 50 degree Celsius rating. Whilst this is most likely not the case, Essential Energy believes it to be a reasonable assumption based on the limited data available.
- The conductor information available is a reasonable sample of the available LV feeder stock.
- The conductors have been assumed to be three phase unless further information was available.
- All insulated overhead cables have a 75 degrees Celsius rating.
- All underground cables:
    - In duct, underground, one duct for single and three phase arrangements.
    - Where the insulation material is not known, PVC is assumed.

Methodology and Assumptions Part 4:

Calculation of “weighted average MVA capacity”

The “weighted average MVA capacity” for a given voltage is determined by assigning a weight to the rating of the feeder section based on the feeder section length divided by

the total feeder length for each voltage class and construction type (overhead and underground).

"Weighted average MVA capacity" of the current year compared to previous years

The asset data used to construct the weighted average MVA capacity is highly variable due to the large amount of unknown conductors and ratings within Essential Energy's network and the process of continual data improvement. Variations in fault data and asset data may have large impacts on the weighted average MVA capacity, in most cases this error in data will have substantially greater impact than the sum of the network upgrades during the year in question, ie. the percentage error is considered to be greater than the actual change in value being measured.

Use of estimated information

Almost all data involved in the "weighted average MVA capacity" with the exception of feeder lengths can be considered to be estimated. These estimations include:

Subtransmission feeder ratings
While subtransmission feeder ratings are calculated based on known conductor types and widely used industry principles, the weather parameters used in those calculations are based on area wide assumptions and hence feeder ratings can be considered as best estimates.

HV feeder ratings
HV feeders do not have uniform ratings along their length for two main reasons; firstly HV feeders consist of different conductor types and phasing along their length and hence have different thermal ratings along their length; secondly HV feeders can have, and in Essential Energy's network the majority will have, considerable voltage drop along the length of the feeder, hence even if maximum thermal rating could be delivered, it would not be at voltages required under our license conditions.

Due to the range of HV feeder constraints and respective solutions to address such constraints, not all HV feeder augmentation results in a change to the HV feeder average fault level, as such, the fault level based method should only be considered an approximation of HV feeder capacity change. The average fault level method used by Essential Energy to formulate the HV feeder ratings as required by the RIN across available feeders is considered the best approach based on available data. Essential Energy is aiming to improve the methodology for future submissions.

This method of using fault current or short circuit current to determine network strength is used in Australian standards such as AS/NZS 61000.3.6:2001 in reference to permitted harmonic thresholds of particular electronic devices.

Material accounting policy changes

Not applicable.

Reliability of information

The data provided in these tables is based on assumptions and estimates and caution should be used when using this data for benchmarking or decision making purposes.

3.5.2.1 Distribution transformer total installed capacity

Compliance with requirements of the notice

The information provided reports a breakdown of transformer capacity of distribution transformers owned by Essential Energy, high voltage customers, and spare transformers owned by Essential Energy that are not currently in use.

Source of information

This data has been obtained from:

- Current Distribution Transformer MVA extracted from WASP using SQL.
- Distribution Transformer Spare Capacity has been obtained from PeopleSoft and Cold Capacity from WASP.
- The data for HV customers has been sourced from metering data (linked to a National Metering Identifier) held by our Network Connections group.

Methodology and Assumptions

- **DPA0501 – Distribution transformer capacity owned by utility including Cold Spares**

  SQL Logic:

  1. Distribution transformer capacity owned by utility (not including Cold Spares)
     - Only Substation Sites with an Owner = “Essential Energy”.
     - Only Substation Sites with a Service Status = “In Service” (Out of Service have been classified as Cold Spares).
     - Excludes Substation Sites with a Substation Type = “Isolator” or “Step Up/Down” (this leaves all Distribution Substation Sites)
     - Excludes Substation Sites with a SWER Primary Voltage (6.35kV, 12.7kv, 19.1kV), therefore excluding SWER Isolators in conjunction with the above item.
     - 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 occurred in 2% of cases):
       - if Substation Site “Total kVA” is blank, then use sum of children Transformer “kVA”.
       - if Substation Site “Total kVA” and children Transformer “kVA” fields are blank, then use Substation Site “Phases” as follows:
         3 phase = 63kVA
         1 phase = 10kVA
       - if Substation Site “Total kVA” and children Transformer “kVA” fields are blank and Substation Site “Phases” is blank, then use Substation Site “Construction Type” as follows:
         Pad/Kiosk Substation = 500kVA
         Chamber Substation = 1000kVA
         Ground Substation = 1000kVA
         All others (eg. Pole Substation) = 10kVA
     - MVA was calculated as kVA (derived if necessary as per above)/1000 and summed.

