ATTACHMENT 6.1
SYSTEM OPEX STRATEGY

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1. Introduction

1.1 Scope

Essential Energy's system operational expenditure is allocated between the following categories: Asset Class specific system operational expenditure as documented in the Asset Management Plans (AMP); and non-Asset Class specific system operational expenditure.

Specifically the scope of the review requires:

1. An overview of proposed system operational expenditure covering both categories (i.e. Asset Class specific and non- Asset Class specific) that introduces the differences between the categories, the basis of forecasts (2013$ base year), a table of the forecasts split by category and driver, key assumptions and dependencies;
2. A high level overarching strategy in respect of Asset Class specific system operational expenditure that summarises the themes and drivers of this category of operational expenditure, the justification (need) and efficiency of the proposed expenditure and how it complies with the regulatory requirements as per NER Chapter 6 and AER RIN; and
3. A detailed overarching strategy in respect of Non-Asset Class specific system operational expenditure that explains the themes and drivers of this category of operational expenditure, the justification (need) and efficiency of the proposed expenditure and how it complies with the regulatory requirements as per Chapter 6 and AER RIN.

1.2 Essential Energy overview

Essential Energy is a State Owned Corporation (SOC) under schedule 5 of the State Owned Corporations Act 1989, and established by the Energy Services Corporations Act 1995. Under section 8 of the Energy Services Corporations Act 1995, Essential Energy's principal objectives are:

1. To be a successful business and to this end to:

    a) Operate at least as efficiently as any comparable businesses

    b) Maximise the net worth of the state's investment in it

    c) Exhibit a sense of social responsibility by having regard to the interests of the community in which it operates.

2. To protect the environment by conducting its operations in compliance with the principles of ecologically sustainable development contained in section 6 (2) of the Protection of the Environment Administration Act 1991.

3. To exhibit a sense of responsibility towards regional development and decentralisation in the way in which it operates.

4. To operate efficient, safe and reliable facilities for the distribution of electricity and other forms of energy.

5. To be an efficient and responsible supplier of services relating to the use and conservation of electricity and other forms of energy.

6. To be a successful participant in the wholesale and retail market for electricity and other forms of energy and for services relating to the use and conservation of electricity and other forms of energy.

Essential Energy is the owner and operator of the electricity distribution network used to supply electricity to homes and business across 95% of New South Wales and to the authorised supply areas of Queensland and Victoria and has a significant investment in the physical electricity system and non-system assets. The business requires that these assets and other resources are efficiently and effectively managed to maximise value to all stakeholders and to deliver essential network services.

This requires assets to be created, operated and maintained in a safe and cost-effective manner by efficiently balancing network risk and investment to deliver appropriate service levels. To achieve these outcomes, Essential Energy employs an asset management process.

Asset management covers the processes for planning, creation and development, operation and inspection, condition assessment, maintenance and disposal for all components of the electricity network. The establishment of a functional asset management system and associated asset management activities and practices are a prerequisite for prudent and efficient capital and operating expenditure. Asset management is an integrated process used to deliver Essential Energy's Business Plan objectives and priorities.

1.2.1 Essential Energy's electricity network

Essential Energy is the largest regionally based network service provider in Australia. The core business is the distribution of electricity to customers in a specified geographical boundary of New South Wales and authorised supply areas of Queensland and Victoria.

Essential Energy's franchise area, as shown in Figure 1.1, covers approximately 737,000 km², or 95% of New South Wales, with approximately 815,000 network customers. The electricity distribution network is one component of an integrated system by which electricity is generated, transmitted and then distributed to customers. The network has a large number of asset types across ten different voltage levels, and customers can be connected at any voltage level from 132 kV down to low voltage (400/230 volts) depending on the customer's power needs.

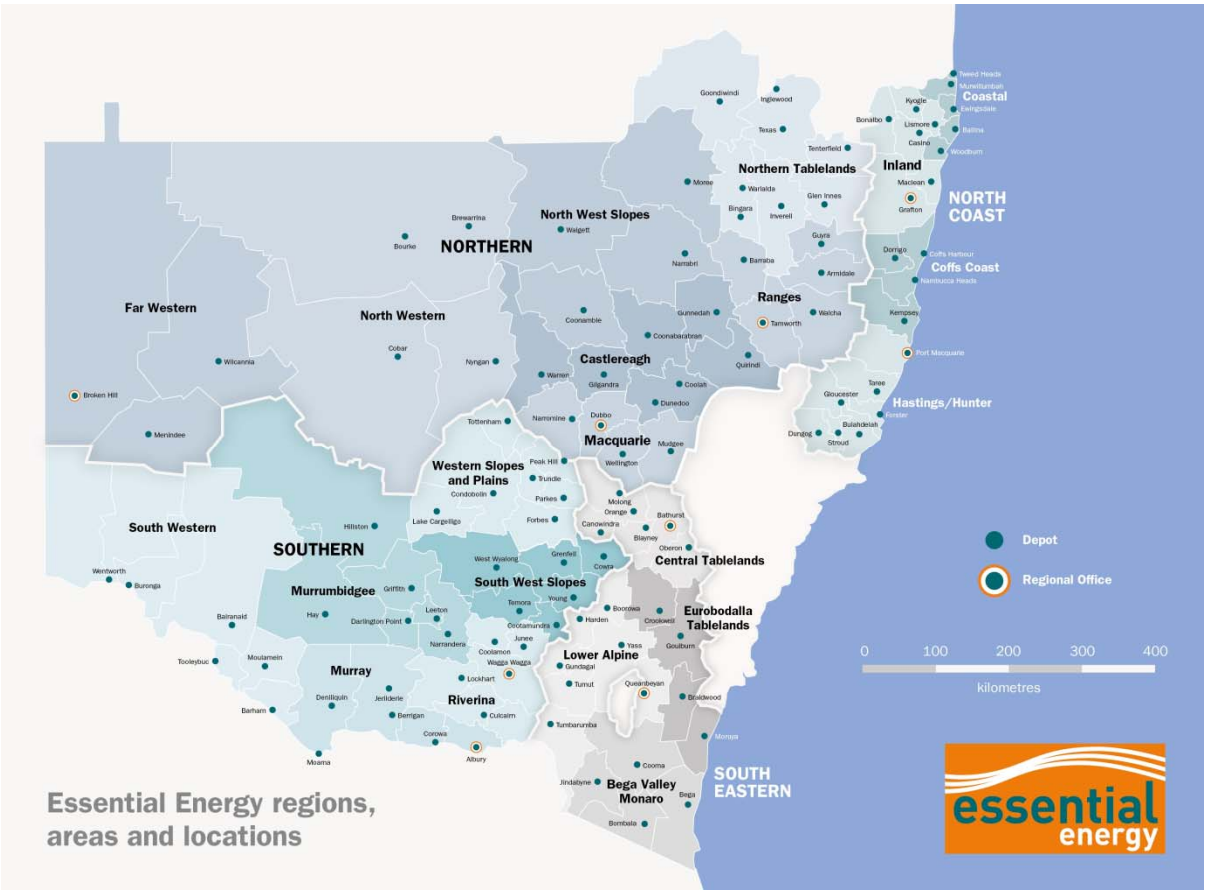

Figure 1 Electricity Network Area

Electrical loads on the network range from large single customers, such as gold and coal mines, cotton gins, abattoirs, feedlots, irrigation pumps, shopping complexes, to urban commercial and residential centres, as well as rural farms, villages and remote Single Wire Earth Return (SWER) connected customers.

Essential Energy's network consists of approximately 200,000 kilometres of subtransmission, high voltage distribution, low voltage distribution power lines, and around 1.4 million poles. This network of "wires and poles"

is predominantly an overhead system that traverses terrain varying from coastal, alpine and mountainous in the east to the open plains in the west, and is exposed to a variety of extreme climatic conditions.

The majority of the rural distribution network is radial in configuration with most parts only able to be supplied from one source. There is little opportunity for interconnection with other circuits for security and continuation of supply when performing maintenance activities or in the event of unplanned outages and this is equally true of the radial 132 kV and 66 kV subtransmission networks. Due to the low customer densities found throughout the rural network, capital expenditure cannot generally be justified to improve this situation. Essential Energy is however committed to continually reviewing the reliability of its network in all parts of its supply area with a view to utilising available technologies and appropriate practices to provide the maximum reliability and security of supply possible, within these constraints.

Almost 98% of the network is of an overhead construction type. The overhead system is exposed to environmental conditions, and with a relatively high average number of lightning days (30 per annum), the impact of lightning and wind from storms on the reliability of the network is significant. These environmental conditions can cause widespread interruptions to the overhead network, which are often difficult and time consuming to locate and repair due to the long radial lines involved.

Over 99% of the distribution substation population are pole-mounted due to the predominately rural nature of the supply area, and the economics of predominantly rural networks. However, this type of distribution substation is inherently more susceptible to unplanned outages than ground mounted distribution substations. These characteristics of the distribution network dictate specific asset management practices and activities in order to minimise unplanned outages and ensure service delivery standards are met.

Network assets have been grouped into logical asset classes based on function, management requirements, voltage level, criticality and other factors relevant to the operation and management of the assets. Asset management plans and capital and operations expenditure plans have then been developed for each of these asset groups.

1.2.2 Essential Energy's values

Corporate values are the worthwhile qualities or attributes that support or assist in achieving the defined outcomes consistent with the Business Plan objectives. The values that underpin Essential Energy's operations are:

Safety excellence

- Put safety as your number one priority
- Do not participate in unsafe acts, and challenge unsafe behaviours
- Think before you act
- Lead by example
- Take responsibility for the health and safety of yourself and others

Respect for people

- Treat all people with respect, dignity, fairness and equity
- Demonstrate co-operation, trust and support in the workplace
- Practise open, two-way communication

Customer and community focus

- Deliver value and reliable service to our customer and communities
- Use resources responsibly and efficiently
- Be environmentally and socially responsible

Continuous improvement

- Look for safer and better ways to do your job
- Improve our financial performance
- Support innovation to add value to our business

Act with integrity

- Act honestly and ethically in everything you do
- Be accountable and own your actions
- Follow the rules and speak up

These values are fundamental to the successful operation of the business.

1.3 Relationship to other strategies

This document is one of a number of high level strategic documents prepared by Essential Energy as part of its current regulatory submission, namely:

- Corporate Overhead Strategy
- Divisional Overhead Strategy
- System Operational Expenditure Strategy (Standard Control Services)

1.4 Relationship to other strategies

Essential Energy's purpose is encapsulated in the statement:

To be of service to our communities by efficiently distributing electricity to our customers in a way that is safe, reliable and sustainable.

As a State Owned Corporation (SOC), Essential Energy is required to address certain legislative and policy directions. These requirements include:

- Meet the SOC and Energy Services Act legislative obligations; and
- Implement the policy directions of our shareholders regarding the restructure of the publicly-owned electricity distribution businesses in NSW.

Essential Energy's strategic objectives and priorities are designed to promote the long term interests of our customers by delivering three key outcomes:

1. Continuous improvement in safety performance
2. Maintaining the reliability and sustainability of the network
3. Containing average network tariff increases to CPI for our customers

To ensure these outcomes are delivered, Essential Energy has a number of corporate planning documents that ensure that our capital and operating forecasts meet the primary corporate objectives of safety, affordability and reliability. These strategies are:

- **The Customer Strategic Plan** – Sets a vision for future engagement with customers to ensure best value for money for the services we provide. The strategy has impacted the development of our proposal in two fundamental ways. It has focused our programs on identifying efficiencies in our costs so as to meet our goal of affordability, and has re-focused the business on engaging with our customers on issues such as levels of reliability and safety.

