Ref: CW:JC:C1994926

13 December 2013

Mr Chris Pattas
General Manager, Network Operations and Development
Australian Energy Regulator
GPO Box 520
Melbourne VIC 3001

Dear Mr Pattas

Regulatory Information Notice
Issued under Division 4 of Part 3 of the National Electricity (NSW) Law

In accordance with the reporting requirements outlined in the Australian Energy Regulator's Regulatory Information Notice (RIN), Essential Energy submits for your consideration the following documents:

- **Attachment 1** contains Essential Energy's 2012-13 financial RIN templates –submitted electronically. These templates provide the information required in the regulatory templates that were attached to Appendix B to the RIN.
- **Attachment 2** contains the required information in respect of the Demand Management Innovation Allowance (DMIA).
- **Attachment 3** addresses the AER's requirements for an Essential Energy officer to verify information specified in the RIN through a statutory declaration as set out in Appendix D to the RIN.
- **Attachment 4** contains the independent audit report resulting from Forsyth's audit of financial information as set out in Appendix E, 1.1(a) to the RIN.
- **Attachment 5** contains the independent audit report resulting from Sinclair Knight Merz's (SKM's) audit of non-financial information as set out in Appendix E, 1.1(b) to the RIN.
- **Attachment 6** demonstrates compliance with requirements in respect of preparing and maintaining information as required under Schedule 1 of the RIN.
- **Attachment 7** is an extract of a resolution by the Essential Energy Board confirming the financial information is presented in a true and fair manner.
- **Attachment 8** contains Essential Energy's Capitalisation Policy, as required in Schedule 1, 1.1(e) to the RIN.
- **Attachment 9** contains Essential Energy's 2012-13 non-financial RIN templates – submitted electronically. These templates provide the information required in the regulatory templates that were attached to Appendix C to the RIN.

If you or your officers have any questions or require any further information in relation to this submission please contact Natalie Lindsay, Manager Network Regulation, on 02 6589 8419 or Catherine Waddell, Network Pricing Manager, on 02 6338 3553.

Yours sincerely

Vince Graham
Chief Executive Officer

ATTACHMENT 2

Regulatory Information Notice (RIN)

Supporting Information for Demand Management Innovation Allowance (DMIA)

2012-2013

November 2013
Prepared by Essential Energy

Contents

1 Introduction

The Demand Management Incentive Scheme (DMIS) applied to Essential Energy by the Australian Energy Regulator (AER) in the *Demand management incentive scheme for the ACT and NSW 2009 distribution determinations* (the Determination) aims to provide incentives for Distribution Network Service Providers (DNSPs) to conduct research and investigation into innovative techniques for managing demand so that in the future, demand management projects may be increasingly identified as viable alternatives to network augmentation.

As per section 3.1.3 of the Determination, projects under the DMIS must meet the following criteria;

1. Demand management projects or programs are measures undertaken by a DNSP to meet customer demand by shifting or reducing demand for standard control services through non–network alternatives, or the management of demand in some other way, rather than increasing supply through network augmentation.

2. Demand management projects or programs may be:
    a. broad–based demand management projects or programs—which aim to reduce demand for standard control services across a DNSP's network, rather than at a specific point on the network. These may be projects targeted at particular network users, such as residential or commercial customers, and may include energy efficiency programs; and/or reduce demand for standard control services across a DNSP's network, rather than at a specific point on the network.
    b. peak demand management projects or programs—which aim to address specific network constraints by reducing demand on the network at the location and time of the constraint.

3. Demand management projects or programs may be innovative, and designed to build demand management capability and capacity and explore potentially efficient demand management mechanisms, including but not limited to new or original concepts.

4. Recoverable projects and programs may be tariff or non–tariff based.

5. Costs recovered under this scheme:
    a. must not be recoverable under any other jurisdictional incentive scheme,
    b. must not be recoverable under any other state or Australian Government scheme, and
    c. must not be included in forecast capital or operating expenditure approved in the distribution determination for the next regulatory control period, or under any other incentive scheme in that determination.

6. Expenditure under the DMIA can be in the nature of capex or opex. The AER considers that capex payments made under the DMIA should be treated as capital contributions under clause 6.21.1 of the NER and therefore not rolled into the regulatory asset base at the start of the subsequent regulatory control period. However the AER's decision on the treatment of capex will only be made as part of the subsequent distribution determination.

Section 3.1.4.1 of the Determination requires that each ACT and NSW DNSPs must submit to the AER annual reports on their expenditure under the DMIA for each regulatory year.

This submission provides the details of Essential Energy's DMIA projects undertaken in the 2012/13 financial year as outlined above.

2 Summary of Submission

Essential Energy's DMIA expenditure for the 2012/13 financial year consisted of six different projects/programs including;

1. Continuation of the Grid Interactive Inverter program based on the 20kVA four quadrant inverter
2. Grid Interactive Inverter program based on the 5kVA four quadrant inverter
3. Conservation Voltage reduction through the use of low voltage regulators
4. Capacitor Package Development
5. Energy and Network Capacity cost evaluation
6. Energy and Demand Audits

A program facilitation "project" was also run to allow for the efficient capture of program management and non-project specific DMIA based costs, details are outlined in section 2.1.

Total Program cost for the 2012/13 financial year is $976,600 with $321,228 allocated to CAPEX and $655,372 allocated to OPEX as follows;

Name of Project	Total amount of the DMIA spent in:		
	2012-2013		
	Operating expenditure ($'000 nominal)	Capital expenditure ($'000 nominal)	Total expenditure ($'000 nominal)
Grid Interactive Inverter program 20kVA based		58,612	58,612
Grid Interactive Inverter program 5kVA based		120,261	120,261
Conservation Voltage Reduction through low voltage regulators		142,355	142,355
Capacitor Package Development	24,763		24,763
Energy and Network Capacity cost evaluation	205,024		205,023
Energy and Demand Audits	43,907		43,907
Program Facilitation	381,677		381,677
Total	**655,372**	**321,228**	**976,600**

For further information refer to the specific project reports.

2.1 Program facilitation

Program facilitation was setup to efficiently capture costs associated with DMIA projects without creating undue burden on limited internal demand management resources. Program facilitation refers specifically to the labour cost of Essential Energy employees for time spent on any of the following;

- DMIA reporting
- General or broad DMIA meetings including but not limited to meetings with other DNSPs for the purpose of collaboration or information sharing
- Time spent on development of project documentation for a project not yet created in Essential Energy's systems. As background, project documentation is first created and approved before project numbers are issued for time to be allocated to said project

- Transitioning between DMIA projects or on a multitude of DMIA projects during a short period

Overall project costs for the “Program Facilitation” project during 2012/2013 were $381,677.24 determined by the use of appropriate time reporting. For all DMIA compliance relevant to the “Program Facilitation” project refer to the project specific documentation.

2.2 Developments from previous years DMIA

Essential Energy’s spending of the DMIA in previous years relates directly to the “Grid Interactive Inverter program 20kVA based” and “Grid Interactive Inverter program 5kVA based” projects, for further information on developments from those projects in 2012/13 refer to the project specific documentation.

3 Grid Interactive Inverter program – 20kVA four quadrant inverter

3.1 Summary

The grid interactive inverter program is a continuation of work completed in previous years under the DMIA to prove the multitude of benefits available from four quadrant inverter technology.

3.2 Background information

An electricity network has real and reactive characteristics which interact with real and reactive power flows to determine the levels of voltage, current and losses around the network. The network's capacity to deliver load or absorb generation at any point can be constrained either by the current rating of elements in the supply path or by unacceptable voltage conditions for customers. Traditional network solutions involve augmentation to increase the supply capacity through upgrading existing infrastructure or providing additional infrastructure to reduce the impedance of the supply path.

A four quadrant inverter is capable of providing a combination of real and reactive power either into or out of the network. This capability can be used to adjust power flows and significantly improve voltages, currents and losses on the existing infrastructure as an alternative to network augmentation. The outcome will be improved utilisation of existing infrastructure and avoidance or deferral of network augmentation.

3.3 Grid Interactive Program overview

A development agreement was signed with an Australian electronics design and manufacturing company in December 2008 for the production of four prototype units, one for bench testing at their premises and three for a test installation on the Essential Energy network. Some of the preliminary development costs were incurred in the 2008/2009 financial year.

During 2009/2010 a test site was established at Queanbeyan, adjacent to the Essential Energy Research and Demonstration Centre and an existing solar array and the prototype four quadrant inverters installed in February 2010. There were significant network compatibility issues observed and the units were returned to the supplier for hardware and firmware upgrades to address them.

Figure 1 Queanbeyan Inverter Installation

The units were reinstalled in June 2010 and firmware adjustments continued through to 2nd September 2010 when network stability was achieved and proof of concept demonstrated. A workshop was held with the supplier in late September 2010 and design modifications agreed for a more robust unit and additional functionality for further field evaluation on the Essential Energy distribution network.

Field testing for the upgraded 20 kVA units began in January 2012 with the replacement of the original prototype units at Queanbeyan to check functionality. This was followed by installation of two three phase statcom field trials in the Bega area in February 2012. Each of these statcom installations comprises three single phase, 20 kVAr inverters configured in statcom mode where the units provide coordinated reactive power support only and do not require a battery. Minor issues have been raised during these field trials which will continue to add positive development to the inverter program.

Figure 2 Bega / Kalaru Inverter Installation

In late 2012, on a single phase 11,000 volt feeder at Pappinbarra, near Port Macquarie, a single 20 kVA inverter and a lithium battery with 40 kWh of useable energy storage were installed, with results pending.

Figure 3 Pappinbarra Inverter Installation

Essential Energy has proven the voltage support benefits of the technology, and will continue to work towards defining the value of the multitude of benefits available and engaging with suppliers to determine the best course forward to a business as usual operation.

3.4 Program Detail

The Grid Interactive inverter program involves research, development and field testing of four quadrant inverters as an enabling technology for energy storage and reactive power support which can be utilised to avoid or defer network augmentation in the low and medium voltage distribution networks. It is a continuation and expansion on Essential Energy's DMIA program from 2011-2012

Individually the Grid Interactive Program consists of research, development and testing of

- 60kVA 3ph modular statcom

A three phase modular statcom developed for a variety of uses as outlined under benefits, with particular focus on application to lines with high reactance to resistance ratios

- 60kVA 3ph energy storage and solar combination

A three phase statcom with energy storage used for development and testing of the optimum solar PV enabling technologies and routines

- 20kVA single phase modular statcom

A single phase modular statcom developed for a variety of uses as outlined under benefits, with particular focus on application to lines with high reactance to resistance ratios

- 20kVA single phase modular energy storage

A single phase modular statcom with lithium ion energy storage developed for a variety of uses as outlined under benefits, with particular focus on application to lines with low reactance to resistance ratios

- Integration of Solar, Wind and Storage Systems into Distribution Grids for Network Support Study

The aim of this project is to develop a structured approach for infrastructure development to facilitate the integration of inverter-interfaced renewable energy resources and energy storage systems into electricity networks. With a focus on network support through:

- Grid interactive inverters used for voltage regulation and power loss minimisation through control of active and reactive power; and
- Design and analysis of graduated correction strategies associated with such systems.

3.5 Nature and Scope

The "Grid Interactive Inverter program based on the 20kVA four quadrant inverter" is a non-tariff based program to develop an enabling technology aimed at addressing specific network constraints by reducing demand on (including demand for generation export capacity) or providing reactive support to the network at the time and location of the constraint.

Four quadrant power electronics technology are currently used extensively in high power, high voltage network applications for static VAr compensation and large energy storage applications. During the initial stages of this program there was no low cost, commercially available similar technology for low power, low voltage or single phase systems, subsequently semi-commercialised products have become available and are continually assessed against the existing product to ensure the most efficient outcomes of the program.

Commercially available low voltage inverters are widely used for the connection of small scale renewable energy generation but their control methodology and design is currently not suited to full four quadrant grid interaction to facilitate network support.

3.6 Aims and Expectations

The aim of the program is to develop cost effective, flexible, low voltage, four quadrant inverters which can be used in a variety of applications to address a range of supply quality issues.

It is expected that final production cost for a single phase inverter will be in the order of $500 per kVA which compares favourably to commercially available small scale photovoltaic units offering substantially less functionality.

Energy storage costs are estimated to be $500 per kWh based on currently available lead acid technology, however it is expected that battery development for electric vehicles will ultimately provide a more cost effective alternative.

3.7 Selection

Essential Energy has a substantial rural distribution network, much of which was installed in the 1950s, 1960s and 1970s under various Rural Electrification Schemes using small section conductor on single phase and SWER construction in order to minimise cost to the customer. The capacity of these lines to supply load or absorb generation is limited.

Subsequent changes to system loads through “infilling” and increased demands of individual installations due to changes in lifestyle and price accessibility of electrical appliances has created many situations throughout Essential Energy where general voltage levels cannot be satisfactorily maintained within the allowable voltage range and short term fluctuations create increasing annoyance for customers.

Traditional network solutions include the installation of voltage regulators to address general voltage levels or conductor upgrades in situations where voltage regulation is not an effective option. Current costing for conductor upgrades is in the order of $5,000 per km for SWER and $6,000 for single phase lines and significant distances are involved if an effective improvement in voltage conditions is to be achieved.

While the initial focus of the project was on a modular 20 kVA unit to address feeder level issues the initial prototype installation demonstrated that the four quadrant capability can also be utilised for power quality improvement on low voltage systems to mitigate voltage drops due to increased circuit loading or voltage rises due to increasing levels of small scale embedded generation. The scope of the program was subsequently extended to facilitate PV connection, VAr support and energy storage at residential level.

Low voltage network solutions include conductor upgrades or additional distribution substations. Depending on the circumstances this could typically cost between $20,000 and $200,000 to address a single constraint.

Initial options considered;

1. Traditional generation

   An alternative is to use an embedded generator at the end of the affected feeder to reduce the load the feeder needs to supply but traditional generators are often difficult to implement as they have issues with noise, pollution, security and maintenance.

2. Adaptation of commercially available inverter equipment

   The use of commercially available inverters as used for the connection of small scale wind and photovoltaic generation has previously been considered. A trial installation at Lake Mungo included Xantrex 4.5 kVA inverters at a unit cost of $6,300. Significant problems were experienced in adapting the inverter operation for interactive grid support with the final configuration and the units were not considered to be suited to further development due to the lack of a suitable grid interface.

3. High Voltage large scale equipment

High voltage inverters with grid interactivity are available from established companies such as ABB and Siemens but they are very expensive and not cost effective for low power applications required on weak rural feeders. Previous contact with these companies indicated that development of a suitable unit was not a high priority and any development costs would need to be recovered.

4. Develop a single phase, modular system (preferred option)

   Identify a suitable partner and work with them to develop a specification and produce a prototype, modular power electronics system to provide real and reactive four quadrant operation for voltage support when used in conjunction with a suitable direct current source such as battery storage or renewable generation

3.8 Implementation

The project has been broken into three distinct stages;

1. Knowledge acquisition phase

   Prototype units are developed and installed in an environment where they can be closely monitored and design improvements checked for inclusion in a production version.

   During the 10/11 financial year proof of concept had been achieved with the prototype units installed at Queanbeyan and design modifications required for the production unit were agreed.

2. Field trial phase

   First run production units are installed and their performance evaluated prior to approval for general use.

   At the close of the 11/12 financial year substantial field trials and development towards a product suitable for general deployment were underway with final refinement work in progress in order to move the devices into the business as usual phase.

   During the 12/13 financial year further monitoring and modification has been made to the units to prepare them for general deployment use.

3. General deployment phase

   The utilisation of four quadrant inverters as a generic supply quality improvement technology on Essential Energy's distribution network which may include development of incentive schemes to leverage spare network support capacity from suitable renewable energy connection equipment.

Essential Energy's network and physical requirements on power electronic devices are fairly extreme, with temperatures in the network area ranging from 49.7°C to -23°C, as well as areas of high humidity, high levels of dust and salt spray. Essential Energy's ideal installation locations can also be remote and difficult to access, resulting in rough transport conditions and minimal communications, electrically sites can be difficult, with spikes, sags and surges common, and a variety of frequency injection signals to contend with. These conditions have delayed the business as usual implementation of four quadrant inverters, however Essential Energy will continue to determine the most efficient means to achieve the benefits desired.

3.9 Costs

Overall program costs including research, development, commissioning and verification of network support functionality during 2012/2013 were $58,612 determined by the use of appropriate procurement systems and time recording.

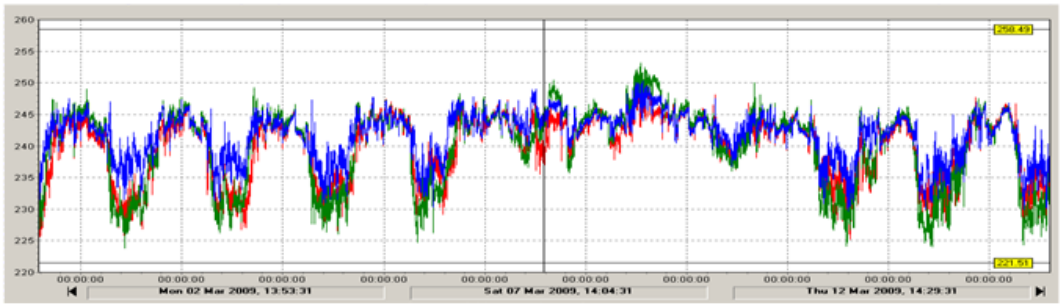
3.10 Benefits

Stage 1 of the project involved development and testing of prototype units and this was ongoing through 2009/2010. This was essentially a knowledge acquisition phase to observe the interaction of the prototype units under real network conditions and provide the basis for specification of a production unit.

Proof of concept was attained in 2010/2011 and design enhancements agreed for Stage 2 field trials, example results are shown below.

WEEKLY VOLTAGE CHART

BEFORE – voltage range 253 to 224, Voltage unbalance 10V



AFTER – voltage range 248V to 234V, unbalance 5V
Normal voltage fluctuations still apparent away from 245V and 239V reactive power support levels

Network models were built and field projects designed to verify equipment functionality and provide the basis for development of the wider deployment strategy.

Three field trials were commenced in 2012 with further refinements and developments required for business as usual operation.

The technology benefits have been proven in the field installations, however actual business benefits will accrue when the technology is field proven and deployed as an enabler for peak reduction and reactive power support applications to avoid or defer network augmentation.

Potential benefits and applications include;

1. Voltage pacification

   Providing combinations of real and reactive power to keep voltages within a given range.

2. Real power support on long rural feeders

   On high resistance circuits store energy at light load periods and release it at peak times to reduce voltage drop on the feeder.

3. Reactive power support

   On high reactance circuits use either leading or lagging reactive power to raise or lower voltages as required.

4. Generation capacity enhancement

   Use lagging reactive power to compensate for voltage rises caused by embedded generation.

5. Motor starting compensation

The fast (sub-cycle) response and short term rating of the inverter enables it to provide reactive power to balance the fluctuations due to starting of large motors.

6. Power factor correction

   Providing reactive power to correct power factor - minimising line currents and losses.

7. Load and voltage balancing

   Transferring real and reactive power between phases to ensure balanced supply conditions.

8. Conservation voltage reduction (CVR)

   Controlling voltage levels to optimise energy usage and efficiency.

9. Loss reduction

   Managing loading patterns to optimise network current flows for loss minimisation.

10. Energy storage (community, household, PV)

    Balancing load and generation at local level to optimise network utilisation.

11. Microgrid operation

    Operation as a fast response balance between generation and load to stabilise microgrid operation.

12. Peak price generation

    Potential to store energy for release over peak price periods on the energy market to enhance asset value.

13. Peak lopping

    Provide real power at peak periods to ensure network ratings are not exceeded.

14. Reliability improvement

    Ability to operate in uninterruptible power supply (UPS) mode to improve voltage quality and sustain critical loads during power outages.

15. Local load control

    Potential to act as a signal generator for local control applications.

16. Harmonic suppression

    Acts as a “sink” for lower order harmonics through inductive coupling to the network.

17. Network monitoring

    Current and voltage measurement at the point of application.

3.11 Compliance

The “Grid Interactive Inverter program based on the 20kVA four quadrant inverter” meets the DMIA criteria under the following conditions;

1. Shifting or reducing demand for standard control services through non–network alternatives

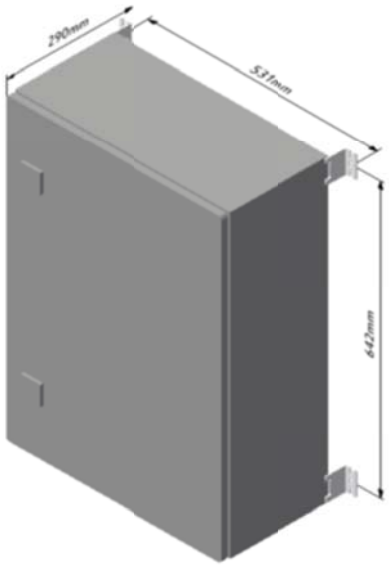
2. For use in;
    a. peak demand management projects or programs—which aim to address specific network constraints by reducing demand on the network at the location and time of the constraint

3. Innovative and designed to build demand management capability and capacity

4. Non–tariff based
    a. not recoverable under any other jurisdictional incentive scheme,
    b. not recoverable under any other state or Australian Government scheme, and
    c. not included in forecast capital or operating expenditure approved in the distribution determination for the next regulatory control period, or under any other incentive scheme in that determination

5. Capex.

4 Grid Interactive Inverter program – 5kVA four quadrant inverter



4.1 Summary

The “Grid Interactive Inverter Program - 5kVA Four Quadrant Inverter” is a development from the 20kVA inverter program, as such much of this section will refer to the “Grid Interactive Inverter program based on the 20kVA four quadrant inverter”. Summarily the 5 kVA grid interactive inverters were developed for use at residential level to support continued renewables generation connections without the adverse side effects currently seen in the distribution network.

4.2 Background information

Refer to section 3.2

4.3 Grid Interactive Program overview

Refer to Section 3.3

After initial developments within the 20kVA grid interactive program in 2010, it was determined that major contributions to the cost of the program and hence any future business as usual installations were;

- The relatively low volumes of devices being produced
- The installation costs involved in using Essential Energy’s field assets and staff.

An opportunity also exists to use consumers own equipment/installations to provide reactive support and hence avoid “doubling up” of similar devices (i.e. residential inverters on the consumers side of the meter without reactive capabilities and four quadrant inverters on the network side of the meter).

To overcome the issues highlighted above and to work toward evaluation of the opportunities available a development agreement was signed with an Australian electronics design and manufacturing company in mid-2011 for the production of a number of 5kVA four quadrant inverters for testing purposes.

During 2012/2013 a number of 5kVA four quadrant inverters were delivered and tested to the proposed technical specifications and appropriate Australia Standards, as an outcome of this testing some modifications have been requested.

A single test site was established in Port Macquarie at the Clearwater Zone Substation to perform longevity and functionality tests, this site has performed near faultlessly with no known issues above what was raised during the initial testing.

Testing and refinement of the product towards a final determination of the value of the benefits to Essential Energy and a defined specification will continue throughout 2013/14.

4.4 Nature and Scope

Refer to section 3.5

4.5 Aims and Expectations

Refer to section 3.6

4.6 Selection

Refer to section 3.7

While the initial focus of the project was on a modular inverter units to address feeder level issues the initial prototype installation demonstrated that the four quadrant capability can also be utilised for power quality improvement on low voltage systems to mitigate voltage drops due to increased circuit loading or voltage rises due to increasing levels of small scale embedded generation. The scope of the program was subsequently extended to facilitate PV connection, VAr support and energy storage at residential level.

Low voltage network solutions include conductor upgrades or additional distribution substations. Depending on the circumstances this could typically cost between $20,000 and $200,000 to address a single constraint.

Initial options considered;

1. Traditional generation

An alternative is to use an embedded generator at the end of the affected feeder to reduce the load the feeder needs to supply but traditional generators are often difficult to implement as they have issues with noise, pollution, security and maintenance.

2. Adaptation of commercially available inverter equipment

The use of commercially available inverters as used for the connection of small scale wind and photovoltaic generation has previously been considered. A trial installation at Lake Mungo included Xantrex 4.5 kVA inverters at a unit cost of $6,300. Significant problems were experienced in adapting the inverter operation for interactive grid support with the final configuration and the units were not considered to be suited to further development due to the lack of a suitable grid interface.

3. High Voltage large scale equipment

High voltage inverters with grid interactivity are available from established companies such as ABB and Siemens but they are very expensive and not cost effective for low power applications required on weak rural feeders. Previous contact with these companies indicated that development of a suitable unit was not a high priority and any development costs would need to be recovered.

4. Develop a single phase, modular system (preferred option)

Identify a suitable partner and work with them to develop a specification and produce a prototype, modular power electronics system to provide real and reactive four quadrant operation for voltage support when used in conjunction with a suitable direct current source such as battery storage or renewable generation

4.7 Implementation

The project has been broken into three distinct stages;

1. Knowledge acquisition phase

Prototype units are developed and installed in an environment where they can be closely monitored and design improvements checked for inclusion in a production version.

During 2012/2013 a number of 5kVA four quadrant inverters were delivered and tested to the proposed technical specifications and appropriate Australia Standards, as an outcome of this testing some modifications have been requested.

A single test site was established in Port Macquarie at the Clearwater Zone Substation to perform longevity and functionality tests, this site has performed near faultlessly with no known issues above what was raised during the initial testing.

Clearwater Zone Substation 5kVA four quadrant inverter (atypical) installation

2. Field trial phase

First run production units are installed and their performance evaluated prior to approval for general use.

3. General deployment phase

The utilisation of four quadrant inverters as a generic supply quality improvement technology on Essential Energy's distribution network which may include development of incentive schemes to leverage spare network support capacity from suitable renewable energy connection equipment

4.8 Costs

Overall program costs including research, development, purchase, installation, testing, commissioning and verification of network support functionality during 2012/2013 were $120,261 determined by the use of appropriate procurement systems and time recording.

4.9 Benefits

Actual business benefits will accrue when the technology is field proven and deployed as an enabler for peak reduction and reactive power support applications to avoid or defer network augmentation
Potential benefits and applications include those referenced in section 3.10;

4.10 Compliance

The “Grid Interactive Inverter program based on the 5kVA four quadrant inverter” meets the DMIA criteria under the following conditions;

1. Shifting or reducing demand for standard control services through non–network alternatives

2. For use in;
    a. Broad-based demand management projects or programs and/or
    b. specific network constraints by reducing demand on the network at the location and time of the constraint

3. Innovative and designed to build demand management capability and capacity

4. Non–tariff based
    a. not recoverable under any other jurisdictional incentive scheme,
    b. not recoverable under any other state or Australian Government scheme, and
    c. not included in forecast capital or operating expenditure approved in the distribution determination for the next regulatory control period, or under any other incentive scheme in that determination

5. Capex.

5 Conservation Voltage Reduction through the use of low voltage regulators

5.1 Summary

The project “Conservation Voltage Reduction through the use of low voltage regulators” has been developed in order to;

Evaluate the technical requirements and performance characteristics of conservation voltage reduction (CVR) in the Essential Energy network

- Build Essential Energy’s technical knowledge for further development in the areas of power quality rectification, remote control, CVR and small scale generation
- Evaluate the reliability, usability and functionality of three phase low voltage regulators

5.1 Background information

Conservation voltage reduction (CVR) is a lowering of voltage at the customer connection point in order to increase end use efficiency, lower peak demand, lower energy use and decrease losses without adversely power quality. CVR is currently implemented in some commercial premises for financial benefit under the name of “voltage optimisation”.