2. Cold Spares (added to item (1) once determined)

- Cold Spare Capacity = Cold (Out of Service) Distribution Transformers + Spare Distribution Transformers
- Cold (Out of Service) Distribution Transformers (source = WASP):
  - All Substations Sites with an Owner = “Essential Energy” and a Service Status = “Out of Service”
  - kVA has been obtained from the Substation Site's “Total KVA”. If this is not available, then kVA has been derived as follows:
    - 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
  - Excludes Substation Sites with a Substation Type = “Isolator” or “Step Up/Down” (this leaves all Distribution Substation Sites).
  - Excludes Substation Sites and Transformers with a SWER Primary Voltage (6.35kV, 12.7kv, 19.1kV), therefore excluding SWER Isolators in conjunction with the above item.
  - MVA was calculated as kVA (derived if necessary as per above)/1000 and summed.
- Spare Distribution Transformers (source = PeopleSoft):
  - Polemount and padmount transformers stock items booked into depots/stores as ‘spares’ in PeopleSoft.
  - kVA has been obtained from the Transformer stock item description.
  - MVA was calculated as kVA (derived if necessary as per above)/1000 and summed.

- **DPA0502 – Distribution transformer capacity owned by High Voltage Customers**

  Data for private HV transformer capacity was sourced from maximum demand records from the 2014-15 fiscal period. The data has been sourced from metering data (linked to a National Metering Identifier) held by our Network Connections group.

  Data for HV customers includes both HV demand and generation customers.

  This value is estimated as it uses the maximum demand rather than the actual transformer capacity. Essential Energy has only very limited data on these HV transformers, as it does not own them (hence the use of the maximum demand value).

The maximum demand value should be reliable, however it is not an accurate representation of the private HV transformer capacity. It is expected that the actual capacity would be at least 20% higher than the maximum demand, and possibly much greater than this.

This methodology is consistent with that used in the 2013-14 RIN.

- **DPA0503 – Cold spare capacity included in DPA0501**
  - Cold Spare Capacity = Cold (Out of Service) Distribution Transformers + Spare Distribution Transformers
  - Cold (Out of Service) Distribution Transformers (source = WASP):
    - All Substations Sites with an Owner = “Essential Energy” and a Service Status = “Out of Service”
    - kVA has been obtained from the Substation Site's “Total KVA”. If this is not available, then kVA has been derived as follows:
      - 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
    - Excludes Substation Sites with a Substation Type = “Isolator” or “Step Up/Down” (this leaves all Distribution Substation Sites).
    - Excludes Substation Sites and Transformers with a SWER Primary Voltage (6.35kV, 12.7kv, 19.1kV), therefore excluding SWER Isolators in conjunction with the above item.
    - MVA was calculated as kVA (derived if necessary as per above)/1000 and summed.
  - Spare Distribution Transformers (source = PeopleSoft):
    - Polemount and padmount transformers stock items booked into depots/stores as “spares” in PeopleSoft.
    - kVA has been obtained from the Transformer stock item description.
    - MVA was calculated as kVA (derived if necessary as per above)/1000 and summed.

Use of estimated information

- Essential Energy has used estimated information when there is no ‘Date Constructed’ for the Substation Site or Transformer as per logic detailed above. This estimation is required in a small number of cases and provides for a good estimation.
- Essential Energy has used estimated information when there is no ‘Total kVA’ for the Substation Site as per the logic detailed above. This was only performed

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 approximated the value for DPA0502 - Distribution transformer capacity owned by High Voltage Customers due to systems not maintaining details of Private High Voltage Customer networks.

Material accounting policy changes

Essential Energy has not undertaken any material changes in accounting policies around the items reported in Table 3.5.2.1 over the period requested.

Reliability of information

The base figures used for the distribution transformer capacity are dependent on the accuracy of the data within the WASP and PeopleSoft databases as well as assumptions made as per this Basis of Preparation document for Table 3.5.2.

3.5.2.2 Zone substation transformer capacity

Compliance with requirements of the notice

The information provided reports on the transformer capacity of distribution Zone substation transformers owned by Essential Energy. The data is broken down according to transformation steps as well as those that are not currently in use. This is in line with the Economic Benchmarking RIN Instructions and Definitions guidance issued by the AER. Further detail has been provided in the subsequent subheadings to address compliance requirements.