- **The Safety Strategic Plan** – The objective is to protect the safety of the public, our employees, our contractors and those who are influenced by our business undertakings. Our long term business success depends on our ability to continually improve the quality of our services while protecting people and the environment. The safety plan is a key influence on our asset replacement programs where we have sought to find efficient ways to maintain the safety of the network despite deterioration in the condition of certain assets.
- **Asset Management Strategic Plan** – Effective asset management is the key to being able to safely and efficiently deliver a reliable and sustainable electricity network, while continuing to promote customer affordability. The plan has focused on ways to prudently defer replacement of assets, through activities such as the prioritisation process.
- **The Risk Management Strategic Plan** - Aims to embed a common Risk Management Framework across the three NSW DNSPs, and accordingly provide a common basis for making decisions such as levels of investment to mitigate risk.
- **Technology Strategic Plan** – The objective is to leverage technology, enable the business' transition to a more efficient business model, and to facilitate delivery of the new business model's objectives. The plan's scope includes information technology and telecommunications, as well as operational and grid technologies. This plan has enabled us to deliver significant reductions in our forecast technology costs over the 2014-19 regulatory control period.
- **The Human Resources Strategic Plan** – This sets a blue-print on how to transition to efficient workplace change and structural reform introduced under industry reform, and to promote efficient leadership and performance across the business. This plan has been instrumental in shaping our expected expenditure related to implementing efficiency reforms such as the Network Reform Program and the prioritisation process.
- **The Finance Strategic Plan** – The objective is to manage the financial health of the three NSW DNSPs in a manner that protects financial value and delivers balanced outcomes for both customers and the shareholder. This has influenced our decisions on levels of capex, and on proposing a rate of return that is commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk.

This document should be read in conjunction with the individual asset management plans prepared by the Essential Energy described in detail in section 3.1:

- Distribution Overhead Feeders (CEOM8018.01)
- Customer Connections (CEOM8018.03)
- Distribution Substations (CEOM8018.04)
- Network Underground Systems (CEOM8018.05)
- Subtransmission Overhead Feeders (CEOM8018.06)
- Load Control Equipment (CEOM8018.08)
- SCADA & DSA Equipment (CEOM8018.09)
- Generation (Regulated Assets) (CEOM8018.10)
- Subtransmission Transformers (CEOM8018.11)
- Subtransmission Equipment (CEOM8018.12)
- Vegetation Management (CEOM8018.15)
- Network Metering (CEOM8018.16)

2. System operational expenditure overview

2.1 Strategic objectives

Essential Energy's strategic objectives are set in order to enable the business to meet the expectations required of it by a range of stakeholders. These requirements essentially drive the policies, strategies, plans and processes that govern the business.

2.1.1 Statutory requirements

Essential Energy's statutory obligations are derived from both Federal and State legislation. The following are the principal categories of statutory compliance relevant to the management of the network. The specific criteria against which Essential Energy measures its compliance with the requirements are given in Table 2.1.

Health and safety

Network assets are managed in a manner that ensures Essential Energy's obligations in regard to the safety of its employees, contractors and the general public are met. Most assets have the potential for harm if they are not appropriately operated and maintained.

The principal occupational health and safety legislation in New South Wales was the Work Health and Safety Act 2011 (NSW) and it's supporting regulations, the Work Health and Safety Regulation 2011 (NSW). However, on 1 January 2012, the Commonwealth, New South Wales and the two territories (ACT and NT) commenced their 'harmonised' Work Health and Safety Acts. There was a 12-month transitional period from that date applying to the Regulations to the legislation (during which time various regulations will come into effect). In addition to occupational health and safety laws, there are also federally developed model Codes of Practice which provide support and guidance on different occupational health and safety issues.

Additionally, Essential Energy are required under the National Electricity Rules and Work Health and Safety Act (NSW) 2011, Electricity (Consumer Safety) Regulation 2006, to provide appropriate 3rd Parties with safe and authorised access to its electrical network.

Regulatory compliance and reporting

Essential Energy, under the Electricity Supply (Safety and Network Management) Regulation 2002, and the Design, reliability and performance – distribution network service provider's licence conditions – 1 December 2007 (Licence Conditions), is required to annually measure and report on its performance.

Essential Energy is also required to capture and monitor the network's performance (and data) in accordance with:

- National Electricity Rules
- Electricity Supply (Corrosion Protection) Regulation 2008State Environment Planning Policy (Infrastructure) 2008
- Guaranteed Service Standards outlined in Electricity Supply (General) Regulation 2001
- Electricity distribution network service providers Service target performance incentive scheme November 2009
- various management plans required under the Electricity Supply (Safety and Network Management) Regulation, 2002

Network safety

The Electricity Supply Act 1995 requires Essential Energy to provide a safe and reliable supply of electricity. The Act provides the framework for promoting industry efficiency generally through establishing a balance of competition and regulation. There is also scope for benefit to customers as a whole in limited standardisation of infrastructure design and service procedures that promote:

- Community Safety;

- Compatibility among electricity supply systems;
- Economies of scale; and
- Freedom for buyers to exercise choice.

Essential Energy is bound by the provisions of the Electricity Supply (Safety and Network Management) Regulation 2008 (NSW), that requires the development and lodgement of a Network Management Plan, which is routinely audited. Amongst other matters, Essential Energy's Network Management Plan must include a commitment to ensuring the safe operation of the distribution system, and to giving safety the highest priority over all other aspects of network management. This plan must provide safety management strategies, including emergency response and bush fire risk management (see following section for further details).

Essential Energy must also ensure network assets and operation achieves and maintains its statutory obligations as outlined under the following legislation:

- Electricity Supply (General) Regulation 2001 (NSW)
- Electricity Act 1994 (QLD)
- Electricity Regulation 2006 (QLD)
- Electrical Safety Act 2002 (QLD)
- Electrical Safety Regulation 2002 (QLD)

Codes of Practice

Essential Energy is also required to adopt the Code of Practice – Electricity Transmission and Distribution Asset Management 2008 (The Code), as directed by the Director General under the Electricity (Safety and Network Management) Regulation 2008. This Code aims to provide guidance as to cost effective practices and procedures that are intended to protect the interest of customers and public particularly in relation matters of safety. A licence holder is required to state its policy on the adoption of the Code in its compliance annual report.

The Code outlines the policy and standards that apply to the design, construction, maintenance and operation of electricity works and has provides for high standards in relation to the safety and integrity of the Network. The Code applies to network operators, service providers and any of their sub-contractors working on electricity works or operating electricity transmission or distribution systems and as is the case for Essential Energy where directed by the Director General in NSW, the network operator is bound to comply with the Code.

Essential Energy is also required to comply with the following Codes of Practice:

- Code of Practice (NSW) 2006 – Work near overhead power lines
- Electricity Industry Code by NSW Maritime
- ENA DOC 001-2008 National Electricity Safety Code
- Service and Installation Rules for NSW
- Code of Practice Contestable works

Network Management

In accordance with the National Electricity Rules, Essential Energy is required to provide safe access to its network and undertake asset and network planning.

The National Electricity Code and Australian Energy Market Operator (AEMO) Standard for Power System Communications 2004, requires Essential Energy to interact with AEMO, and outlines the requirements to comply data requests and instructions from AEMO.

Bushfire protection

Essential Energy must manage its distribution system in compliance with the Electricity Supply (Safety and Network Management) Regulation 2008 (NSW) and Planning for Bushfire Protection 2006. This requires Essential Energy to ensure its distribution system does not contribute to the development or propagation of bushfires at any time.

Planning for Bushfire Protection (PBP) 2006 was developed by the NSW Rural Fire Service to enable the NSW Government to work jointly with local government and the public and private sectors to link responsible planning and development control with the protection of life, property and the environment. Bushfire is a major challenge for the community, and Essential Energy has an important role to play in ensuring that its network assets do not contribute to the development or propagation of bushfires at any time.

Environmental protection

Under the Protection of the Environment Operations Act 1997, State Environment Planning Policy (Infrastructure) 2007 and Protection of the Environment Operations (Waste) Regulation 2005, Essential Energy has obligations to appropriately manage its waste, prevent spills and leaks, and ensure it does not pollute and harm the environment.

In NSW the management of storm water run-off from industrial facilities is a growing concern. Any spill of contaminated water, transformer oil, lubricants or chemicals from Essential Energy sites or during the maintenance or operation of its assets has the potential to pollute water catchments. The Protection of the Environment Operations Act 1997 (POEO Act) contains general requirements for the minimisation of water pollution due to site run off, while the National Water Quality Management Strategy (NWQMS) provides a framework for action and a series of guidelines and scientific criteria that help improve water quality. As part of its participation in the NWQMS, the NSW Government has established processes to coordinate water quality management programmes across all State Government agencies. The management and disposal of potentially contaminated run-off is detailed within Essential Energy's Safety, Security, Health and Environmental Manual: Water (CECM1000.73).

Under the POEO Act, Essential Energy is required to ensure that it does not permit contaminated water, oil or chemical spills to pollute water catchments. Essential Energy does have potential contaminants within some of its asset classes, and uses potential contaminants, such as fuel, solvents and lubricants, in the construction and maintenance of network assets. The specific metric for this service level obligation and the required performance target are recognised as part of Essential Energy's network asset management objectives.

The POEO Act and the NSW Industrial Noise Policy also requires Essential Energy to manage its noise pollution.

Customers

Essential Energy must comply with Electricity (Consumer Safety) Regulation 2006, and National Energy Retail Rule. Essential Energy has a responsibility for the safety of the customer's installation assets and a duty to monitor the condition of the overhead connection equipment at the customer's point of attachment and advise the customer of potentially unsafe situations.

In accordance with the National Electricity Rules and the National Energy Customer Framework, Essential Energy is required to provide notification of planned outages to affected customers, provide telephone answering services and deliver relevant information concerning unplanned supply interruptions to customers and retailers.

State Owned Corporations Act 1989

Under the State Owned Corporations Act 1989, Essential Energy is required to operate, and maintain its assets at least as efficiently as any comparable business, and maximise the net worth of the State's investment.

Statutory service level obligations

Table 1 Statutory service level obligations

Requirement	Criteria	Target
Ensure Essential Energy's obligations in regard to the safety of its employees, contractors and the public are met.	Number of incidents in Totalsafe attributable to network assets per financial year.	Zero in each financial year
Prevent bushfire starts from network assets.	Number of bushfire starts caused by network assets per financial year.	Zero in each financial year
Ensure that contaminated water, oil or chemicals spills from network assets are not permitted to pollute water catchments in accordance with the POEO Act 1997 while supporting the National Water Quality Management Strategy (NWQMS).	Number of non-conformances registered within Totalsafe in financial year	Zero in each financial year
Ensure that the network assets limit noise pollution in accordance with the POEO Act 1997	Number of assets generating sound pressure levels exceeding the POEO Act requirement per financial year	Zero in each financial year

2.1.2 Licence requirements

Essential Energy's Licence Conditions pursuant to item 6(1)(b) of Schedule 2 of the Electricity Supply Act 1995 include a requirement to comply with specified reliability and customer service standards. The specific criteria against which Essential Energy measures its compliance with the requirements are given in Table 2.

Reliability standards

On 1 August 2005, the Minister for Energy imposed additional conditions pursuant to item 6 (1) (b) of Schedule 2 of the *Electricity Supply Act 1995* relating to reliability performance on licences held by electricity distributors under the Electricity Supply Act1995. On 1 December 2007 following a review by the Minister, the conditions were varied with effect on and from that date. Following a further review by the Minister, the conditions were varied with effect on and from 1 July 2014.