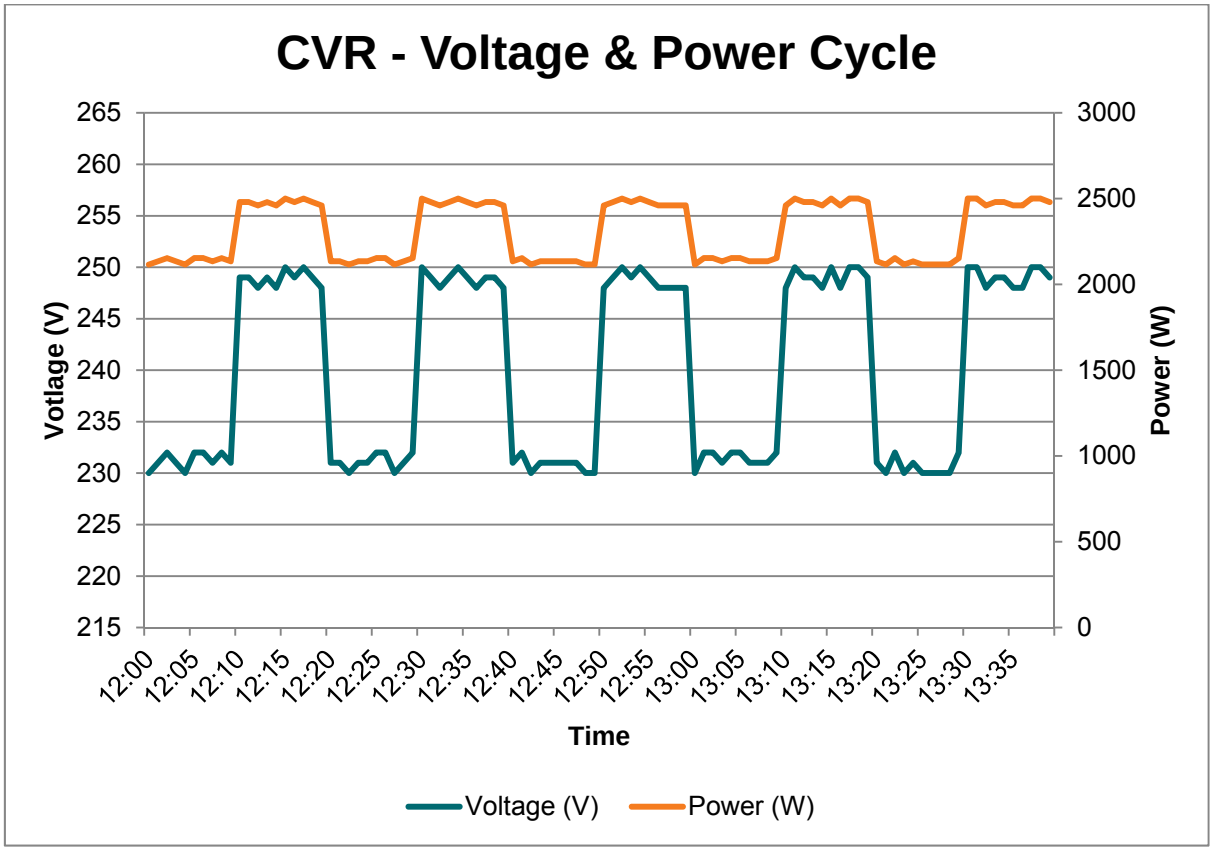


Figure 5.1: Pulse Train Voltage & Power Response

CVR a relatively unused concept for most utilities due to a number of technical issues in its implementation, instead CVR's main proponents are those in the energy efficiency sector.

The CVR factor or CVRf is the percentage change in energy for a given percentage change in voltage i.e.

$$\frac{\% \Delta \text{ energy}}{\% \Delta \text{ voltage}}$$

The CVRf can also be expressed in terms of kW, kVAr demand reduction as;

$$\frac{\% \Delta X}{\% \Delta \text{ voltage}}$$

Where X is kW or kVAr, however unless explicitly stated CVRf refers to the change in energy.

Numerous studies have been completed on CVR with many stating the average CVRf for both demand and energy to be around 1.0 or slightly below. A CVRf of above zero is beneficial (ignoring fixed energy requirements) to a customer who is charged on kWh or on kW as any reduction in voltage, will decrease power.

A CVRf of greater than one (i.e. where current decreases with voltage) or a negative CVRf (where voltage can be increased to decrease current) is required to be of direct benefit to a distributor whose lines and losses are related to current rather than energy or power. The addition of a voltage regulator provides a separation between the HV voltage levels and LV voltage levels and changes the interaction from the HV voltage to one of constant power. Conservation Voltage Reduction through the use of low voltage regulators project overview;

The chosen device to investigate the CVRf theories outlined above is a three phase low voltage regulator, the benefits of using such a device are;

- Connected at LV, therefore trials can be small and with minor impacts to Essential Energy's business as usual operations
- The three phase regulator, once brought into the operational environment can be used in other sites for correction of voltage issues that would have required costly augmentation
- Allows the creation of a "constant power" LV network, thereby mitigating the issues outlined above

Whilst the main aim of the project is a thorough understanding of CVR, CVRf and its implementation (innovation), the project has a secondary aim of evaluating the three phase regulator for business as usual use (building of capability) and determining the value of CVR when used as a secondary function, with this in mind it is planned that the Conservation Voltage Reduction through the use of low voltage regulators project will consist of the following;

- One three phase low voltage regulator installed for testing of CVR in a residential area
- One three phase low voltage regulator installed for testing of CVR in a commercial area
- One three phase low voltage regulator installed for testing of CVR in an industrial area
- Five three phase low voltage regulators installed for evaluation as a business as usual tool for voltage support, with CVR as the secondary consideration.

5.2 Nature and Scope

The Conservation Voltage Reduction through the use of low voltage regulators project is a non-tariff based project with the following objectives;

- Evaluation of the technical requirements and performance characteristics of conservation voltage reduction (CVR) in the Essential Energy network
- Building Essential Energy's technical knowledge for further development in the areas of power quality rectification, remote control, CVR and small scale generation
- Evaluation of the reliability, usability and functionality of three phase low voltage regulators

To complete the above objectives, the project will include the acceptance testing, soak and functionality testing of a three phase low voltage regulator (in both voltage support and CVR functions), to determine the business as usual cost effectiveness (i.e. the calculation of total installed cost and benefits) of the product and to bring the documentation around the product up to the level required for business as usual use. Given these desired outcomes the low voltage regulator development and testing will be limited to the following;

- CVR functionality
- The physical installation
- The configuration
- The operational aspects
- The network impacts
- The total known package costs
- Internal standards for installation and maintenance
- Education on product use

While testing development is to be limited to the above items, issues, risks and learnings will be unlimited in nature.

5.3 Aims and Expectations

The aim of the program is to test CVR at low voltage, in order to allow a separation between HV and LV voltages. Longer term if successful, the completion of this project will allow Essential Energy to provide the business case for CVR at low voltage, and through previous research completed compare this to the benefits of CVR at HV, develop programs for the conservation of energy where economically viable, and defer network augmentation through either the reduction of demand through the use of CVR or the implementation of low voltage regulators to support the voltage at times of peak demand, with energy conservation as the secondary benefit.

5.4 Selection

Conservation Voltage Reduction is considered to be an effective tool in the conservation of energy, however for the reduction of network loads (current) ideally a separation between LV and HV voltages would exist to ensure the benefits of CVR are available in the HV feeder.

Initial options considered;

1. Single phase low voltage regulators

Single phase low voltage regulators are already used by Essential Energy to maintain voltages in constrained areas. Essential Energy has a firm appreciation of the costs involved in these installations, and due to the relatively high installed costs compared to the small loads passed through the device (typically one or two customers) it is not considered economical to install single phase low voltage regulators for the primary use of implementing CVR. Additionally installation and data from the existing single phase low voltage regulator installations is atypical, as the short distance between the installed single phase regulators and the customers has meant that taking into account the voltage drop and losses between the regulator and the customer has not been a major issue.

2. The use of LV reactive compensation

The use of low voltage reactive compensation can provide voltage regulation, but with the regulation comes the possibility of increased losses as power factor strays away from unity. It could be possible to constrain the reactive compensation in such a way as to ensure losses are not increased and that voltage regulation for the purpose of CVR is maintained, however the complexities and development involved would be far beyond what Essential Energy could hope to achieve in the timeframe scheduled for this project. The use of LV reactive compensation for voltage regulation in order to achieve CVR is not the preferred option at this stage, however it has been highlighted for consideration as a future project should this project prove successful.

3. High Voltage Regulation

High voltage regulation with the use of HV regulators and zone substation load drop compensation is already implemented on many of Essential Energy's feeders and high voltage distribution capacitors are in the initial stages of being used in business as usual situations. CVR for use in conserving energy can be implemented on some of these feeders provided monitoring or analytics are used, however in theory the peak current reductions for CVR on the HV feeder are minimal compared to using CVR on the low voltage side, that said the cost should also be significantly less, it will be part of learnings of this project to determine whether, given the differences in benefits achieved at HV and LV where CVR is most cost effective to implement.

4. Distribution Transformer regulation

HV transformers use on-load tap changers to regulate voltage at the zone substation or on the HV feeder. On-load tap changers require a degree of maintenance and monitoring to ensure adequate operation and lifetime, the costs involved with this work and the additional capital cost of on-load tap changers has largely precluded their use on distribution transformers, however recent developments claim maintenance free on-load tap changers for distribution networks offering a potential opportunity for future CVR implementation. Essential Energy currently has in service approximately 130,000 distribution transformers which would likely rule out any large scale roll-out, nor would not be considered to be cost effective to remove and replace transformers for the trial period. However as a transformer requires an upgrade or reaches the end of serviceable life, then it may be cost effective to replace it for the purposes of CVR, if this project proves successful the business case for regulating low voltage transformers will be evaluated.

5. Low Voltage 3ph regulators

Low voltage regulators provide the decoupling between LV and HV voltages required for the optimal demand reductions (current). It is estimated that low voltage three phase regulators will provide a greater benefit/cost ratio than a single phase regulator due to the increased capacity for load being serviced and similar requirements for installation. Low voltage regulators will allow all objectives to be met with minimal intrusion into business as usual systems and therefore lower costs, low voltage regulators are also predicted to have business use outside of this project in deferring voltage constraint based augmentations. Therefore this is the preferred solution.

5.5 Implementation

The project has been broken into three distinct stages;

1. Knowledge acquisition phase

Unit/s are installed in a workshop environment where design, settings, control and communications can be closely monitored, reviewed and any issues raised immediately with the supplier.

The completion of this work is expected during the 13/14 financial year.

2. Field trial phase

Three units will be installed in field locations offering voltages at the higher end of the acceptable range, thereby allowing the greatest improvement and measurement of CVR potential. These installations will be across three load types of commercial, residential and industrial.

Five units will be installed in field locations suffering from voltages outside of the acceptable range as this best represents the business as usual use for low voltage regulators. The potential for implementation CVR will be measured and the benefits calculated.

The completion of this work is expected during the 13/14 financial year.

3. Business as usual readiness

At the completion of the field trail conclusions will be drawn on the effectiveness of CVR in the Essential Energy area, and of the three phase regulator as a cost effective means of performing the CVR function. If the business case proves viable, then further evaluation will be undertaken to ensure the most cost effective implementation of CVR.

Finally an evaluation on the three phase regulator installations will also take place to ensure any issues or risks raised during the project are implemented before claiming the specific device as business ready.

5.6 Costs

Overall project costs thus far are $142,355.30 including research, purchasing and testing of two three phase low voltage regulators by appropriately qualified staff.

5.7 Benefits

Due to the project being in the initial stages, minimal project benefits have been delivered, however a number of anticipated benefits are highlighted below;

- Knowledge acquisition in the area of conservation voltage reduction
- Evaluation of the potential for conservation voltage reduction as a secondary benefit in business as usual operation
- Avoid network augmentation through reducing/limiting peak demand and improved power quality
- Increase end use efficiency and equipment life
- Decrease network losses
- Facilitating the integration of distributed generation into the grid
- 3 phase voltage balancing
- Improve power factor
- Improving network visibility via remote monitoring and control

5.8 Compliance

The “Conservation Voltage Reduction through the use of low voltage regulators” project meets the DMIA criteria under the following conditions;

1. Project undertaken to meet customer demand by shifting or reducing demand for standard control services through non–network alternatives.

2. For use in;
    a. broad–based demand management projects or programs and/or
    b. peak demand management projects or programs—which aim to address specific network constraints by reducing demand on the network at the location and time of the constraint.

3. Innovative and designed to build demand management capability and capacity.

4. Non–tariff based.
    a. not recoverable under any other jurisdictional incentive scheme,
    b. not recoverable under any other state or Australian Government scheme, and
    c. not included in forecast capital or operating expenditure approved in the distribution determination for the next regulatory control period, or under any other incentive scheme in that determination.

5. Capex

6 Capacitor Package Development

6.1 Summary

The Capacitor Package Development project was initiated based on the outcomes of a trial pole top capacitor bank project completed in 2011/12. The 2011/12 pole top capacitor bank installation was used to alleviate a specific voltage constraint and in doing so defer capital investment, this trial was therefore considered to be outside of the DMIA.

The project “Capacitor Package Development” has been created in order to develop standards and guidelines for use of distribution pole top capacitor banks, such that a broad scale roll-out could be implemented in the future with a minimum of technical issues.

6.2 Background information

Distribution feeder capacitors are highly utilised assets for many utilities within the US power system, and are increasingly being used within Australia in order to;

- Supplement substation power factor correction: In brownfield substations it can be prohibitively expensive to install extra capacitor banks and breakers in order to reduce current on the subtransmission feeder, installing capacitor banks on the distribution network avoids these costs whilst also providing additional benefits due to its proximity to the load.
- Provide an alternative to substation capacitors: As above.
- Manage distribution voltage profiles: Capacitors provide a voltage boost by either supplying reactive power requirements closer to the load or by the capacitive volt-ampere-reactives (VARs) travelling through the network inductance to upstream loads. Switched capacitors serve to regulate voltage on a feeder, having the ancillary benefit of reducing the number of operations of voltage regulators, both line

(and to a lesser degree) substation on-load-tap-changers. This reduces the required maintenance on both regulators and tap-changers.

- Increase network capacity: Figure 1 illustrates the extra capacity that can be released by correcting the power factor of a feeder, as an example if the power factor on the feeder at peak load is at 0.8, then an additional 25% of feeder capacity is available (not including reduced losses or increased voltage).
- Reduce line losses: By cancelling the reactive power drawn by loads with low-power factor, capacitors decrease the upstream line current required to supply these loads and significantly lower I^2R losses.

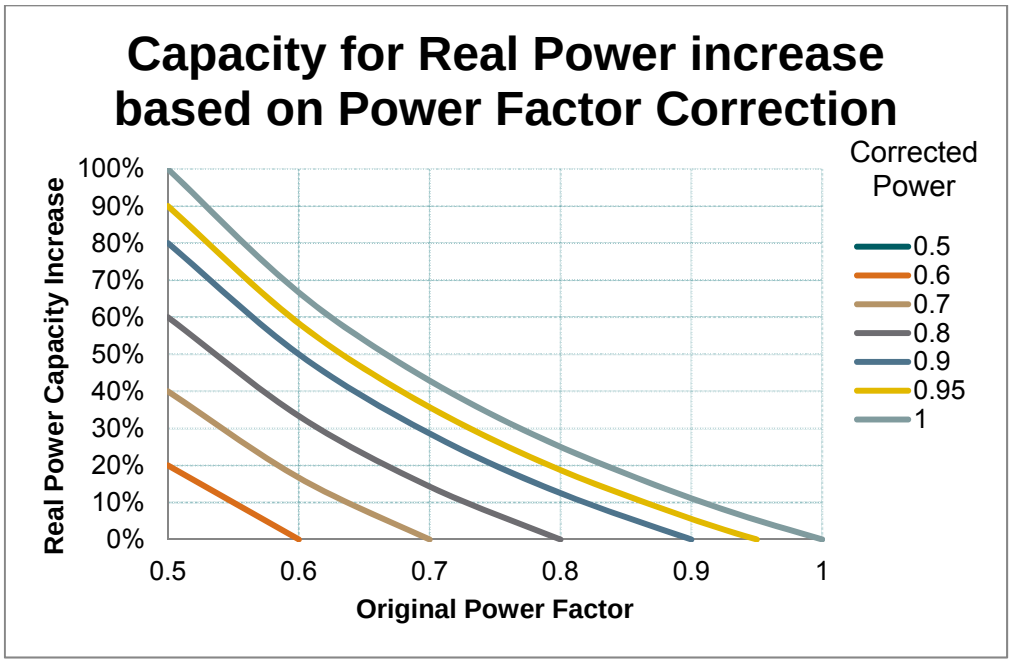


Figure 2 - Example of capacity increase through the correction of Power Factor

Simplified Theory of Capacitors

Capacitors work by storing energy. They are a relatively simple device; two metal plates sandwiched around an insulating dielectric. When charged to a given voltage, opposing charges fill the plates on either side of the dielectric. The strong attraction of the charges across the very short distance that separates the plates creates a strong electric field (electrostatic field) enabling the storage of energy. Having this field also means that capacitors oppose changes in voltage, hence it is also important to note that the charge on the plates does not change instantaneously; rather there is a time constant associated with charging and discharging capacitors.

In an AC power system capacitors don't store their energy very long – just one half cycle. As each half cycle a capacitor charges up and then discharges its stored energy back into the power system. The net real power (excluding losses) is zero. Every half cycle the capacitor will exchange reactive power with the (typically local) loads on the system that have a poor power factor. This benefits the system as the reactive power (seen as extra line current) does not have to be transmitted from the generators through kilometres of line and multiple transformers and this in turn frees up generators and upstream lines to generate and distribute greater amounts of real power.

Essential Energy's experience with Capacitors

Capacitors are installed, maintained and utilised within around 180 of Essential Energy's Zone Substations with relatively few issues, however the installation of distribution feeder capacitor banks within Essential Energy's network has been limited and sporadic. The reasons for the limited installation of distribution capacitor banks include;

- A number of potential issues that can arise if capacitor banks are incorrectly applied to the distribution network including;
  - Amplification of harmonics
  - Amplification/attenuation of frequency injection signals, this point is of considerable issue to Essential Energy due to the vast array of frequencies used in the installed frequency injection systems.
  - Switching transients (exacerbated historically by the number of single phase switches on the network)
  - Concern over leading power factors
  - Over voltages
  - Additional losses (where control settings are incorrect)
- A lack of understanding around the multitude of benefits of a distribution feeder capacitor installation and therefore underestimating the value of a capacitor bank installation during NPV analysis.
- A general lack of experience/knowledge in distribution capacitor banks, which creates a disincentive to install and an easy point of blame should any network issues arise (which will inevitably occur if the potential issues are not understood).

6.3 Capacitor Package Development overview

In 2011/12 a trial capacitor bank installation was completed at Clarencetown, confirming the expected costs and benefits and highlighting the outstanding issues for wider implementation, subsequently the Capacitor Package Development project was created in order to overcome the remaining issues and provide the appropriate training and education for business as usual use.

Figure 3 - Clarencetown trial capacitor bank installation

6.4 Nature and Scope

The “Capacitor Package Development” project is a non-tariff based program to develop internal standards, guidelines and manuals for the use of power factor correction technology aimed at addressing specific network constraints by reducing demand on, or providing reactive support to the network at the time and location of the constraint.

Therefore the desired outcome for the “Capacitor Package Development” project is a robust package covering design, installation and operation which will allow the implementation of distribution capacitor banks across the Essential Energy network with minimal development on behalf of the end user. The robust package outlined above will include;

- Robust capacitor bank standard/s at various voltages and sizes (minimal variations)
- Maintenance plans
- Operational manuals
- Installation/specification manuals for use by the planning department
- Education of the end users (including planning and field staff)

6.5 Aims and Expectations

The aim of the “Capacitor Package Development” project is to develop a robust capacitor information package covering design, installation and operation which will allow the implementation of distribution capacitor banks across the Essential Energy network with minimal development on behalf of the end user.
As HV distribution capacitors are already a mature technology, it is not expected that a great deal of cost reduction will occur in the future external to Essential Energy, however it is anticipated that internally there will be substantial cost reductions available as the final installed cost for distribution capacitors are expected to be under $100 per kVAr.

The low anticipate $/kVAr figure will therefore allow for substantial cost effective voltage improvements on long lines and peak demand and loss reductions in poor to moderate power factor areas particularly in high loss distribution networks as shown in case study D8 of “Energy Efficiency Opportunities in Electricity Networks - Findings of industry trials for the extension of the EEO Program to network businesses” prepared by Energeia in consultation with the Department of Resources, Energy and Tourism.

6.6 Selection

There is little doubt that power factor correction is a cost effective alternative to network augmentation however there are quite a number of options on how to implement power factor correction for the greatest benefits and least cost. The options for installation of power factor correction were reviewed by Essential Energy as below;

1. Installation of capacitor banks at Zone Substation level

Installation of capacitor banks at the zone substation is already undertaken by Essential Energy, however they can be cost prohibitive to upgrade in a physically constrained environment or to install in a brownfields site, on-top of this zone substation capacitors offer the least benefit of the possible options. Due to these cost implications it is proposed that Zone Substation capacitor bank installations occur only where substantial ancillary costs are not present, i.e. that Essential Energy continues to install power factor correction at zone substations where it is cost effective to do so, however alternatives offering greater benefits do exist with minimal cost implications, and hence this is not the preferred solution for this project.

2. Installation of pole-top distribution capacitors

Installation of pole-top distribution capacitors provide substantial additional benefits over the zone substation installations, in demand reductions, voltage improvements and loss reduction, particularly on very long lines, whilst in theory the use of capacitors in pole-top configurations should not add greatly to the cost equation. This is the preferred solution.

3. Installation of distributor owned low voltage capacitors

Installation of capacitors on the low voltage system has the additional benefits of reducing losses and peak demand in the low voltage feeder, however by greatly decreasing the size of the load able to be connected off the capacitor (i.e. if 100% of load comes from the zone substation, 20% through any particular feeder and 1% through any particular distribution transformer by moving the installation to the distribution transformer we have decreased the reactive power flowing through the point of common coupling) we have greatly increased the number (and therefore cost) of installations required if we wish to avoid any adverse impacts. Due to these cost implications it is not proposed that distributor owned power factor correction be utilised in the low voltage network for bulk power factor correction at this stage, however should substantial developments occur that would alter the cost or benefit structure of the proposed solutions this should be re-evaluated.

4. Incentivising customers to perform their own power factor correction, through the use of tariffs and metering

Currently many of Essential Energy's customers pay for their customer classes' average impact on demand, hence price signals are for the most part blurred through the use of energy as a surrogate for demand, with some customers paying more than their fair share, and others paying less than their fair share.

By using price signals which relate relatively poorly to the cost of supply, manufacturers of end-use equipment and customers themselves have limited incentive to ensure that end-use equipment has a minimal impact on the network or the costs of the network. To avoid customers paying more or less than their fair share, and to provide an incentive to reduce overall network costs, ideally customers should pay for their true impact on the cost structure of Essential Energy's assets, i.e. customers would pay for the impact of their demand, in terms of kVA (both kW and kVAr).

Currently Essential Energy is not in a position to bring demand type pricing to the majority of customers, nor does it believe the majority of customers have enough understanding of power factor or its impacts on demand to respond appropriately, therefore this is not the preferred option at this point in time. The AER is beginning to regulate the above inequalities and lack of education through the implementation of the "Power of Choice" and as this regulation moves through to implementation Essential Energy will be able re-evaluate the potential of moving more customers to a position of greater cost reflectivity.

6.7 Implementation

The project has been broken into three distinct stages;

1. Knowledge acquisition phase

The multitude of issues relating to the use of distribution capacitors was researched and tabulated, along with the functional requirements of our internal process regarding switching, safety, SCADA, maintenance, etc. This work was completed during the 2012/13 financial year.

2. Simulation and development phase

Options to overcome the fore mentioned issues have been developed, simulated to ensure their usefulness and will be canvassed amongst stakeholders. Specifications and guidelines for general use within Essential Energy's network area are currently being developed and once finalised will be reviewed by the appropriate stakeholders to ensure compatibility with the existing network infrastructure and operations. Completion of this work is scheduled for the 2013/14 financial year.

3. General deployment phase

The utilisation of distribution capacitors as an alternate technology for demand reductions on Essential Energy's distribution network will require appropriate training through all levels of the supply chain as well as familiarisation with the appropriate specifications and guidelines on distribution capacitor bank usage. This training and education will take place toward the end of the 2013/2014 financial year.

6.8 Costs

Overall program costs including research, development, and simulation in the development of a robust distribution capacitor package during 2012/2013 were $24,763.36 as determined by the use of appropriate procurement systems and time recording.

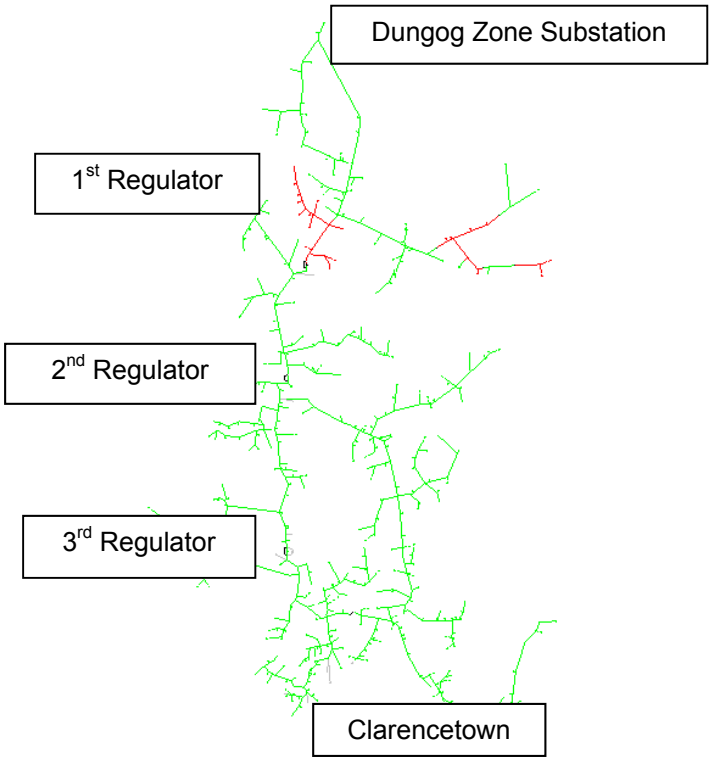
6.9 Benefits

Through the completion of the Capacitor Package Development project, Essential Energy will have built demand management capability and capacity, specifically in the use of distribution capacitors, in doing so distribution capacitors will become business as usual items for use in Essential Energy's network area. The use of distribution capacitors offers significant benefits to voltage, peak demand and loss reduction as shown in the examples below;

Example 1.

Peak load before any recent augmentation on the Clarencetown feeder out of Dungog Zone Substation (top of picture) was approximately 4.9 MVA, with 2MVA supplying the Clarencetown load some 30km from the Zone Substation through three series regulators.

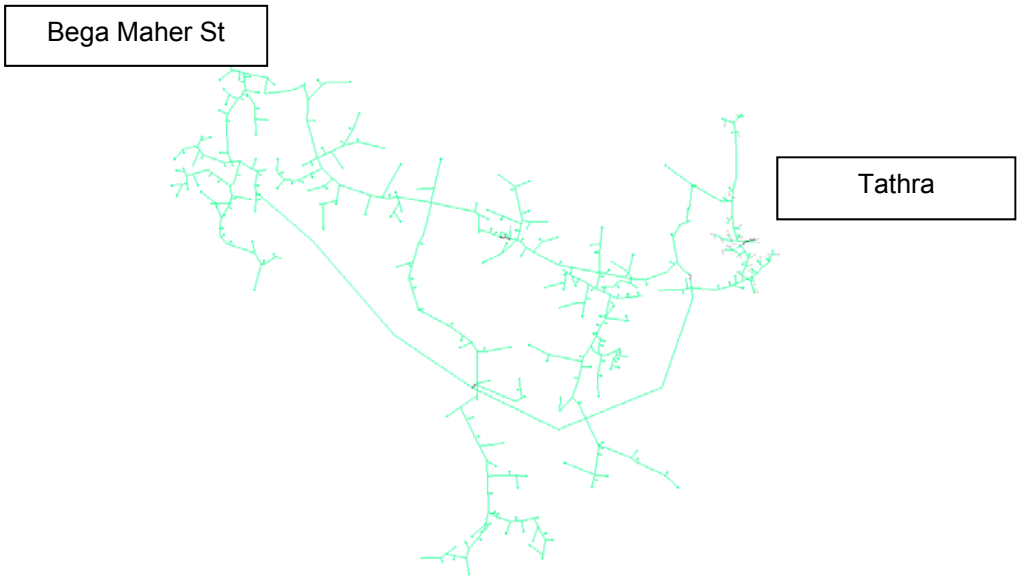
Concerns were raised over low voltage issues before the first and second regulators as well as over the thermal capacity of the mainline through to Clarencetown.



The table below shows the benefits of installing two 300kVAr capacitor banks in Clarencetown.

	Original	2x 300kVAr Capacitor Banks	Unit reduction
ZS kVA	4,911	4,360	551
1st regulator kVA	3,802	3,470	332
2nd regulator kVA	3,227	2,971	256
3rd regulator kVA	2,065	1,943	122
Minimum Voltage p.u.	0.89	0.91	-0.02
Losses (peak) kW	853	688	165
Estimated annual losses (MWh)	2,241	1,808	433

Example 2.
Peak load before any recent augmentation on the Tathra feeder out of Bega Maher St Zone Substation (top of picture) was approximately 4.2 MVA, with 2MVA supplying the Tathra load at the end of the feeder (split into northern and southern feeder legs) some 20km from the Zone Substation.



The table below shows the benefits of installing two 300kVAr capacitor banks in Tathra.

	Original	2x 300kVAr Capacitor Bank	Unit reduction
ZS kVA	4,225	3,942	283
Regulator kVA	1,455	1,350	105
Northern Tathra kVA	749	678	71
Southern Tathra kVA	1,344	1,212	132
Minimum Voltage p.u.	0.95	0.98	-0.03
Losses (peak) kW	209	181	28
Estimated annual losses (MWh)	549	476	74

6.10 Compliance

The Capacitor Package Development project meets the DMIA criteria under the following conditions;

1. Shifting or reducing demand for standard control services through non–network alternatives.
2. For use in;
    a. Innovative and peak demand management projects or programs—which aim to address specific network constraints by reducing demand on the network at the location and time of the constraint.
3. Designed to build demand management capability and capacity.
4. Non–tariff based.
    a. not recoverable under any other jurisdictional incentive scheme,
    b. not recoverable under any other state or Australian Government scheme, and
    c. not included in forecast capital or operating expenditure approved in the distribution determination for the next regulatory control period, or under any other incentive scheme in that determination.
5. Opex

7 Energy and Network Capacity cost evaluation

7.1 Summary

The “Energy and Network Capacity cost evaluation” project was developed in order to provide a more cost reflective evaluation of demand management measures within Essential Energy and to enable the business case and use of broad-based demand management initiatives.