Source of information

This data has been obtained from:

- Current Zone Substation Transformer MVA extracted from the WASP system using SQL.

Methodology and Assumptions

- **DPA0601 – Total installed capacity for first step transformation where there are two steps to reach distribution voltage**
- **DPA0602 – Total installed capacity for second step transformation where there are two steps to reach distribution voltage**
- **DPA0603 - Total zone substation transformer capacity where there is only a single step transformation to reach distribution voltage**
- **DPA0605 - Cold spare capacity of zone substation transformers included in DPA0604**

SQL Logic:

- All ZS Power Transformer assets where the Owner <> “Private” (all others should be Essential Energy owned).

- All ZS Power Transformers with Service Status of:

  "In Service", "Out of Service", "Proposed", "System Spare", "Under Construction", or "Under Repair".

- Excludes ZS Power Transformers with a Type of:
  - "Regulators", "SWER Isolators"
    (results in only Power Transformers)
- MVA has been obtained from the "Maximum Rating (MVA)" attribute. If blank it is assumed to be 5 MVA (note that this occurred in <1% of cases).
- The totals for DPA0601, DPA0602, DPA0603 and DPA0605 have been determined based on the "Usage" attribute on the ZS Power Transformer assets as follows:
  - DPA0601 = "Step 1 of 2 to distribution voltage"
  - DPA0602 = "Step 2 of 2 to distribution voltage"
  - DPA0603 = "Step 1 of 1 to distribution voltage"
  - DPA0605 = "Spare"

  Those with a "Usage" of "Generator", "Ignore" or <NULL> were ignored. The "Usage" attribute was used to determine cold/spares rather than the "Service Status".

- **DPA0604 - Total zone substation transformer capacity**

This is the total of DPA0601, DPA0602, DPA0603 and DPA0605.

Use of estimated information

- Essential Energy has used estimated information when there is no "Maximum Rating (MVA)" for the ZS Power Transformer as per the logic detailed above. This only occurred in <1% of cases. The methodology used to estimate the MVA in these instances is considered to provide a reasonable approximation and was determined using averages and most common MVA by Power Transformer Type.

Material accounting policy changes

Essential Energy has not undertaken any material changes in accounting policies around the items reported in Table 3.5.2.2 over the period requested.

Reliability of information

The base figures used for the current zone substation transformer capacity are dependent on the accuracy of the data within the WASP database and the Zone Substation Manuals as well as assumptions made as per this Basis of Preparation document for Table 3.5.2.2.

3.5.3 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 by Essential Energy but not owned by Essential Energy have been included.

Source of information

This data has been obtained from:

- Current Public Lighting luminaire and pole figures extracted from the WASP system.

Methodology and Assumptions

- **DPA0701 – Public Lighting Luminaires**

  SQL Logic:

  - All Streetlights regardless of Owner.
  - Only Streetlights with a Service Status = “In Service”.
  - Streetlights with a Lighting Category = “Quarantined” were excluded as they are not verified.
  - Streetlights with a Lighting Category = “Metered” were excluded as EE has no responsibility for them.
  - Assets with a category of “Nightwatch Light” were excluded.

- **DPA0702 – Public Lighting Poles**

  SQL Logic:

  - All Streetlights regardless of Owner.
  - Only Streetlights with a Service Status = “In Service”.
  - Streetlights with a Lighting Category = “Quarantined” were excluded as they are not verified.
  - Streetlights with a Lighting Category = “Metered” were excluded as EE has no responsibility for them.
  - Assets with a category of “Nightwatch Light” were excluded.
  - Count each pole once regardless of the number of streetlights attached.

Use of estimated information

The base/current Public Lighting figures do not use estimated information.

Material accounting policy changes

Essential Energy has not undertaken any material changes in accounting policies around the items reported in Table 3.5.3 over the period requested.

Reliability of information

The figures used as a base for current Public Lighting Poles and Luminaires are dependent on the accuracy of the data within the WASP database and the estimations made.

Worksheet 3.6 – Quality of services

3.6.1.1 – 3.6.1.2 Inclusive & Exclusive of MEDs

Compliance with requirements of the notice

In this section we demonstrate how the information provided is consistent with the requirements of this Notice.

The data for 2014-15 has been collected and collated in line with the definitions. Customer numbers include active NMIs with an active or inactive account. This is the way data has been collected and stored since PowerOn Fusion went live in November 2012.