The purpose of the revised conditions is to facilitate the delivery of a reliable and cost-effective supply of electricity. The conditions impose reliability and performance standards on electricity distributors.

The reliability performance requirements are set out in Schedule 2 and Schedule 3 of the Licence Conditions. The Reliability Standards require Essential Energy to not exceed specified average SAIDI and SAIFI targets in any financial year (after excluding allowable events) for each feeder type.

Licence service level obligations

Table 2 Licence service level obligations

Requirement	Criteria	Target		
		Urban	**Short Rural**	**Long Rural**
Comply with the Reliability Standards as set out in Schedule 2 (Network Overall) of the Licence Conditions.	SAIDI – minutes per customer	125	300	700
	SAIFI – number per customer	1.8	3.0	4.5

Requirement	Criteria	Target		
		Urban	**Short Rural**	**Long Rural**
Comply with the Reliability Standards as set out in Schedule 3 (Individual Feeder) of the Licence Conditions.	SAIDI – minutes per customer	400	1000	1400
	SAIFI – number per customer	6	8	10
Comply with the Customer Service Standards as set out in Schedule 5 of the Licence Conditions.	Interruption duration	Zero interruptions greater than 18 hours		
	Interruption frequency – max number of interruptions of ≥ x hours	4 interruptions ≥ 5 hours		

Customer service standards

The Customer Service Standards are set out in Schedule 5 of the Licence Conditions, and require Essential Energy to not exceed specified interruption durations and frequencies at each customer's premises during a financial year (see Table 2 Licence service level obligations).

2.1.3 Standards requirements

Essential Energy is committed to achieving compliance with specific stakeholder requirements in terms of the overall quality of network services and the delivery of value. This also entails a commitment to public and staff safety as well as the management of environmental impacts while maintaining acceptable levels of corporate risk. In observing these commitments, good electricity industry practice also compels Essential Energy to comply with a range of engineering standards relevant to its network assets. Adherence to these engineering standards ensures the necessary level of quality and compliance is achieved across a range of stakeholder requirements.

A range of Australian and international standards apply to the design, construction and operation of electricity network assets. Asset management plans make detailed reference to those standards that are applicable to the asset class concerned; however the criteria against which Essential Energy measures its compliance with the requirements are universal and are given in Table 3.

These Standards include:

- Service & Installation Rules of New South Wales 2006
- AS/NZS 3000 Electrical Installations (the Wiring Rules)
- AS/NZS 6008 Standard Voltages
- AS/NZS 7000:2010 Overhead Line Design Standard
- AS 6947-2009 Crossing of waterways by electricity infrastructure
- IEC / DNP3 Communications Standards
- AS 1940-2004 The storage and handling of flammable and combustible liquids
- AS/NZS ISO 31000:2009 Risk Management
- ISSC3 – Guideline for managing vegetation near power lines (2005)
- WorkCover Guide 'Work near Underground Assets"
- AS/NZS 3017:2001 Electrical installations – Testing and installation guidelines
- AS 4741-2010 Neutral Integrity
- AS 5804.1 High Voltage Live Working
- ISSC Guidelines
- ENA Guidelines

Standards service level obligations

Table 3 Standards service level obligations

Standards service level obligations		
Requirement	**Criteria**	**Target**
Compliance with applicable Australian standards and applicable business standards	Number of non-conformances recorded as defects in any financial year	Zero greater than 6 months old
Australian standard AS 6003.8 Standard Voltages and the Electricity Supply Act 1995 requirements for power supply quality	Number of customer complaints attributable to network assets	Zero
Australian Standard AS 6947-2009 Crossing of waterways by electricity infrastructure	Number of non-conforming sites	Zero

2.1.4 Customer and community requirements

The *Electricity Supply Act 1995* requires Essential Energy to provide a standard form customer connection contract, part of which details the specific obligations imposed on Essential Energy by its Licence Conditions regarding supply reliability. However, other than this, there are few specific customer or community requirements that impact on the management of Essential Energy's network assets.

For example, in vegetation management, which is a large component of system operational expenditure, customers and the community in general have expectations regarding the management of vegetation from an environmental, aesthetics, safety and engagement perspective. Furthermore, Essential Energy has rights of way across public and private land to ensure that it has access to network assets and vegetation that requires maintenance. Maintaining these rights of way involves the management of access track clearances and surfaces, gates, cattle grids, and related access security to protect enclosed lands, livestock, etc.

Essential Energy recognises that these community and landholder expectations are applicable to its asset management practices and has procedures that appropriately address these matters. However, Essential Energy does not currently have specific criteria against which to judge its compliance with customer or community expectations.

In addition, as detailed in Chapter 2 of the Essential Energy Substantive Regulatory Proposal, engaging with customers and stakeholders has been an integral part of design and planning for all asset class specific and non-asset class specific categories. During the preparation of the plans for operating expenditure, Essential Energy have increased the depth and range of engagement to enable the business to incorporate the long term interest of consumers in line with operations of the business.

This approach and engagement will continue to be refined and considered as part of the ongoing maintenance of all plans.

2.1.5 Business requirements

Essential Energy supports the safe, efficient operation of the network, including performing specific activities to reduce SAIDI-SAIFI figures. This includes providing generation support, efficient management and delivery of inspection and maintenance programs, and monitoring network performance.

Essential Energy has an established Business Plan which guides business performance and corporate outcomes. The Business Plan aligns with the requirements of Networks New South Wales and sets targets against which it measures and reports its performance on a scorecard on a monthly basis. In addition to targets addressing safety, environmental, licence, and customer and community engagement requirements, it also sets targets relating to financial, business process and organisation culture objectives.

The targets are reviewed annually and subject to board approval. Table 2.4 below outlines the FY 2013/14 corporate scorecard metrics and preliminary FY 2014/15 metrics that have not been approved by the board. Individual corporate scorecard measures and FY 2014/15 targets may change from the figures provided below. Final FY 2014/15 board approved targets will be set to drive management incentives that are aligned to ensure the delivery of continuous improvement in operational performance.

Table 4 Essential Energy Scorecard Targets

Key Result Areas	Measures	Full Year Target 13 / 14	**DRAFT** Full Year Target 14 / 15
SAFETY			
Safe, capable, motivated employees	Lost Time Injury Frequency Rate (LTIFR)	2.2	2.0
	Significant Electricity Network Incidents (SENI) - Controllable	37	34
	Total Recordable Injury Frequency Rate (TRIFR)	25	22.8
CUSTOMER and COMMUNITY			
Valued by our community	Reportable incidents – NECF type 1 breaches	0	<4
	Customer Satisfaction - Q	75%	75%
Protect public safety & environment	Reportable Environment Incidents – Controllable	4	4
Reliable & sustainable network	System Average Interruption Duration Index (SAIDI) MDN - Minutes	236	236
FINANCIAL			
Financial sustainability	Net Profit After Tax (NPAT) - $M	$176.5	$126.5
Efficient operations	Operating Expenditure (OPEX) Budget - $M	$550.7	$572.0
	Overtime Expenditure - $M	$34.2	$34.1
BUSINESS PROCESS			

Key Result Areas	Measures	Full Year Target 13 / 14	**DRAFT** Full Year Target 14 / 15
Network plan delivery	Asset Management Plan (Construction) % Complete	95%	100%
	Asset Management Plan (Maintenance) % Complete	0	>95%
Governance, risk & compliance management	Audit Recommendations Outstanding > 90 Days - Q	0	0
	Risk Treatment Plans Outstanding > 90 Days - Q	0	0
	Safety Corrective Actions (SCAR) outstanding > 60	0	0
CULTURE			
Safe, capable, motivated employees	Absenteeism - Days per Person	4.9	4.7
	Gross to Base (GBR) Ratio	75	40

2.1.6 Risk assessment and optimisation

Essential Energy uses a number of criteria to assess network and asset risk. This assessment is used to optimise and prioritise the plans related to operation and maintenance and to capital investment. Defects identified from various sources (e.g. customer complaints, routine inspection results) will be risk assessed and categorised in order to identify what further actions are required, and with what degree of urgency and priority.

Table 5 Defect Risk Categories

Defect risk category	Risk description (likelihood and consequence)
Emergency	Damaged components and defects that endanger employees, the public or property or defects that result in unplanned outages
Urgent Risk	The defect is assessed as a high risk with the potential to affect continuity of supply, safety or pose a significant environmental risk
Risk	The defect is assessed as a medium level risk with the potential to affect system reliability, safety, or environmental concerns if left in its present condition and will require attention within a six month period
General Maintenance	No threat to system reliability or safety but defects related to construction or other compliance standards. These types of defects/work tasks are generally issued for rectification in conjunction with programmed feeder work packs.
Monitor	These tasks are not considered defects nor require programming for rectification. The task is recorded to monitor the performance of the associated asset.

The risk assessment considers the likelihood that the identified condition of the asset will lead to failure within the inspection cycle timeframes, and the consequences of failure in terms of failing to achieve the network's service

level obligations. Depending on the further action required, there may be a requirement for capital or further operational expenditure to be incurred.

2.2 Description of categories

2.2.1 Asset class specific

Asset class-specific operational expenditure categories are those that can be related to tangible network assets. Expenditure is categorised similarly across most asset classes and is related to activities that are undertaken in order to operate and maintain them. The main categories used by Essential Energy are:

- Inspection – including the routine inspection of assets in order to determine their condition, and assess the need for maintenance, repair, refurbishment, or replacement;
- Maintenance and repair – the planned maintenance, repair and refurbishment of network assets to restore them to a condition that will allow Essential Energy to achieve its objectives within the risk tolerance of the business (subtransmission equipment and transformers, and generation are categorised under 'Other Network Maintenance); and
- Emergency Response (F&E) – the unplanned repair and reinstatement of network assets resulting from fault and emergency (F&E) events;

Additionally, Essential Energy considers the management of vegetation along its feeder routes to be an asset class for the purposes of asset management. Vegetation Management operational expenditure is categorised according to the various programmes implemented, as follows:

- Cyclic Maintenance;
- Aerial Patrol (LiDAR);
- Immature Tree Clearing;
- Hazard Tree Program; and
- Management & Administration

2.2.1.1 Asset classes

Essential Energy classifies its network assets according to the following list. Each asset class is managed in accordance with its own whole of life asset management plan, designated CEOM8018.xx as shown.

- Distribution Overhead Feeders (CEOM8018.01)
- Customer Connections (CEOM8018.03)
- Distribution Substations (CEOM8018.04)
- Network Underground Systems (CEOM8018.05)
- Subtransmission Overhead Feeders (CEOM8018.06)
- Load Control Equipment (CEOM8018.08)
- SCADA & DSA Equipment (CEOM8018.09)
- Generation (Regulated Assets) (CEOM8018.10)
- Subtransmission Transformers (CEOM8018.11)
- Subtransmission Equipment (CEOM8018.12)
- Vegetation Management (CEOM8018.15)
- Network Metering (CEOM8018.16)

2.2.1.2 Key drivers

As discussed in more detail in Chapter 6 of Essential Energy's Substantive Proposal, Essential Energy's concerted effort to reduce cost within the 2009-14 period, particularly in the last two years, has provided a solid platform in meeting the objective to contain the average increase to customers electricity bills at or below CPI during the next regulatory period.

To ensure forecast operating expenditure reflects the expected expenditure requirements for the next period, Essential Energy has considered a number of factors that would impact on this expenditure requirement. Generally, some of the factors that influence the level of expenditure required in the forthcoming regulatory control period are:

- Regulatory obligations and changes to these obligations or the introduction of new obligations.
- Essential Energy's environment and changes to this operating environment since the last determination, including costs required to deliver long term savings to our customers.
- The current condition of Essential Energy's asset and the inherent relationship between forecast capital and operating expenditure and the impact on operational expenditure from future capital investments.
- Forecast cost of inputs (i.e. labour, materials etc).
- Implementation costs supporting reform initiatives.