7.2 Background information

Essential Energy has the responsibility of distributing electricity according to the Electricity Association of NSW ‘Code of Practice – Electricity Service Standards’ and the applicable Australian Standards whilst also minimising the present value cost of meeting those standards and maximising the net benefit to consumers, generators and other market participants.

The growth category in table 1 consists of all capital expenditure required to augment network capacity in order to meet increasing demand. As can be seen in table 1.1.1, “Growth” is the main influence on Essential Energy’s “Total system capital expenditure” at roughly 43% for the regulatory period 2009-2014.

$M (2008 - 09)	2009-10	2010-11	2011-12	2012-13	2013-14
System related					
Asset renewal/replacement	138	155	165	173	183
Growth	249	275	291	302	314
Reliability and quality of service enhancement	165	179	185	188	191
Environmental, safety and statutory obligations	36	39	42	43	45
LESS: Productivity Gains	(3)	(7)	(7)	(7)	(8)
Total system capital expenditure	**584**	**642**	**675**	**699**	**725**

Figure 4 – Forecast System Capital Expenditure 2009-2014

The relationship between electricity end use and growth expenditure;

Consumer loads have an incremental effect on the overall and local diversified demand and the true cost of providing a given overall network capacity is made up of the sum of many augmentations in separate parts of the network over indefinite lengths of time.

On the other hand, network augmentations to build the required capacity once a constraint is reached takes place through lumpy augmentations and extensions at different levels throughout the network - subtransmission, high voltage, low voltage mains and substations.

In these circumstances, whereby the expenditure is large, lumpy and a single network element, while the growth is small, incremental and effects the entire electricity supply chain, the economic deferral of a single network augmentation is both difficult to justify and a false representation of the true value to all market participants.
Energy and Network Capacity cost evaluation overview;

The task set for the “Energy and Network Capacity cost evaluation” was the development of models and methodologies which allow the true value of demand reductions in business case development.

In early 2012 a request for proposal was developed and sent to a number of potential suppliers, based on proposals returned a consultant was chosen and services procured in mid-2012.

During mid to late 2012 the models and methodologies were developed which have allowed Essential Energy to more accurately view the cost of growth in all levels of its network. The work completed thus far has also highlighted the significant data issues hindering the implementation of such models in more detailed, location specific views.

These models and methodologies have allowed the development of broad-based demand management business cases, the evaluation and confirmation of existing broad-based programs such as hot water load control, and the development of new concepts around the cost of demand growth.

In the coming years Essential Energy will move toward implementing these models and methodologies in all related business decisions, such that the most cost effective implementation of network and non-network solutions can be assured.

7.3 Nature and Scope

The “Energy and Network Capacity cost evaluation” project is a non-tariff based program to build the capabilities and capacity required to construct meaningful demand management business cases.
Essential Energy engaged a suitable consultant to design, build and implement a model capable of determining the average long run marginal cost at each level of the network and the average cost of capacity at each network level, it was hoped that the model would also be able to determine these values across time and location, however the granularity of the available data has limited this output. As a secondary requirement, a methodology was developed around the valuation of location specific demand management incorporating specific upstream demand reductions. The consultant also delivered descriptions, guidelines and manuals to allow for updating and maintenance of the models.

7.4 Aims and Expectations

The aim of the Energy and Network Capacity cost evaluation project was to develop more cost reflective valuations of demand and demand reduction, this aim has been accomplished through the development of previously specified models and methodologies.

It is expected that from this information Essential Energy will be able to more accurately implement the cost/benefit decisions relating to peak demand reductions over the coming years, such as for ;

- Broad-based demand management business cases
- Project specific demand management business cases
- Embedded generation business cases/benefits
- Input into network pricing

7.5 Selection

The development of business cases for demand management, particularly in the development of broad-based business cases, requires substantial information and analysis on the benefits of achieving peak demand reductions across a broad area, this type of information was previously not available to Essential Energy in any firm or quantifiable form. The requirements to build demand management business cases is known, i.e. the benefit in $/kVA of a demand reduction at a particular point or on average across the network, the options are therefore limited to various methods of obtaining this value.

Initial options considered to gather this information included;

1. Use of overall growth expenditure and overall peak demand growth

The simple use of overall growth expenditure and high level overall peak demand growth in calculating the benefits of demand reduction, while having a very low cost, gives poor accuracy and does not include many of the additional costs of servicing/maintaining additional network investment. A calculation at the overall level also leaves much to be desired in assessing the cost in particular areas, given that the cost to supply the variety of areas in Essential Energy’s network was expected to be substantially different this was not the preferred solution.

2. Use of network pricing methodology (“Cost of Supply”) models

As per Essential Energy’s “Annual network prices report 1 July 2013 – 30 June 2014”; Essential Energy’s cost of supply model aims to provide equitable outcomes with prices averaged by customer class, as a result of this the model does not take into account the marginal cost of supply to specific areas. Given that the cost to supply the

variety of areas in Essential Energy's network was expected to be substantially different this was not the preferred solution.

3. Specific growth expenditure and specific peak demand growth per area

The use of specific growth expenditure and specific peak demand growth per area allows for the further analysis required in determining the cost to supply a particular network area, the cost of servicing/maintain the additional network investment could also be brought into the model overcoming many of the deficiencies of the previous options. This was therefore the preferred solution.

7.6 Implementation

The project has been broken into three distinct stages;

1. Development Stage

   The unique skill set to develop the required models incorporating economics, finance and engineering, along with the resourcing required and the desire for the models to have substantial independence from any particular business unit meant that best course of action was to engage a consultant with sufficient skill and expertise to undertake such development.

   In the 2011/2012 financial year a consultant was engaged and data mining and development of the required models began incorporating a multitude of variables to provide the most accurate representation of peak demand benefits, these included the following developments;

   - Mapping of regions and linking of regions to bulk supply points
   - Network system and financial assumptions
   - Peak demand by system level tables and coincidence factors
   - Growth cost of capacity by system level
   - Growth Operating and Maintenance costs by system level
   - Growth capex by system level
   - Non growth capex by system level
   - Transmission costs
   - Peak demand for BSPs and zone substations
   - Tariff calculations
   - Links between Bulk Supply Point peak demand projections and lower level peak demands
   - Links between Zone substation peak demand projections and lower level peak demands
   - Links between Subtransmission data and capex data
   - Links between optimised depreciated value projections and Regulated Asset Base
   - Low voltage allocation of peak demand and specific expenditure
   - System growth cost floor (to account for currently unplanned works)
   - Distribution loss factors linkages
   - Power factor projections

The required development of the above items highlighted the fragmentation of data experienced in Essential Energy's systems and also the requirement to develop stronger linkages between systems to enable a better understanding of the cost to supply peak demand in particular areas.

The first payments for delivery of the models were made in the 2012/2013 financial year. In 2012/2013 a model was delivered which derived the benefits of peak demand reductions in terms of $/kVA including;

- The components of the marginal cost at the low voltage level contributed by each system level
- The marginal cost at each system level
- The components of the average cost at low voltage level contributed by each system level.

- The average cost at each system level
- The cumulative components of the marginal cost at all system levels

2. Specific Deployment Stage

   In 2012/2013 the developed models where used to;

   - Evaluate the cost/benefit of the existing load control system
   - Evaluate the viability of and develop the business case for broad based power factor correction programs
   - Evaluate the viability of and develop the business case for promoting the load control system through increased hot water load control
   - Evaluate the viability of and develop the business case for promoting the load control system through increased pool pump load control
   - Evaluate the viability of and develop the business case for air conditioner based load control

3. General deployment phase

   In the coming years Essential Energy will move towards using the modelled figures to influence all appropriate business decisions, such as specification of loss values in standard constructions, determination of possible network tariffs and evaluation of specific network projects.

   Essential Energy will also work towards firming the assumptions used in the model and correcting the issues related to sourcing of the currently fragmented data thereby moving the model into a more automated, easy to maintain model, through the linkage of systems and reporting where possible.

7.7 Costs

Overall program costs including research and development of the appropriate models during 2012/2013 were $205,023.96 determined by the use of appropriate procurement systems and time recording.

7.8 Benefits

The development of an appropriate measure for the benefits of demand reductions has in turn allowed for the development of broad-based demand reduction business cases, the long term benefits being a substantial increase in the level of demand management able to be implemented and the inclusion of appropriate peak demand information into a multitude of business decisions.

7.9 Compliance

The “Energy and Network Capacity cost evaluation” meets the DMIA criteria under the following conditions;

1. Shifting or reducing demand for standard control services through non–network alternatives.

2. For use in;

   a. broad–based demand management projects or programs—which aim to reduce demand for standard control services across a DNSP’s network, rather than at a specific point on the network. These may be projects targeted at particular network users, such as residential or commercial reduce demand for standard control services across a DNSP’s network, rather than at a specific point on the network. These may be projects targeted at particular network users, such as residential or commercial customers, and may include energy efficiency programs; and/or

3. Innovative, designed to build demand management capability and capacity and explore potentially efficient demand management mechanisms

4. Non–tariff based.

a. not recoverable under any other jurisdictional incentive scheme,
b. not recoverable under any other state or Australian Government scheme, and
c. not included in forecast capital or operating expenditure approved in the distribution determination for the next regulatory control period, or under any other incentive scheme in that determination.

5. Opex

8 Energy and Demand Audits

8.1 Summary

The Energy and Demand Audits project was developed in order to analyse the minor changes consumers can make to processes and equipment which benefit both the consumer and the network.

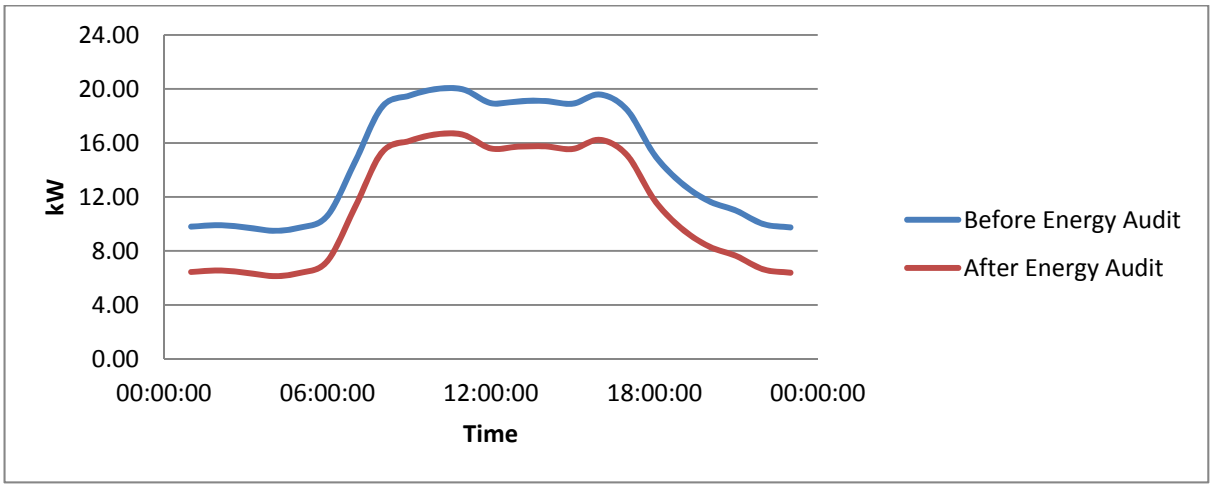
The project is similar to that suggested in the "Demand Management and Planning Project" (DMPP) final report (completed under the auspices of a Management Committee comprising the NSW Department of Planning, Energy Australia and TransGrid), June 2008; "It is recommended that the NSW Government considers requiring all State owned network operators to conduct platform studies similar to the DMPP, with a focus on establishing a data base of opportunity areas and developing project facilitation arrangements".

8.2 Background information

Consumer based demand reductions based on permanent, one-off cost solutions can offer utilities long term deferral of network augmentation, however large one-off cost solutions are often too expensive to be justified on the benefits of single network augmentation, it is therefore important to derive the benefits of solutions from a multitude of angles, in order to provide cost effective demand reductions.

Energy audits are a common, cost effective tool for decreasing consumers energy consumption, with the outcome/s of the energy audit (e.g. replacement of certain items/plant) normally being justified on commercial returns to the customer through the reduction of energy costs (by way of retail pricing initiatives).

However it is important to note that energy reductions do not necessarily translate into proportional peak demand reductions (the main concern to an electricity network) e.g. the diagram below shows an energy reduction of 6.74kWh/day or 2.4MWh per year, however the peak demand reduction is only 0.29kW.



8.3 Energy and Demand Audits project overview

In 2010/11 Essential Energy investigated the cost/benefit of completing a similar study to the DMPP in the Essential Energy network area (in light on the DMPP outcomes), unfortunately the cost involved in sourcing the information sought through large energy/demand audits is too cost prohibitive (up to $30,000) to perform on a large scale with no anticipated near term benefits, the concept was therefore sent back to the drawing board to determine a more cost effective means of sourcing similar information. On review of the options available it was determined that a more cost effective solution may be available if Essential Energy was able to implement a supplementary demand audit on the back of energy audits already being completed, this was further investigated in consultation with a number of energy auditors and deemed to be a viable solution.

In 2011/2012 Essential Energy partnered with Transgrid (who through their DMIA will be funding 50% of the final project cost) and two service providers operating within the Essential Energy network area who were offering Energy Audits to commercial and industrial consumers. Essential Energy then worked with these two service providers to create an Energy and Demand Audit.

By the end of the 2012/13 financial year a total of 10 audits had been completed with approximately 101 demand management initiatives investigated.

Preliminary results have been compiled and they show that substantial benefits are available to both the consumers involved and the network. Strategies and programs are currently being constructed to take advantage of the results and move the benefits into business as usual operation.

8.4 Nature and Scope

Due to the large cost involved in energy and demand audits, Essential Energy sought suitable partners operating within the Essential Energy network area and worked with them to develop a supplementary audit component (i.e. the demand component of the "Combination Energy and Demand Audit") which was then able to provide an assessment of the potential for and likely cost of network demand management applications.

During the audit project;

- The customers (commercial and industrial) usage patterns are recorded and/or observed, preferably at a machine/process level as well as at an overall level, along with any external influencing factors e.g. temperature, production process timing, etc. The customers premise are then evaluated for all efficiency and demand reduction/load shifting possibilities
- Individual audit reports on the potential improvements in efficiency, power factor and load curtailment for each facility is developed along with the cost and payback period based on existing retail tariffs.
- A project report is to be developed by Essential Energy personnel based on the collated individual audit reports and consisting of;
  - Project outcomes
  - Recommendations for further research
  - Typical price profiles for demand reductions based on audits in general and by particular item replacement for various customer classes
  - The most common inefficiencies, poor power factor customer types, and peak demands.
  - The individual demand reduction items with the quickest payback to the customer based on existing retail tariffs.
  - Possible mechanisms for incentivising the uptake of audit outcomes
- Demand reduction strategies and programs based on outcomes of the energy and demand audits with typical costs for various customer classes throughout Essential Energy's footprint will be developed.

8.5 Aims and Expectations

The aim of the "Energy and Demand Audits" project is to gain the following information for use in future location specific and broad based demand management programs and projects;

- A typical price profile for demand reduction energy audits and by particular item replacement, for various customer classes
- The most common inefficiencies, poor power factor customer types, and peak demands found in energy and demand audits in Essential Energy's network
- The individual demand reduction items with the quickest payback
- Demand reduction strategies and programs based on outcomes of the energy and demand audits with typical costs for various customer classes throughout Essential Energy's footprint.

Through the acquisition of this knowledge it is expected that Essential Energy will be able to deliver more cost effective customer specific demand reductions to the benefit of all customers.

8.6 Selection

Given the information sought (set out in section 8.5), specific to Essential Energy's network area the following options were considered;

1. Demand Audits

   Demand audits within Essential Energy's network area are the most direct way to source the information required and provide site specific information should a demand management project become applicable to a particular area, however demand audits are costly to perform with minimal benefits in the near term and possibly difficult to implement without customers educated on the merits of such an audit. Therefore this was not the preferred solution.

2. Use of demand audit information from sites outside of Essential Energy's network area

   Demand audit information is available from projects such as the DMPP, however without additional information there is little way to correlate with any confidence the information acquired with the Essential Energy network area. Additionally using information acquired external to the business removes any development of internal experience in developing business relationships with appropriate vendors and vendors requirements, it also removes any site specific information that may have been used at a later date. Therefore this was not the preferred solution.

3. Combination Energy and Demand Audits

   By joining a supplementary demand audit with existing energy audits in the Essential Energy network area substantially decreased costs are available with similar acquired knowledge, while this method does reduce the ability to target audits at particular locales or customers this ability was not deemed essential to objectives of the project. Therefore this was the preferred solution.

8.7 Implementation

The "Energy and Demand Audits" project has been broken into three distinct stages;

1. Audit development

   In consultation with a number of energy auditors, a combined energy and demand audit was first deemed to be a viable solution.

   Essential Energy partnered with two service providers operating within the Essential Energy network area who were offering Energy Audits to commercial and industrial consumers. Essential Energy then worked with these two service providers to create and review an energy and demand audit.

2. Audit Implementation

   By the end of the 2012/13 financial year a total of 10 audits had been completed with approximately 101 demand management initiatives investigated, it expected that by the end of the project roughly twice the number of audits will have been delivered.

   Preliminary results have been compiled and they show that substantial benefits are available to both the consumers involved and the network. Strategies and programs are currently being constructed to take advantage of the results and move the benefits into business as usual operation.

3. General deployment phase

   During the general deployment stage Essential Energy will implement the strategies and programs based learnings and achieve the benefits found in the initial stages of the project.

8.8 Costs

Overall program costs including research, development and implementation of the audits during 2012/2013 were $43907.13 determined by the use of appropriate procurement systems and time recording.

8.9 Benefits

Stage 1 of the "Energy and Demand Audits" project involved development of a demand audit, indirectly this has provided auditors with education around the drivers for network expansion, and the benefits of demand reductions, internally it has grown Essential Energy's experience with customer facing service providers and the specific requirements of energy/demand auditors.

Stage 2 of the project has thus far achieved a total of 10 completed audits, with approximately 101 demand management initiatives investigated; it expected that by the end of the project roughly twice the number of audits will have been delivered.

Preliminary results have been compiled and they show that substantial benefits are available to both the consumers involved and the network as shown below. Strategies and programs are currently being constructed to take advantage of the results and move the benefits into business as usual operation.

Including 1 year customer benefit					
	$/kVA				
	Average	Max	Min	Median	No of investigations
Load Shedding	$ 95	$ 310	-$ 8	$ 45	24
Power Factor Correction	$ 144	$ 679	-$ 22	$ 97	9
Fuel Switching	$ 358	$ 500	$ 216	$ 358	2
Load Shifting	$ 1,531	$ 3,333	$ 43	$ 1,374	4
Embedded Generation	$ 1,885	$ 5,684	$ 2	$ 1,621	12
Energy Efficiency	$ 3,725	$ 41,941	-$ 209	$ 2,009	48

Including 4 years customer benefit					
	$/kVA				
	Average	Max	Min	Median	No of investigations
Power Factor Correction	-$ 936	-$ 282	-$ 2,783	-$ 826	9
Fuel Switching	$ 57	$ 500	-$ 387	$ 57	2
Load Shedding	$ 84	$ 310	-$ 280	$ 45	24
Energy Efficiency	$ 1,768	$ 32,764	-$ 4,238	$ 249	48
Load Shifting	$ 1,239	$ 3,333	$ 43	$ 790	4
Embedded Generation	$ 909	$ 3,075	$ 2	$ 587	12

- Note: Above estimated costs are for implementation only, i.e. no incentive payments or fuel costs are included.

While the benefits thus far have been in terms of knowledge, experience and development, it is expected that substantial financial and environmental benefits could be achieved in the near future as strategies and programs are rolled into business as usual operation.

8.10 Compliance

The "Energy and Demand Audits" meets the DMIA criteria under the following conditions;

1. Shifting or reducing demand for standard control services through non–network alternatives.

2. For use in;

    a. broad–based demand management projects or programs—which aim to reduce demand for standard control services across a DNSP's network, rather than at a specific point on the network. These may be projects targeted at particular network users, such as residential or commercial reduce demand for standard control services across a DNSP's network, rather than at a specific

point on the network. These may be projects targeted at particular network users, such as residential or commercial customers, and may include energy efficiency programs; and/or

b. peak demand management projects or programs—which aim to address specific network constraints by reducing demand on the network at the location and time of the constraint.

3. Innovative and designed to build demand management capability and capacity and explore potentially efficient demand management mechanisms.

4. Non–tariff based

   a. not recoverable under any other jurisdictional incentive scheme,
   b. not recoverable under any other state or Australian Government scheme, and
   c. not included in forecast capital or operating expenditure approved in the distribution determination for the next regulatory control period, or under any other incentive scheme in that determination.

5. Opex.

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I, Vince Graham of 8 Buller Street, Port Macquarie

do solemnly and sincerely declare that: -

1. I am an officer, for the purposes of the National Electricity (NSW) Law, of Essential Energy (ABN 37 428 185 226);

2. Essential Energy (ABN 67 505 337 385) is a state owned corporation established under the *Energy Services Corporations Act 1995* (NSW) (**Essential Energy**) and a regulated network service provider under the National Electricity Law.

3. Essential Energy's response to the requirement to provide the Australian Energy Regulator (**AER**) with the information specified in Schedule 1 of the regulatory information notice dated 28 September 2012 (**Notice**), with the exception of the information audited in accordance with paragraph 1.1 of Appendix E to the Notice, is to the best of my knowledge and belief:

   (a) in accordance with the requirements of the Notice which includes identifying where sections of the regulatory templates (set out in Appendices B and C to the Notice) are incomplete whether in whole or in part: and

   (b) is true and accurate in all material respects, and can (except where the information has been identified as not being provided or incomplete) be relied upon by the AER to:

      (i) monitor the compliance of Essential Energy with the 2009-14 distribution determination;

      (ii) publish reports relating to the financial or operational performance of Essential Energy, and

      (iii) make future distribution determinations to apply to Essential Energy or other regulated network service providers;

   in respect of the regulated electricity distribution services Essential Energy provides in NSW.

4. In relation to the information provided in accordance with Schedule 1 to the Notice, Essential Energy has prepared the information in the manner and form specified in paragraph 1.1 of Schedule 2 of the Notice.

5. As required in the Notice, Essential Energy has put in place procedures to maintain the information specified in paragraph 2.1 of Schedule 2 to the Notice in the manner and form specified in Schedule 2 of the Notice and the AER can rely upon Essential Energy's intention to maintain the information in accordance with those procedures to:

   (a) monitor the compliance of Essential Energy with the 2009-14 distribution determination;

   (b) publish reports relating to the financial or operational performance of Essential Energy, and

   (c) make future distribution determinations to apply to Essential Energy or other regulated network service providers;

   in respect of the regulated electricity distribution services Essential Energy provides in NSW

and I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of the Oaths Act 1900.

Declared at SYDNEY on 12TH December, 2013

.....
(signature of Declarant)

in the presence of an authorised witness, who states:

I, JAMES HAMILTON LONSDALE, a SOLICITOR
[name of authorised witness] [qualification of authorised witness]

certify the following matters concerning the making of this statutory declaration by the person who made it:

1. I saw the face of the person, and
2. I have known the person for at least 12 months.

.....
[signature of authorised witness]

12 DECEMBER 2013
[date]

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Forsyths
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ABN 24 935 296 225

INDEPENDENT AUDITOR'S REPORT TO ESSENTIAL ENERGY AND THE AUSTRALIAN ENERGY REGULATOR

We have audited the Regulatory Accounting Statements of Essential Energy for the Regulatory Reporting year ended 30 June 2013 being a special purpose financial report, comprising income statement, balance sheet, statement of cash flows, changes in equity, provisions, other expenditure information and accompanying notes, set out on templates 1 to 22.

Directors' Responsibility for the Regulatory Accounting Statements

Essential Energy directors are responsible for the accurate preparation and presentation of the Regulatory Accounting Statements and the information they contain. The directors have determined that the accounting principles and policies used in the preparation of the Regulatory Accounting Statements are consistent with the financial reporting requirements contained in the Regulatory Information Notice under Division 4 of part 3 of the *National Electricity (NSW) Law* issued to Essential Energy by the Australian Energy Regulator (AER) dated 28 September 2012 and for such processes and internal controls as the directors determine is necessary to enable the preparation of Regulatory Accounting Statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on the Regulatory Accounting Statements based on our audit. We have conducted our audit in accordance with Australian Auditing Standard ASA 800: Special Consideration – Audits of Financial Reports Prepared in accordance with Special Purpose Frameworks. This standard requires that we comply with relevant ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial information is verifiable and can be reconciled with the statutory accounts of the business and whether the Regulatory Accounting Statements have been prepared in accordance with the relevant AER approved Cost Allocation Methodology.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the Regulatory Accounting Statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the Regulatory Accounting Statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair

presentation of the Regulatory Accounting Statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal controls. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the Regulatory Accounting Statements.

Because of the inherent limitations of an audit engagement, together with the inherent limitations of internal control, there is an unavoidable risk that some material misstatements may not be detected, even though the audit is properly planned and performed in accordance with Australian Auditing Standards.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

We confirm that we comply with the "Class of person to conduct the audit" requirements of Section 2 of Appendix E of the Regulatory Information Notice.

In conducting our audit, we followed applicable independence requirements of Australian professional ethical pronouncements.

Inherent scope limitations

The scope of our assurance engagement has the following inherent scope limitations:

- We have relied upon the audited statutory financial statements of Essential Energy for the year ended 30 June 2013 in accordance with the AER Regulatory Information Notice; and
- In accordance with Section 1.1(a) of Appendix E of the AER Regulatory information notice we have not audited the Audited Statutory Accounts information, forecast information, non-financial data or explanations relating to Material differences or step change expenditure in the Regulatory Accounting Statements and therefore we will express no opinion on them.

This report has been prepared specifically for Essential Energy and the AER at their request and for their exclusive use in meeting Essential Energy's regulatory requirements. Neither this report nor its contents may be referred to or quoted in any statement, without the express written approval of Forsyths Chartered Accountants. We disclaim any assumption of responsibility for any reliance on this report, or on the Regulatory Accounting Statements to which it relates, to any person or for any other purpose than that for which it was prepared.

Audit Comments and Findings

We make the following comments and observations to be taken into consideration when reading our audit opinion.

Template 1 - Income Statement

In order to separate the distribution business from the non-distribution businesses Essential Energy creates a general ledger dataset by extracting the entity's trial balance and applying the approved AER cost allocation methodology to each account, in each department, for each

product and each project to estimate the Regulated distribution business, Standard control services and Alternative control services. The dataset is reconciled to the audited financial statements and used to create Template 1.

In accordance with the AER determination, Essential Energy does not have Negotiated services.

Template 2 – Balance sheet

The general ledger dataset is used to create the Balance Sheet in Template 2. As a result Template 2 has been prepared in accordance with the approved AER cost allocation methodology and reconciles to the audited financial statements.

In accordance with the AER determination, Essential Energy does not have Negotiated services.

Template 3 – Cashflows statement

The cashflows statement in Template 3 reconciles to the Balance Sheet in Template 2 which has been prepared in accordance with the approved AER cost allocation methodology and reconciled to the 30 June 2013 financial statements.

However, the opening cash balance has been adjusted for an error related to restricted cash in the prior year in relation to Unregulated Services of $14.7m which has now been corrected.

Template 4 – Changes in equity

The changes in equity in Template 4 has been created using the general ledger dataset and as a result Template 4 has been prepared in accordance with the approved AER cost allocation methodology and reconciled to the 30 June 2013 financial statements. Template 4 reconciles to Template 2 Balance Sheet.

Template 5 – Capex by Reason

The capital expenditure and capital contributions have been extracted from the Peoplesoft general ledger and mapped to the AER captions set out in the Tables in Template 5.

Total capex reconciles to the audited financial statements for the year ended 30 June 2013 and the capex information has been prepared in accordance with the approved AER cost allocation methodology. Comments on specific tables in Template 5 are as follows:

- Table 1 "Standard Control Service by Reason" – includes capex for standard control services and excludes capital contributions.
- Table 2 "Material Differences Explanation" - in accordance with Section 1.1(a) of Appendix E of the AER Regulatory information notice we have not audited the forecast information or explanations relating to material differences and therefore we will express no opinion on them.
- Table 3 "Capex by Asset Class" – includes both standard control services and alternative control services and excludes capital contributions.
- Table 4 "Other Services" – includes the capex for unregulated services for the year and includes capital contributions.
- Table 5 "Related Party Transactions" - Management informed us that there were no related party transactions in the Regulated Distribution Business. As a result no transactions have been reported in Table 5. There are no related party transactions disclosed in the financial statements in relation to the Regulated Distribution Business.

- Table 6 "Capital Contributions by Asset Class (excluding Gifted Assets)" - includes capital contributions for both standard control services and alternative control services.
- Table 7 "Gifted Assets by Asset Class" - includes gifted assets for both standard control services and alternative control services.
- Table 8 "Disposals by Asset Class" - reconciles to the audited financial statements for the year ended 30 June 2013.