The Tmed threshold for 2014-15 was used.

Source of information

In this section, we explain the source from which Essential Energy obtained the information provided.

Data is sourced from PowerOn Fusion and 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 named: “RIN Tables v2”.

Methodology and Assumptions

The data has been collected and collated in line with the Economic Benchmarking RIN Instructions and Definitions guidance issued by the AER.

The Threshold for Major Event Days (TMED) for 2014-15 was applied as per the definition.

Use of estimated information

Not applicable as actual information has been provided.

Material accounting policy changes

Not applicable.

Reliability of information

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

3.6.2 Energy not supplied

Compliance with requirements of the notice

This section contains an estimate of the energy that was not supplied as a result of Customer Interruptions as per the Economic Benchmarking RIN Instructions and Definitions guidance issued by the AER.

Source of information

Data has been sourced from reported Planned customer minute off-supply and Unplanned customer minutes off-supply.

Methodology and Assumptions

As provided in the 2014-15 Annual Regulatory Accounts.

Based on the information available the estimated kWh was determined by calculating an average kWh use per minute for the financial year, based on the total consumption divided by the total number of customers divided by the number of minutes in a year. This average kWh use per minute was then applied to the recorded Total Planned and Unplanned customer minutes off supply.

Use of estimated information

All information for these tables was based on an aggregate network level and a best estimate.

Material accounting policy changes

Not applicable.

Reliability of information

The 2015 GWh supplied were as reported in the 2014-15 Annual Regulatory Accounts.

3.6.3 System losses

Compliance with requirements of the notice

This section contains the proportion of energy that is lost in distribution of electricity from the transmission network to Essential Energy customers.

Source of information

The result is formula driven and data utilised in Table 3.6.3 came from Table 3.4.1.2 and Table 3.4.1.3 for Electricity imported, while Electricity delivered was from Table 3.4.1.

Methodology and Assumptions

The methodology used in this section was as provided in the Economic Benchmarking RIN Instructions and Definitions guidance issued by the AER. Refer to Formula 2, below.

System losses = (electricity imported – electricity delivered) / (electricity imported) x 100

The electricity imported is the sum of the Energy received from the TNSP plus the Energy received into the DNSP system from embedded generation.

Use of estimated information

The calculation is based on tables that have been provided. Please refer to Table 3.4.1, 3.4.1.2 and 3.4.1.3.

Material accounting policy changes

Not applicable.

Reliability of information

The data provided is considered reliable.

3.6.4 Capacity utilisation

Compliance with requirements of the notice

This section follows the Economic Benchmarking RIN Instructions and Definitions guidance issued by the AER which defines the requirements as:

"Capacity utilisation is a measure of the capacity of zone substation transformers that is utilized each year. Essential Energy must report the sum of non-coincident Maximum Demand at the zone substation level divided by summation of zone substation thermal capacity. For the purpose of this measure, thermal capacity is the rated continuous load capacity of the zone substation (with forced cooling or other capacity improving factors included if relevant). This must be the lowest of either the transformer capacity or feeder exit capacity of the zone substation. Feeder exit capacity should similarly be the continuous rating."

Source of information

The result is formula driven and data utilised in Table 3.6.4 came from Table 3.4.3.3 and Table 3.5.2.2.

Methodology and Assumptions

Essential Energy has ignored feeder capacity and used:

Table 3.4.3.3 Non–coincident Summated Raw System Annual Maximum Demand divided by Table 3.5.2.2 Total zone substation transformer capacity.

Use of estimated information

The calculation is based on data in tables that have been provided. Please refer to Table 3.4.3.3 and 3.5.2.2.

Material accounting policy changes

Not applicable.

Reliability of information

The calculation is based on data in tables that have been provided. Please refer to Tables 3.4.3.3 and 3.5.2.2.

Worksheet 3.7 – Operating environment

3.7.1 Density factors

Compliance with requirements of the notice

This section has been completed as per the provided formulas in the Economic Benchmarking RIN Instructions and Definitions document issued by the AER.

Source of information

“Customer Density” sources information from Table 3.4.2.2 Total customer numbers and Table 3.7.3 Route line lengths.

“Energy Density” sources information from Table 3.4.1 Energy delivered and Table 3.4.2.2 Total customer numbers.

“Demand Density” sources information from Table 3.4.3.3 Annual system maximum demand, DOPS0201, and Table 3.4.2.2 Total customer numbers.