Essential Energy's asset management strategies are developed to align with the requirements of the strategic objectives in section **Error! Reference source not found.**. The key requirements imposed by strategic objectives lead to key drivers that result in operational expenditure and their corresponding operating and maintenance strategies are as follows:

Table 6 Key drivers mapped to requirements

Requirement (from strategic objectives)	Key drivers
Statutory	Safety Environmental Licence compliance Demand management
Licence	Licence compliance Quality of supply Security of supply
Standards	Asset condition Technological obsolescence
Customer & community	Safety Environmental
Business	Safety Environmental
Risk assessment & optimisation	Reliability Asset condition Technological obsolescence

The operational and maintenance strategies for each key driver are provided below:

Table 7 Planned strategies to address key drivers

Key drivers	Operational strategies	Maintenance strategies
Licence compliance **Reliability** **Security of supply**	Asset availability is proactively managed Assets are operated within design parameters Core network data access is obtained at least cost Fault and emergency information is used to make real-time decisions Network reliability is continuously managed Operation is aided by engineered protective measures Operational resources are strategically deployed Operational risk is understood and managed System redundancy is used to maintain asset availability	Asset condition is actively monitored Batch scheduling techniques are employed to improve maintenance efficiency Corrective maintenance is employed selectively Essential spare parts and maintenance contracts are actively managed Failure impacts are actively managed to resolution Maintenance activities are managed to minimise impacts Non-intrusive maintenance techniques are employed Resources are strategically deployed to achieve response times
Safety	Safety is proactively managed Assets are operated within design parameters Fault and emergency information is used to make real-time decisions Operation is aided by engineered protective measures Operational risk is understood and managed	Asset condition is actively monitored Critical components are maintained Failure impacts are actively managed to resolution Maintenance activities are managed to minimise impacts Maintenance is prioritised using risk-based techniques
Environmental	Safety is proactively managed Fault and emergency information is used to make real-time decisions Operation is aided by engineered protective measures Operational risk is understood and managed	Asset condition is actively monitored Critical components are maintained Failure impacts are actively managed to resolution Maintenance activities are managed to minimise impacts Maintenance is prioritised using risk-based techniques Navigable waterways crossings are assessed and treated
Demand management	Assets are linked to Customer information and expectations Operational resources are strategically deployed System redundancy is used to maintain asset availability	Maintenance is prioritised using risk-based techniques
Quality of supply	Assets are linked to Customer information and expectations	Maintenance activities are managed to minimise impacts Maintenance is prioritised using risk-based techniques
Asset condition	Asset changes are proactively managed	Asset condition is actively monitored Asset data is captured at the time of

Key drivers	Operational strategies	Maintenance strategies
Technological obsolescence	Assets are operated within design parameters Core network data access is obtained at least cost Selected assets are run to failure Operational risk is understood and managed	inspection and corrective maintenance Corrective maintenance is employed selectively Critical components are maintained Essential spare parts and maintenance contracts are actively managed Failure impacts are actively managed to resolution Maintenance activities and outcomes are documented Resources are strategically deployed to achieve response times Testing, preventative and corrective maintenance is employed

Details of which strategies are principally used in relation to each class of asset are given in section 4.2.

2.2.2 Non-asset class specific

Non-asset class-specific operational expenditure categories are those that are not generally related directly to tangible network assets. Instead, they are related to the operation or functioning of the network as a whole, or to functions that are not themselves performed as part of a specific asset management plan.

2.2.2.1 Non-asset classes

The principal categories used by Essential Energy are:

- Customer Service
- Network Operation
- Other operating expenses

The three categories have eight main functions associated with them, as follows:

Table 8 Non-asset classes specific categories and associated activity / functions

Customer Service	Quality of supply investigation
	Customer network support
	Installation inspections
Network Operation	Network operation and control
	Field switching for third parties
Other operating expenses	Work scheduling and programming
	Data capture
	Other

These categories are detailed in section 3.2

2.2.2.2 Key drivers

In section 2.2.1.2 Asset class specific operating expenditure sets out the key drivers for investment, and as the non-asset class specific relate to the operation of the network as a whole the above mentioned expenditure directly ties back to the same drivers, operational and maintenance strategies.

Similarly, the strategic objectives and the associated drivers are in the main the same for non-asset class specific operational expenditure as for asset class specific operational expenditure. However, the activities and functions of the business in this area are necessarily broader and more generic than those associated specifically with different asset classes. As shown by the categorisations above, they are directed at customer service, overall network operations, or at supporting and coordinating other activities in order to improve operational efficiencies whilst still meeting the businesses strategic objectives.

In the customer service category, for example, one key function which has grown in importance during the last regulatory period is to investigate reports of poor quality power supply. In many cases this has been found to be a result of multiple domestic solar installations affecting both the service voltage and the harmonic content of a customer's supply. Investigations are usually initiated in response to a customer report of poor power quality. Essential Energy has an obligation to investigate and report on such complaints in a timely manner and to provide accurate information and advice to customers affected. Essential Energy also uses the outcomes of such investigations to inform its own network development plans, and to optimise the growth of the network in order to mitigate the occurrence of power quality issues in future.

In the network operation category, one function is to perform network switching operations on behalf of third parties (usually TransGrid). Essential Energy as the owner of the distribution network is often requested by TransGrid to reconfigure the distribution network in order to allow TransGrid to perform maintenance work on the transmission network without unduly affecting the power supply delivered to customers that would otherwise be affected. This function is an obligation of each of the NSW DNSPs in order to allow TransGrid to operate the state-wide supply system in accordance with statutory and licence requirements.

Details of which strategies and activities are principally used in relation to each non-asset class-specific function are given in section 4.3.

2.3 Essential differences

Both asset class specific and non-asset class specific strategies and activities are driven to achieve the same strategic objectives described in section 2.1. The key drivers, therefore, are primarily the same, such as achieving a safety environment where no one knowingly participates in an unsafe act, or achieving the reliability of supply and customer service standards required by the Licence Conditions. Where they differ, therefore, are the strategies employed in order to meet the requirements.

Asset class specific asset management plans and strategies are aimed specifically at operating and maintaining equipment belonging to the class of asset concerned; they are related to tangible assets or groups of assets. They encompass strategies such as:

- Operating an asset within its design or known limits;
- Being proactive about maximising the availability of the asset; and
- Understanding the risk to the network in the event that the asset becomes faulty to inform how it is used.

This can be demonstrated using the following example: The likelihood and/or consequence of failure of an asset is so high that the asset must be constantly checked and/or monitored; should the network have built-in

redundancy by duplicating key assets; or, conversely, is the likelihood and/or consequence of failure so low that the asset can be allowed to run to failure before it is replaced?

Non-asset class specific strategies are those that are related to technical functions required to service customers, to management of the overall network itself, and to undertake functions and processes that support the management of network assets. Such functions are not clearly identifiable as being related to individual asset classes, but may involve management of processes bridging across several asset classes.

For example, the work scheduling and programming function (WS&P) is tasked with coordinating and planning the maintenance requirements across all network assets. It generates schedules, work packages and budgets for maintenance projects, drawing on maintenance requirements derived from sources such as OEM-prescribed maintenance schedules, defect reports generated by asset inspectors, and fault reports resulting from customer complaints. The work is planned to make most efficient use of available physical and human resources whilst still meeting the acceptable risk tolerance of the business. It has to be flexible and responsive to urgent needs that arise from fault and emergency situations, and has to be able to amend and defer plans accordingly, sometimes at very short notice.

Another non-asset class specific function concerns Essential Energy's obligation to perform compliance inspection and testing of customer installations to check that the installations conform to AS/NZS 3000:2007 Wiring Rules, and to provide accurate, timely and readily understandable AS/NZS 3000:2007 Wiring Rules compliance inspection reports to customers and stakeholders in a format appropriate to their needs. In this function, Essential Energy is not maintaining its own network assets, but is dealing with its customers, and managing the risk to both its network and its customers' installations that would result from a non-compliant installation. The work is primarily performed by qualified regional inspection staff who are able to respond in a timely and efficient manner to customer requests.

The essential difference between system operational expenditure attributable to asset specific strategies and that attributable to non-asset specific strategies are the difference between expenditure used specifically on tangible assets, and that used on broader and non-tangible network services and functions.

2.4 System operational expenditure forecast

The consolidated system operational expenditure forecast for the regulatory period 2014-19 is shown in Table 9. Further details of the forecasts for asset class specific operational expenditure and non-asset class specific operational expenditure are shown in tables in section 3.1 and section 3.2 respectively.

Table 10 Consolidated system operational expenditure forecast [1]

Standard Control	Forecast Expenditure ($million, 2013-14)					Total Reg ($million, 2013-14)
	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2014-19
TOTAL (excluding alternative control)	**289**	**283**	**274**	**273**	**273**	**1392**
Asset Class Specific	**261**	**254**	**245**	**245**	**245**	**1250**
Inspection	22	22	22	22	22	111
Maintenance & Repair	54	54	54	54	54	270
Vegetation Management	113	107	98	97	97	511
Emergency Reponse	55	55	55	55	55	273
Other Network Maintenance	17	17	17	17	17	84
Non-Asset Class Specific	**28**	**28**	**28**	**28**	**28**	**142**
Network Operating Costs	1	1	1	1	1	6
Customer Service	13	13	13	13	13	67
Other Operating Costs	14	14	14	14	14	69

[1] Expenditure forecasts are direct dollars ($million, 2013-14) and therefore exclusive of overheads and labour and material escalators.

3. Detailed system operational expenditure forecasts

3.1 Asset class specific operational expenditure forecasts

The forecasts of operational expenditure for each asset class are drawn from the asset management plans and summarised in the following sections.

Expenditure forecasts in this section are presented as direct dollars ($million, 2012-13) and therefore exclusive of overheads and labour and material escalators. These forecasts have been sourced from Essential Energy's Asset Management Plans.