Template 6 – Capex overheads

The Essential Energy ledger is unable to accurately provide the Capex overheads as set out in Template 6 for the 2013 year. To complete the Template Essential Energy have extracted Capex costs for a sample of projects during the year and analysed the cost to derive an approximation of the percentage of overheads in Capex for the year. As a result, Template 6 is an approximation of the Capex overheads based on the Capex set out in Template 5. Comments on specific tables in Template 6 are as follows:

- Table 1 "Standard Control Service by Reason" - includes capex for standard control services only and excludes capital contributions.
- Table 2 "Other Services" - includes the capex for unregulated services for the year and includes capital contributions.
- Table 3 "Related Party Transactions" - Management inform us that there were no related party transactions in the Regulated Distribution Business. As a result no transactions have been reported in Table 3. There are no related party transactions disclosed in the financial statements in relation to the Regulated Distribution Business.

Template 7 – Capex for tax depreciation

The tax standard lives have been agreed to the final AER approved model for this current determination period.

Template 8 – Network Maintenance

Maintenance costs for the distribution business have been extracted using the same general ledger dataset used to create Templates 1, 2, 3 and 4. As a result Template 8 has been prepared in accordance with the approved AER cost allocation methodology and reconciles to the audited financial statements. Template 8 reconciles to the maintenance costs disclosed in Template 1 Income Statement. Comments on specific tables in Template 8 are as follows:

- Table 1 "Total network maintenance expenditure by category" and Table 3 "Other Network Maintenance Costs" - Essential Energy does not account for maintenance using the categories prescribed by the AER in Table 1 and 3. In order to report the maintenance in the AER categories each maintenance account, in each department for each product and each project in the trial balance has been assigned a Table 1 and 3 category. As a result, Table 1 and 3 provides an approximation of the maintenance by category.
- Table 2 "Material Differences Explanation" - in accordance with Section 1.1(a) of Appendix E of the AER Regulatory information notice we have not audited the forecast information or explanations relating to material differences and therefore we will express no opinion on them.

- Table 4 "Related Party Transactions" - Management inform us that there were no related party transactions in the Regulated Distribution Business. As a result no transactions have been reported in Table 4. There are no related party transactions disclosed in the financial statements in relation to the Regulated Distribution Business.

Template 9 – Network Maintenance overheads

Essential Energy's general ledger is unable to accurately provide the maintenance overheads as set out in Template 9 for the 2013 year. In order to complete Template 9 Essential Energy has extracted maintenance costs for a sample of operational projects during the year and analysed the cost to derive an approximation of percentage of overhead in maintenance costs. This has been used to estimate the maintenance overheads based on the maintenance costs set out in Template 8. As a result Template 9 is an approximation of the maintenance overheads.

Template 10 – Operating costs

Operating costs for the distribution business have been extracted using the same dataset used for Templates 1, 2, 3 and 4. As a result Template 10 has been prepared in accordance with the approved AER cost allocation methodology and reconciles to the audited financial statements. Template 10 reconciles to the Operating costs disclosed in Template 1 Income Statement. Comments on specific tables in Template 10 are as follows:

- Table 1 "Operating expenditure – network operation costs" - Essential Energy does not account for operating expenditure using the categories prescribed by AER in Table 1. In order to report the operating costs in the AER categories each operating expenditure account, in each department for each product and each project in the trial balance has been assigned a Table 1 category. As a result, Table 1 provides an approximation of the operating expenditure by category.

- Table 2 "Material Differences Explanation" - in accordance with Section 1.1(a) of Appendix E of the AER Regulatory information notice we have not audited the forecast information or explanations relating to material differences and therefore we will express no opinion on them.

- Table 3 "Operating expenditure – other network operating costs" – There were no items of "Other network operating costs" greater than 5% of standard control or alternative control network operating costs.

- Table 4 "Related Party Transactions" - Management informed us that there were no related party transactions in the Regulated Distribution Business. As a result no transactions have been reported in Table 4. There are no related party transactions disclosed in the financial statements in relation to the Regulated Distribution Business.

- Table 5 & 6 - Management informed us that there were no "non-recurrent network operating costs" or "non-network alternatives (demand management) operating costs that are not captured by DMIS" in the Regulated Distribution Business. As a result no transactions have been reported in Table 5 and 6.

Template 11 – Operating overheads

Essential Energy's general ledger is unable to accurately provide the operating overheads as set out in Template 11 for the 2013 year. In order to complete Template 11, Essential Energy has extracted operating costs for a sample of operational projects during the year and analysed the cost to derive an approximation of the percentage of overheads in operating costs. This has been

used to estimate the operating overheads based on the operating costs set out in Template 10. As a result Template 11 is an approximation of the operating overheads.

Management informed us that there were no other network operating overhead costs in the Regulated Distribution Business. As a result no transactions have been reported in Table 2.

Template 12 – Cost categories

Essential Energy is unable to accurately split their operating and maintenance expenditure for the distribution business between labour, materials, contractors and other. In order to complete Template 12 they have extracted the operating and maintenance expenditure by categories for the whole of Essential Energy and used these to estimate the distribution business operating and maintenance expenditure by category.

Template 13 – Opex step change

In accordance with Section 1.1(a) of Appendix E of the AER Regulatory information notice we have not audited the step change expenditure in the Regulatory Accounting Statements and therefore we will express no opinion on Template 13.

Template 14 – Provisions

Template 14 has been extracted using the same general ledger dataset used to create Templates 1, 2, 3 and 4. As a result Template 14 has been prepared in accordance with the approved AER cost allocation methodology and reconciles to the audited financial statements. Template 14 reconciles to Template 2 Balance Sheet.

Template 15 – Overhead allocation

The overhead allocation for the distribution business has been extracted using the same dataset used for Templates 1, 2, 3 and 4. As a result Template 15 has been prepared in accordance with the approved AER cost allocation methodology and reconciles to the audited financial statements. Template 15 reconciles to the Operating and maintenance expenditure disclosed in Template 1 Income Statement.

Essential Energy does not account for operating expenditure using the categories prescribed by AER in Table 1. In order to report the operating costs in the AER categories each operating expenditure account, in each department for each product and each project in the general ledger dataset has been assigned a Table 1 category. As a result, Table 1 provides an approximation of the operating expenditure by category.

Template 16 - Avoided Cost Payments

The information has been extracted from the same dataset as is used for Templates 1, 2, 3 and 4 which has been reconciled to the signed 30 June 2013 audited financial statements and has been prepared in accordance with the approved AER cost allocation methodology.

Template 17 – Alternative Control and Other Services.

The Alternative control and other services been extracted using the same dataset used for Templates 1, 2, 3 and 4. The Alternative control operating expenditure agrees to Template 1 and Templates 8 & 9, the Capex agrees to Template 5 and the revenue agrees to Template 1.

The client has not included "Unregulated other activities" information in Table 1, however, this information is available in Templates 1, 5, 8, 9, 10 and 11.

Template 18 – Efficiency benefit sharing scheme (EBSS)

The operating expenditures for EBSS purposes for the distribution business have been extracted using the same dataset used for Templates 1, 2, 3 and 4. As a result Template 18 has been prepared in accordance with the approved AER cost allocation methodology and reconciles to the audited financial statements. Template 18 reconciles to the operating and maintenance expenditure disclosed in Template 1 Income Statement

Although a self-insurance event has been reported in Template 21 it has not been adjusted for EBSS purposes as the new transformer has been capitalised to the balance sheet. As a result there are no qualifying self-insurance costs within operating costs for EBSS purposes.

Management informed us that there were no non-network alternatives costs or pass through event costs for EBSS purposes during the year. In addition, there were no changes in capitalisation policy in the Regulated Distribution Business. As a result no changes have been reported in Table 2.

Template 19 – Jurisdictional scheme amounts

Template 19 jurisdictional scheme amounts reconciles to Template 1 Income Statement which has been reconciled to the signed 30 June 2013 audited financial statements and has been prepared in accordance with the approved AER cost allocation methodology.

Template 20a – Demand Management Incentive Scheme (DMIS)

Table 1 "DMIA projects submitted for approval" - following the requirements set by the AER in the Demand management incentive scheme for the ACT and NSW 2009 distribution determination, Essential Energy completed the table with the total expenditures incurred during the year ended 30 June 2013 for each project. Amounts reflected in the table were reconciled to the signed 30 June 2013 audited financial statements.

Table 2 "Foregone revenue" - Management informed us that there was no foregone revenue in relation to the DMIA projects.

Template 20b –DMIS D-factor

Management informed us that Essential Energy does not have a D-factor scheme amount for the year ended 30 June 2013 and therefore no information has been provided.

Template 21 – Self Insurance

We have made enquiries with the relevant Essential Energy management who are responsible for insurance and self-insurance. Only self-insurance events that fall within the categories allowed in the current AER determination can be reported in Template 21. Table 1 discloses one qualifying self-insurance event greater than $100,000. We are informed by management that there were no qualifying self-insurance events less than $100,000.

The cost of the event has been extracted from the general ledger based on the project number related to the event. An allowance for on-cost and divisional overheads has been added to the project costs to determine an estimate of the cost of the events. The event disclosed was a distribution business event only and therefore the costs relate only to the distribution business.

There are no insurance events disclosed in the audited financial statements for the year ended 30 June 2013. As a result we have been unable to reconcile the costs of the insurance events to the financial statements.

Template 22 – Change of Accounting Policy

There were two changes in accounting treatment during the year which resulted in reclassification within the income statement and within the balance sheet. Neither of these changes had an impact on the net assets or profit of Essential Energy.

These changes in accounting policy agree to the audited financial statements for the year ended 30 June 2013

Opinion

In our opinion, subject to the comments and findings above, the Regulatory Accounting Statements present fairly, in all material respects, in accordance with the Regulatory Information Notice the financial position of Essential Energy as at 30 June 2013 and the results of its operations and its cash flows for the period then ended.

Basis of Accounting and Audit Findings

Without modifying our opinion we draw attention to the fact that the Regulatory Accounting Statements have been prepared in accordance with Regulatory Information Notice, Under Division 4 of part 3 of the *National Electricity (NSW) Law* issued to Essential Energy by the AER dated 28 September 2012, to assist Essential Energy to meet the regulatory requirements under the *National Electricity (NSW) Law*. As a result, the Regulatory Accounting Statement may not be suitable for another purpose.

Forsyths Business Services Pty Ltd

Geoffrey W Allen
Principal
6 December 2013

Essential Energy - 2012/13 Regulatory Information Notice (RIN) Submission

SKM AUDIT REPORT

13th November 2013

SINCLAIR KNIGHT MERZ

SKM

Essential Energy - 2012/13 RIN Audit

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Contents

1. Introduction

Essential Energy has prepared its 2012-13 Regulatory Information Notice (RIN) non-financial data submission to the Australian Energy Regulator (AER). This reporting is as per the instructions in the RIN issued by the AER to Essential Energy on February 2013 and the clauses in the Electricity Distribution Network Service Providers (DNSPs) Service Target Incentive Scheme of November 2009 document (STPIS). The AER requires elements of the data to be independently audited prior to submission. Essential Energy has engaged Sinclair Knight Merz (SKM) to audit the specific data elements identified by the AER. Additionally, Essential Energy has requested that SKM review the remaining data in the non-financial RIN templates. This report contains the following findings:

- SKM's audit of the specific data elements identified by the AER in the non-financial RIN templates. The data is contained within Essential Energy's RIN spread-sheet[1] and the specific auditable elements are:
  - Template 1a: STPIS Reliability – Tables 1, 2 and 3
  - Template 1b: STPIS Customer Service – Tables 1, 2, 3 and 4
  - Template 1c: STPIS Daily Performance – Table 1
  - Template 1d: STPIS MED Threshold – Tables 1 and 2
  - Template 1e: STPIS Exclusions – Table 1
  - Template 2: Demand – Tables 1 and 2
- SKM's review of the remaining data in the non-financial RIN templates. The remaining data which are not required to be audited are:
  - Template 3: Outcome Customer Service – Table 3 (*Timely provision of services*, *Timely repair of faulty streetlights*, and *Call Centre performance* only)
  - Template 4: General Information – Tables 1, 4, 5 and 7
  - Template 5a: Network Data Outage – Tables 1 and 2
  - Template 5b: Network Data Feeder – Table 1
  - Template 5c: Cause of Outages – Table 1
  - Template 5d: Planned Outage – Table 1
  - Template 7: Asset Installation – Table 1

It should be noted that Essential Energy has advised that the AER's Guaranteed Service Level (GSL) scheme did not apply at any time during the regulatory year. Therefore Essential Energy has not provided any data in Template 1f: STPIS GSL, and hence, SKM has not audited this template.

SKM's audit findings are given in the form of a written opinion on the accuracy and reliability of the auditable data to be submitted by Essential Energy.

The scope of the audit included discussions with Essential Energy personnel who gave descriptions of the processes, procedures and systems used to provide the information required in the regulatory templates. SKM then attempted to verify the validity and accuracy of the auditable information by tracing data flow through the various systems. This included an assessment of the validity of the data entering the system, followed by scrutiny of the data manipulation throughout the individual processes. SKM has conducted reasonable sampling to satisfy itself that the processes are robust, focussing on any instances of manual data manipulation or where anomalies are evident.

[1] Filename: ESSENTIAL Energy – Annual RIN – 2012-13 non financial information FINAL.xlsx (dated 11 November 2013)

Throughout this report SKM has expressed opinions – in the form of positive assurance statements – on the information contained in the RIN templates and the underlying systems used to derive that information. In forming a view SKM has undertaken audit procedures to obtain sufficient evidence to warrant the stated opinions. The procedures selected depend on the judgement of the auditors who have primarily considered the risks of material misstatement of the RIN data. In making judgements and risk assessments, SKM's auditors have considered Essential Energy's relevant internal controls for collecting and presenting the RIN data.

Due to the inherent limitations of any internal control structure it is possible that fraud, error, or non-compliance with laws and regulations may occur and not be detected. Further, the audit was not designed to detect all weakness or error in internal controls so far as they relate to the requirements set out above as the audit has not been performed continuously throughout the period and the procedures performed on the relevant internal controls were on test basis. Any projection of the evaluation of control procedures to future periods is subject to risk that the procedures may become inadequate because of change in conditions, or that the degree of compliance with them may deteriorate.

SKM has undertaken its audit of Essential Energy's regulatory reporting in accordance with Appendix E[2] of the RIN and any specific audit instructions given with each RIN template.

Based on the audit scope as described above SKM has performed a number of audit procedures to form its audit opinions, including:

- Reviewing Essential Energy's internal business procedures, and based on these procedures and SKM's knowledge of utility operations and reporting, identifying areas assessed with higher risk of weakness in controls or data accuracy.
- Interview Essential Energy management and staff to query aspects of their systems and processes, test the application of those systems and processes, and to explain any unusual data.
- Reviewing Essential Energy's underlying data used to calculate the figures presented in the RIN, and checks on this data for internal consistency. Data items were identified which appeared to have inconsistencies or were otherwise assessed as higher risk or materiality for inclusion within sampling, alongside random sampling.
- Checking the calculations used to present the final figures in the RIN template from the underlying data.
- Identifying, comparing and corroborating secondary data points against the RIN data, to provide increased assurance of the accuracy and completeness, and to highlight potential weaknesses in controls.
- Testing the RIN data, and assessing the accuracy of the reported data based on a combination of risk based and random sampling.
- Testing the application and the use of the processes, procedures and systems used to produce the data. This involved assessing the reliability of the processes and systems applied to generate and prepare the reported data, and whether these were correctly used by the relevant Essential Energy's staff; and are capable of reliably reporting the RIN data.

In SKM's view the audit evidence obtained is sufficient and appropriate to provide a basis for our audit opinions against each of the items in the RIN.

[2] Regulatory Information Notice (RIN) Appendix E – National Electricity Law (NSW), Section 28M(e), Audits

2. Audit Findings

SKM's findings and opinions on the audited portion of Essential Energy's 2012-13 non-financial RIN data submission to the AER are detailed in this section of the report. The audit findings provide the basis for SKM's audit opinion. Essential Energy's reported information is derived from underlying data that is extracted from, and dependent on, various Essential Energy systems and procedures. Thus, SKM's opinion on the accuracy and validity of reported information is largely based upon a review of relevant Essential Energy systems and processes. SKM's assessments have been made in consideration of the AER instructions included in each RIN template, the RIN issued to Essential Energy on February 2013, and the DNSPs STPIS of November 2009.

The portions of Essential Energy's non-financial RIN submission that require auditing can be broadly categorised into the five distinct areas outlined below. It should be noted that in the RIN submission each area may be presented in multiple tables and RIN templates. Also of note is that each area will have different associated systems and procedures which SKM has assessed independently.

The five areas and their associated RIN submission templates are as follows:

- Customer numbers
  - Template 1a: STPIS Reliability – Table 3
- Network supply reliability
  - Template 1a: STPIS Reliability – Tables 1 and 2
  - Template 1c: STPIS Daily Performance – Table 1
  - Template 1e: STPIS Exclusions – Table 1
- MED Threshold
  - Template 1d: STPIS MED Threshold – Tables 1 and 2
- Customer service
  - Template 1b: STPIS Customer Service – Tables 1, 2, 3 and 4
- Demand
  - Template 2: Demand – Tables 1 and 2

2.1 Customer numbers

2.1.1 Reported Data

RIN Template 1a: STPIS Reliability – Table 3 reports Essential Energy's distribution customer numbers at the start date (1 July 2012) and the end date (30 June 2013) of the 2012-13 annual period for the various the network as a whole and broken down by feeder category (Urban, Rural short, Rural long and Whole network). The average distribution customer numbers for the 2012-13 period is then calculated by averaging the customer counts at the start and end dates. It is noted that Essential Energy has reported this information in two sets which cover two time periods throughout the 2012/13 reporting period i.e. the starting and ending distribution customer numbers has been reported for July 2012 to October 2012 period and from November 2012 to June 2013 period.

The specific information to be provided in this table is defined in the Definitions and Interpretations section of the RIN issued by the AER to Essential Energy and in the Appendix A of the STPIS (Nov 2009).

2.1.2 System and Procedures Assessment

SKM's below assessment is based upon a review of the systems and procedures that Essential Energy followed to record, store, extract and process the reported information. As part of the review SKM analysed the reported and underlying data, and interviewed staff responsible for preparing this information. SKM notes the following:

- Essential Energy has relied on the combination of its ENERGY billing system and the GIS Smallworld system to report the information in this RIN table. Data extracted from the ENERGY billing system contains the tariff, connection types and customer details and is considered as the most accurate, ENERGY has been used to determine the total customer count on given (starting and ending) dates.

  GIS Smallworld has been used to provide the breakdown of customer numbers by feeder category (Urban, Rural short and Rural long). GIS Smallworld is a geographical information system that topographically and/or schematically maps Essential Energy assets and connections in its network area. Essential Energy personnel have advised that the information contained in GIS Smallworld is incomplete and may not have current and accurate details[3].

  SKM notes that there are 1,013 less premises or customers in GIS Smallworld than the ENERGY billing system. Also, there are 5,266 premises in GIS Smallworld with unknown details. Rather than take the customer counts directly from GIS Smallworld, Essential Energy have used this proportion to breakdown the total customer count from the ENERGY billing system into the relevant feeder categories.

  It is also noted that while the data from the ENERGY billing system was extracted on the starting and ending dates, the GIS Smallworld data extraction was performed in August 2013 and thus does not reflect the network connection situation at the same point in time.

- Essential Energy has reported two sets of customer numbers to cover the 2012/13 period. Essential Energy personnel have advised that this is due to a system upgrade which changed whether or not active and inactive customers would be captured in the counts.

  The first set of reported distribution customer numbers covers 1 July 2012 to 31 October 2012 and excludes inactive accounts. The exclusion of inactive customers is consistent with the definition in the STPIS (Nov 2009) and the new RIN issued to Essential Energy on February 2013.

  However, the reported distribution customer numbers for the remaining period in 2012-13 which are the counts on 1 November 2012 and 30 June 2013 are inclusive of inactive accounts and therefore inconsistent with the STPIS and the RIN definitions.

  The change from November 2012 to include inactive accounts coincides with the ENMAC version upgrade to PowerOn Fusion. SKM understands that Essential Energy initiated the change to include inactive customers in an attempt to comply with the 2010-11 and 2011-12 RIN distribution customer definitions[4], which have changed slightly in the 2012-13 RIN definitions.

  It is noted that even though the total average distribution customer number is determined for the denominator post reporting period to calculate the reliability metrics, the interrupted customer count used in the numerator is recorded at the time of the outages. This meant that the inactive customers had already been captured prior to the new RIN for 2012-13 and 2013-14 reporting periods being issued in February 2013. In SKM's view it would have been impractical for Essential Energy to change the outage management system setup to exclude inactive accounts for the remainder of 2013, which would have resulted in Essential Energy having to provide three sets of data in order to calculate the reliability indices.

- SKM notes that the Essential Energy's ENERGY billing system has the ability to report distribution customer numbers without inactive accounts for the date 30 June 2013, however has retained the customer count that includes inactive account for a portion of the reporting period. SKM understands that

[3] SKM understands that Essential Energy is presently vetting and updating the details in it to make it more accurate and complete.

[4] SKM notes that the old RIN defined the customer number to include "active and/or inactive accounts" and therefore contradicted the DNSPs STPIS (Nov 2009) which defined the customer number to include only active accounts. The new RIN issued on February 2013 removed this contradiction by being consistent with the STPIS.

this is to be consistent with the numerator in the reliability metric calculations which include inactive accounts from November 2012 to June 2013.

2.1.3 Auditors Opinion

The summary of SKM's opinion on the accuracy and reliability of the information reported in this RIN table is:

- The use of ENERGY billing system provides accurate total customer count information, however the accuracy at the feeder category level is partially lost due to the use of GIS Smallworld to proportionally classify the total count into various categories (Urban, Rural short and Rural long). In SKM's view apportioning the ENERGY billing system customer counts based on GIS Smallworld is a reasonable approach given the limitations of each system.
- The customer count is consistent with definition in the new RIN and the STPIS only for July 2012 to October 2012 period.

  However, it is inconsistent due to the inclusion of the inactive accounts from November 2012 to June 2013 period. Comparing the step increase in the distribution customer number from 799,507 at 31 October 2012 to 836,680 at 01 November 2012, SKM estimates the average number of inactive accounts in Essential Energy network for the 2012-13 reporting period to be around 35,000 to 40,000.

  SKM also notes that the total distribution customer number at 30 June 2013 excluding the inactive account was 812,288 from the ENERGY billing system. Therefore, the average total for 2012-13 reporting period would have been 805,678 following the definition in RIN and STPIS.
- The distribution customer count is also inconsistent with the information provided in the RIN Template 4, Table 4 which reports the same data, due to the scope and method used to report them. A note has been made in the accounts to this effect.

2.2 Network supply reliability

2.2.1 Reported Data

RIN Template 1a: STPIS Reliability – Tables 1 and 2 reports total SAIDI and SAIFI for the network as a whole and broken down by each feeder category (Urban, Rural short, Rural long and Whole network), both with and without the excluded events for the 2012-13 annual period.

RIN Template 1c: STPIS Daily Performance – Table 1 reports SAIDI and SAIFI metrics for each day for the network as a whole and broken down by each feeder category (Urban, Rural short, Rural long and Whole network), both with and without the excluded events for the 2012-13 annual period. It also identifies the MED days in this list.

RIN Template 1e: STPIS Exclusions – Table 1 lists and gives details on all the outage events that Essential Energy has identified as Excluded Events as per the new RIN and the STPIS (Nov 2009).

The definition of the terms used in these tables are provided in the Definitions and Interpretations section of the RIN issued by the AER to Essential Energy and in the Appendix A of the STPIS (Nov 2009).

2.2.2 System and Procedures Assessment

SKM's below assessment is based upon a review of the systems and procedures that Essential Energy followed to record, store, extract and process the reported information. As part of the review SKM analysed the reported and underlying data, and interviewed staff responsible for preparing this information. SKM notes the following:

- In 2012-13 reporting period Essential Energy reduced the three control rooms (in Queanbeyan, Port Macquarie and Bathurst) into two control rooms (Queanbeyan and Port Macquarie).

- Essential Energy utilise a tool named ENMAC for the outage management of the network. ENMAC is an integrated network management system with schematic representation of Essential Energy's distribution network down to 11kV distribution transformer level that allows real-time management, monitoring and control of the network. ENMAC is the source for outage data used to report on reliability in the RIN template.
- In 1 November 2012, ENMAC was updated to PowerOn Fusion, which is an updated version of the same software package.
- The outage management process can be summarised as:
  - Supply Interruptions Group (SIG) receives call and records the details into the call management system called PowerOn Call Taker.
  - A network operator will record the outage on the ENMAC spatial map. Highlighting an interrupted customer on the ENMAC spatial map allows the relative position of other reported outages on the network to be considered. Two or more calls will initiate an outage predication algorithm within ENMAC and as more calls accumulate, the location of the outage is continuously refined. Network operators can also manually record the extent of an outage.
  - An incident report (IR) is then created to track and record the outage.
  - Alternatively, some equipment in the network is monitored by SCADA and faults will be automatically raised in ENMAC and an IR created prior to any calls being logged.
  - The IR is sent to dispatch who will arrange for a crew to attend the incident.
  - The network operator will instruct the crew to restore the network and upon receiving confirmation will perform the switching in ENMAC.
  - ENMAC records the time of each switching event including the initial outage. The start time is deemed to be the time of the first call reporting loss of supply or as per the SCADA system.
  - After the switching action or the restoration of the outage, the field crew calls call network operator to advise the switching operations. Sometimes the actual time of switching will be conveyed and noted, but often it is recorded as the time the call was made to the Network Operator. Where the restoration or switching can be performed remotely via ENMAC through SCADA system, the restoration times for sections of the network are based on the switching in ENMAC.
  - As ENMAC is a spatial network model the system can determine which customers are connected to each section of the network down to 11kV distribution substation level. ENMAC will automatically calculate the count of interrupted customers and minutes of interruption duration and is able to account for staged restoration of the network.
  - The IR is closed and the network operator may include comments or indicate exclusion categories which can be reviewed by the reliability reporting team. The network operator cannot exclude or delete the IR.
  - Planned outages are managed in a very similar way however the commencement of the outage is initiated by the network operator as opposed to a supply interruption. The switching register with the approved schedule of all planned operational and maintenance work is referred in this case.
- There are a number of known issues with the system. These are:
  - Network operators should disable the auto incident creation function for some outages where a temporary network arrangement is implemented to prevent loss of supply during a planned outage. This is not always completed and an unplanned error can be erroneously created.
  - In situations where an LV backfeed is used to restore supply, ENMAC may report an extended loss of supply to customers where in reality they have been restored using a temporary measure.
  - The testing of software patches is sometimes completed by creating fictitious outages in the system which needs to be filtered out when processing the information for reporting purpose.

There are procedures in place to capture these events and make changes to the outage records in the reliability database. Operator comments are one the triggers for an incident to be investigated. These changes are all captured in a series of change registers for auditing trail.

- The network model in ENMAC is only down to the 11kV distribution transformer level. For single phase LV outages the system will assume that all three phases on the secondary (415V) of the distribution substation have been interrupted. This is a known limitation, and given the number of single phase outages and the number of customers which would be affected by each single phase outage, this error is considered small in comparison to the total of network interruptions. Further, in some instances, if the outage is confirmed as a single phase outage and the network operator has provided such comments in the IR comment fields, the interrupted customer number can be changed in the reliability database to reflect single phase connection.
- The ENMAC system model identifies which distribution substation customers are connected to and which 11kV feeders the distribution substations are connected to. This information is used to determine the number of customers that are connected to each feeder.
- Essential Energy updates the customer numbers for each distribution substation at midnight on each day.
- Feeder configurations are updated at the end of the reporting period as it is common for some distribution substations to change feeders throughout the period. Thus the number of customers connected to a particular feeder is based on the feeder configuration at the end of the period and not averaged with the number at the start of the period.
- Feeders are categorised into Urban, Rural short and Rural long is once a year at the start of the financial year or reporting period. This classification remains fixed unless a major network re-configuration occurs (which did not happen in 2012-13 period). Loading characteristics of a feeder may change in a year, but it will not be reclassified.
- Outage data can be retrieved from ENMAC and is then stored in reliability database from where analysis of the outages is undertaken. Essential Energy conducts internal audits of incident reports on regular basis which continuously results in corrections and revision of their reliability data. Particular focuses are given to events with Lost Customer Minutes greater than 100,000 and unusual interruption starting/ending time records. The validation and correction of data extracted from the ENMAC to analyse and report network performance and reliability parameters are an on-going process within Essential Energy.
- It is possible for a line item entry in the reliability database to be deleted. This may happen seldom when, for example, SCADA may give false alarms or duplicated IR may be created in the ENMAC. Also, the network operator can change the timing details in the IR, however SKM understand that there is no incentive or purpose to do so.