Methodology and Assumptions

The methodology used in this section was as provided in the Economic Benchmarking RIN Instructions and Definitions document issued by the AER.

Customer density is the total number of customers divided by the route line length of the network.

Energy Density is the total MWh delivered to the customer divided by the total number of network customers.

Demand density is the non-coincident Maximum Demand at zone substation level, in kVA units, divided by the total number of network customers.

Use of estimated information

These calculations are based on tables that have been provided. Please refer to Table 3.4.2.2, Table 3.7.3, Table 3.4.1 and Table 3.4.3.3.

Material accounting policy changes

Not applicable.

Reliability of information

These calculations are based on data provided in tables. Please refer to Table 3.4.2.2, Table 3.7.3, Table 3.4.1.2, Table 3.4.1.3 and Table 3.4.3.3.

3.7.2 Terrain factors

Compliance with requirements of the notice

In this section we demonstrate how the information provided is consistent with the requirements of this Notice.

Source of information

- WASP
- Field survey 2011/12
- Smallworld

Methodology and Assumptions

Rural proportion
The Rural proportion is calculated as rural feeder length divided by the total route feeder length.

Urban and CBD vegetation maintenance spans
The number of Urban and CBD vegetation spans was sourced from the Smallworld system , plus a proportion of spans classified as LV. The LV portion was based on the percentage of In Service LV poles in the WASP system with a classification of Urban.

The percentage vegetated is an average based on a sample of all completed scoped urban maintenance areas for the 2014/15 financial year and is derived from the number of defects reported divided by the total number of spans in the maintenance area.

Rural\Urban Classification:
Route length data is derived by extracting all cable information from Smallworld and breaking down at a pole level to create Spans. Each span is then analysed and assigned an operating voltage base on the highest rated cable in the span. HV spans are assigned the Feeder Category they are joined to in Smallworld.

Rural vegetation maintenance spans
The number of Rural vegetation spans was sourced from the Smallworld system, plus a proportion of spans classified as LV. The LV portion was based on the percentage of In Service LV poles in the WASP system with a classification of Rural. In addition, all of the Subtransmission network was considered Rural.

The percentage vegetated is an average based on a sample of all completed scoped rural maintenance areas for the 2014/15 financial year and is derived from the number of defects reported divided by the total number of spans in the maintenance area.

Rural\Urban Classification:
Route length data is derived by extracting all cable information from Smallworld and breaking down at a pole level to create Spans. Each span is then analysed and assigned an operating voltage base on the highest rated cable in the span. HV spans are assigned the Feeder Category they are joined to in Smallworld.

Total vegetation maintenance spans
This is the sum of Rural and Urban vegetation spans outlined in the previous two metrics plus LV and Subtrans categories to ensure that all overhead network has been included.

Total number of spans
The total number of spans was sourced from the Smallworld system.

Average urban and CBD vegetation maintenance span cycle
This is the total number of urban vegetation maintenance areas completed in the financial year divided by the total number of urban areas.

Average rural vegetation maintenance span cycle
This is the total number of rural vegetation maintenance areas completed in the financial year divided by the total number of rural areas.

Average number of trees per urban and CBD vegetation maintenance span
The vegetation density for all years is based on field survey data from the 2011/12 financial year. Thirty vegetation maintenance areas were surveyed across the Essential Energy urban network with the sample made up of vegetation maintenance areas from each of the five vegetation maintenance zones.

Average number of trees per rural vegetation maintenance span
The vegetation density for all years is based on field survey data from the 2011/12 financial year. 66 vegetation maintenance areas were surveyed across the Essential Energy rural network with the sample made up of vegetation maintenance areas from each of the five vegetation maintenance zones.

Average number of defects per urban and CBD vegetation maintenance span
This is the total number of defects reported from all sources for vegetation stored in the WASP system for the 2014/15 financial year divided by the total number of maintenance spans for urban areas.

Average number of defects per rural vegetation maintenance span
This is the total number of defects reported from all sources for vegetation stored in the WASP system for the 2014/15 financial year divided by the total number of maintenance spans for rural areas.

Tropical proportion
Climate data from BOM (see link below) is used to identify the number of Route Spans that fall within Climate Zones with a Grid Code of 2.

http://reg.bom.gov.au/jsp/ncc/climate_averages/climate-classifications/index.jsp

Standard vehicle access
Standard vehicle access data was sourced from Smallworld. A query was run returning line length within 50m of the centreline of selected road classifications which were deemed to be two wheel drive suitable. Classifications selected were Arterial Road, Collector Road, Local Road, Sub-Arterial Road, Highway, Lane/pathways and 2WD Tracks.