Table 11 Total operating expenditure by cost category (asset class specific only)

Standard Control Categories ($2012-13)	2014/15	2015/16	2016/17	2017/18	2018/19
Inspection	$22,249,147	$22,249,147	$22,249,147	$22,249,147	$22,249,147
Maintenance and repair	$53,906,506	$53,906,506	$53,906,506	$53,906,506	$53,906,506
Emergency Response (F&E)	$54,609,784	$54,609,784	$54,609,784	$54,609,784	$54,609,784
Other Network Maintenance	$16,889,995	$16,889,995	$16,889,995	$16,889,995	$16,889,995
Other (Vegetation Management)	$112,886,435	$106,741,738	$97,629,424	$97,223,254	$ 96,951,155

Table 12 Operating expenditure by cost category and AMP

Standard Control Categories ($2012-13)	2014/15	2015/16	2016/17	2017/18	2018/19
Inspection	**$ 22,249,147**	**$ 22,249,147**	**$ 22,249,147**	**$ 22,249,147**	**$ 22,249,147**
Customer Connections AMP (CEOM8018.03)	$ 639,866	$ 639,866	$ 639,866	$ 639,866	$ 639,866
Distribution O/H lines AMP (CEOM8018.01)	$ 15,495,252	$ 15,495,252	$ 15,495,252	$ 15,495,252	$ 15,495,252
Distribution Substations AMP (CEOM8018.04)	$ 3,017,741	$ 3,017,741	$ 3,017,741	$ 3,017,741	$ 3,017,741
Load Control Equipment AMP (CEOM8018.08)	$ -	$ -	$ -	$ -	$ -
Network U/G Systems AMP (CEOM8018.05)	$ 978,280	$ 978,280	$ 978,280	$ 978,280	$ 978,280
SCADA & DSA Equipment AMP (CEOM8018.09)	$ -	$ -	$ -	$ -	$ -
Subtransmission O/H lines AMP (CEOM8018.06)	$ 2,118,009	$ 2,118,009	$ 2,118,009	$ 2,118,009	$ 2,118,009
Maintenance and repair	$ 53,906,506	$ 53,906,506	$ 53,906,506	$ 53,906,506	$ 53,906,506
Customer Connections AMP (CEOM8018.03)	$ 2,903,351	$ 2,903,351	$ 2,903,351	$ 2,903,351	$ 2,903,351
Distribution O/H lines AMP (CEOM8018.01)	$ 39,538,505	$ 39,538,505	$ 39,538,505	$ 39,538,505	$ 39,538,505
Distribution Substations AMP (CEOM8018.04)	$ 4,286,080	$ 4,286,080	$ 4,286,080	$ 4,286,080	$ 4,286,080
Load Control Equipment AMP (CEOM8018.08)	$ 555,083	$ 555,083	$ 555,083	$ 555,083	$ 555,083
Network U/G Systems AMP (CEOM8018.05)	$ 2,948,977	$ 2,948,977	$ 2,948,977	$ 2,948,977	$ 2,948,977
SCADA & DSA Equipment AMP (CEOM8018.09)	$ 916,690	$ 916,690	$ 916,690	$ 916,690	$ 916,690
Subtransmission O/H lines AMP (CEOM8018.06)	$ 2,757,820	$ 2,757,820	$ 2,757,820	$ 2,757,820	$ 2,757,820
Emergency Response (F&E)	$ 54,609,784	$ 54,609,784	$ 54,609,784	$ 54,609,784	$ 54,609,784
Customer Connections AMP (CEOM8018.03)	$ 2,367,320	$ 2,367,320	$ 2,367,320	$ 2,367,320	$ 2,367,320
Distribution O/H lines AMP (CEOM8018.01)	$ 40,609,429	$ 40,609,429	$ 40,609,429	$ 40,609,429	$ 40,609,429
Distribution Substations AMP (CEOM8018.04)	$ 3,382,571	$ 3,382,571	$ 3,382,571	$ 3,382,571	$ 3,382,571
Load Control Equipment AMP (CEOM8018.08)	$ 2,067,000	$ 2,067,000	$ 2,067,000	$ 2,067,000	$ 2,067,000
Network U/G Systems AMP (CEOM8018.05)	$ 3,127,799	$ 3,127,799	$ 3,127,799	$ 3,127,799	$ 3,127,799
SCADA & DSA Equipment AMP (CEOM8018.09)	$ -	$ -	$ -	$ -	$ -
Subtransmission O/H lines AMP (CEOM8018.06)	$ 2,528,666	$ 2,528,666	$ 2,528,666	$ 2,528,666	$ 2,528,666
Network Metering AMP (CEOM8018.16)	$ 527,000	$ 527,000	$ 527,000	$ 527,000	$ 527,000
Other Network Maintenance	$ 16,889,995	$ 16,889,995	$ 16,889,995	$ 16,889,995	$ 16,889,995
Subtransmission Equipment AMP (CEOM8018.12)	$ 16,062,686	$ 16,062,686	$ 16,062,686	$ 16,062,686	$ 16,062,686
Subtransmission Transformers AMP (CEOM8018.11)	$ 427,309	$ 427,309	$ 427,309	$ 427,309	$ 427,309

Generation AMP (Broken Hill) (CEOM8018.10)	$ 400,000	$ 400,000	$ 400,000	$ 400,000	$ 400,000
Other	$ 112,886,435	$ 106,741,738	$ 97,629,424	$ 97,223,254	$ 96,951,155
Vegetation Management (CEOM8018.15)	$ 112,886,435	$ 106,741,738	$ 97,629,424	$ 97,223,254	$ 96,951,155

3.1.1 Distribution Overhead Feeders (CEOM8018.01)

The distribution overhead feeder's asset group makes up almost 48% of Essential Energy's total asset base by value. It includes distribution overhead conductors (LV and HV), poles, pole top hardware, stays, associated earthing, attachments, and pole-mounted network control equipment. The live components of this asset group generally operate at voltages up to 22kV, with some operating at 33kV.

The Network Control Equipment (NCE) included in this asset group is further categorised into switching and protection, and voltage control. NCE is comprised of a large quantity of assets such as air-break switches, reclosers, sectionalisers, line fuses, links, ring main units in switch cubicles, capacitor banks (outside zone substations), regulators and surge arrestors.

Table 13 Distribution overhead feeders – forecast operating expenditure

Distribution Overhead Feeders (CEOM8018.01)	2013/14 (forecast)	2014/15	2015/16	2016/17	2017/18	2018/19
Inspection	$ 15,495,252	$ 15,495,252	$ 15,495,252	$ 15,495,252	$ 15,495,252	$ 15,495,252
Maintenance and repair	$ 41,022,747	$ 39,538,505	$ 39,538,505	$ 39,538,505	$ 39,538,505	$ 39,538,505
Emergency Response (F&E)	$ 40,609,429	$ 40,609,429	$ 40,609,429	$ 40,609,429	$ 40,609,429	$ 40,609,429

3.1.2 Customer Connections (CEOM8018.03)

The Customer Connections asset group is defined as overhead and underground service lines including the associated attachments as defined in the Service & Installation Rules of NSW.

The overhead Customer Connections are defined as an overhead line operating at a voltage less than 1000 volts owned by Essential Energy and located or to be located between Essential Energy's overhead line and point of connection to an electrical installation.

The underground Customer Connections are defined as underground cables operating at a voltage less than 1000 volts owned by Essential Energy and located between Essential Energy's UGOH or pit or pillar and the point of connection to an electrical installation.

Table 14 Customer connection – forecast operating expenditure

Customer Connections (CEOM8018.03)	2013/14 (forecast)	2014/15	2015/16	2016/17	2017/18	2018/19
Inspection	$ 639,866	$ 639,866	$ 639,866	$ 639,866	$ 639,866	$ 639,866
Maintenance and repair	$ 2,903,351	$ 2,903,351	$ 2,903,351	$ 2,903,351	$ 2,903,351	$ 2,903,351
Emergency Response (F&E)	$ 2,367,320	$ 2,367,320	$ 2,367,320	$ 2,367,320	$ 2,367,320	$ 2,367,320

3.1.3 Distribution Substations (CEOM8018.04)

The substation assets group includes:

- Pole substations
- Padmount substations
- Chamber substations; and
- Ground substations

Table 15 Distribution substations – forecast operating expenditure

Distribution Substations (CEOM8018.04)	2013/14 (forecast)	2014/15	2015/16	2016/17	2017/18	2018/19
Inspection	$ 3,017,741	$ 3,017,741	$ 3,017,741	$ 3,017,741	$ 3,017,741	$ 3,017,741
Maintenance and repair	$ 4,286,080	$ 4,286,080	$ 4,286,080	$ 4,286,080	$ 4,286,080	$ 4,286,080
Emergency Response (F&E)	$ 3,382,571	$ 3,382,571	$ 3,382,571	$ 3,382,571	$ 3,382,571	$ 3,382,571

3.1.4 Network Underground Systems (CEOM8018.05)

The Network Underground Systems AMP includes:

- Distribution underground cables (HV & LV)
- Sub-transmission underground cables (33kV and above)
- Cable terminations: Underground switchgear terminations, OH – UG terminations known as “potheads”, and associated earthing
- Low Voltage cable pit and pillars.
- Cable access pits
- Conduits and under bores

Table 16 Network underground systems – forecast operating expenditure

Network Underground Systems (CEOM8018.05)	2013/14 (forecast)	2014/15	2015/16	2016/17	2017/18	2018/19
Inspection	$ 978,280	$ 978,280	$ 978,280	$ 978,280	$ 978,280	$ 978,280
Maintenance and repair	$ 2,948,977	$ 2,948,977	$ 2,948,977	$ 2,948,977	$ 2,948,977	$ 2,948,977
Emergency Response (F&E)	$ 3,127,799	$ 3,127,799	$ 3,127,799	$ 3,127,799	$ 3,127,799	$ 3,127,799

3.1.5 Subtransmission Overhead Feeders (CEOM8018.06)

The subtransmission overhead feeder's asset group makes up almost 7% of Essential Energy's total asset base by value. It includes subtransmission overhead conductors, poles, pole top hardware, stays, and associated earthing attachments; the live components of this asset group generally operate at voltages of 33, 66,110 and 132kV.

The limits of the Sub-transmission assets are from the Transmission Bulk Supply Point to the Distribution Zone Substation.

Table 17 Subtransmission overhead feeder – forecast operating expenditure

Subtransmission Overhead Feeders (CEOM8018.06)	2013/14 (forecast)	2014/15	2015/16	2016/17	2017/18	2018/19
Inspection	$ 2,118,009	$ 2,118,009	$ 2,118,009	$ 2,118,009	$ 2,118,009	$ 2,118,009
Maintenance and repair	$ 2,757,820	$ 2,757,820	$ 2,757,820	$ 2,757,820	$ 2,757,820	$ 2,757,820
Emergency Response (F&E)	$ 2,528,666	$ 2,528,666	$ 2,528,666	$ 2,528,666	$ 2,528,666	$ 2,528,666

3.1.6 Load Control Equipment (CEOM8018.08)

The Load Control asset group is defined on the basis of the common functions of providing the ability to turn OFF and ON electrical loads associated with concessional tariffs. Traditionally, this has been achieved by way of the use of time clocks installed on customer switchboards, or by the use of a Frequency Injection Relay (FIR) in lieu of a time clock. The Load Control asset group includes all Essential Energy Frequency Injection plant used in Zone Substations and Frequency Injection Relays mounted on customer switchboards.

Table 18 Load control equipment – forecast operating expenditure

Load Control Equipment (CEOM8018.08)	2013/14 (forecast)	2014/15	2015/16	2016/17	2017/18	2018/19
Inspection	-	-	-	-	-	-
Maintenance and repair	$ 555,083	$ 555,083	$ 555,083	$ 555,083	$ 555,083	$ 555,083
Emergency Response (F&E)	$ 2,067,000	$ 2,067,000	$ 2,067,000	$ 2,067,000	$ 2,067,000	$ 2,067,000

3.1.7 SCADA & DSA Equipment (CEOM8018.09)

The SCADA and DSA asset group is defined on the basis of the common functions of providing remote control and data acquisition of HV equipment used within both the Subtransmission and Distribution networks.

The SCADA asset group includes all Essential Energy Remote Terminal Devices used in Zone Substations and Communication devices used for interrogation of Field Reclosers and other distribution system monitoring devices. These devices are used on HV equipment with nominal primary voltages between 132kV and 6.6kV.

Table 19 SCADA & DSA equipment – forecast operating expenditure

SCADA & DSA Equipment (CEOM8018.09)	2013/14 (forecast)	2014/15	2015/16	2016/17	2017/18	2018/19
Inspection	-	-	-	-	-	-
Maintenance and repair	$ 916,690	$ 916,690	$ 916,690	$ 916,690	$ 916,690	$ 916,690
Emergency Response (F&E)	-	-	-	-	-	-

3.1.8 Generation (Regulated Assets) (CEOM8018.10)

This category currently includes all Essential Energy major generation facilities, which include Solar PV, Hydro and Diesel-fired Gas Turbines, as well as the civil infrastructure pertaining to those sites, such as dams, weirs, tunnel intakes, pipelines and access roads/bridges.