2.2.3 Auditors Opinion

The summary of SKM's opinion on the accuracy and reliability of the information reported in these RIN tables is:

- ENMAC is a sophisticated and highly integrated network management system which is appropriate for the size and complexity of the Essential Energy network. The recording of incidents is automated where possible and is able to accurately and reliably record supply interruptions on the network.
- Essential Energy staff responsible for reliability reporting has identified potential limitations in the system and have implemented processes to capture, investigate and correct these errors. Documented procedures for these processes exist and records of changes are maintained.
- Outage records from ENMAC are exported to a reliability database for the purpose of reporting various reliability performance parameters. The database allows processing of such voluminous data to check for errors or unusual events and data correction before report production. However, it is still possible for erroneous data or incorrect classification not to be identified during the regular process of data validation and correction, and thus getting included in the reported parameters. It is noted that best endeavours are made to report the reliability parameters as accurately as possible.

- The impact of only those events that are listed in the STPIS (Nov 2009) clause 3.3(a) has been excluded from the daily performance reporting in the Template 1c Table 1 with respect to the reliability data. Whereas, the impact of the events that are listed on both clauses 3.3(a) and 3.3(b) are excluded with respect to the customer service parameters (columns W and X in the RIN spreadsheet template) for the same daily performance reporting. This is consistent with the instructions in the RIN and the STPIS.
- SKM corroborated the reported data in these tables against the underlying data extracted from the reliability database. Investigation and independent recalculation of this underlying data extract yields similar SAIDI results for both with and without the exclusions as reported in the RIN Templates 1a Tables 1 and 2, Template1c Table 1, and Template 1e Table 1.
- The presentation or the nature of the data extracted from the reliability database did not allow SKM to independently corroborate the reported SAIFI metric for the entire duration of 2012-13 reporting period. However, SKM managed to independently corroborate the SAIFI metric for few chosen days against the reported daily SAIFI performance data. Based on this, SKM is satisfied that the SAIFI has been correctly calculated using the underlying data.
- ENMAC has the ability to capture time details or provide time stamps (outage start and end time) to second resolution. However when the outage details are exported to the reliability database for vetting, manipulation and reporting purpose, the time stamps recording loses the second resolution details and the timing details in the reliability database contains up to minute resolution only. In other words, only integers are transferred to the database and not the whole number. Essential Energy uses this timing details form the reliability database to calculate its reliability metrics. SKM notes that this leads to a loss of resolution in the reported SAIDI and the chance of actual result might be marginally higher or marginally lower (with equal chances) than the reported data. The error however is negligible for the reporting purpose. For example, in the case of 2012-13 reporting period, the unplanned total SAIDI for the whole network is calculated to be 375.01 accounting for the outage timing resolution up to second, whereas the data reported in the RIN is 375.34. This does not impact SAIFI calculation as it does not take into account outage timing.
- Essential Energy has used the two average distribution customer numbers (average count for July 2012 to October 2012 period, and average count for November 2012 to June 2013 period) reported in Template 1a Table 3 as denominator to calculate the reported reliability metric (SAIDI and SAIFI) respectively for those periods. The reported distribution customer numbers for the later period is not consistent with the definition of the RIN and STPIS (Nov 2009) as explained in Section 2.1.3. Therefore, the accuracy of the reported SAIDI and SAIFI data is also impacted by this inconsistency. The error in the reported SAIDI and SAIFI data due to this inconsistency is somewhat limited because both the numerator (interrupted customer numbers) and the denominator (total customer numbers) includes inactive accounts.
- There are number of instances where the outage has been identified or classified as unplanned and are not qualified for exclusion, but the description in the comment fields indicates that they were planned outages. The SAIDI impact due to such instances totals to 0.53 minutes, which SKM considers as negligible.
- A total of 54 unique outage IDs is reported in Template 1e Table 1 with total unplanned SAIDI impact of 9.78 minutes, whereas the details of only the 41 outages were provided with the total unplanned SAIDI impact of 8.19 minutes in the underlying data extracted from the reliability database. The details of the missing 13 outages with the remaining total unplanned SAIDI impact of 1.59 minutes were subsequently provided after SKM request. While Essential Energy has correctly qualified these outages as Excluded Events with the correct amount of the SAIDI and SAIFI impact deducted from the reported exclusion data, this demonstrates the manual handling of the underlying data in the reliability database for the reporting purpose.
- The reported SAIFI is not correctly expressed as per the definition in STPIS (Nov 2009), i.e. to be expressed per 0.01 interruptions.

2.3 MED Threshold

2.3.1 Reported Data

RIN Template 1d: STPIS MED Threshold – Tables 1 and 2 provides the underlying historical reliability metrics used and the result of the calculated MED threshold applicable for the 2012-13 reporting period.

The definition of the term used in this table is provided in the Definitions and Interpretations section of the RIN issued by the AER to Essential Energy and in the Appendix A of the STPIS (Nov 2009).

2.3.2 System and Procedures Assessment

SKM's below assessment is based upon a review of the systems and procedures that Essential Energy followed to record, store, extract and process the reported information. As part of the review SKM analysed the reported and underlying data, and interviewed staff responsible for preparing this information. SKM notes the following:

- The MED threshold value applicable for 2012-13 reporting period is based on historical 5 years daily unplanned SAIDI data. Therefore, the assessment of the outage management system and the reporting processes which forms the basis of the historical 5 years reliability data should be considered as the quality of the determined MED threshold value is dependent on it.
- It is noted that outage management system ENMAC was commissioned only from 2010-11 period and thus only covers the later portion of the historical 5 years period. Section 2.2.2 should be referred for its assessment as its attributes influences the reported MED threshold value.
- For period prior to ENMAC, assessment of the then existing historical outage management system is not possible and has been excluded from this audit scope.

2.3.3 Auditors Opinion

The summary of SKM's opinion on the accuracy and reliability of the information reported in this RIN table is:

- Essential Energy has accurately applied the prescribed statistical test to the data set to test whether the natural logarithm of each daily unplanned SAIDI is a normal distribution as per the requirements of the STPIS major event day calculation method.
- The data set used to determine the 2012-13 threshold MED value consists of the daily unplanned SAIDI value of each day from 01 July 2007 to 30 June 2012. It is noted that there was no day without unplanned supply interruption during this period, i.e. each day during this period had the daily unplanned SAIDI with value >0. Given that the entire population is included in the data set, the statistical formula used to calculate the beta (β) in the T_{MED} equation should be the *population* standard deviation and not the *sample* standard deviation as used by Essential Energy. The resulting T_{MED} difference between the two formulas is very small (to third decimal place) and this difference did not impact the exclusion of major event days in 2012-13 RIN reporting. Nevertheless, the usage of different standard deviation formula results in different T_{MED} value and may impact the exclusion of major event day in the future reporting.
- Four days in 2012-13 have daily unplanned SAIDI value greater than the calculated threshold or T_{MED} value. These four major event days have been correctly identified for the 2012-13 period.

2.4 Customer service – Telephone Answering

2.4.1 Reported Data

RIN Template 1b: STPIS Customer Service – Table 1 provides the summary of the annual performance data on telephone answering system for the 2012-13 reporting period.

Columns W and X in the RIN Template 1c: STPIS Daily Performance – Table 1 spreadsheet reports the daily performance data on telephone answering system for the 2012-13 reporting period.

The definition of the term used in this table is provided in the Definitions and Interpretations section of the RIN issued by the AER to Essential Energy and in the Appendix A of the STPIS (Nov 2009).

2.4.2 System and Procedures Assessment

SKM's below assessment is based upon a review of the systems and procedures that Essential Energy followed to record, store, extract and process the reported information. As part of the review SKM analysed the reported and underlying data, and interviewed staff responsible for preparing this information. SKM notes the following:

- All network related calls to Essential Energy are directed to one of the supply interruption call centres for attention. Essential Energy has supply interruption call centres in Port Macquarie and Queanbeyan known as the supply interruption group (SIG). Callers are able to be connected with these call centres via a telephone number specific to supply interruptions or can be diverted here from other Essential Energy call centres. The reported figures relate only to the supply interruption call centres.
- Calls received are either addressed through the use of an automated voice response (IVR) system or are placed in a queue to be answered by the next available human operator. The IVR system is only implemented when the call centre experience large numbers of calls and is unable to answer all calls promptly. These situations occur when a major outage of the network has occurred and the IVR will be enabled to give callers a recorded message explaining the details of the outage. Messages are kept as brief as possible with only pertinent information included. The IVR has the functionality to identify whether a caller is within the area affected by a major known outage so that callers from other areas will not be played the recorded message. In all situations the caller can elect to speak to an attendant after listening to the IVR message by staying on the line and will be placed in the call queue. Alternatively the caller can hang up.
- Essential Energy has the combined capacity across Port Macquarie and Queanbeyan SIG to take 240 calls simultaneously via flexible routing option from the Telstra carrier. In the event of high call scenarios, the system has the ability to overflow into the General Enquiries contact centre channels which provide the SIG with additional 60 channels. Once this combined 300 lines capacity is reached, the Essential Energy telephone answering system can flexibly overflow to an additional 250 simultaneous lines in Telstra application called Archiver. It provides any caller reaching this application with standard messages that can be customised as situation requires informing the caller about the high call circumstances, alternate options and is terminated.
- The system only retains details of each individual call for 7 days however the count or the total number of each type of call per period is still available through the system for reporting purposes. Reports can be run through this system which provides statistics about the received calls for a nominated period of time.
- The nature of each phone call is identified by SIG as belonging to one of the six categories (or skillsets), namely – 'Emergency', 'Hotwater', 'Planned Outages', 'Vegetation', 'Streetlight' and 'Others'. In the case where non-fault related telephone call comes to SIG, it gets transferred or referred to the correct destination (for e.g. retailer, new connection, procurement enquiries etc.). However, it is very likely that such non-fault calls are lumped together into 'Other' category along with other genuine fault related phone calls and therefore cannot be specifically isolated and filtered out from the overall telephone answering performance reporting. Given that all the functions from recording to reporting the performance metrics of the telephone system is highly automated without any manual intervention or handling of the data, the numbers of such non-fault telephone calls gets included in the annual RIN reporting. SKM notes that such instances are very few.
- Essential Energy's call management system excludes the time for which a customer is connected to the IVR system which is in accordance with the STPIS definition.

- Essential Energy has a highly automated call management system which records the statistics of all phone calls received by the call centres. The reporting process involves extracting the required data from the call management systems by running the skillset performance reports from their symposium web client. This data includes the following:
  - Total calls answered;
  - Calls answered outside 30 seconds threshold; and
  - Total abandoned calls.

  Using these three records or information, Essential Energy provides the data for the annual RIN reporting. Essential Energy cannot measure the number of abandoned calls which were abandoned within 30 seconds and have therefore adopted the AER allowed estimate that 20% of abandoned calls are done so within the threshold. This information is used to determine the following:

  - Total number of calls (Total) = Total number of calls to the fault line
    [As per the RIN definition]

    = Total number of answered calls + Total number of abandoned calls
    [Essential Energy's calculation]

    SKM notes that Essential Energy's calculation is consistent with the RIN definition. The annual summary of this metric is reported in Template 1b Table 1.

  - Total number of calls (Total after removing excluded events) **=** Total number of calls to the fault line – Excluded Events or Exclusion allowed under the STPIS (Nov 2009) Clauses 5.4[5] – Calls to payment lines and automated interactive services – Calls abandoned by the customers within 30 seconds
    [As per the RIN definition]

    = Total number of answered calls + 80% of the number of abandoned calls.
    [Essential Energy's calculation]

    SKM notes that Essential Energy's calculation only equals to Total number of calls to fault line minus the calls abandoned by the customers within 30 seconds. It does not deduct Excluded Events as per STPIS (Nov 2009) Clauses 5.4, and calls to payment lines and automated interactive services. The annual summary of this metric is reported in Template 1b Table 1. The daily count of this metric is reported Template 1c Table 1.

  - Number of calls answered within 30 seconds (Total after removing excluded events) = Number of calls to fault line answered within 30 seconds – Excluded Events or Exclusion allowed under the STPIS (Nov 2009) – Call to payment lines and automated interactive services – Calls abandoned by the customers within 30 seconds
    [As per the RIN definition]

[5] This clause in turn refers to STPIS (Nov 2009) Clause 3.3a and 3.3b.

= Total number of answered calls – Number of calls answered after 30 seconds

[Essential Energy's calculation]

SKM notes that Essential Energy's calculation only equals to Number of calls to fault line answered within 30 seconds. It does not deduct Excluded Events as per STPIS (Nov 2009) Clauses 5.4, calls of payment lines and automated interactive services, and calls abandoned by customer within 30 seconds. The annual summary of this metric is reported in Template 1b Table 1. The daily count of this metric is reported Template 1c Table 1.

- SKM notes that the presently Essential Energy does not have the functionality within their call management system and the Symposium web client to attribute calls to an outage and thus cannot report on or filter out the Excluded Events or Exclusions allowed under the STPIS (Nov 2009) Clause 5.4. Also, as stated earlier telephone calls related to non-fault topics cannot be filtered out from the call management system extracted data.
- SKM viewed the historical reports for both call centres generated by the Symposium web client and verified the calculation of the reported RIN numbers. SKM has also confirmed with Essential Energy that the IT systems are designed to function in the correct manner with the correct thresholds.

2.4.3 Auditors Opinion

The summary of SKM's opinion on the accuracy and reliability of the information reported in this RIN table is:

- The systems for measuring phone call statistics are highly automated and based on IT solutions which appear to be functioning as intended. However, except for the Total number of call (Total) metric, the calculation of other reported performance metrics are inconsistent with the RIN definition[6]. This is because Essential Energy does not have functionality within their existing system to attribute calls to Excluded Events and to specifically identify each telephone call related to non-fault topic to filter it out from the reporting data.
- Notwithstanding the above point, the reported data in Template 1b Table 1 otherwise matches with the daily data reported in Template 1c Table 1 columns W and X.
- The process for reporting in the RIN template is documented and traceable.

2.5 Customer service – New Connections

2.5.1 Reported Data

RIN Template 1b: STPIS Customer Service – Table 2 provides the annual performance data on new connection for the 2012-13 reporting period.

The definition of the term used in this table is provided in the Definitions and Interpretations section of the RIN issued by the AER to Essential Energy and in the Appendix A of the STPIS (Nov 2009).

[6] SKM notes that while the STPIS (Nov 2009) provides the definition for the *Number of calls answered within 30 seconds* parameter, it is the RIN which provides comprehensive definition for each parameter and the required reporting metrics.

2.5.2 System and Procedures Assessment

SKM's below assessment is based upon a review of the systems and procedures that Essential Energy followed to record, store, extract and process the reported information. As part of the review SKM analysed the reported and underlying data, and interviewed staff responsible for preparing this information. SKM notes the following:

- Essential Energy has only reported the total number of new connections and has advised that it is unable to report the total number of new connections which were not provided on or before the agreed date. The difficulty in determining this information is because the majority of new connections in NSW are performed by accredited service providers (ASP's) and any agreement between the customer and the ASP, if one exists, is unknown to Essential Energy. Essential Energy receives notice of new connections being made by ASP's but do not receive information about when the request was made to the ASP or if any date was agreed.
- New connections are defined as all new connections to the network' and do not include re-energisation of existing premises. Essential Energy has a process flow that checks every notification of a connection to the network to determine if the premise is an existing premise. New premises are added along with the unique National Metering Identifier (NMI). Essential Energy has extracted a list of new connections (or unique NMIs) which were registered within the 2012-13 reporting period. This number is reported as the total number of new connections.
- There is a time limit of 48 hours after Essential Energy receives the request to connect from the connecting new premises (or the retailer) to provide the new NMI for the new connection. This limit is always complied with.
- SKM reviewed a list of the new connections reported for the year and confirmed the count of new customers. However, the auditors were not able to view the records of four new connections or premises randomly selected from the list of all new connections.

2.5.3 Auditors Opinion

The summary of SKM's opinion on the accuracy and reliability of the information reported in this RIN table is:

- The process for recording new connections is based on appropriate information systems, is well documented and appears to be followed correctly by staff.
- The total number of new connections has been accurately determined based on data extracted from these systems. Copies of records for the following new connections were sighted following the request after audit interview:
  - PREMNUM 1388807
  - PREMNUM 2570640
  - PREMNUM 1979282
  - PREMNUM 2677120
- The number of new connections which were not provided on or before the agreed date has not been reported. This is considered appropriate given that the majority of connections are made by ASP's and Essential Energy does not have any knowledge or information on this.
- The total new customer connection count reported in RIN Template 4 Table 4 does not match with this reported data given that it is the same metric.

2.6 Customer service – Streetlight Repair

2.6.1 Reported Data

RIN Template 1b: STPIS Customer Service – Table 3 provides the annual performance data on streetlight repair for the 2012-13 reporting period.

The definition of the term used in this table is provided in the Definitions and Interpretations section of the RIN issued by the AER to Essential Energy and in the Appendix A of the STPIS (Nov 2009).

2.6.2 System and Procedures Assessment

SKM's below assessment is based upon a review of the systems and procedures that Essential Energy followed to record, store, extract and process the reported information. As part of the review SKM analysed the reported and underlying data, and interviewed staff responsible for preparing this information. SKM notes the following:

- There was a drop in the streetlight faults reporting in 2012-13 reporting period due to the periodic bulk lamp replacement program undertaken last year. This is a three year cyclic program.
- Essential Energy manages all aspects of the streetlight repair recording through their asset management system known as WASP. It contains information about each streetlight asset known to Essential Energy.
- The notification of streetlight faults is received by the supply interruption group (SIG) when it is reported by a member of public, a customer, or a customer from a neighbouring property. A "*trouble call*" is lodged into the system by SIG which then flows to WASP in a batch once every workday. The transfer of this "*trouble call*" from SIG to WASP happened at 12:00 noon each day during the 2012-13 reporting period. If SIG lodged a "*trouble call*" later in the afternoon, it will be transferred and picked up in WASP only the next working day noontime.
- The start time for the streetlight fault is the time the "*trouble call*" is registered in WASP and therefore not the actual time of the notification received by SIG.
- The "*trouble call*" is also entered into WASP directly and a work package issued when an Essential Energy crew or contractor detects streetlight faults during routine asset inspection patrolling.
- The streetlight team detects the faulty streetlight in the network and the instruction for repair is initiated by creating a work package in the WASP. The streetlight team creates the Detailed Task Instruction (DTI) in WASP and issue it to the WSMP team (field staff) for repair work. Once the faulty streetlight is repaired and the actions taken by WSMP team are recorded, the defect is completed. The WSMP team then closes the DTI in the WASP.
- Essential Energy run COGNOS (business tool) reports of WASP to obtain the information reported in the RIN.
- There are still 267 quarantined streetlights in Essential Energy network the sufficient details for which are not presently known to Essential Energy. The existence of these streetlights are known but are not billed due to the lack of ownership information. This is excluded in the reported total number of streetlights in the RIN.
- Streetlight faults reported by a "person who is the occupier of an immediately neighbouring residence or is the proprietor of an immediately neighbouring business" are recorded by the SIG operator receiving the complaint. Since the objective definition of 'neighbour' is not available for RIN reporting purpose, the identification (and monetary claim) by the fault reporter and its verification by the streetlight team remains subjective. Also, the information about whether the streetlight abuts a fault reporter's property is not kept in the WASP that this report is based on. This information is stored in Lotus Notes and is manually counted at the time the RIN report is produced and therefore the possibility of inaccurate data exists.
- SKM viewed 3,326 reported count of total number of streetlight faults reported by person whose property is abuts the faulty streetlight in the initial version of the RIN. During the course of the audit, this data could

not be reproduced or validated in Essential Energy's business system (Lotus Notes) which was used to report this information. This data has been subsequently revised to 3,321 and finally to 3,332 count in the final RIN version. This demonstrates the degree of manual counting and reporting process involved to provide data for this RIN.

- The process of detecting a faulty streetlight is manual and based on a printed notification being received by the streetlight team and referencing to WASP. There is potential for error in this process.
- There is some manual manipulation of the data to remove situations where the streetlight was not faulty and was not working due to faults in the supply area.
- It was noted that the data extracted from COGNOS which forms the basis of the RIN report have 95 data entries or streetlight faults without actual completion/repair dates. At the time of generating the report, these faults were not completed and as such they have been provided with an universal default completion date of the day COGNOS report was generated (03 July 2013 in this instance). This has introduced inaccuracies in the reported number for the faulty streetlight not repaired within 5 days.

2.6.3 Auditors Opinion

The summary of SKM's opinion on the accuracy and reliability of the information reported in this RIN table is:

- Essential Energy uses it asset management system to record streetlight faults and repairs. The functionality of the system is appropriate to accurately report the data required in the RIN.
- In many instances, the start date of the reported streetlight fault is incorrectly recorded being the date it was transferred from SIG to WASP rather than the actual date of SIG being notified of the fault. This has introduced inaccuracies in the reported number for the faulty streetlight not repaired within 5 days.
- There is potential inaccuracy in the reported number for "person who is the occupier of an immediately neighbouring residence or is the proprietor of an immediately neighbouring business" based on the subjective and manual identification of abut properties from different information source. This reported figure represent the best information which Essential Energy has available.
- The reported number for "faulty streetlight not repaired within 5 days" is inaccurate due to the universal application of the report generation date as the default completion date for faults which were not completed at the time of report production.

2.7 Customer service – Response to Written Enquiries

2.7.1 Reported Data

RIN Template 1b: STPIS Customer Service – Table 4 provides the annual performance data on response to written enquiry for the 2012-13 reporting period.

The definition of the term used in this table is provided in the Definitions and Interpretations section of the RIN issued by the AER to Essential Energy and in the Appendix A of the STPIS (Nov 2009).

2.7.2 System and Procedures Assessment

SKM's below assessment is based upon a review of the systems and procedures that Essential Energy followed to record, store, extract and process the reported information. As part of the review SKM analysed the reported and underlying data, and interviewed staff responsible for preparing this information. SKM notes the following:

- Essential Energy uses Contact Management System (CMS), Retail Database and Quality of Supply Database to manage all written enquiries and complaints. Depending on the nature or category of the correspondence, an individual record is generated in one of these databases for each written enquiry or complaint received. Essential Energy uses these systems or database to assign a responsibility to address the issue and to record communications and actions taken to resolve the contact. The data from all three

are exported or extracted and merged into a single excel spreadsheet. It include the following information which is relevant to the process of reporting in the RIN template:

- *Details* – Details of the customer.
- *How Contacted* – Method by which they made contact. It can be email, mail or fax.
- *Raised* – Is the time when the enquiry was received which is either, when a written letter or fax was received by Essential Energy or when an enquiry is lodged online.
- *Type* – Defines whether the contact is an enquiry or a complaint. An enquiry requires only a response where as a complaint will require some form of rectification.
- *Category / Subcategory* – Records the subject of the inquiry in two fields.
- *Resolution Date* – The time at which an operator deems the issue has been resolved. This is to capture that a response to an enquiry has been made while the record can remain open until agreed action is completed.
- *Completion Date* – Is the time at which a record is closed and no further action is required. This is used as the response date in terms of the RIN reporting for enquires but not for complaints.
- The CMS system will also store copies of any correspondence with the customer.

- The exported or extracted data merged into a single spreadsheet is analysed and processed for the RIN reporting purpose. Essential Energy undertakes a series of manual filtering and vetting processes to eliminate non-relevant records. These filters are:
  - Enquiries which are not related to the network are discounted by filtering through the category and subcategory fields. Essential Energy receives numerous enquiries and complaints which are unrelated to the distribution business. This includes enquiries related to Gas, Water, Marketing and Retail aspects of the business.
  - Enquiries which are not from Essential Energy customers. Essential Energy receives enquires from a variety of sources who are not customers. Examples of this type of enquiry include businesses who wish to gain work with Essential Energy and students who are conducting projects for which they require some information.
  - Enquiries which are internally generated as a means of prioritising work.
  - From the remaining records the number responded to within 5 days is determined using MS Excel function based on the recorded “Raised Date” and “Resolution Date” counting only business days.
- Essential Energy has deemed that a phone call response to a customer constitutes a written response for the purpose of reporting the number of written enquiries not responded to within the 5 day threshold. This has been reported in previous years audit reports as well. No clarification on the interpretation of this parameter has been sought with or provided by the AER. It is however noted that in many cases, the preference to be communicated or receive a response by phone call is chosen or dictated by the customers themselves.
- Similar to previous years, both written enquiries and complaints are included in the reported figures as Essential Energy believes that a written compliant is also an enquiry since it also requires a response in addition to resolution.
- Essential Energy’s RIN reporting is based on business day duration between the raised date and resolution date if this information is available, or completion date if this information is available, or report production date, in this priority.
- It is noted that while the complaints might be responded, the record will remain incomplete until the agreed steps or actions are completed. SKM has found a record (Ref No N07761) in the raw data extract which is the underlying basis of the reported data where the resolution date is after the completion date. This record is incorrect and illustrates an instance where the staff incorrectly used the flag while entering the details in the system or database.

- There are many records in the extracted raw data wherein enquiries which only require response and where a response was provided, the record were closed (with completion date stamp) at much later dates. This illustrates instances where the staffs do not immediately close off the enquiry records. This however does impact the data for RIN reporting.
- SKM interrogated the 1,913 records in the spreadsheet containing the extracted and merged raw data which forms the basis of the data reported in the RIN and found 507 records without resolution dates. The response duration in such instances were calculated instead from the completion date or from the report production date (if the completion date was also missing). As highlight earlier, the actual response to the enquiry may occur before the record closing or the completion date and as such the reported figure in the RIN may contain inaccuracies. It is noted that such inaccurate reporting is not to Essential Energy's benefit as the calculated duration would be more than the actual duration. This arises due to the staff forgetting to click on the 'agreed resolution' button to accurately record the events.
- There is record (Ref No 16094) that has been tagged as 'escalated' which have neither been resolved nor completed, but the response duration still has been calculated. SKM notes that this duration is based on the report extraction or production date and in reality the record would continue to be unresolved / open until its resolution/completion. It is also noted that Essential Energy would wait to produce the data for RIN reporting well after 5 working days threshold to ensure that those not responded in 5 working days are definitely identified. The data for this 2012-13 RIN reporting was generated on 25 July 2013.
- The process of manipulating and filtering the extracted data for the RIN reporting is largely manual and human error is possible. SKM independently performed this exercise on the raw extracted data following the same Essential Energy's instruction, but arrived at 558 counts of number of written enquiries instead of the reported 560 counts in the RIN report.

2.7.3 Auditors Opinion

The summary of SKM's opinion on the accuracy and reliability of the information reported in this RIN table is:

- The reporting process of the information from the CMS, Retail and Quality of Supply Databases involves a large amount of manual input, manual filtering and vetting of the data. SKM found a number of errors including inaccurate inputs to the record and inaccurate filtering of the records for reporting.
- There were a number of correspondences found where the response time is over reported due to operator error.
- The data reported is based on an assumption that a phone response may be provided in lieu of a written response. The AER may wish to provide clarification on this. It is however noted that in many cases, the preference to be communicated or get response by phone call is chosen or dictated by the customer themselves.

2.8 Demand

2.8.1 Reported Data

RIN Template 2: Demand – Table 1 reports the maximum coincident demand at the network level previously forecasted for 2012-13 period, actual recorded in 2012-13 period, and present forecast for 2013-14 period.

RIN Template 2: Demand – Table 2 reports the summer and winter non-coincident maximum demand by zone substation level previously forecasted for 2012-13 period, actual recorded in 2012-13 period, and present forecast for 2013-14 period. It also reports the nameplate rating the transformers existing in those zone substations.

The definition of the term used in this table is provided in the Definitions and Interpretations section of the RIN issued by the AER to Essential Energy and in the Appendix A of the STPIS (Nov 2009).

2.8.2 System and Procedures Assessment

2.8.2.1 Demand capture

SKM's below assessment is based upon a review of the systems and procedures that Essential Energy followed to record, store, extract and process the reported information. As part of the review SKM analysed the reported and underlying data, and interviewed staff responsible for preparing this information. SKM notes the following:

- Essential Energy has used the MWh energy metering data from the following sources to determine the maximum coincident MW demand at the network level:
  - Bulk supply points;
  - Cross border supply;
  - TUOS pass through[7]; and
  - Generators directly supplying to Essential Energy network

  SKM notes that a large portion of the data was in the past collected in fifteen minute intervals which then underwent manual manipulation to be summated with the thirty minute interval data. However, for the 2012-13 reporting period the process has been changed so that all data is now collected in thirty minute intervals. This has improved the process by reducing the need for manual data manipulation.

  SKM has reviewed the data at the network level for the regulatory year and confirmed that the calculation of maximum coincident demand is reported correctly in the RIN template. SKM considers the use of metering data for the calculation of maximum demand to be suitable.
- Essential Energy does not capture and report the maximum coincident apparent (MVA) demand at network level for the forecast and t+1 years – although, SKM notes that these cells are coloured grey in the RIN template and are therefore not required to be reported.
- Essential Energy personnel have advised that they do not have a process for weather normalisation at zone substation level that gives consistent correlation and are thus not able to provide this information.
- SKM notes that weather corrected demand profiles may be less relevant for Essential Energy's network than for distribution networks which serve large urban centres. This is because in smaller non-urban areas peak demand may be driven by other factors such as agricultural processing and irrigation, tourism, mining etc. Essential Energy has also expressed that it seems likely that local planners in regional areas tend to be more in touch with network issues than network planners in urban areas, as they are more locally involved and live in these communities. Essential Energy has also highlighted the scale of weather effects as less on smaller demand centres i.e. if weather patterns increase a 100MVA demand by 10% additional capacity may be required, whereas if a 10MVA demand increases by 10% it is less of an issue.
- Essential Energy does not calculate the PoE 10% and PoE 90% figures – regular demand capture and forecasting procedures are reported as the PoE 50% figures.
- Essential Energy has reported the summer and winter non-coincident maximum demand for 368 zone substations. SKM notes that this count exceeds the total number of zone substations on the Essential Energy network. This is because demand is reported at each transformation level – a single zone substation site may have multiple transformations (66/11kV, 66/22kV and 66/33kV) and as such multiple MW demand data may be reported for the same zone substation site.
- The actual (raw) maximum demands have been obtained from a number of sources including:
  - Revenue/Statistical Metering (65%);
  - Network operations SCADA system (20%);
  - Recloser data (12%); and

[7] Two mining customers supplied directly by TransGrid with residual energy supplied to Essential Energy network.