Bushfire risk
Essential Energy has an annual bushfire mitigation aerial patrol program that is carried out across the entire rural network. On this basis all rural spans have been included as a bushfire risk.

Use of estimated information

This has been explained in the Methodology and Assumptions section above.

Material accounting policy changes

Not applicable.

Reliability of information

The colour coding system has been used in the RIN template to indicate the level of confidence in each of the cells completed.

3.7.3 Service area factors

Compliance with requirements of the notice

The Notice requires the route length of overhead lines and underground cables to be determined for the 2014-15 financial year. For Table 3.7.3, the route length disregards the number of circuits that span between two poles and uses the length of any one of the circuits as the route length.

Final connections to the mains have been excluded (ie. overhead service lines and underground service cables), as well as overhead lines and underground cables for public street lighting.

Source of information

Overhead line and underground cable data (ie. “Cables”) and pole data was exported from GIS Smallworld using FME and saved as MapInfo files.

Overhead line route lengths:

The pole and cable data was analysed using FME to determine where Essential Energy owned overhead cable spans were shared by other circuits, and if they were, these circuits were reduced to a single circuit to represent the route length for each span. The highest voltage between the two poles was assigned the voltage of the span.

Underground cable route lengths:

The cable data was analysed using FME to determine where Essential Energy owned underground cables runs parallel to other underground cables. Where there are cables in parallel, the part of any cables that are in parallel except the one with the highest voltage are removed.

Methodology and Assumptions

The total route length was determined by totalling the overhead line route lengths and the underground cable route lengths determined above.

The FME Workbench filtered out all cables that were not owned by Essential Energy and Service Status was ignored. Any LV cables that had an LV Service Type of “Service” were considered as Service and any that had an LV Service Type of

"Consumer Mains" or "Sub-mains" were ignored. The Nominal Length attribute on the cable was used for the length of each cable. The results were then summarised.

Figures obtained from GIS Smallworld are assumed to be actual, even though it is acknowledged that the data may be incomplete, incorrectly located or duplicated.

Overhead lines

Overhead lines are generally drawn in GIS Smallworld on top of each other, from one pole to the next, unless the line is the same voltage as another line. In those cases, one of the lines is drawn parallel to the other line. If there is a switch in the line, the line stops two metres short of the pole to allow for the switch. The methodology used to determine the route length of overhead lines was to determine where there are multiple lines between any two poles and if so, remove all but one of the lines. Lines drawn parallel to a line of the same voltage were snapped to the poles, and gaps for switches were also snapped to the pole.

The route length of overhead lines has reduced due to the identification of overhead LV mains as LV services.

Underground cables

Underground cables are generally drawn in side by side in GIS Smallworld. To determine the route length of underground cables, it was assumed that if part of a cable was drawn in parallel to part of another cable in the GIS (within a tolerance of four metres) it shared a trench, and therefore the route length was the length of only one of the cables in parallel. If a cable did not have another cable in parallel, then that cable (or part thereof) was accepted as the route length.

The FME Workbench used to determine the route length of underground cables was unable to resolve cables in parallel which had the same voltage. If the Workbench could resolve this issue then the total route length would be less, but it would be extremely difficult to estimate. In addition, due to the way in which underground data has been captured in GIS Smallworld and the tolerance that has been used, there would be instances where cables have been inadvertently deemed as sharing a trench and others that have been inadvertently missed.

The route length of underground lines has reduced due to improvements made to the FME Workbench method used to determine route length.

Use of estimated information

As described above.

Material accounting policy changes

Not applicable.

Reliability of information

The data that has been used for the quantity in Table 3.7.3 has come from Essential Energy's GIS Smallworld system. The accuracy of the information presented in the tables was directly affected by the accuracy of the data in GIS Smallworld at the time. Contributing factors to accuracy are listed below.

The quality of the cable information stored in GIS Smallworld has been steadily improving over many years, however the following points describe some of the known data quality issues:

- Data quality checks regularly highlight data quality issues, however certain issues cannot be resolved without field visits, which in many cases are not warranted due to the nature of the issue and the distance needed to be travelled;
- Some underground cables may be missing or drawn in the incorrect location, and may not be detected because it is difficult to know exactly where they are.