Only the diesel-fired gas turbines (Broken Hill) are Regulated assets and all other such assets within the current portfolio are under review currently as to their long-term future with Essential Energy. As such this cost below is restricted to Broken Hill alone.

Table 20 Generation (regulated assets) – forecast operating expenditure

Generation (Regulated Assets) (CEOM8018.10)	2013/14 (forecast)	2014/15	2015/16	2016/17	2017/18	2018/19
Inspection	-	-	-	-	-	-
Maintenance and repair	$ 400,000	$ 400,000	$ 400,000	$ 400,000	$ 400,000	$ 400,000
Emergency Response (F&E)	-	-	-	-	-	-

3.1.9 Subtransmission Transformers (CEOM8018.11)

The subtransmission transformer asset group is defined on the basis of the common functions of transformation and voltage control, and includes associated tap changers.

The transformer asset group includes all Essential Energy transformers and regulators with nominal primary voltages between 132kV and 6.6kV and includes regulators with rated voltages of up to 66kV.

Table 21 Subtransmission transformers – forecast operating expenditure

Subtransmission Transformers (CEOM8018.11)	2013/14 (forecast)	2014/15	2015/16	2016/17	2017/18	2018/19
Inspection	-	-	-	-	-	-
Maintenance and repair	$ 427,309	$ 427,309	$ 427,309	$ 427,309	$ 427,309	$ 427,309
Emergency Response (F&E)	-	-	-	-	-	-

3.1.10 Subtransmission Equipment (CEOM8018.12)

The Subtransmission equipment asset group is defined as all Subtransmission equipment located within a securely fenced Essential Energy zone substation, with nominal primary voltages between 132kV and 6.6kV. Subtransmission equipment typically comprises circuit breakers, switchboards, instrument transformers, surge diverters, batteries and protection relays. This category also includes all civil aspects associated with zone substations.

Table 22 Subtransmission equipment – forecast operating expenditure

Subtransmission Equipment AMP (CEOM8018.12)	2013/14 (forecast)	2014/15	2015/16	2016/17	2017/18	2018/19
Inspection	-	-	-	-	-	-
Maintenance and repair	$16,062,686	$16,062,686	$16,062,686	$16,062,686	$16,062,686	$16,062,686
Emergency Response (F&E)	-	-	-	-	-	-

3.1.11 Vegetation Management (CEOM8018.15)

Essential Energy considers the management of vegetation along its feeder routes to be an asset class for the purposes of asset management. Vegetation Management operational expenditure is categorised according to the various programmes implemented, as follows:

- Cyclic maintenance;
- Aerial patrol (LiDAR);
- Immature tree clearing;
- Hazard tree program; and
- Management & administration.

Table 23 Vegetation management – forecast operating expenditure

Vegetation Management (CEOM8018.15)	2013/14 (forecast)	2014/15	2015/16	2016/17	2017/18	2018/19
Cyclic Maintenance	$ 77,268,323	$ 65,398,958	$ 62,390,975	$ 58,918,811	$ 58,917,465	$58,916,562
Aerial Patrol (LiDAR)	$ 28,684,000	$ 21,736,920	$ 19,414,098	$ 18,598,834	$ 18,598,409	$18,598,124
Immature Tree Clearing	$ 21,197,677	$ 18,778,837	$ 18,545,355	$ 14,302,608	$ 14,302,281	$14,302,062
Hazard Tree Program	-	$ 4,971,720	$ 4,391,310	$ 3,809,170	$ 3,405,099	$ 3,134,407
Management & Administration	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000

3.1.12 Network Metering (CEOM8018.16)

Network metering assets include electricity meters, instrument transformers, and associated communications equipment (such as modems and radio transceivers) for metering and at wholesale metering points, and metering installed at the customer's premises over and above customer requirements for network monitoring purposes.

Table 24 Network Metering – forecast operating expenditure

Network Metering AMP (CEOM8018.16)	2013/14 (forecast)	2014/15	2015/16	2016/17	2017/18	2018/19
Inspection	-	-	-	-	-	-
Maintenance and repair	-	-	-	-	-	-
Emergency Response (F&E)	$ 527,000	$ 527,000	$ 527,000	$ 527,000	$ 527,000	$ 527,000

3.2 Non-asset class specific operational expenditure forecasts

The forecasts of operational expenditure for non-asset class-specific functions and activities are drawn from the Essential Finance systems and summarised in the following sections.

Expenditure forecasts in following sections are presented as direct dollars ($million, 2012-13) and therefore exclusive of overheads and labour and material escalators. These forecasts have been sourced from Essential Energy's Finance systems.

Table 25 Non-asset class specific - forecast operating expenditure

Category	Function	2013/14 (forecast)	2014/15	2015/16	2016/17	2017/18	2018/19
Customer service	**Quality of supply investigation**	$ 4,136,042	$4,136,042	$4,136,042	$4,136,042	$4,136,042	$4,136,042
	Customer network support	$3,611,097	$3,611,097	$3,611,097	$3,611,097	$3,611,097	$3,611,097
	Installation	$3,659,571	$3,659,571	$3,659,571	$3,659,571	$3,659,571	$3,659,571

	inspections						
	Other	$2,060,419	$2,060,419	$2,060,419	$2,060,419	$2,060,419	$2,060,419
Network operation	**Network operation and control**	$ 254,466	$ 254,466	$ 254,466	$ 254,466	$ 254,466	$ 254,466
	Field switching for third parties	$ 880,972	$ 880,972	$ 880,972	$ 880,972	$ 880,972	$ 880,972
Other operating expenses	**Data capture**	$2,851,604	$2,851,604	$2,851,604	$2,851,604	$2,851,604	$2,851,604
	Works Scheduling & Programming	$6,340,607	$6,340,607	$6,340,607	$6,340,607	$6,340,607	$6,340,607
	Other	$4,627,067	$4,627,067	$4,627,067	$4,627,067	$4,627,067	$4,627,067

3.2.1 Customer service

Customer service, as it relates to non-asset class specific category is the provision of service to customers that ensures the business is focussed on delivering customer value through the provision safe and affordable services, efficient and quality customer service. There are three main activities covered under non-asset class specific operating expenditure:

3.2.1.1 Quality supply investigation

Essential Energy performs quality supply investigations to ensure its compliance with AS 6003.8 Standard Voltages and the Electricity Supply Act 1995.

All direct expenditure related to the investigation, analysis and advice on quality supply issues

- Used by Power quality technicians
- Perform tests and quality assurance based on incoming request; Essential Energy also uses the outcomes of such investigations to inform its own network development plans, and to optimise the growth of the network in order to mitigate the occurrence of power quality issues in future.
- In some cases, qualified depot employees will examine supply issues.

Work orders are initiated in two ways for the Power Quality Technicians:

1. Customer Complaints and/or
2. Internally initiated by planners (Network Planning Engineering Officers)

3.2.1.2 Customer network support

Field related contact with customers in relation to asset management, metering, tariff advice, padlock requests and field access issues to ensure compliance with *Electricity (Consumer Safety) Regulation 2006* and *National Electricity Rules*.

- Time is allocated manually through timesheets.
- Monthly tracking report demonstrates a region's performance against budget on customer service level.
- FY13 life support program is also linked to National Energy Customer Framework (NECF).

3.2.1.3 Installation inspections

Inspection, testing and works associated with customer installations to ensure compliance with AS3000 and NSW wiring rules

Essential Energy's obligation to perform compliance inspection and testing of customer installations to check that the installations conform to AS/NZS 3000:2007 Wiring Rules, and to provide accurate, timely and readily understandable AS/NZS 3000:2007 Wiring Rules compliance inspection reports to customers and stakeholders in a format appropriate to their needs.

In this function, Essential Energy is not maintaining its own network assets, but is dealing with its customers, and managing the risk to both its network and its customers' installations that would result from a non-compliant installation. The work is primarily performed by qualified regional inspection staff who are able to respond in a timely and efficient manner to customer requests.

1. When electrical work has been completed, certified contractor/Accredited Service Provider will submit Certification of Compliance Electrical Work and Notification of Services Work into Essential Energy's Secure Web Form data base.
2. New Connections Team will issue Works Instruction – includes specific details on what needs to be inspected
3. Works Instruction is sent by email to relevant Resource Supervisor (depot) who will allocate to qualified Electrical Technicians
4. Personnel inspect installation and resubmits the Works Instruction into Secure Webform
5. New Connections Team verifies the information collected against the information within CIS is correct and compliant.
    - Each region has a number of installation inspectors who by NSW Wiring rules will inspect a specific number of customer premises and ensure they are safe etc.
    - Increase number of solar installations has caused spikes in number of inspections – particular north coast

3.2.2 Network operation

As it relates to system operating expenditure specifically, deals with fault finding, switching, isolation and maintenance of network access procedures.

3.2.2.1 Field switching for 3rd party

Expenditure related to operation requests to assist 3rd Parties, including TransGrid, Ergon Energy, Energex, Powerlink and high voltage customers. Essential Energy must comply with *National Electricity Rules*, W*ork Health and Safety Act (NSW) 2011*, and *Electricity (Consumer Safety) Regulation 2006*, in working with 3rd parties.

1. 3rd Party will normally notify via System Control Engineering / System Operations Coordinators 3 months in advance.
2. Essential analyse and approve / reject and schedule.

If the 3rd Party advice impacts a customer, normal Switching Request Register protocols and timelines apply regarding NECF.

3.2.3 Other operating expenses

This includes all activities that relate the ongoing maintenance and support of Essential Energy's assets and the ongoing operation of Essential Energy's network system.

3.2.3.1 Work scheduling & programming

This is used by schedulers when initiating projects.

Work scheduling and programming function (WS&P) is tasked with coordinating and planning the maintenance requirements across all network assets. It generates schedules, work packages and budgets for maintenance projects, drawing on maintenance requirements derived from sources such as OEM-prescribed maintenance schedules, defect reports generated by asset inspectors, and fault reports resulting from customer complaints.

Efficient management and delivery of work is required under the *State Owned Corporation Act 1989 (NSW).*

3.2.3.2 Data capture

Field technicians have the ability to capture more and better quality, asset management data. Improved data capturing processes allow for better analysis and evaluation and forms fundamental element in asset management decision making and through its analysis it helps to drive the inspection and works programs which results in improved resource allocation.

The data is also used to support the business in meeting legislative and business requirements, including *Electricity Supply (Corrosion Protection) Regulation 2008*, *State Environment Planning Policy (Infrastructure) 2008,* and monitor performance against management plans required under the *Electricity Supply (Safety and Network Management) Regulation, 2002.*

3.2.3.3 Other

- Outage Management
- Business Processes and Data
- Policy & Procedure Standards
- System Maintenance
- Operational Design
- Property Enquiries
- Network Pricing
- System Support
- Protection Design & Investigation
- Protection Database Maintenance
- Data Audit

4. Asset class operational expenditure strategies

4.1 Operational expenditure strategy overview

Essential Energy must meet the strategic objectives discussed in Section 2.1 at the lowest whole of lifecycle asset cost, whilst meeting and maintaining compliance with all statutory requirements, licence conditions and service level obligations.

In order to meet these objectives and close existing asset performance gaps, each asset class requires a selection of operation and maintenance strategies which are designed and employed to ensure operational expenditure is prudently and efficiently delivered, with due consideration for the concurrent expenditure of capital necessary to meet the same strategic objectives. While there is by necessity much commonality in these strategies across the asset classes there are also numerous differences in Essential Energy's tactical approach to their delivery. Detailed discussion of the application of each of these strategies is provided in Section 8.2 of each of the following Asset Management Plans.