- Other (%3).

Revenue/Statistical Metering data is considered the most accurate and reliable of these sources followed by SCADA and auto-reclosers.

- Where there is no other sources available, field equipment such as maximum demand indicators (MDI's) may be used to determine the maximum demand. MDI's only provide absolute maximum demand over the measurement period and are not date/time stamped. Further, this is captured in amperes which must then be converted to power assuming a nominal system voltage and power factor similar to nearby/like substations. SKM notes that this procedure is only carried out for a small number of zone substations ("maybe half a dozen"), each with demand under 1MW.
- Essential Energy uses a manual process to check each demand profile is credible. Peaks considered to be erroneous or due to abnormal system operation – such as load switching – are excluded. SKM considers the removal of such peaks to be good practice.
- SKM reviewed the raw data covering the period from October 2011 to March 2013 for the following sample of ZSs:
  - Bonalbo
  - Clearwater Crescent
  - Crescent Head
  - East Tamworth
  - Lismore East
  - Oxley Vale
  - Rocks Ferry
  - Clearwater Crescent
  - South West Rocks
  - Wathagar
  - Werris Creek

  The above sites included data collected via sample of metering, SCADA, auto-reclosers and MDIs. In the review all data was found to be consistent with the reported actual maximum demand.
- Essential Energy has advised that the reported data is for the following periods:
  - Summer: October 2012 – March 2013.
  - Winter: April 2012 – September 2012.

  SKM notes that Essential Energy reporting maximum demands for six month winter and summer periods whereas the RIN specifies a three month winter (June to August) and summer (December to February) period.

  Of the substations reviewed above SKM found that all of the peaks were within the "three month" periods specified in the RIN. However, Essential Energy has advised that there are a small number of cases where the peak falls outside these months. Essential Energy has advised that these are for zone substations that serve small population centres where the peak is a result of seasonal agricultural activities such as cotton processing, free-flow irrigation, etc.

2.8.2.2 Demand forecasting

- The zone substation non-coincidental demand forecasting is fully managed from within Essential Energy's Network Planning section (in consultation with other staff where required). These forecasts are prepared in accordance with Essential Energy's load forecasting methodology which is described in their operational procedure for sub transmission and distribution network planning criteria and guidelines (CEOP8003).

- Essential Energy's forecasting methodology uses up to ten years – with a minimum of five years – of historical demand which is captured as previously described. The forecast is then made by applying a simple linear regression trend to project the historical data forwards.
- All forecasts are manually "sanity checked" for credibility and will undergo manual adjustments if deemed necessary. Essential Energy has advised that due to recent fluctuations in maximum demand and some significant reductions in growth rates across the network, the majority of forecasts now need to be adjusted. Essential Energy has advised that this is a manual process and there are no rigid guidelines for adjusting forecasts.
- When a forecast is adjusted the reasoning applied will be noted on the spreadsheet. SKM viewed a sample of adjusted demand forecasts in its on-site audit review (Essential Energy office workstation), and has not found any adjustments that would be considered unreasonable. However, SKM notes that due to the inherently imprecise nature of demand forecasting the adjustments will be subject to the judgment of the individual analyst.
- At present, any projected growth rate above 2% automatically raises a flag and will be reviewed and adjusted manually.
- All negative growth rates would be reassessed and most likely "flat lined" in the forecast – some may be made slightly positive depending on the circumstances, however no forecasts are left with a negative growth rate (except in consideration of imminent demand transfers and spot loads).
- Essential Energy has advised that negative growth is less relevant for loads less than 5MW from a network planning perspective. This is because capacity would rarely be removed from the network if demand decreases. Essential Energy also notes that any demand forecast that results in a network constraint is analysed in much greater detail before any network augmentations would be planned to resolve the constraint.
- Spot loads and load transfers are considered in discussions with distribution planners however, these are not included in reported figures unless they are identified as "committed" projects. SKM has identified several of such situations in the reported figures and was able to observe load transfers between substations (e.g. Suffolk Park and Ewingsdale), with a step decrease in demand at one zone substation and a corresponding step increase at the other zone substation.
- Minor network changes such as the installation of PF correction equipment and feeder transfers are not generally included.
- Although the power factor (PF) is calculated at peak demand for recorded periods, forecasts project forward using an average demand for the zone substation. The average will be manually checked for credibility and may be adjusted manually.
- Essential Energy has approximately sixty Bulk Supply Point (BSP) substations and these forecasts consider additional factors, including:
  - Temperature correction;
  - Embedded generation (solar and other);
  - Electricity price elasticity – biggest variable;
  - Economic – regional and state growth projections; and
  - Population – regional and state growth projections – from NSW Department of Planning.

2.8.3 Auditors Opinion

The summary of SKM's opinion on the accuracy and reliability of the information reported in these RIN tables are in the following subsections.

2.8.3.1 RIN Template 2: Demand – Table 1

- Forecast: The forecast cells are required to be populated with Essential Energy's network level projected coincident demand for 2012-13 which was produced at the beginning of the 2009-14 price control period.
  - Essential Energy has provided the PoE 50% (MW) demand. The PoE 10% and PoE 90% figures have not been provided as these forecasts were not produced by Essential Energy at the beginning of the 2009-14 price control period.
  - SKM has cross checked the total network level coincident demand forecast for 2012-13 made at the beginning of the price control period and can confirm that the PoE 50% MW figure corresponds with the t+1 forecast from previous year RIN template. SKM understands that Essential Energy engaged consultant National Institute of Economic and Industry Research (NIEIR) to generate this forecast in 2008. SKM did not review this data and the source of this information.
- Actual – raw: The actual – raw cells are required to be populated with Essential Energy's maximum network coincident demand (MW) for 2012-13.
  - Essential Energy has provided the underlying half hourly metered demand for the network, which contains elements of Bulk Supply Point (BSP), cross-border supply, TUOS pass through and generator (negative) demand.
  - SKM has reviewed the underlying data and calculations, and has not identified any apparent errors or anomalies. Based on this SKM is satisfied that the figure provided for the network coincident maximum demand is accurate, notwithstanding the limitations surrounding the demand systems and data shortcomings detailed in Section 2.8.2.1 of this report.
- Actual – weather normalised: The demand that is required to be provided is the network coincident maximum demand for the period, adjusted for weather fluctuations.
  - Essential Energy has not provided any weather normalised demands.
- t+1 forecast: The demand that is required to be provided is the forecasted network level coincident maximum demand for the 2013-14 period.
  - Essential Energy has provided the PoE 50% (MW) demand. The PoE 10% and PoE 90% figures have not been provided as these forecasts have not been produced by Essential Energy.
  - SKM understands that Essential Energy engaged consultant National Institute of Economic and Industry Research (NIEIR) to generate this forecast in 2008. It is noted that this is the latest available forecast. SKM did not review this data and the source of this information.

2.8.3.2 Template 2: Demand – Table 2

- Forecast: The forecasted demand that is required to be provided is Essential Energy's projected coincident demands for each zone substation made at the beginning of the price control period.
  - SKM has reviewed the data provided in the RIN template and has not identified any apparent errors or anomalies.
  - SKM has also reviewed a large sample of the 2012 winter and 2013 summer forecasts which were provided in the ESDR 2008, and can confirm that the figures reported in the ESDR 2008 correspond with the figures provided in the 2012-13 RIN template.
- Actual – raw: The demand that is required to be provided is the coincident maximum demand for each zone substation over the period.
  - SKM has conducted a detailed review of the process, from the capture of metered demand through to assessment of individual demand profiles. In this review SKM assessed twenty of the reported

summer and winter figures through each step and did not identify any errors or anomalies. In the sample SKM observed misrepresentative peaks omitted (such as load switching etc.) from the reported figures as appropriate.

- SKM compared the results of the above review against the RIN data and can confirm a correlation between the figures.
- SKM has reviewed the data provided in the RIN template and has not identified any apparent errors or anomalies.
- Based on the above SKM is satisfied that the individual substation coincident maximum demands are accurate, notwithstanding the limitations surrounding the demand systems and data shortcomings detailed in Section 2.8.2.2 of this report.

- Actual – weather normalised: The demand that is required to be provided is the individual substation coincident maximum demands for the period, adjusted for weather fluctuations.
  - Essential Energy has not provided any weather normalised demands.
- t+1 forecast: The demand that is required to be provided is the individual substation coincident maximum demands for the 2013-14 period.
  - The t+1 forecast is produced using up to ten years (minimum of five years) of recorded historical network coincident demand, projected forward using a linear regression. These coincident maximum demand forecasts are referred from the latest available ESDR 2013 document.
  - The resultant forecast has not been normalised for weather, however, and individual historical peaks have been corrected for misrepresentative peaks (such as load switching) as appropriate.
  - SKM has reviewed the forecasting procedures and the figures reported in the RIN template. In this review SKM has not identified any apparent errors or anomalies.
  - Based on the above SKM is satisfied that the figure provided for the t+1 network coincident maximum demand is accurate, notwithstanding the limitations surrounding the demand systems and data shortcomings detailed in Section 2.8.2.2 of this report.
- Nameplate rating: These cells are required to be populated with the nameplate rating for each substation.
  - Essential Energy has included the nameplate ratings for each transformer as reported in the ESDR 2013. SKM considers it useful to provide the ratings by transformer as the substation firm rating will be significantly less than the summation of the nameplate ratings of individual transformers.
  - SKM has reviewed the underlying data and can confirm that the ratings correspond with the figures reported in the RIN template.

3. Compliance with AER audit requirements

SKM performed an audit of Essential Energy's 2012-13 Regulatory Information Notice (RIN) statements to the Australian Energy Regulator (AER). SKM audited the information reported in the following regulatory templates:

- Template 1a: STPIS Reliability – Tables 1, 2 and 3
- Template 1b: STPIS Customer Service – Table 1
- Template 1c: STPIS Daily Performance – Table 1
- Template 1d: STPIS MED Threshold – Tables 1 and 2
- Template 1e: STPIS Exclusions – Table 1
- Template 2: Demand – Tables 1 and 2

SKM has undertaken its audit of Essential Energy's RIN in accordance with the following standards and guidelines:

- Standard on Assurance Engagements – ASAE 3000 Assurance Engagements;
- Audit instructions specified in each RIN reporting template; and
- AER Service Target Performance Incentive Scheme (STPIS) for the DNSPs (Nov 2009).

SKM performed the following activities in accordance with the standards and guidelines referenced above, and in particular can attest:

- SKM has complied with the standards set out in section 3.2 of Appendix E of the RIN, and in conducting the audit have assessed:
  - the reliability of the processes, procedures and Systems used and applied by the relevant staff to prepare, provide and maintain the information;
  - whether the processes, procedure and Systems were correctly used and applied by the relevant staff to prepare, provide and maintain the information;
  - whether the Systems are able to prepare and provide the required parameter definitions in accordance with the service target performance incentive scheme and asset installation template;
  - whether the systems are able to completely identify and correct errors and whether the information reflects any such corrections;
  - whether there are any changes in the processes, procedures or Systems since the last audit was conducted that may have compromised the reliability of the information prepared and provided and may lead to the conclusion that the current compliance level does not represent compliance during the time since that last audit;
  - whether the processes, procedures or systems provide information which corresponds to information previously provided; and
  - whether the processes, procedures, or Systems provide any missing information of unusual trends that suggest errors in the information entry or manipulation.
- The RIN audit report has been prepared in accordance with the requirements of Appendix E of the RIN – National Electricity (NSW) Law, Section 28M(e). Regarding the class of the person to conduct the audit, this means that:
  - SKM will be ultimately responsible for the audit;
  - SKM and the auditors are independent from Essential Energy and all of its related bodies corporate;
  - SKM has been appointed for the purposes of expressing an opinion on an accountability matter;

  - SKM and the auditors have experience in conducting financial, performance, operation or quality assurance audits and conducting data sampling in the electricity industry;
  - SKM and the auditors possesses relevant knowledge and experience in the electrical industry, engineering, IT systems, asset management and customer service;
  - SKM and the auditors understands the procedures and methodologies underlying the data and the AER's relevant definitions for all information; and
  - if necessary, SKM and the auditors are available to discuss issues relating to the audit with Essential Energy and the AER, including where an audit report is critical of, or highlights deficiencies in, the audited information.
- SKM has complied with the fundamental ethical principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.
- The audit is expressed as a positive expression of opinion and provides a high level of assurance. The engagement is a "direct reporting engagement" and SKM provides an opinion about the effectiveness of control procedures and provides relevant and reliable information about the procedures where appropriate.
- The criteria for the audit are described in the STPIS. SKM has reviewed the criteria and assessed the criteria for suitability.
- SKM planned the audit such that the work would be completed in an efficient manner with appropriate consideration given to the nature of the area of activity to be examined, the extent to which information technology is used and the documentation available. An engagement plan describing the expected scope of the audit setting out the requirements for interviews and data availability was developed and implemented. In the development of this plan, SKM assessed areas considered to potentially contain significant risk, the extent of available evidence, the nature of the control procedures, and the effectiveness of control procedures.
- In planning and implementing the audit procedures SKM gave due consideration to the materiality of the control procedures and devoted appropriate attention to important areas of the engagement.
- SKM reviewed procedures and conducted interviews with relevant Essential Energy staff to develop a sufficient understanding of the activities and circumstances involved in the engagement.
- SKM has performed tests to obtain sufficient evidence to evaluate the effectiveness of control procedures. Professional judgement has been exercised in assessing what constitutes sufficient evidence. SKM has also sought corroborating data from other systems and processes such as SCADA, control logs and field reports. Where SKM has become aware of a matter which leads to doubts that the evidence obtained in sufficient, SKM has pursued the matter and sought further evidence.
- Where appropriate, SKM has conducted sampling to provide a reasonable basis to draw conclusions about the population from which the sample is selected. The audit sample has been designed to reduce sampling risk to an acceptable level and with consideration to the purpose of the audit and characteristics of the population from which the sample is drawn. Professional judgement has been exercised to sample items such that a representative sample is selected. Due consideration has been given to the materiality to overall results and the nature of the processes used to gather the underlying data. In the case of deviations and misstatements identified, SKM has sought to investigate and evaluate the cause and possible effect. The sample cases used in undertaking the audit and findings are discussed in the schedule of audit findings.
- SKM has formed the opinions presented in this report based on the audit evidence obtained during the audit.

Adam Homan

Lead Auditor

13th November 2013

4. Review Comments

In addition to the audit as presented in Section 2 of this report, SKM also performed high level reviews of the remaining data provided in the 2012-13 non-financial RIN report that was not required to be audited.

4.1 Scope

It should be noted that this is a high level review without the rigour and thoroughness of the RIN audit requirement as detailed in Section 3 of this report. The scope is to review the provided data from high level perspective and provide comments. It involved minimum interaction with Essential Energy staff responsible for the reporting the information to gain an appreciation of the underlying system and the reporting process. It did not involve extensive interaction followed by post-interview questionnaires with those staff, review of additional validating or corroborating information, and in-depth analysis of the provided information for error and anomalies against the defined metrics in the RIN and STPIS (Nov 2009). SKM also did not trace the flow or trail of the reported data back to the source. SKM reviewed the information contained the RIN template at face value in good faith.

The non-financial RIN requiring review only broadly covers the following four distinct areas. Each area may be presented in multiple tables in multiple RIN templates. Each of these areas has different systems and procedures which SKM has appreciated.

- **Customer numbers** which is presented in:
  - Template 4: General Information – Table 1 Metered supply points (review only)
  - Template 4: General Information – Table 4 Customer numbers (review only)
- **Network supply reliability** which is presented in:
  - Template 5a: Network Data Outage – Tables 1 and 2 (review only)
  - Template 5b: Network Data Feeder – Table 1 (review only)
  - Template 5c: Cause of Outages – Table 1 (review only)
  - Template 5d: Planned Outage – Table 1 (review only)
- **Customer service** which is presented in:
  - Template 3: Outcome Customer Service – Table 3 (*Timely provision of services*, *Timely repair of faulty streetlights*, and *Call Centre performance* only) (review only)
- **General asset information** which is presented in:
  - Template 4: General Information – Tables 3, 5 and 7 (review only)
  - Template 7: Asset Installation – Table 1 (review only)

4.2 Customer numbers

4.2.1 Reported Data

RIN Template 4: General Information – Table 1 reports the metered supply points at the end date (30 June 2013) of the 2012-13 annual period for various regions (Urban, Rural short, Rural long and Whole network). This information in this table is broken down into customer types and by various supply voltage levels.

RIN Template 4: General Information – Table 4 reports the distribution customer numbers at the start date (1 July 2012) and the end date (30 June 2013) of the 2012-13 annual period for various supply voltage levels.

The definition of the term used in this table is provided in the Definitions and Interpretations section of the RIN issued by the AER to Essential Energy and in the Appendix A of the STPIS (Nov 2009).

4.2.2 System and Procedures Assessment

Refer to Section 2.1.2 to appreciate the underlying system and procedure involved in producing these data in these RIN tables.

4.2.3 Review Comments

SKM provides the following comments on the information reported in these RIN tables:

- Refer to the opinion stated in Section 2.1.3 as they are applicable here.
- The reported count in RIN Template 4 Table 1 is as of the end date (30 June 2013) of the 2012-13 reporting period.
- The reported metered supply point count in RIN Template 4 Table 1 excludes the streetlight and hot water controlled load meters number.
- The reported customer number count in RIN Template 4 Table 4 includes the streetlight. The hot water controlled load number count is also separately reported in this table as of the end date (30 June 2013) of the 2013-14 period and is based on the details from the ENERGY billing system.
- The reported count in RIN Template 4 Table 1 broken down by meter types (domestic and non-domestic) is based on meter tariff details contained in the ENERGY billing system and therefore accurate. However the accuracy is lost when this breakdown is further disaggregated into various region/feeder type categories (Urban, Rural short and Rural long) because it is based on GIS Smallworld which is relatively less accurate, as discussed in Section 2.1 of this report.
- The reported count in RIN Template 4 Table 1 broken down by various supply voltage levels (Subtransmission, HV and LV) and further disaggregated into various region/feeder type categories (Urban, Rural short and Rural long) is not accurate as this breakdown and disaggregation is based on GIS Smallworld which is relatively less accurate.
- The total new customer connection count in RIN Template 4 Table 4 does not match with the data reported in the Template 1b Table 2 and Template 3 Table 3 (Timely provision of services) because it reports the difference between active premise numbers at a point in time whereas the others report on the number of new greenfield sites established during the year.
- SKM notes that reported data in both these RIN tables, the count of metered supply points and customer number are interchangeably used. Essential Energy has used the details of the unique NMIs connected to its network to interpret and report for both the RIN tables.

4.3 Network supply reliability

4.3.1 Reported Data

RIN Template 5a: Network Data Outage – Tables 1 and 2 lists each individual unplanned and planned outages that occurred in 2012-13 reporting period.

RIN Template 5b: Network Data Outage – Table 1 lists all the feeders in the Essential Energy network and provides the necessary details to determine the feeder reliability metrics in 2012-13 reporting period.

RIN Template 5c: Cause of Outages – Table 1 reports the number of unplanned outages against the list of causes of those outages that occurred in 2012-13 reporting period.

RIN Template 5d: Planned Outage – Table 1 reports SAIDI and SAIFI of planned outages for various regions (Urban, Rural short, Rural long and Whole network) without the excluded events for the 2012-13 reporting period.

The definition of the term used in this table is provided in the Definitions and Interpretations section of the RIN issued by the AER to Essential Energy and in the Appendix A of the STPIS (Nov 2009).

4.3.2 System and Procedures Assessment

Refer to Section 2.2.2 to appreciate the underlying system and procedure involved in producing these data in these RIN tables. In addition, SKM also observed the following:

- Essential Energy has procedures to attempt to correctly notify customers for all planned interruptions. This includes the submission of work plans 28 days prior to the outage so that there is sufficient time to notify customers. Records of customer notifications are kept and can be retrieved for investigation of complaints.

4.3.3 Review Comments

SKM provides the following comments on the information reported in these RIN tables:

- Refer to the opinion stated in Section 2.2.3 as they are applicable here.
- Essential Energy has reported 28,126 instances of unplanned supply interruptions in RIN Template 5a Table 1. This information has been extracted from the reliability database. These unplanned outages correspond to 50,844 switching records. SKM has randomly checked few daily SAIDI and SAIFI metrics against the reliability database records and observed that it is consistently same.
- SKM reviewed the commentary entered in the interruption cause description field in the reliability database extract and found no doubtful description suggesting it was not unplanned outage. However, the same information reported in the RIN Template 5a Table 1 does not match with the reliability database extract because the comments in the RIN has been summarised into higher level and fewer descriptions.
- Essential Energy has reported 15,299 instances of planned supply interruptions in RIN Template 5a Table 2. This information has been extracted from the reliability database. These planned outages correspond to 24,353 switching records. SKM has randomly checked few daily SAIDI and SAIFI metrics against the reliability database records and observed that it is consistently same.
- SKM reviewed the commentary entered in the interruption cause description field in the reliability database extract and found no doubtful description suggesting it was not planned outage. However, the same information reported in the RIN Template 5a Table 2 does not match with the reliability database extract because the comments in the RIN has been summarised into higher level and fewer descriptions.
- The reported SAIFI is not correctly expressed as per the definition in STPIS (Nov 2009), i.e. to be expressed per 0.01 interruptions.
- Essential Energy has reported a total of 1,451 feeders in its network in RIN Template 5b Table 1. The feeder classification against each of the listed feeder is consistent with classification reported in RIN Template 5a Tables 1 and 2.
- The sum of all the average distribution customer number connected to all the listed feeders reported in the RIN Template 5b Table 1 totals to 841,732. SKM notes that this is the distribution customer count at 30 June 2013 and therefore not an average of 2012-13 period. Further, this count includes inactive customer accounts which is inconsistent with the RIN and STPIS (Nov 2009) definition. The total distribution customer number following the definition in RIN and STPIS (Nov 2009) at 1 July 2012 was 799,068 as reported in RIN Template 1a Table 3, and at 30 June 2013 was 812,288 as per the data extracted from the ENERGY billing system. Therefore, the average distribution customer number for the 2012-13 reporting period is 805,678.

- The sum of length of distribution HV overhead lines reported for the listed feeders in RIN Template 5a Table 1 does not equals to the total length of distribution HV overhead lines reported in Template 4 Table 3.
- The maximum MW demand for the feeders has been derived from a mixture of revenue/statistical metering, SCADA, recloser data and field equipment. This data is sourced from different personnel/system from the network performance and reliability group. It is noted that the maximum MW demand has not been reported for all feeders because of unavailability of accurate and/or historic data for these feeders. There are 150 feeders with missing maximum MW demand data.
- The sum of number of unplanned and planned outages reported for the listed feeders in RIN Template 5b Table 1 equals to the total instances of unplanned and planned supply interruptions reported in RIN Template 5a Table 1 and Table 2 respectively.
- Only the SAIFI data (Unplanned outages with and without Excluded Events, and Planned outages) reported in RIN Template 5b Table 1 consistently matches with the same data reported in various other RIN tables. The Customer Minutes Off-Supply (Unplanned outages with and without Excluded Events, and Planned outages) are inconsistent with the RIN definition, because Essential Energy has instead reported SAIDI data which is not what is required to be reported.
- The data reported in RIN Template 5c Table 1 matches with the description and its count reported in RIN Template 5a Table 1.
- The SAIDI and SAIFI data without Excluded Events for Planned outages reported in RIN Template 5d Table 1 consistently matches with the same data reported in various other RIN tables.
- The reported SAIFI data in all the RIN tables is not correctly expressed as per the definition in STPIS (Nov 2009), i.e. to be expressed per 0.01 interruptions.

4.4 Customer service

4.4.1 Reported Data

RIN Template 3: Outcome Customer Service – Table 3 reports the annual metrics against timely provision of services for new connection, timely repair of faulty streetlights, and call centre performance.

The definition of the term used in this table is provided in the Definitions and Interpretations section of the RIN issued by the AER to Essential Energy and in the Appendix A of the STPIS (Nov 2009).

4.4.2 System and Procedures Assessment

Refer to Sections 2.4.2, 2.5.2 and 2.6.2 to appreciate the underlying systems and procedures involved in producing these data in these RIN tables.

4.4.3 Review Comments

SKM provides the following comments on the information reported in these RIN tables:

- Refer to the opinion stated in Sections 2.4.3, 2.5.3 and 2.6.3 as they are applicable here.
- The new connection made in 2012-13 period reported in RIN Template 3 Table 3 does not match with the data reported in RIN Template 4 Table 4 because Template 4 Table 4 reports the difference between active premise numbers at a point in time whereas the other report on the number of new greenfield sites established during the year as mentioned above.
- The average monthly streetlight fault notified to Essential Energy is consistent with the annual streetlight fault notified (i.e. divided by 12 months) reported in Template 1b Table 3. SKM sighted the underlying report generated by WASP validating the average number of days to repair reported in RIN Template 3

Table 3. The data reported for "Not repaired by fixed by date" was sighted in the underlying report generated by WASP for the number of streetlights that took more than 8 days to repair. SKM understands the choice of 8 days threshold is based on present IPART requirement, whereas the STPIS (Nov 2009) requires reporting for 5 days threshold.

- The data reported against the call centre performance metrics is supported by the provided underlying data. Comparing the calculation against the RIN definition, the calls to payment lines and automated interactive services has not been excluded from the reported 228,190 counts of calls to fault line not answered within 30 seconds

4.5 General asset information

4.5.1 Reported Data

RIN Template 4: General Information – Table 3 reports the length of the overhead lines and underground cable for various regions (Urban, Rural short, Rural long and Whole network). This information in this table is broken down into various supply voltage levels.

RIN Template 4: General Information – Table 5 reports the number of distribution and zone substation transformers for various sizes or capacity.

RIN Template 4: General Information – Table 7 reports the total number of distribution and zone substation transformers along with overhead line pole counts.

RIN Template 7: Asset Installation – Table 1 reports various asset groups that forms Essential Energy's network along with its replacement unit cost, standard asset age, total quantities and age profile.

The definition of the term used in this table is provided in the Definitions and Interpretations section of the RIN issued by the AER to Essential Energy and in the Appendix A of the STPIS (Nov 2009).

4.5.2 System and Procedures Assessment

Essential Energy uses its WASP system to report the distribution assets data in these RIN tables. WASP contains asset database with the record of those distribution assets attributes. Essential Energy uses its GIS Smallworld system that hold the asset attributes of overhead lines and underground cables to provide information on Subtransmission lines and cables asset. Further, a spreadsheet register containing the details of zone substation is also used to provide information on zone substation.

The provided asset replacement unit cost is referred from the Essential Energy's 2010 ODRC (Optimised Depreciated Replacement Cost) value, inflated by AER's approved inflation index bring the dollar values to today's term. The standard asset life reported in the RIN Template 7 Table 1 refers to the Treasury guideline from 1998 (updated in 2004) which provides such data for various classes of DNSP assets.

4.5.3 Review Comments

SKM provides the following comments on the information reported in these RIN tables:

- RIN Template 4 Table 5 reports of two transformers in Essential Energy's zone substation which does not have capacity details (MVA) details, whereas there is only one such unknown reported in the RIN Template 7 Table 1 which list information for the same asset. This illustrates that the underlying system, data or reporting process is not consistent internally within Essential Energy.
- According to the data reported in RIN Template 4 Table 5, there are 742 zone substation transformers in Essential Energy's network. This information is in contradiction with the reported total of 655 zone substation transformers in RIN Template 2 Table 2 which list all zone substation transformers with

nameplate (MVA) ratings. Essential Energy notes that the quantity reported in Template 2 Table 2 are the only ones with remote communication setup with ability to provide the demand data.

- SKM did not review the asset standard life, replacement unit cost and the age profile in the information reported in RIN Template 7 Table 1.

~ END OF REPORT ~

REGULATORY INFORMATION NOTICE (RIN) – SCHEDULE 1

1.1(a) Financial template
Provide the information required in the Regulatory Accounting Statements, being the information required in the worksheets in the Microsoft Excel workbook attached at Appendix B.

Please refer to worksheets in Attachment 1, prepared from the Microsoft Excel workbook provided at Appendix B of the Regulatory Information Notice (the Notice).

1.1(b) Non-Financial template
Provide the information required in the Non-Financial Regulatory Templates in the Microsoft Excel workbook attached at Appendix C.

Please refer to worksheets in Attachment 9, prepared from the Microsoft Excel workbook provided at Appendix C of the Notice.

1.1(c)(i) Assumptions and methodologies
Explain, where applicable, the assumptions and methodologies underlying the information provided.