- Distribution Overhead Feeders (COEM8018.01)
- Customer Connections (CEOM8018.03)
- Distribution Substations (CEOM8018.04)
- Network Underground Systems (CEOM8018.05)
- Subtransmission Overhead Feeders (CEOM8018.06)
- Telecommunications (CEOM8018.07)
- Load Control Equipment (CEOM8018.08)
- SCADA & DSA Equipment (CEOM8018.09)
- Generation (Regulated Assets) (CEOM8018.10)
- Subtransmission Transformers (CEOM8018.11)
- Subtransmission Equipment AMP (CEOM8018.12)
- Vegetation Management (CEOM8018.15)
- Network Metering AMP (CEOM8018.16)

Set out in Section 4.2 are summaries of the overarching business drivers and high level operational expenditure strategies for each asset class. Section 4.3 describes the categories of non-asset class operational expenditure with the drivers and strategies associated with each.

4.2 Asset class strategies

4.2.1 Distribution Overhead Feeders

Drivers	Safety; reliability; licence compliance; asset condition; technological obsolescence; quality of supply; demand management; growth; security of supply
Operational Strategies	Asset availability is proactively managed Operational risk is understood and managed Protective measures are engineered into the network to aid operation Assets are operated within design parameters Operational resources are strategically deployed Selected assets are run to failure
Maintenance Strategies	Asset condition is actively monitored Testing, preventative and corrective maintenance is employed Asset data is captured through maintenance practices Essential spares and parts are actively managed Risk-based techniques are employed to prioritise maintenance activity Navigable waterways crossings are assessed and treated

4.2.2 Customer Connections

Drivers	Safety; reliability; licence compliance; asset condition; technological obsolescence; quality of supply; demand management; growth; security of supply
Operational Strategies	Asset availability is proactively managed Operational risk is understood and managed Protective measures are engineered into the network to aid operation Assets are operated within design parameters Operational resources are strategically deployed Assets are linked to Customer information and expectations
Maintenance Strategies	Asset condition is actively monitored Testing, preventative and corrective maintenance is employed Asset data is captured through maintenance practices Essential spares and parts are actively managed Risk-based techniques are employed to prioritise maintenance activity

4.2.3 Distribution Substations

Drivers	Safety; reliability; licence compliance; asset condition; technological obsolescence; quality of supply; demand management; growth; security of supply
Operational Strategies	Asset availability is proactively managed Fault and emergency information is used to make real-time decisions Operational risk is understood and managed Protective measures are engineered into the network to aid operation Assets are operated within design parameters Operational resources are strategically deployed Selected assets are run to failure
Maintenance Strategies	Asset condition is actively monitored Asset data is captured at the time of inspection Testing, preventative and corrective maintenance is employed Essential spares and parts are actively managed Risk-based techniques are employed to prioritise maintenance activity

4.2.4 Underground Network Systems

Drivers	Safety; reliability; licence compliance; asset condition; technological obsolescence; quality of supply; demand management; growth; security of supply
Operational Strategies	Asset availability is proactively managed Network reliability is continuously managed Operational risk is understood and managed Protective measures are engineered into the network to aid operation Assets are operated within design parameters Operational resources are strategically deployed Selected assets are run to failure
Maintenance Strategies	Asset condition is actively monitored Asset data is captured at the time of inspection Testing, preventative and corrective maintenance is employed Essential spares and parts are actively managed Risk-based techniques are employed to prioritise maintenance activity

4.2.5 Subtransmission Overhead Feeders

Drivers	Safety; reliability; licence compliance; asset condition; technological obsolescence; quality of supply; demand management; growth; security of supply
Operational Strategies	Asset availability is proactively managed Network reliability is continuously managed Operational risk is understood and managed Protective measures are engineered into the network to aid operation Assets are operated within design parameters Operational resources are strategically deployed Selected assets are run to failure
Maintenance Strategies	Asset condition is actively monitored Asset data is captured at the time of inspection Testing, preventative and corrective maintenance is employed Essential spares and parts are actively managed Risk-based techniques are employed to prioritise maintenance activity

4.2.6 Telecommunications

Drivers	Safety; reliability; licence compliance; asset condition; technological obsolescence; quality of supply; demand management; growth; security of supply
Operational Strategies	Asset changes are proactively managed Core network data access is obtained at least cost System redundancy is used to maintain asset availability
Maintenance Strategies	Asset condition is actively monitored Asset data is captured through maintenance practices Testing, preventative and corrective maintenance is employed Maintenance activities are managed to minimise impacts Maintenance activities and outcomes are documented Essential spare parts and maintenance contracts are actively managed Risk-based techniques are employed to prioritise maintenance activity Failure impacts are actively managed to resolution Resources are strategically deployed to achieve response times

4.2.7 Load Control Equipment

Drivers	Safety; reliability; licence compliance; asset condition; demand management; growth; security of supply
Operational Strategies	Asset availability is proactively managed Operational risk is understood and managed Operation is aided by engineered protective measures Assets are operated within design parameters Operational resources are strategically deployed Selected assets are run to failure
Maintenance Strategies	Asset condition is actively monitored Asset data is captured at the time of inspection and corrective maintenance Testing, preventative and corrective maintenance is employed Essential spares and parts are actively managed Resources are strategically deployed to achieve response times

4.2.8 SCADA & DSA Equipment

Drivers	Safety; reliability; licence compliance; asset condition; technological obsolescence; quality of supply; demand management; growth; security of supply
Operational Strategies	Asset availability is proactively managed Operational risk is understood and managed Operation is aided by engineered protective measures Assets are operated within design parameters Operational resources are strategically deployed
Maintenance Strategies	Asset condition is actively monitored Testing, preventative and corrective maintenance is employed Asset data is captured through maintenance practices Essential spares and parts are actively managed Risk-based techniques are employed to prioritise maintenance activity

4.2.9 Generation (Regulated Assets)

Drivers	Safety; reliability; licence compliance; asset condition; technological obsolescence; quality of supply;
Operational Strategies	Asset availability is proactively managed Operational risk is understood and managed Operation is aided by engineered protective measures Assets are operated within design parameters Operational resources are strategically deployed
Maintenance Strategies	Asset condition is actively monitored Testing, preventative and corrective maintenance is employed Asset data is captured through maintenance practices Essential spares and parts are actively managed

4.2.10 Subtransmission Transformers

Drivers	Safety; reliability; licence compliance; asset condition; quality of supply; security of supply;
Operational Strategies	Asset availability is proactively managed Operational risk is understood and managed Operation is aided by engineered protective measures Assets are operated within design parameters Operational resources are strategically deployed Selected assets are run to failure
Maintenance Strategies	Asset condition is actively monitored Testing, preventative and corrective maintenance is employed Maintenance is prioritised using risk-based techniques Non-intrusive maintenance techniques are employed Critical components are maintained Essential spares and parts are actively managed Asset data is captured through maintenance practices

4.2.11 Subtransmission Equipment

Drivers	Safety; reliability; licence compliance; asset condition; quality of supply; security of supply; growth;
Operational Strategies	Asset availability is proactively managed Operational risk is understood and managed Operation is aided by engineered protective measures Assets are operated within design parameters Operational resources are strategically deployed Selected assets are run to failure
Maintenance Strategies	Asset condition is actively monitored Testing, preventative and corrective maintenance is employed Maintenance is prioritised using risk-based techniques Non-intrusive maintenance techniques are employed Essential spares and parts are actively managed Asset data is captured through maintenance practices

4.2.12 Vegetation Management

Drivers	Safety; reliability; licence compliance; growth;
Maintenance Strategies	Vegetation management scoping guidelines and work scope identification training will be revised and implemented Trained scopers are employed A vegetation management information system (VIMS) will be implemented LiDAR data will be increasingly used to identify risks and optimise work-package scoping Cyclic maintenance frequencies will be increased until efficiency and effectiveness is optimised Pre-summer aerial inspections will be gradually reduced using a risk-based approach which is carefully coordinated with the increase in cyclic maintenance Network growth projects and routine inspections of distribution overhead feeder assets are leveraged to provide vegetation management information The corridor reclamation program will be replaced with a targeted hazard tree approach integrated with the cyclic maintenance program Vegetation cutting is outsourced using competitive tendering Scope and scale efficiencies are managed Quality and compliance are assured through audit practices All vegetation management stakeholder relationships are actively managed

4.2.13 Network Metering

Drivers	Safety; licence compliance; asset condition; quality of data;
Operational Strategies	Asset availability is proactively managed Controlled Load Profile Data is validated and provided to National Electricity Market Operational risk is understood and managed Operation is aided by engineered protective measures Assets are operated within design parameters Operational resources are strategically deployed
Maintenance Strategies	Asset condition is actively monitored Load control relay assets that fail in service are replaced. Non-intrusive maintenance techniques are employed Critical metering installations are inspected and maintained Essential spares and parts are actively managed Asset data is captured through maintenance and inspection practices

4.3 Non-asset specific operational expenditure strategies

4.3.1 Customer Service

4.3.1.1 Quality of supply investigation (Project code 11110)

Drivers	Essential Energy is bound by the provisions of the Electricity Supply (Safety and Network Management) Regulation 2008 (NSW), specifically to the safe operation of the distribution system Meet Australian standard AS 6003.8 Standard Voltages and the Electricity Supply Act 1995 requirements for power supply quality Publish quality of supply Service Standards as set out in the National Electricity Rules Meet the Reliability Standards as set out in Schedule 2 of the Licence Conditions. Volume driven by asset condition, technological obsolescence, demand management, and growth
Opex Strategies	Maintain the Network Power Quality Strategy 2014-19 (CEOP2090) and manage the network according to this document. Investigate all supply quality issues using a risk-based approach to prioritise all actions Undertake analysis of supply quality issues using all available data and information in accordance with recognised industry best practice Provide timely and accurate reporting on supply quality issues to all stakeholders in accordance with our corporate obligations Provide timely and accurate advice to all stakeholders to minimise supply quality issues Make available all supply quality information for the optimisation of the distribution network

	and its operation to prevent the occurrence of unwanted supply quality issues

4.3.1.2 Customer network support (Project code 11115)

Drivers	Comply with Electricity (Consumer Safety) Regulation 2006 and National Energy Retail Rules Comply with Code of Practice (NSW) 2006 – Work near overhead power lines and WorkCover Guide 'Work near Underground Assets" Meet the Safety and Reliability Standards. Essential Energy's Customer Value Strategy outlines a requirement to engage with individual customers, local councils, community groups and other stakeholders on local network management issues. Activities driven by Essential Energy's aim to protect the safety of employees, customers, contractor and the public from network assets. Volume driven by asset condition, quality of supply, demand management and growth.
Opex Strategies	Respond to all customer enquiries and reporting in a timely manner commensurate with their expectations and our corporate obligations Prevent unauthorised access to network assets, particularly by non- Essential Energy staff and contractors, e.g. customers and community Notify customers of planned interruptions to supply of electricity Meet the Safety and Reliability Standards Provide accurate, timely and readily understandable information on tariffs and metering to all customers and prospective customers in a format appropriate to their needs Negotiate and manage mutually acceptable locking solutions with all stakeholders where shared pedestrian and vehicle access arrangements are necessary for network operation and maintenance

4.3.1.3 Installation inspections (Project code 11120)

Drivers	Inspections required to ensure installations are safe or customers in accordance with Electricity Supply Act 1995 Clause 10 (c) and that installation comply with: ▪ AS/NZS 3017:2001 Electrical installations – Testing and installation guidelines ▪ AS/NZS 3000:2007 Wiring rules ▪ AS 5804.1 High Voltage Live Working ▪ AS 4741-2010 Neutral Integrity Installation inspections including notification of installation defects must comply with Electricity (Consumer Safety) Regulation 2006, Chapter 3.
Opex Strategies	Respond to all customer requests for AS/NZS 3000:2007 Wiring Rules compliance inspection and testing in a timely manner commensurate with their expectations and our corporate obligations Provide accurate, timely and readily understandable AS/NZS 3000:2007 Wiring Rules compliance inspection reports to customers and stakeholders in a format appropriate to their needs Manage in a proactive manner the increasing AS/NZS 3000:2007 Wiring Rules compliance risk within customer premises which have embedded PV generation

4.3.2 Network operation

4.3.2.1 Field switching for 3rd party (Project code 11500)

Drivers	Safety; reliability; licence compliance; security of supply. Essential Energy under the National Electricity Rules, W*ork Health and Safety Act (NSW) 2011*, and *Electricity (Consumer Safety) Regulation 2006*, is required to provide 3rd Parties with safe and authorised access to its electrical network. Essential Energy must ensure load levels to not exceed specified limits by TNSPs. Volume driven by quality and security of supply, demand management, and growth
Opex Strategies	Maintain a safe work environment, and provide clearance and safe access for authorised 3rd Parties Execute 3rd Party initiated field switching work requests in a timely manner commensurate with our mutually agreed expectations and our corporate obligations Manage customer load in coordination with TNSPs to ensure the load level does not exceed specified limit 3rd Parties include TransGrid, Ergon Energy, Energex, Powerlink and High Voltage Customers.