1. Financial Information

The Financial templates are populated in accordance with the Cost Allocation Methodology (CAM) previously approved by the AER. The financial information consists of:

- The data from audited statutory financial statements of Essential Energy for the year ended 30 June 2013.
- The data from the customer billing system of Essential Energy audited by the Auditor-General.

The CAM is applied to the audited trial balance with combinations of general ledger fields grouped to complete the various line items of the Regulatory Information Notice (RIN) template. The CAM also calculates the percentage of financial transactions attributable to the standard control and alternate control services of Essential Energy's distribution business. This information is audited against the CAM and back to the Statutory Accounts by our financial auditor as required in the RIN.

Data is extracted from the customer billing system and interrogated applying mapping tables based on premise and tariff information.

The key systems used to populate the financial templates are:

- Financial Management Information System (FMIS) – PeopleSoft
- Billing System – Peace
- Reporting – Cognos

2. Non-financial Information

Demand

Essential Energy utilised a tool named ENMAC for the management of the network. ENMAC is an integrated network management system with schematic representation of Essential Energy's distribution network down to distribution transformer level that allows real-time management, monitoring and control of the network. ENMAC was updated to Power-on Fusion (POF) another GE product in November 2012. ENMAC/POF is the source for outage data used to report on reliability.

Essential Energy used bulk supply point revenue metering data to determine the maximum co-incident demand at the network level. Revenue metering is used to report maximum co-incident demand at the network level.

Demand "forecasts" for zone substations are reported in accordance with the 2012 forecast in the Electricity System Development Review (ESDR 2008) which was used for Essential Energy's most recent regulatory proposal. The "t+1 forecast" is as per the ESDR 2013.

The demand forecasts are prepared in accordance with Essential Energy's load forecasting methodology which is described in their operational procedure for sub-transmission and distribution network planning criteria and guidelines (CEOP8003).

The actual (raw) maximum demands have been obtained from a number of sources including:

- Revenue/Statistical Metering (65%);
- Network operations SCADA system (20%);
- Recloser data (12%); and
- Other (%3).

Feeder Performance

Essential Energy selects best and worst performing feeders based on SAIDI information from the ENMAC/POF system and the maximum demand for the feeders has been derived from a mixture of revenue/statistical metering, SCADA, recloser data and field equipment. The maximum demand is not reported for all feeders because on availability of accurate data for these feeders.

Operational Procedure: Supply Interruption: Record Creation & Auditing Responsibilities CEOP2104

Reliability, Unplanned Outages and Exclusions

Unplanned outages are managed in ENMAC/POF via the following process:

1) Supply Interruptions Group (SIG) receives call and records the details into the call management system.

2) A network operator will record the outage on the ENMAC/POF spatial map. Highlighting an interrupted customer on the ENMAC/POF spatial map allows the relative position of other reported outages on the network to be considered.

3) Other calls related to the same outage can be combined into an incident and the extent of an outage will be predicted. Network operators can also manually record the extent of an outage. An incident report (IR) is then created to track and record the outage.

   Alternatively, some equipment in the network is monitored by SCADA and faults will be automatically raised in ENMAC/POF and an IR created prior to any calls being logged.

4) The IR is sent to dispatch who will arrange for a crew to attend the incident.

5) The network operator will instruct the crew to restore the network and upon receiving confirmation will perform the switching in ENMAC/POF.

6) ENMAC/POF records the time of each switching event including the initial outage. The start time is deemed to be the time of the first call reporting loss of supply or as per the SCADA system. The restoration times for sections of the network are based on the switching in ENMAC/POF.

7) As ENMAC/POF is a spatial network model the system can determine which customers are connected to each section of the network down to a distribution sub level. ENMAC/POF will

automatically calculate the total customer interruptions and minutes and is able to account for staged restoration of the network.

8) The IR is closed and the operator may include comments or indicate exclusion categories which can be reviewed by the reliability reporting team.

Planned Outages

Planned outages are managed in a very similar way to unplanned outages however the commencement of the outage is initiated by the network operator as opposed to a supply interruption.

Outage data can be retrieved from ENMAC/POF and is then stored in a series of databases from where analysis of the outages is undertaken.

Operational Procedure: Planned Interruption Guidelines CEOP2384
Operational Procedure: Systems Operations: Switching Request and Planned Outage Notification CEOP2056

MED Boundary

The MED boundary is calculated in accordance with the RIN whose methodology is based on IEEE Std. 1366. Also a statistical test is applied to the data set to test whether the natural logarithm of each daily unplanned SAIDI is a normal distribution.

Telephone Answering

Essential Energy has a highly automated call management system which records the statistics of all phone calls received by the call centres. The systems records details including abandoned calls, calls answered within 30 seconds and calls answered outside of 30 seconds. The system only retains details of each individual call for seven days however the total number of each type of call per period is still available through the system for reporting purposes. Reports can be run through these systems which provide statistics about the received calls for a nominated period of time.

Essential Energy has a simple process for extracting the required data from the call management systems by running network skillset performance reports from their symposium web client. The reports generated include the total number of calls, number answered after the threshold and the total number of abandoned calls. Essential Energy cannot measure the number of abandoned calls which were abandoned within 30 seconds and have therefore adopted the AER allowed estimate that 20% of abandoned calls are done so within the threshold. These figures are used to determine:

- Total number of calls – This is the total number of answered calls + 80% of the number of abandoned calls.
- Calls answered within threshold – The number of calls answered within the threshold.
- Percentage of total calls answered within the threshold.

New Connections

New connections are defined as ‘all new connections to the network’ and do not include re-energisation of existing premises. Essential Energy has a process flow document relating to new connections and this was reviewed by our auditors.

On each occasion that a notification of a connection is received by Essential Energy, a check is completed to determine if the premise is an existing premise. Any new premises are added along with the National Metering Identifier (NMI). Essential Energy has extracted a list of new connections which were registered within the regulatory year. This number is reported as the total number of new connections.

SKM reviewed a list of the new connections reported for the year and confirmed the count of new customers. The auditor also viewed the premise details screen for four new connections in Essential Energy’s customer management system and found the process for recording new connections is

based on appropriate information systems, is well documented and appears to be followed correctly by staff.

The number of new connections which were not provided on or before the agreed date has not been reported. This is considered appropriate given that the majority of connections are made by ASPs.

Streetlight Repair

Essential Energy manages all aspects of streetlight repair recording through its asset management system known as WASP. WASP contains information about each streetlight asset known to Essential Energy. When a notification of a defect is received by the streetlight team, an asset is defected and the instruction for repair is initiated. Once repaired the actions taken by field staff are recorded and the defect is completed. Essential Energy then run reports of the database to obtain the information reported in the RIN.

Response to Written Enquiries

Essential Energy uses a Contact Management System (CMS) to manage enquiries. An individual record is generated in CMS for each enquiry/complaint received. The CMS system is then used to assign a responsibility to address the issue and to record communications and actions taken to resolve the contact.

CMS records include the following information which is relevant to the process of reporting in the RIN template:

- *Details* – Details of the customer.
- *How Contacted* - Method by which they made contact.
- *Raised* - Is the time when the enquiry was received which is either when a written letter was received by Essential Energy or when an enquiry is lodged online.
- *Type* – Defines whether the contact is an enquiry or a complaint. An enquiry requires only a response whereas a complaint will require some form or rectification.
- *Category / Subcategory* – Records the subject of the inquiry in two fields.
- *Resolution Date* – The time at which an operator deems the issue has been resolved. This featured was added following the recommendations of the previous audit to capture that a response to an enquiry has been made while the record can remain open until agreed action is complete. This is used as the response date for the purpose of RIN reporting.
- *Completion Date* – Is the time at which a record is closed and no further action is required.
- The CMS system will also store copies of any correspondence with the customer.

Records for the reporting period can be extracted from CMS into a spreadsheet for analysis using an automated reporting tool developed in the CMS database. Essential Energy then undertakes a series of manual filtering and vetting processes to eliminate non-relevant records. These filters are:

- Enquiries not related to the network are discounted by filtering through the category and subcategory fields. Essential energy receives numerous complaints which are unrelated to direct control services. This includes enquiries related to Gas, Water and Retail aspects of the business.

- Enquiries not from Essential Energy Customers: Essential Energy receives enquires from a variety of sources who are not customers. Examples of this type of enquiry include businesses who wish to gain work with Essential Energy and students who are conducting projects for which they require some information.

- Enquiries that are internally generated as a means of instigating field work.

- For the remaining records the number responded to within 5 days is determined using Excel functions based on the recorded “Raised Date” and “Resolution Date” counting only business days.

Notification of Planned Interruptions

Planned interruptions are managed through ENMAC in a similar way to unplanned outages.

Essential Energy has procedures to ensure that an attempt to notify customers is made for all planned interruptions. This includes the submission of work plans 28 days prior to ensure that there is sufficient time to notify customers. Records of customer notifications are kept and can be retrieved for investigation of complaints.

There are a number of situations which can occur such that a customer notification is not successfully delivered. Some of those are:

- When local staff delivering notifications miss a property.
- A customer is incorrectly mapped within ENMAC and not known to be connected to the affected network segment.
- Customer details are not available as the retailer which they have an account with has not provided contact details.

EBSS

Essential Energy has an EBSS procedure which was reviewed by our auditors and ensure that operating expenditure for EBSS purposes is accurately reported.

DMIS – DMIA Annual Report

Essential Energy uses the FMIS to record expenses associated with demand management projects which qualify for the DMIA. These include both internal expenses such as employee labour costs and fleet, as well as external expenses such as payments to equipment manufacturers, capital costs, and other direct project costs for which Essential Energy is provided an invoice by a third party.

Systems used for non-financial information

- System monitoring – ENMAC
- Telephone Answering – Symposium
- Streetlight Repair – WASP
- Financial Management – PeopleSoft
- Asset Management System - Smallworld

1.1(c)(ii) Instances
Explain, where applicable, each instance where the information cannot be provided or is not provided in full.

Financial template – Sch 5. Capex – Table 7. Gifted Assets by Asset Class – Forecast column
Forecast figures for gifted assets were not prepared for the current determination period.

Financial template – Sch 5. Capex – Table 8. Disposals by Asset Class – Forecast column
Forecast figures for disposals were not prepared for the current determination period.

Financial template – Sch 6. Capex overheads – Table 1. Standard Control Service by Reason – Forecast column
Essential Energy did not differentiate between direct costs and overheads when preparing its capex forecast for the current determination period.

Financial template – Sch 9. Maintenance overheads – Table 1. Network maintenance overheads by category – Forecast column
Essential Energy did not differentiate between direct costs and overheads when preparing its opex (including maintenance) forecast for the current determination period.

Financial template – Sch 10. Operating costs – Table 5. non-recurrent network operating costs

There were no items which made up more than 5 per cent of the total standard control or alternative control network operating costs.

Financial template – Sch 11. Operating overheads – Table 1. Overhead costs – network operation – Forecast column

Essential Energy did not differentiate between direct costs and overheads when preparing its opex forecast for the current determination period.

Financial template – Sch 12. Cost categories – Table 1. Operating and maintenance costs by category – Forecast columns

Essential Energy did not differentiate between the requested cost categories when preparing its opex (including maintenance) forecast for the current determination period.

Financial template – Sch 12. Cost categories – Table 2. Explanation of material difference by category

Essential Energy cannot provide information of material differences as forecast figures were not available in these categories (see previous).

Non-Financial template – Sch 1b. STPIS Customer Service – Table 2. New connections

Essential Energy was unable to report on number of new connections made not provided on or before the agreed date, or percentage thereof, as this work is performed by Accredited Service Providers.

Non-Financial template – Sch 1c. STPIS Daily Performance – Table 1. Daily performance data (Unplanned SAIDI, Unplanned SAIFI)

Data relating to excluded events was not available.

Non-Financial template – Sch 1f. STPIS GSL – Table 1. Guaranteed service levels - AER GSL scheme

This table was not completed as the AER's GSL scheme did not apply during the regulatory year.

Non-Financial template – Sch 3. Outcomes customer service – Table 3. Customer service

Essential Energy was unable to report on number of new connections made not provided on or before the agreed date, or percentage thereof, as this work is performed by Accredited Service Providers.

Non-Financial template – Sch 4. General information – Table 6. Unmetered supply points

Essential Energy was unable to provide the feeder type splits for this information.

1.1(d) Movements between Accounting Statements

Provide a Microsoft Excel workbook or other information that explains all movements between the Audited Statutory Accounts and the Regulatory Accounting Statements.

The Regulatory Accounting Statements reconcile back to the Audited Statutory Accounts.

The Financial templates are populated in accordance with the Cost Allocation Methodology (CAM) previously approved by the AER. The financial information consists of:

- The data from audited statutory financial statements of Essential Energy for the year ended 30 June 2013.

- The data from the customer billing system of Essential Energy audited by the Auditor-General.

The CAM is applied to the audited trial balance with combinations of general ledger fields grouped to complete the various line items of the Regulatory Information Notice (RIN) template. The CAM also calculates the percentage of financial transactions attributable to the standard control and alternate control services of Essential Energy's distribution business. This information is audited against the CAM and back to the Statutory Accounts by our financial auditor as required in the RIN.

1.1(e) Capitalisation Policy
Provide the Capitalisation Policy for the Relevant Regulatory Year.

Please refer to Attachment 8.

1.1(f) Compliance with CAM
Provide the statement of policy/s for determining the allocation of overheads in accordance with the Cost Allocation Method *for the Relevant Regulatory Year and the Previous Regulatory Year.*

Essential Energy apply the approved CAM to the trial balance. This is done manually and agreed back to the statutory accounts and verified by independent auditors.

There is no actual statement of policy for this procedure.

1.2 and 1.3 Identify material differences and explanations
For each of the following items, identify each Material difference between that reported in the Regulatory Accounting Statements and that provided for in the 2009-14 Distribution Determination for the Relevant Regulatory Year, and explain the reasons for any underlying operational activities or drivers that caused each Material difference.

(a) total actual revenue and total forecast revenue – the allowance for the year was $1,526.5m while the actuals are $1,485.6m (this includes income from Miscellaneous and Monopoly Fees). Although overall kilowatt hour consumption was higher than forecast the proportion used by small customers on higher rates was much less than forecast and this has led to reduced revenue.
(b) total actual Operating Expenditure and total forecast Operating Expenditure – Material differences and corresponding explanations have been provided in Table 2 Explanation of material difference in Sheet 10 Operating costs of the RIN financial template.
(c) total actual Maintenance Expenditure and total forecast Maintenance Expenditure – Material differences and corresponding explanations have been provided in Table 2 Explanation of material difference in Sheet 8 Maintenance of the RIN financial template.
(d) total actual Capital Expenditure and total forecast Capital Expenditure - Material differences and corresponding explanations have been provided in Table 2 Material Difference Explanation in Sheet 5 Capex of the RIN financial template.

1.4 Explain procedures and processes
Explain the procedures and processes used by Essential Energy to ensure that the distribution services *have been classified as determined in the 2009-14 Distribution Determination.*

Combinations of general ledger fields are used to identify the classification of services against financial transactions.

Each year a review is undertaken to identify changes to the business as a whole and specific general ledger fields, to ensure the fields have retained integrity in relation to business operations. This is included in the financial audit.

1.5 Explain procedures and processes

Explain the procedures and processes used by Essential Energy to ensure that the negotiated distribution service criteria*, as set out in the 2009-14 Distribution Determination, have been applied.*

Essential Energy does not have any negotiated services.

1.6 Negative change events

Describe the process the DNSP has in place to identify negative change events under clause 6.6.1(f) of the NER and the threshold of materiality applied by Essential Energy to these events.

Essential Energy's regulatory and communications teams receive notification from all regulatory and government bodies of proposed or actual changes to any Rules, Regulations or Legislation that may impact the electricity sector. These are maintained in a register and assigned to the appropriate team for review and notification to the business of any new or changed requirements in relation to Essential Energy's distribution business. This register is reviewed on a weekly basis by the regulatory team.

In addition a monthly meeting is held between the Regulatory and Finance and Risk teams to ensure that any changes to accounting standards, reporting or taxation laws are communicated to the Regulatory team.

Through a regular review of this register and liaison with other areas of the business, Essential Energy can confirm that none of the negative pass through events listed in 6.6.1(f) of the NER or the 2009-2014 NSW Distribution Determination have occurred during the 2012/13 year that would have resulted in a 1 per cent of revenue (approximately $15m) change in the cost of providing direct control services. These events are listed below.

NER 6.6.1(f)

A negative change event for a *Distribution Network Service Provider or* a *pass through event* that materially reduces the costs of providing *direct control services*:

Any of the following is a pass through event:

- a regulatory change event;
- a service standard event;
- a tax change event; or
- a terrorism event.

In addition the following were approved as pass through events in the *2009-2014 NSW Distribution Determination:*

- Retail project event;
- Smart meter event;
- Emissions trading scheme event;
- Aviation hazard event; or
- General nominated pass through event.

2.1(a) Cost allocation to the regulated distribution business

Identify each item in the Regulatory Accounting Statements that is not allocated on a directly attributable basis but is allocated on a causation basis to the distribution business*.*

These items are listed in Sheet 15 Overheads allocation of the RIN financial template.

2.1(b) Cost allocation to the regulated distribution business

Identify each item in the Regulatory Accounting Statements that is not allocated on a directly attributable basis and cannot be allocated on a causation basis to the distribution business*.*

These items are any overheads which have the following allocators applied to them:

- Direct Labour
- Full Time Equivalents (FTEs)
- Fleet Usage

These are included in the figures reported in Sheet 15, referred to in 2.1(a).

3.1(a) Cost allocation to service segments
Identify each item in the Regulatory Accounting Statements that is not allocated on a directly attributable basis but is allocated on a causation basis from the distribution *business to a service segment.*

The same allocation methodology is used across all service segments of the business, with all direct costs attracting overheads, regardless of the segment these costs relate to.

3.1(b) Cost allocation to service segments
Identify each item in the Regulatory Accounting Statements that is not allocated on a directly attributable basis and cannot be allocated on a causation basis from the distribution *business to a service segment.*

The same allocation methodology is used across all service segments of the business, with all direct costs attracting overheads, regardless of the segment these costs relate to.

4.1 Related party transactions
Identify each Related Party with which a transaction has been conducted.

Essential Energy did not enter into any related party transactions.

5.1 Efficiency Benefit Sharing Scheme (EBSS)
Identify all changes between the Capitalisation Policy for the Relevant Regulatory Year and Previous Regulatory Year.

There were no changes to the capitalisation policy.

6.1 Demand Management Incentive Scheme (DMIS)
In respect of the Demand Management Innovation Allowance, provide details of each demand management project or program for which approval is sought.

Please refer to Attachment 2.

7.1 D-Factor
In respect of the D-Factor, provide details of each non-tariff demand management measure undertaken by Essential Energy during the Relevant Regulatory Year.

Essential Energy did not participate in a D-Factor scheme.

8.1 Asset replacement volumes
With respect to the asset replacement volumes reported on Asset Installation sheet (sheet 7) of the Non-Financial template, for each asset identify the proportion of total replacements that were a like-for-like replacement, where the new asset provided an equivalent level of service as the asset being replaced. If the proportion of like-for-like replacements is estimated, please provide details of the basis for estimation.

Essential Energy's systems do not provide this level of detail.

9.1(a) Reconciliation of regulatory asset base

Provide information that reconciles the incremental change in the Property, Plant and Equipment category within the Audited Statutory Accounts (that is, the change in the closing values of this category of the Balance Sheet between the Previous Regulatory Year and the Relevant Regulatory Year).

The following is an excerpt from Essential Energy's 2013 Annual Report.

Property, plant and equipment

	Note	Consolidated and Corporation			
		Land and buildings $M	System assets $M	Plant and equipment $M	Total $M
At 1 July 2012- fair value					
At cost		209.6	8,836.3	786.9	9,832.8
Accumulated depreciation and impairment		(12.9)	(2,642.7)	(433.3)	(3,088.9)
Net carrying amount		**196.7**	**6,193.6**	**353.6**	**6,743.9**
At 30 June 2013 - fair value					
At cost		212.4	9,525.4	790.7	10,528.5
Accumulated depreciation and impairment		(16.6)	(2,911.2)	(483.8)	(3,411.6)
Net carrying amount		**195.8**	**6,614.2**	**306.9**	**7,116.9**
Year ended 30 June 2013					
Net carrying amount at start of year		**196.7**	**6,193.6**	**353.6**	**6,743.9**
Additions		4.9	690.3	27.6	722.8
Disposals		(1.7)	(1.0)	(9.8)	(12.5)
Depreciation		(4.1)	(244.6)	(64.5)	(313.2)
Impairment		-	(24.1)	-	(24.1)
Net carrying amount at end of year		**195.8**	**6,614.2**	**306.9**	**7,116.9**

Please note that these figures do not relate to the regulatory asset base, but rather to Essential Energy's audited statutory accounts.

9.1(b) Reconciliation of regulatory asset base
Provide information that reconciles the incremental change in the closing values for the Regulatory Asset Base between the Previous Regulatory Year and the Relevant Regulatory Year.

The Regulatory Asset Base (RAB) is maintained independently from the statutory accounts. Each year the amount of standard control capital expenditure as reported in the annual RIN template is added to the values in the RAB approved by the AER and deprecation is calculated to provide closing balance of standard control assets. This information is provided to the AER in the form of the Roll Forward Model provided as part of the five year regulatory submission.

10.1(a) Group corporate structure chart
Provide charts that set out the group corporate structure of which Essential Energy is a part.

Figure 1. Umbrella Agreement

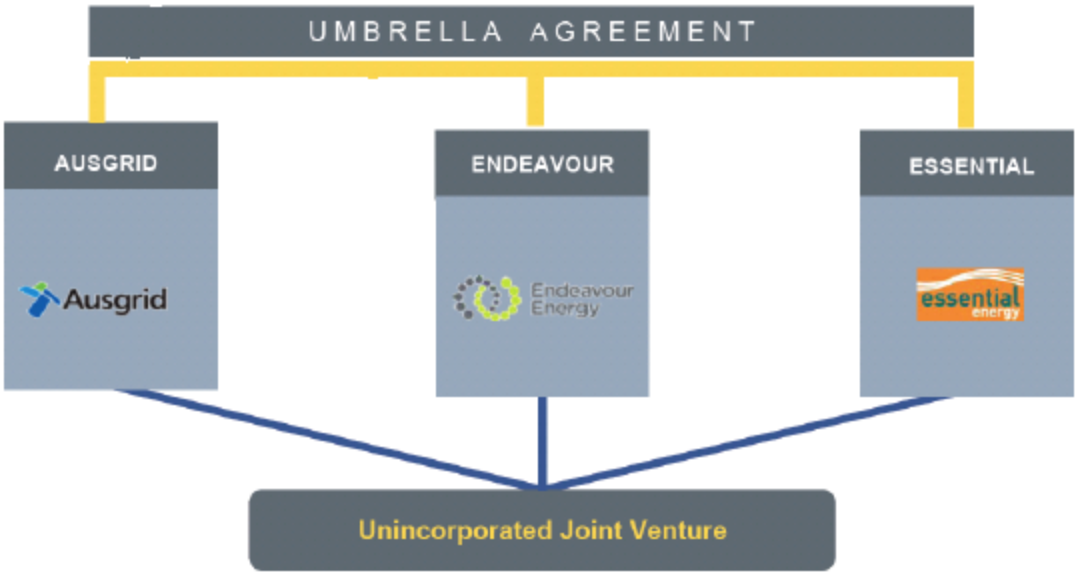
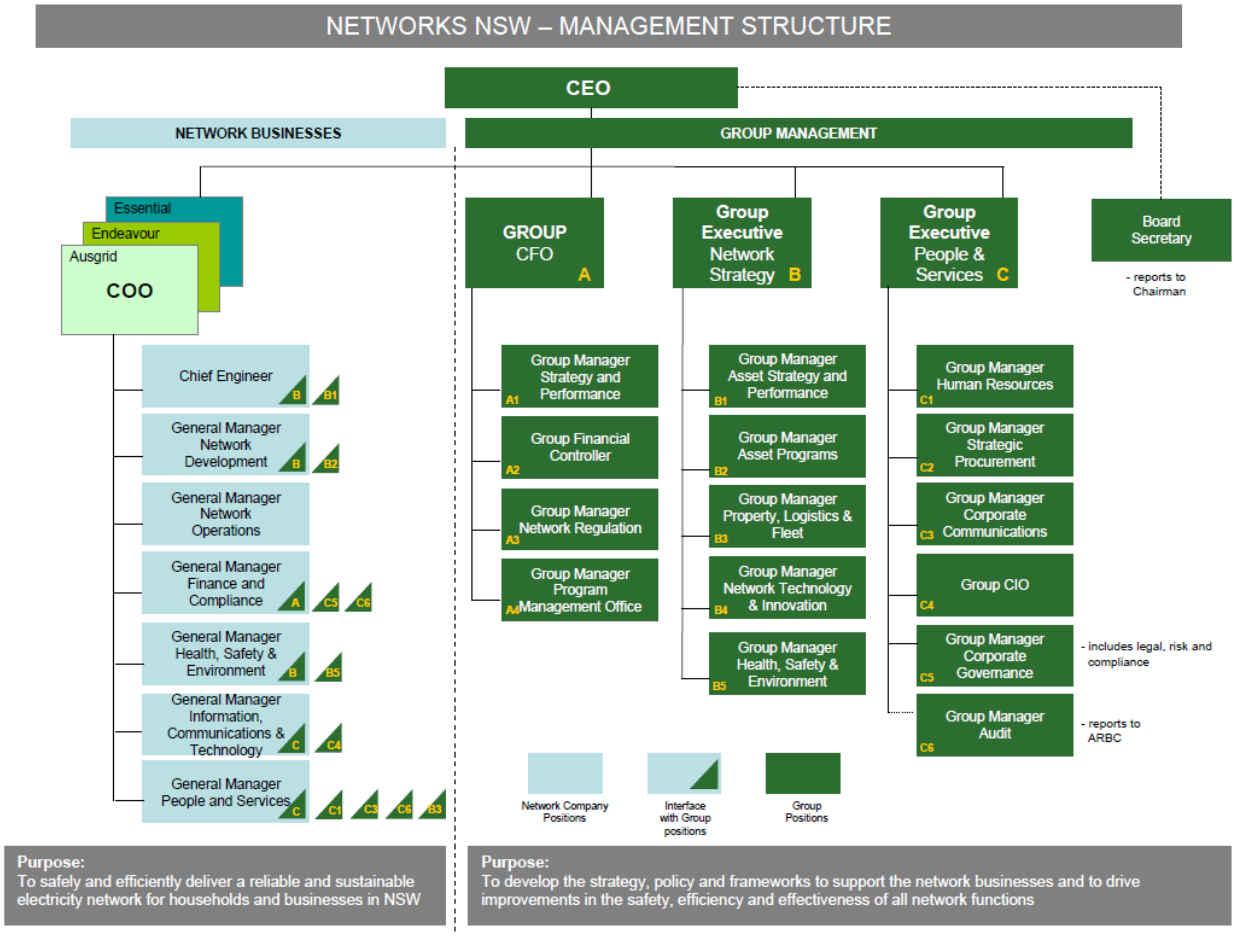


Figure 2. Organisation structure of Networks NSW



10.1(b) Essential Energy organisational structure chart
Provide a chart that sets out the organisational structure of Essential Energy.

	Essential Energy Structure						
ELG	Chief operating Officer						
General Managers	Chief Engineer	GM Network Development	GM Network Operations	GM Health Safety & Environment	GM ICT	GM Finance & Compliance	GM People & Services
Branches (Functions)	• Manager Electrical Safety & Authorisations • Manager Primary Systems • Manager Secondary System • Manager Asset & Network Planning • Manager Network Data & Performance • Manager NBN • Manager Metering Strategy	• Manager Maintenance • Manager Capital Programs • Manager Vegetation Programs • Manager Major Projects • Manager Portfolio Management Office • Manager Project Development • Manager Streetlighting	• Manager System Control • Manager Operational Performance • Manager Network Connections • Manager Regional Operations • Manager Transmission Services/Zone Substations • Manager Water Management • Manager Metering Services • Manager Meter Reading	• Manager HSE Management Systems &Reporting • Manager Safety & Environmental Services • Manager Health & Injury Managerment • Manager HSE Assurance & Improvements	• Manager Governance,Strategy & Sourcing • Manager Network Systems • Manager Business & Support Systems • Manager Infrastructure Systems • Manager Service Management	• General Counsel • Financial Controller • Manager Finance Transactions & Services • Manager Commercial & Decision Support • Manager Governance Risk & Compliance • Manager Network Regulation • Manager PMO & Corporate Planning	• Manager internal Audit • Manager Procurement & Logistics • Manager Property • Manager Fleet • Manager Human Resources Operations • Manager Workplace Relations • Manager Corporate Affairs • Manager Learning & Development • Manager Customer Operations • Manager Retail Transitions

11.1(a) Financial audit report
Provide an Audit Report in the form of a Special Purpose Financial Report in accordance with the requirements set out at Appendix E of this Notice.

Please refer to Attachment 4 from Forsyths Chartered Accountants.

11.1(b) Non-Financial audit report
Provide an Audit Report in the form of an Audit Report (for Non-Financial Regulatory Templates information) in accordance with the requirements set out at Appendix E of this Notice.

Please refer to Attachment 5 from SKM.