4.3.3 Other operating expenses

4.3.3.1 Work scheduling and programming (Project code 12630)

Drivers	Comply with *Electricity Supply (Safety and Network Management) Regulation 2008 (NSW)* and *Protection of the Environment Operations Act 1997*, in ensuring network assets can safely deliver reliable supply of electricity while minimising its impact on the environment. Comply with *State Owned Corporation Act 1989 (NSW)* in efficiently managing and delivering work. Comply with Reliability Standards as set out in Schedule 2 of the Licence Conditions. Meet customer expectations that all effort is made to ensure the network activities and services are managed and delivered in the most cost effective manner Meet Industry Best Practice in project and program management, including governance and project delivery.
Opex Strategies	Scheduling – planning and coordination of asset maintenance requirements across the network to achieve efficient use of resources within the risk tolerance of the business, while ensuring assets are effectively maintained to deliver safe, reliable supply of electricity Estimation – develop work packs, allocate budget to scheduled asset management requirements to govern efficient expenditure and meet network needs/demands Process improvement – review maintenance outcomes and adjust scheduling and estimation processes accordingly Reporting and data capture – updating of like-for-like replacement asset management and GIS data Respond to fault and emergency situations – respond flexibly, efficiently and effectively to reports of fault and emergency issues; amend and defer planned schedules and estimates as required

4.3.3.2 Data capture

Drivers	Essential Energy requires operation and asset data to be captured to support: ■ Delivery of safe, reliable electricity as outlined in *Electricity Supply Act 1995* ■ Efficient management and delivery of network works as set out in *State Owned Corporation Act 1989 (NSW)* ■ Monitoring of its performance against Guaranteed Service Standards outlined in *Electricity Supply (General) Regulation 2001*, Reliability Standards as set out in Schedule 2 of the Licence Conditions, and against various management plans required under the *Electricity Supply (Safety and Network Management) Regulation, 2002* ■ Recording of network asset data and activities in accordance with *Electricity Supply (Corrosion Protection) Regulation 2008*, *State Environment Planning Policy (Infrastructure) 2008*, and National Electricity Rules ■ Compliance with ISSC and ENA Guidelines Volume driven by demand management and growth.
Opex Strategies	Accurate recording and entry of asset details in asset management (WASP) and GIS (Smallworld) databases. Accurate entry of inspection and testing modules to asset management system. Maintenance and modification of asset data following operation and maintenance activities Entry of defect records into workpack system Periodic data cleansing, quality checks and validation

5. Forecast – operating expenditure

Essential Energy are proposing $1.45 billion ($2013/14) of operating expenditure to manage all assets classes (asset specific and non-asset specific categories) throughout the next regulatory period, and will continue to focus on realising efficiencies which result in a decrease in operating costs towards the end of 2014-19 – refer to sections 2.4 and 3 of this document and Chapter 6 of the Essential Energy Substantive Proposal for more information.

Chapter 6 of the Substantive Proposal details the forecasting methodologies used to develop forecasts. This section will summarise the individual methods used for each asset classes and list key assumptions or any variations.

The key drivers that underpin forecast approach are:

1. The need to keep the network safe and reliable and comply with obligations. Customers have indicated that they are concerned with network prices, particularly large increases in the past. However, Essential Energy is also obliged to meet legislative and regulatory obligations as well as ensuring that the network is safe and reliable.
2. There are unavoidable upward pressures on the operating costs forecast in the next period (labour and materials). Whilst performance during the current period has provided Essential Energy with a solid platform going forward, there are however necessary increases in operating expenditure requirements for the 2014-19 period.
3. Essential Energy will minimise price pressures through efficiency savings ie: vegetation management.

Essential Energy has incorporated these efficiency savings into our forecasts to offset these increases to operating expenditure to contain average increases in their share of customers' electricity bills at or below CPI.

5.1 Forecasting methodologies

The rules require Essential Energy to provide information on the methods used to develop the forecast operational expenditure as well the forecast of key variables and the key assumptions underlying the forecast operational expenditure. This is detailed in the following sections.

Each forecast method is described in Chapter 6 of the Substantive Proposal and summarised below:

- Base year method ('revealed cost' or 'base step trend')
  - Base year method – variation by volume
  - Base year method – historical averaging
- Bottom up method
- Forecast of debt raising costs

Table 26Summary of forecast method by asset class and AMP

	Base Year			Bottom Up	'Top down' approach
	Base Year	Variation by Volume	Historical Averaging		
Inspection					
Customer Connections AMP (CEOM8018.03)	✓	✓			
Distribution O/H lines AMP (CEOM8018.01)	✓				
Distribution Substations AMP (CEOM8018.04)	✓				
Network U/G Systems AMP (CEOM8018.05)	✓				
Subtransmission O/H lines AMP (CEOM8018.06)	✓				
Maintenance and Repair					
Customer Connections AMP (CEOM8018.03)	✓				
Distribution O/H lines AMP (CEOM8018.01)	✓				
Distribution Substations AMP (CEOM8018.04)	✓				
Subtransmission O/H lines AMP (CEOM8018.06)	✓				
Load Control Equipment AMP (CEOM8018.08)	✓				
Network U/G Systems AMP (CEOM8018.05)	✓				
SCADA & DSA Equipment AMP (CEOM8018.09)	✓				
Other Network Maintenance					
Subtransmission Equipment AMP (CEOM8018.12)	✓				
Subtransmission Transformers AMP (CEOM8018.11)	✓				
Generation AMP (Broken Hill) (CEOM8018.10)	✓				
Emergency Response (F&E)					
Customer Connections AMP (CEOM8018.03)	✓				
Distribution O/H lines AMP (CEOM8018.01)	✓				
Distribution Substations AMP (CEOM8018.04)	✓				
Load Control Equipment AMP (CEOM8018.08)	✓				
Network U/G Systems AMP (CEOM8018.05)	✓				
Subtransmission O/H lines AMP (CEOM8018.06)	✓				
Network Metering AMP (CEOM8018.16)	✓				
Other: Vegetation Management					
Vegetation management AMP (CEOM8018.15)					
Proposed Programs					
Cyclic maintenance;	✓	✓			
Aerial patrol (LiDAR);	✓			✓	
Immature tree clearing;	✓			✓	
Hazard tree program; and	✓				
Management & administration.	✓			✓	

5.2 Key assumptions and variations

The rules further require Essential Energy to include in the regulatory proposal the forecast of key variables relied upon to derive the forecast operating expenditure and the method used (above) to develop these forecast of key variables.

Chapter 6 of the Substantive Proposal details the key variables as:

There are four key variables in our application of the base year method and its variants. These are:

- The base year.
- Actual annual maintenance opex incurred during the current period.
- Real cost escalation.
- Change factors. These comprises of:
    - Cost increases to comply with legislative obligations and due to changed circumstances.
    - Growth factors where applicable.
    - Productivity savings to offset necessary cost increases.

This section details which of these variation apply to the different cost categories.

Table 27 Summary of variables and assumptions used by category

Inspection	Assumptions
Customer Connections AMP (CEOM8018.03)	Number of routine maintenance inspection programs (annual, 4 year) Ad-hoc inspections are also undertaken following major weather events and unforeseen destructive events Specific inspections regimes may be deployed where risk analysis indicates it is warranted e.g. public shock, failure rates Expenditure based on 'base' unit cost
Distribution O/H lines AMP (CEOM8018.01)	Routine pole and line inspection number Expenditure based on cost esclation applied to 'base' unit cost, and then used to forecast average unit cost for each year
Distribution Substations AMP (CEOM8018.04)	Number of routine inspection regimes, either 4 years, 6 months or annual depending on the type of inspection
Network U/G Systems AMP (CEOM8018.05)	Routine asset inspection program - 4 yearly inspection cycle Expenditure based on 'base' unit cost
Subtransmission O/H lines AMP (CEOM8018.06)	Number of routine asset inspection program (annual, 4 year, 8 year) - pole and line 4 yearly inspection cycle - live line pole top insepections
Maintenance and Repair	**Assumptions**
Customer Connections AMP (CEOM8018.03)	Maintenance practices based on on cyclic testing and maintenance routine Expenditure based on 'base' unit cost
Distribution O/H lines AMP (CEOM8018.01)	Number of routine maintenance program (6month, annual and 4 yearly) Expenditure based on cost esclation applied to 'base' unit cost, and then used to forecast average unit cost for each year
Distribution Substations AMP (CEOM8018.04)	Maintenance practices based on on cyclic testing and maintenance routine Expenditure based on 'base' unit cost
Subtransmission O/H lines AMP (CEOM8018.06)	Maintenance practices based on on cyclic testing and maintenance routine Expenditure based on 'base' unit cost
Load Control Equipment AMP (CEOM8018.08)	Expenditure based on 'base' unit cost
Network U/G Systems AMP (CEOM8018.05)	Maintenance practices based on on cyclic testing and maintenance routine Expenditure based on 'base' unit cost
SCADA & DSA Equipment AMP (CEOM8018.09)	Expenditure based on 'base' unit cost
Other Network Maintenance	**Assumptions**
Subtransmission Equipment AMP (CEOM8018.12)	Number of routine maintenance program (annual, 2 year, 4 yearl, 10 year depending on equipment) Expenditure based on 'base' unit cost
Generation AMP (Broken Hill) (CEOM8018.10)	Expenditure based on 'base' unit cost
Subtransmission Transformers AMP (CEOM8018.11)	Number of routine maintenance and testing programs (annual, 2 year, 4 year, 8 year depending on asset and test required) Expenditure based on 'base' unit cost
Emergency Response (F&E)	**Assumptions**
Customer Connections AMP (CEOM8018.03)	Restore services where unplanned failure has occurred Expenditure based on 'base' unit cost

Distribution O/H lines AMP (CEOM8018.01)	Expenditure based on cost escalation applied to 'base' unit cost, and then used to forecast average unit cost for each year
Distribution Substations AMP (CEOM8018.04)	Expenditure based on 'base' unit cost
Load Control Equipment AMP (CEOM8018.08)	Expenditure based on 'base' unit cost
Network U/G Systems AMP (CEOM8018.05)	Expenditure based on 'base' unit cost
Subtransmission O/H lines AMP (CEOM8018.06)	Expenditure based on 'base' unit cost