12.1 Board resolution
Provide an extract from the board minutes or a resolution agreed to at an Essential Energy board meeting that confirms that, to the best of the Board's information, knowledge and belief, certain information provided to the AER is true and fair.

Please refer to Attachment 7.

Resolution of the Board of Essential Energy
AER Regulatory Information Notice 2012/13

In relation to the AER Regulatory Information Notice for 2012/13, the Board of Essential Energy resolved that:

1. to the best of their information, knowledge and belief the financial information for 2012/13 is true and fair; and
2. to the best of their information, knowledge and belief the information provided with respect to the service target performance incentive scheme, demand information and asset installation is true and fair.

Resolution Dated Wednesday 27 November 2013

Lisa Maffina
Board Secretary
On Behalf of the Board of Essential Energy

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Operational Procedure: Asset: Capitalisation

CEOP2416

Before you begin …

1 CHECK that this printed document is the most recent version before you use it

- The online version of this document is the current version.

2 DO NOT unlawfully disclose any restricted information in this document

- To see how the law applies to you:
  - Employee: Read your contract of employment with Essential Energy
  - Contractor: Read your contract of engagement with Essential Energy
  - Sub-contractor: Read your contract with the contractor engaged by us
  - Accredited Service Providers: comply with Essential Energy policies, state acts and regulations.

Summary

The Asset Capitalisation policy aims to:

- ACHIEVE a consistent interpretation of capital expenditure across all areas of Essential Energy
- ALIGN the accounting for capital expenditures for both management decision making (Commercial Accounting) and external financial reporting (Financial Accounting)
- MEET the requirements of NSW Treasury's Guidelines for Capitalisation of Expenditure in the NSW Public Sector (TPP 06-6), Australian equivalents to International Financial Reporting Standards (AIFRS), and Urgent Issues Group (UIG) Abstracts.

Positions and Responsibilities

Key positions	Responsibilities
Finance Team	All Sections
Executive Management, Regional General Managers, General Managers, Group Managers, Area Managers, Business Performance Managers, Team Leaders and Work Schedulers, Purchase Requisitioners	4

Contacts

Position	Extension number
Group Manager – Financial Accounting & Treasury	8230
Senior Financial Accountant – Capitalised Assets	8646

CONTENTS PAGE

1 INTRODUCTION

The objectives of this policy are:

- ACHIEVE a consistent interpretation of capital expenditure across all areas of Essential Energy
- ALIGN the accounting for capital expenditures for both management decision making (Commercial Accounting) and external financial reporting (Financial Accounting); and
- MEET the requirements of NSW Treasury's Guidelines for Capitalisation of Expenditure in the NSW Public Sector (TPP 06-6), Australian equivalents to International Financial Reporting Standards (AIFRS), and Urgent Issues Group (UIG) Abstracts.

The policy applies to all areas of Essential Energy and is effective from 1 July 2009. This policy should be read in conjunction with other Essential Energy policies, in particular:

- CEOP2008 - Network: Capital Expenditure
- CEOP2191 – Corporate Finance: Business Case
- CEOP8019 - Networks: Capital Contributions
- CEOP8018 – Networks: Asset Management
- CEOP2133 – Disposal: Management of Unserviceable Distribution Transformers
- CEOP2438 – Procurement: Corporate Procurement.

This policy does not address:

- Assets or maintenance in relation to Australian taxation laws
- Allocation of overheads to capital projects.

2 WHY THESE INSTRUCTIONS ARE IMPORTANT

This document is designed to ensure consistency and create one point of reference for the treatment of Capital expenditure in Essential Energy.

3 CHALLENGES

- Provide consistent interpretation of capital expenditure across all areas of Essential Energy
- Align the accounting for capital expenditures for both management decision making (Commercial Accounting) and external financial reporting (Financial Accounting)
- Ensure we adhere to the NSW Treasury's Guidelines for Capitalisation of Expenditure in the NSW Public Sector (TPP 06-6), Australian equivalents to International Financial Reporting Standards (AIFRS), and Urgent Issues Group (UIG) Abstracts.

4 THE PROCEDURES

Executive Management, Regional General Managers, General Managers, Group Managers, Area Managers, Business Performance Managers, Team Leaders and Work Schedulers, Purchase Requisitioners

4.1 Capitalisation Threshold

Expenses can be classified as either operating or capital expenditure. The classification of the expenditure is based on whether future economic benefits will flow to the entity as a result of the expenditure (Refer to **Section 4.4**). Once the classification of the expense has been determined as capital or operating, the next step is to identify whether the type of expense relates to Network assets or Non-Network assets.

Essential Energy has set a capitalisation threshold of $600 for Non-Network assets. This means that all non-Network asset expenditure in excess of **$600** are to be treated as capital as they are expected to provide future economic benefits for more than one financial year.

When applying the capitalisation threshold the costs of the assets or parts of an asset that form part of a network (eg computer system and office furniture) should be aggregated together. The dollar value by itself does not indicate the nature of the expenditure**. Please note if the dollar value of the group of assets is greater than $600, then a project number must be assigned to the expenditure**.

Non-Network asset expenditure below the capitalisation threshold are expensed.

The Capitalisation threshold does not apply to Network assets. If the asset expenditure relates to the Network or Network assets, then review of the criteria as set out in **section 4.4** of this policy must be undertaken to determine whether the expense is operating or capital.

4.2 Asset Definition

An 'Asset' is defined as a resource controlled by an entity as a result of past events and from which future economic benefits are expected to flow to the entity.

Essential Energy assets are defined as either complex or component assets. For example:

The electricity network is a complex asset. The component assets to the network include substations, HV lines, LV lines and metering. Each of these component assets can be broken down into further component assets (e.g. feeders, poles, wires, and switchgear).

A component asset has a useful life that is materially different than its complex asset. The assessment of whether expenditure is capital or maintenance (i.e. operating expenditure) is performed at the **component asset** level where the useful life of the asset is materially different to the complex asset. For example:

A pole and its assemblies is a component asset of a complex asset being a feeder. The useful life of a pole is generally shorter than the useful life of the entire line. Asset related expenditure is assessed at the component asset level. In consideration of Essential Energy's business processes and the monitoring of business performance, a more reliable unit of measurement when making Network capital expenditure decisions is the key component asset level eg. Poles, Switchgear, Transformers, Reclosers and Regulators and Conductors.

4.3 Asset Recognition

Assets are initially measured at cost being the amount of cash or cash equivalent paid or the fair value of other consideration given to acquire the asset at the time of its acquisition. The cost of a new asset purchase comprises:

(a) its **purchase price**, including **import duties** and **non-refundable purchase taxes**, after deducting trade discounts and rebates

(b) any **costs directly attributable** to brining the asset to the location and condition necessary for it to be capable of operating in the manner intended by management; and

(c) the initial estimate of the **costs of dismantling** and **removing** the item and restoring the site on which it is located.

Examples of **directly attributable** costs are:

- Costs of employee benefits arising directly from the construction or acquisition of the item of property, plant and equipment
- Costs of site preparation
- Initial delivery and handling costs
- Installation and assembly costs
- Costs of testing whether the asset is functioning properly
- Professional fees.

4.3.1 Assets constructed for own use

Assets that are constructed by Essential Energy (using employees, third party contractors, or a combination of both) are capitalised.

These assets are typically network related, but can include the development of IT assets (e.g. computer software).

The cost of these assets may include:

- Directly purchased physical assets and associated incidental costs
- Labour and supervision costs up to stage when asset is ready for use in location and condition intended by management
- Costs of design and technical assistance
- Internal and external plant hire costs
- Transfers from inventories
- Directly attributable overheads up to stage when asset is ready for use in location and condition intended by management.

4.3.2 Asset Replacement

All expenditure relating to the replacement of an asset is **capitalised** to the extent that the asset:

(a) has reached the end of its useful life; or

(b) has not reached the end of its useful life but the replacement will result in an **increase** or **improvement** to the asset's current:

- Service capacity
- Service quality; or

- Useful life.

This is determined at the component asset level. For example:

The electricity network (complex asset) will probably never be replaced in its entirety. Replacement would take place at the lower component level being the poles and wires, etc.

Specific examples of asset replacement that are to be capitalised include:

- Pole replacement (including ancillary assemblies)
- Service cable replacement
- Replacement of street lighting fittings
- Air break switch replacement.

Refer to further examples in **section 4.9** of this policy. The examples above are capitalised to the extent that the asset is at the end of its useful life or that the replacement will result in an increase in service capacity, service quality, or useful life (where the asset has not reached the end of its useful life).

4.3.3 Asset Enhancement

Asset related expenditure is capitalised when and only when there is an **increase** or **improvement** to a component asset's current:

- Service capacity
- Service quality; or
- Useful life.

Asset enhancement includes **Augmentation** and **Refurbishment**. Examples of asset enhancement that are capitalised include:

- Converting an old undersized overhead conductor to a new larger capacity overhead or underground feeder
- Refurbishment of distribution transformers (including refurbishment of earthing systems)
- Modification, improvement or upgrading of the functionality of an existing IT asset.

Refer to further examples in **section 4.9** of this policy.

Examples of asset related expenditure that would not be classified as asset enhancement, and is therefore operating expenditure includes:

- Aesthetic improvements or beautification projects (e.g. painting)
- General Defects i.e. replacing only the cross arms on the pole. If defect expenditure included the removal of old pole, insulators, cross arms and reconductoring results in asset enhancement then expenditure is capital.

The **refurbishment of unserviceable distribution transformers** is subject to specific treatment as described in CEOP2133 – Management of Unserviceable Distribution Transformers.

4.3.4 Gifted Assets

The recognition and measurement of gifted assets (i.e. capital contributions) is covered in CEOP8019: Procedure Policy - Capital Contributions.

4.3.5 Training

In accordance with accounting standards, related staff training costs is **not** to be included as a cost of an item of property, plant and equipment.

4.4 Maintenance

Maintenance expenditure is not capitalised. It is treated as an expense for accounting purposes. Maintenance expenditure will normally have the following characteristics:

- Periodic, regular, and on-going
- Required to ensure asset remains operational
- Required to ensure the achievement of the asset's pre-determined service capacity and quality; and
- Required to achieve the asset's pre-determined useful life (i.e. there is no increase to the asset's original useful life).

Examples of maintenance expenditure include:

- Work to rectify a breakdown (i.e. forced maintenance)
- General defects, particularly in relation to "fault emergency"
- Ad hoc painting of a building
- Electrical and plumbing repairs
- Pole ground line inspection and treatment
- Clearing of vegetation under lines (e.g. tree clearing and weed control)
- Replacement of "consumable items" (e.g. globes, starters, diffusers, and gaskets) in street lights
- Filtering or changing oil in a power transformer in a zone substation.

Refer to further examples in **section 4.9** of this policy.

4.4.1 Major Periodic Maintenance (MPM)

MPM can either fit the definition of routine type maintenance, which is expensed, or represent the replacement of separately identifiable asset components, which is capitalised. To ascertain the correct accounting treatment, each case must be assessed separately. For example:

All of Essential Energy's feeders are subjected to a Reliability Centred Maintenance (RCM) assessment every 4.5 years, on a cyclical basis. If the nature of the work falls under the definition of asset enhancement or asset replacement (in accordance with **section 4.4** of this policy) the expenditure should be **capitalised**. In this case, the work is separately identified as a component asset. If the work is purely maintenance (in accordance with this section of the policy) the work is treated as an **expense**.

4.5 Information Technology Assets (IT Assets)

All IT asset expenditure, whether expended for operational use, as part of R&D projects, or for any other purpose will be subject to the capitalisation tests described in this policy.

4.5.1 Research Phase of Internally Generated Intangible Assets

No intangible asset arising from research (or from the research phase of an internal project) is capitalised. Expenditure on research (or on the research phase of an internal project) is operating expenditure when it is incurred.

4.6 Spares for Plant and Equipment

An assessment is required to be made, prior to recognition, as to whether a spare part is considered major or not.

Spare parts and servicing equipment are usually carried as inventory and recognised in profit and loss as consumed. However major spare parts and stand-by equipment qualify as property, plant and equipment where they are expected to be used during more than one period.

Spare parts that are for a particular asset, or class of assets, and which would become redundant if that asset or class was retired or discontinued, are to be included in the cost of the asset or class to which the asset relates. The depreciable amount of spares must be allocated over the useful life of the asset or the class. This is because spares that can be used only in connection with a particular non-current asset do not have useful lives of their own.

Spares are distinguished from separate components of an asset that have their own useful lives. Spares can also be distinguished from stores and supplies that would generally be consumed on an ongoing basis and are disclosed as inventories.

4.7 Recording of Assets

4.7.1 Work in Progress (WIP) - Projects

Assets that are recorded under 'Project' numbers are normally Network assets. However, non-network assets may also be recorded under a project number where the aggregate cost of the expenditure is greater than $600.

When expenditure is incurred on a project asset, the asset will be initially recorded in an appropriate WIP ledger account. This is the process of capitalisation. WIP is included in the Property, Plant and Equipment disclosure in the Balance Sheet and is disclosed separately in the notes to the financial statements.

4.7.2 Asset Class

When all acquisition costs have been recorded and the asset is first put to use or held ready for use, the carrying value of the asset will be moved from WIP to an appropriate asset class and recorded in the asset register. At this time, depreciation of the asset begins (subject to Depreciation Conventions).

In the case of a complex asset that requires installation in successive stages, it will be deemed to be ready for use after installation has been completed to a stage where service or saleable product can be obtained.

4.7.3 Depreciation

The depreciation method used shall reflect the pattern in which the asset's future economic benefits are expected to be consumed by the entity.

The depreciation method applied to an asset shall be reviewed at least at the end of each annual reporting period and, if there has been a significant change in the expected pattern of consumption of the future economic benefits embodied in the asset, the method shall be changed to reflect the changed pattern.

Refer to **section 4.10** for Essential Energy's depreciation rates.

4.7.4 Purchasing – 'Non- Project' Assets

Assets that are purchased through the purchasing module are non-network assets.

When expenditure is incurred on a non-project asset through the PeopleSoft purchasing module, the asset will initially be recorded in an appropriate capital clearing account and subsequently added to fixed asset register via an automated asset addition process. The purchase category and associated asset profile chosen will determine the depreciation method.

4.8 Capitalisation Checklist

Cost Item Description	Capitalise	
	Yes	No
New Asset Purchase		
Buildings	✓	
Communication bearer systems	✓	
Communications	✓	
Computer hardware – laptop	✓	
Concrete pole line	✓	
Customer meter	✓	
Fleet and fleet (heavy)	✓	
Furniture and fittings	✓	
Gas	✓	
Generation	✓	
Generation switchyard	✓	
High voltage powerline purchase	✓	
Individual assets costing less than $600		×
IT hardware	✓	
IT software	✓	
Land	✓	
Leasehold improvements	✓	
Motor vehicle	✓	
Office equipment purchase greater than $600	✓	
Other line	✓	
Other substation	✓	
Other transformer	✓	
Overhead line	✓	
Pole substation	✓	

Cost Item Description	Capitalise	
	Yes	No
Pole transformer	✓	
Powerline purchase	✓	
Radio equipment/mobile phones	✓	
SCADA	✓	
Steel pole line	✓	
Street lighting overhead	✓	
Street lighting underground	✓	
Sub transmission substation	✓	
Substation, transformers and transformer bays purchases	✓	
SWER line	✓	
Telephone installations	✓	
Tools and tests equipment	✓	
Tower line	✓	
Transformers	✓	
Underground cable	✓	
Easement purchase	✓	
Zone substation purchase	✓	
Asset Constructed for Own Use		
Costs of design and technical assistance	✓	
Directly attributable overheads	✓	
Directly purchased physical assets and associated incidental costs	✓	
Internal and external plant hire costs	✓	
Labour and supervision costs	✓	
Transfers from inventories	✓	
Asset Replacement		
Air break switch replacement	✓	
Conductor replacement	✓	
Cross arm and insulator replacement (when completed as part of a work pack)	✓	
Feeder circuit breaker replacement	✓	
HV switching station replacement	✓	
Pole replacement (including ancillary assemblies) plus nailing	✓	
Power transformer replacement in zone substation	✓	
Protection relay replacement	✓	
Replacement of full street lighting assembly (i.e. not just consumables)	✓	

Cost Item Description	Capitalise	
	Yes	No
Service cable replacement	✓	
Transformer replacement	✓	
Voltage regulator replacement	✓	
Zone substation fence replacement	✓	
Asset Enhancement		
Aesthetic improvements or beautification projects (e.g. painting)		×
Balancing loads on feeders resulting in improved voltage balance and tighter control of voltage received by customers (improved service quality)	✓	
Converting an old, undersized overhead conductor to a new, larger capacity overhead or underground feeder	✓	
Installation of power factor correction units (decreases load on networks, decreases losses and increases and improves capacity of supply and quality of voltage levels received by customers)	✓	
Major upgrade and expansion of zone substation	✓	
Measurable quality improvement (e.g. health or safety improvements)	✓	
Modification, improvement or upgrading of the functionality of an existing IT asset	✓	
Rectification of conductor defects (i.e. completed under forced maintenance conditions)		×
Rectification of pole and pole attachment defects i.e. completed under forced maintenance conditions)		×
Refurbishment	✓	
Refurbishment of distribution transformers (including refurbishment of earthing systems)	✓	
Upgrading an old re-closer to a more modern device	✓	
Upgrading capacity of feeder exit cables out of zone substations	✓	
Maintenance		
Painting of a building		×
Broken tie wire replacement		×
Carrying out annual "pre bush fire season" aerial patrol		×
Clearing of vegetation under lines (e.g. tree clearing and weed control)		×
Cross arm replacement		×
Electrical and plumbing repairs		×
Filtering or changing oil in a power transformer in a zone substation		×
Fitting a splice over a broken strand		×

Cost Item Description	Capitalise	
	Yes	No
General defects, particularly in relation to "fault emergency"		×
Performing a "thermoscan" survey		×
Periodic testing of protection equipment		×
Pole ground line inspection and treatment		×
Repairs to customer metering equipment		×
Replacement or repair of "consumable items" (e.g. globes, starters, diffusers, and gaskets) in street lights		×
Re-tension of a line		×

Cost Item Description	Capitalise	
	Yes	No
Re-tension of a stay wire		×
Work to rectify a breakdown (i.e. forced maintenance)		×
Other asset related expenditure		
Accounts payable department costs directly attributable to construction activity	✓	
Accounts payable department costs relating to marketing, distribution and administration		×
Administration and other general overhead costs		×
Advertising and promotional activities		×
Apprentice labour hours directly incurred on site construction	✓	
Apprentice training costs		×
Borrowing costs directly attributable to the acquisition, construction or production of a qualifying asset	✓	
CEO and Finance Managers' time directly attributable to construction activity	✓	
Claims from third parties	✓	
Costs of conducting business in a new location or with a new class of customer		×
Costs of design and technical assistance directly related to a construction contract	✓	
Costs of employee benefits arising directly from the construction or acquisition of assets	✓	
Costs of hiring plant and equipment	✓	
Costs of moving plant, equipment and materials to and from a contract site	✓	
Costs of opening a new facility		×
Costs of site preparation	✓	
Costs of testing whether a constructed asset is functioning properly	✓	
Depreciation of idle plant and equipment		×
Depreciation of plant and equipment used in the construction of network assets	✓	
Direct labour costs	✓	
Direct materials costs (incl. expenditure on spare parts that are for a particular asset, or class of assets, and which would become redundant if that asset or class was retired or discontinued)	✓	
Disposal costs on sale of assets (e.g. legal fees, valuation fees, title search fees, rates)		×
Estimated costs of rectification and guarantee work (including expected warranty costs) on a construction contract	✓	

Intangible Asset research costs - Feasibility, functionality or impact studies		×
In house lunches and meal entertainment		×
Initial delivery and handling costs	✓	
Installation and assembly costs	✓	
Insurance costs (self and public liability) that are operating in nature and cannot be specifically identified as insurance related to construction activity		×
Insurance costs that can be specifically identified as insurance relating to construction activity	✓	
IT integration and connectivity costs		×
IT minor development or changes that do not significantly increase the overall functionality of software (eg. changes to reports or formats, screen layouts etc)		×
Legal fees that cannot be specifically identified as legal fees related to construction activity		×
Maintenance activities (including OH&S)		×
Manual data entry conversion into electronic format		×
Preliminary network or infrastructure design		×
Preparation and processing of construction personnel payroll	✓	
Professional fees arising directly from brining an asset to its working condition	✓	
Rent, land tax and council rates		×
Research and development costs		×
Selling costs		×
Site labour costs (including site supervision)	✓	
Staff training costs		×
Storage costs		×
User and/or technical training		×

4.9 Depreciation Rates

Asset Description	Depreciation Method	Depreciation Rate	Effective Life Years
11 kV Overhead Line	Straight Line	2.22%	45
11 kV Underground Cable	Straight Line	2.00%	50
132 kV Concrete/Steel Pole Line	Straight Line	2.11%	47
132 kV Other Line	Straight Line	2.11%	47
132 kV Tower Line	Straight Line	2.11%	47
132 kV Underground Cable	Straight Line	2.11%	47
132/66/33/22/11 kV Transformers	Straight Line	2.50%	40
22 kV Overhead Line	Straight Line	2.22%	45
22 kV Underground Cable	Straight Line	2.00%	50
33 kV Concrete Pole Line	Straight Line	2.22%	45
33 kV Other Line	Straight Line	2.22%	45
33 kV Underground Cable	Straight Line	2.00%	50
66 kV Concrete Pole Line	Straight Line	2.22%	45
66 kV Other Line	Straight Line	2.22%	45
66 kV Underground Cable	Straight Line	2.00%	50
Buildings	Straight Line	2.50%	40
Communication Bearer Systems	Straight Line	10.00%	10
Communications	Straight Line	15.00%	7
Computer Hardware - Laptop	Straight Line	33.33%	3
Customer Meter	Straight Line	4.00%	25
DC Link	Straight Line	2.11%	47
Easement	Straight Line	-	-
Emergency Spares	Straight Line	-	-
Fleet (Passenger)	Straight Line	15.00%	7
Fleet (Light)	Straight Line	15.00%	7
Fleet (Heavy)	Straight Line	10.00%	10
Furniture & Fittings	Straight Line	7.50%	13
Gas	Straight Line	5.00%	20
Generation	Straight Line	3.33%	30
Generation Switchyard	Straight Line	3.33%	30
Intangibles	Straight Line	25.00% or life of intangible	
IT Hardware	Straight Line	25.00%	4
IT Software	Straight Line	25.00%	4
Land	Straight Line	-	-
Land Under Infrastructure	Straight Line	-	-
Leasehold Improvements	Straight Line	Term of lease	
LV Overhead Line	Straight Line	2.22%	45
LV Underground Cable	Straight Line	2.00%	50
Office Equipment	Straight Line	20.00%	5
Other Substation	Straight Line	2.50%	40
Other Transformer	Straight Line	2.50%	40
Pole Substation	Straight Line	2.50%	40
Pole Transformer	Straight Line	2.50%	40
Radio Equipment / Mobile Phones	Straight Line	10.00%	10
SCADA	Straight Line	10.00%	10
Street Lighting Overhead	Straight Line	6.67%	15
Street Lighting Underground	Straight Line	6.67%	15
Sub-Transmission Substation	Straight Line	2.50%	40
SWER Line	Straight Line	2.22%	45
Telephone Installations	Straight Line	5.00%	20
Timber Poles	Straight Line	2.22%	45
Tools & Test Equipment	Straight Line	20.00%	5
Zone Substation	Straight Line	2.50%	40

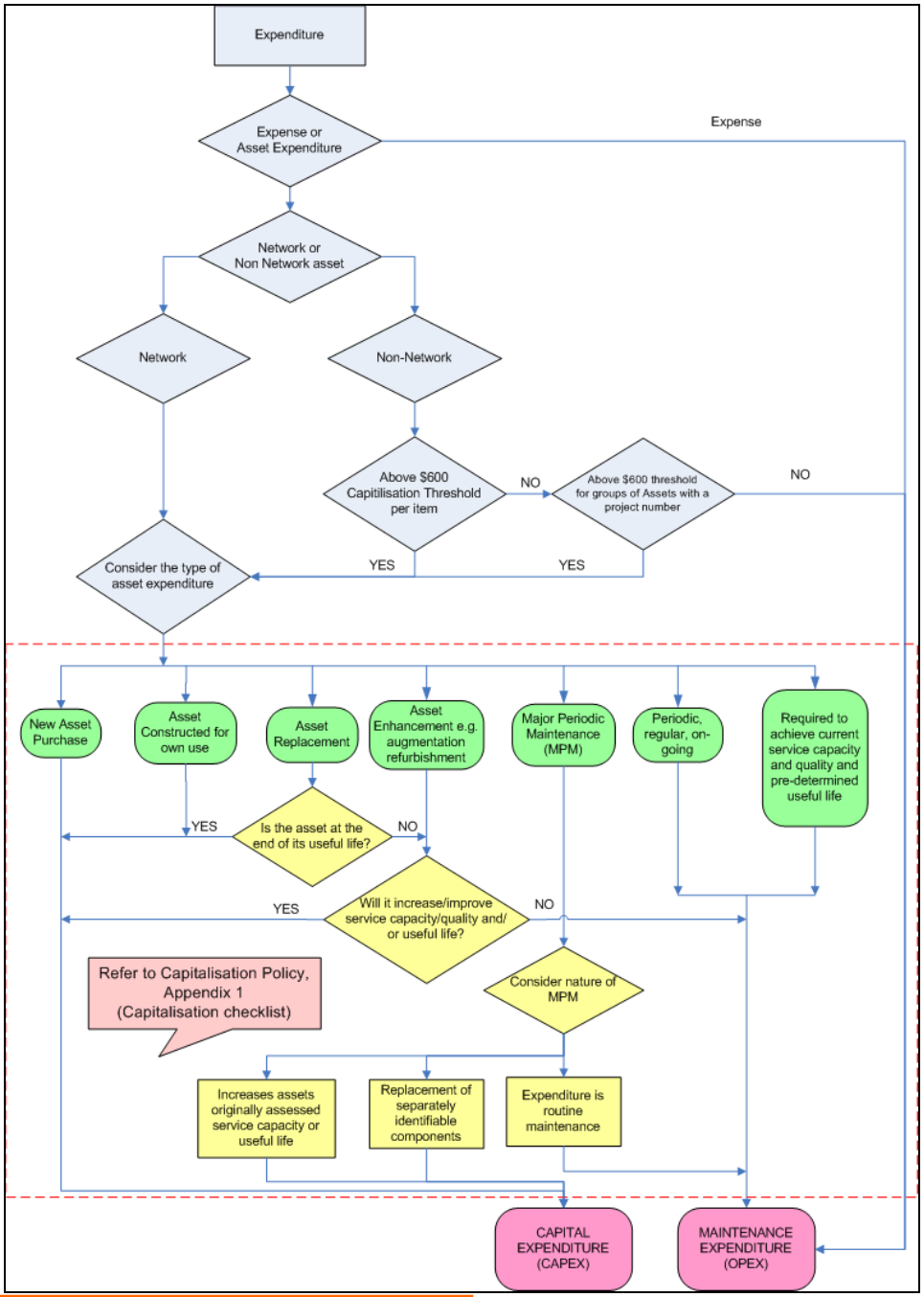
4.10 Expenditure Classification Decision Tree

Expense: An outflow of cash which will not result in any future economic benefits beyond the current financial year.

Asset expenditure: An 'Asset' is defined as a resource controlled by an entity as a result of past events and from which future economic benefits are expected to flow to the entity.

Network Asset: is the equipment, plant or building used to convey, and control the conveyance of, Utilities (Electricity, Gas and Water) to customers. Network assets are commonly referred to as 'System Assets'.

Non-Network Asset: is the equipment, plant or building that is used in the daily operating activities of the entity but is not used in the direct supply of Utilities (Electricity, Gas and Water) to customers. Examples include Land, Structures & Improvement, Office Furniture & Equipment, Fleet, Communication plant & equipment etc. Non-Network assets are commonly referred to as 'Non-System Assets'.



5 REFERENCES

CEOF6631 - Finance: General Capital Expenditure Guidelines Summary - Retail

CEOF6632 - Finance: General Capital Expenditure Guidelines Summary - Infrastructure

CEOF6633 - Finance: General Capital Expenditure Guidelines Summary - Infrastructure Operations

CEOF6634 - Finance: General Capital Expenditure Guidelines Summary - Finance and Risk

CEOF6635 - Finance: General Capital Expenditure Guidelines Summary - Engineering Services

CEOF6636 - Finance: General Capital Expenditure Guidelines Summary - Customer and Corporate Affairs

CEOF6637 - Finance: General Capital Expenditure Guidelines Summary

CEOF6638 - Finance: General Capital Expenditure Guidelines Summary - Corporate and Commercial Services

CEOF6639 - Finance: General Capital Expenditure Guidelines Summary - Corporate and Business Strategy

CEOP2008 - Network: Capital Expenditure

CEOP2191 - Corporate Finance: Business Case

CEOP8019 - Networks: Capital Contributions

CEOP8018 – Networks: Asset Management

CEOP2133 – Disposal: Management of Unserviceable Distribution Transformers

CEOP2438 – Procurement: Corporate Procurement

6 REVISIONS

Issue Number	Section	Details of Changes in this Revision
2	All	Update to rebrand to Essential Energy