ATTACHMENT 8.1
PUBLIC LIGHTING PROPOSAL

CONTENTS

Alternate Control Services – public lighting

1.1 Executive Summary

Essential Energy proposes to move to a more cost reflective tariff structure for the new determination period.

Essential Energy has prepared tariff models for the transitional year 2014/15 and the balance of the regulatory period commencing 2015/19 adjusting inputs to reflect current costs including but not limited to the following;

Component	Old Value	New Value
On Cost Materials Rate	30%	7.94%
On Cost Labour Rate	130.93%	56.95%
On Cost Plant Rate	30%	30%
Div *& Corp Overheads	0%	41.25%
WACC	8.07%	7.09%
EWP Rate	$62.17	$53.84
Standard Labour Rate	$34.54	$38.76
Pole Maintenance Frequency	4.5 years	4 years
Timber Pole Maintenance Costs	$9.98	$13.35
Bulk Lamp Replacement Frequency	4 years	3 years
Approximate average defect rate	3.6%	7.9%
Contract bulk unit rate	$16.88	$28.66

Essential Energy has also adjusted its models to introduce cost reflectivity and in doing so has made adjustments to the costing in the categories below;

- Bulk Lamp Maintenance Program
    - Current contract rates
    - Current Material contract rates
- Spot Maintenance
    - Based on historical luminaire defect rates
    - Number of defects per trip
    - Time to travel to maintain street lights

The information below details how the current regulated tariffs are below efficient cost reflective levels, the reasons behind this, and how we propose to converge revenue from tariffs with efficient costs over the course of the period to 30 June 2019.

Essential Energy proposes an average increase of 62% the financial year 2015/16 in street light tariffs, in order to attain cost reflectivity, over the period to 30 June 2019. Due to variations in material costs and defect rates individual tariffs will vary in accordance with input costs.

1.2 Introduction

This section provides Essential Energy's proposals for its revenue requirement to recover the efficient cost of providing public lighting services and the methodology used to set public lighting prices for the period from 1 July 2015 to 30 June 2019. These proposals have been prepared in accordance with:

- The relevant National Electricity Rules (NER) requirements relating to alternate control services;
- Guidance contained in the Stage 1 Framework and approach paper dated March 2013;
- Guidance contained in the Stage 2 Framework and approach paper dated January 2014

In this document, we explain:

1. The public lighting services that we provide, the different types of lighting installations and the drivers underlying the provision of lighting services;
2. The activities undertaken by us to provide our customers with lighting services and their associated capital and operating costs;
3. Relevant regulation and regulatory requirements; and
4. The current tariff structure and the implementation of the 2009 AER determination.

Following this, we:

1. Propose changes to the level and structure of the schedule of public lighting tariffs;
2. Demonstrate the application of our proposals; and
3. Provide supporting information, including reference to benchmarks and stakeholder consultation.

1.3 Overview of Essential Energy's public lighting services

1.3.1 Overall service elements

The public lighting service is a bundled service consisting of:

- The provision of asset information to the customers of the service;
- The provision of consumption information to the market for calculation of Retail and Network Use of System (NUOS) charges by the retailer; and
- The maintenance of public lighting infrastructure - Street Lighting Use of System (SLUOS).

This regulatory proposal addresses the SLUOS component of the public lighting service only.

This section of Essential Energy's regulatory proposal applies to all street lighting in the Essential Energy distribution franchise area which Essential Energy owns and/or is responsible for maintaining. This regulatory proposal does not apply to security lighting, some non-standard decorative lighting, and other special purpose lighting.

1.3.2 Key service parameters

In Essential Energy's franchise area, there are approximately 150,000 in service street lights serving more than 100 councils for more than 800,000 homes and businesses across NSW supplied by more than 200,000 kilometres of power lines including 63726 poles or columns which are dedicated streetlight supports. Out of the 150,000 lights in its area, Essential Energy is responsible for the maintenance on approximately 149,000 (more than 99 per cent).

Essential Energy services 95% of the New South Wales geographic footprint covering some 809,444 square kilometres.

Table 1 - Matrix of light types and tariff classification for lights maintained by Essential Energy

Light Type	Tariff					
	1	2	3	4	Grand Total	%
Major	9074	13605	1091	12564	36334	24.4
Minor	17943	26773	4261	63511	112488	75.6
Grand Total	27017	40378	5352	76075	148822	

We attend on a spot basis approximately 15,000 lights on average per year representing nearly 10% of our inventory. We attend spot failures of 150 lights on average per LGA per year or 2.88 lights per Local Government Authority (LGA) per week.

On a three year recurring cycle we bulk replace all lamps in our inventory. The cycle frequency has been arrived at considering our mix of light stock and the least common denominator of lamp life and lumen depreciation.

1.3.3 Australian standards

In line with relevant Australian Standards[1], there are broadly three types of public lighting services.

- Main roads – for public safety reasons main road lighting standards require higher light output (lumens) and therefore require higher wattage lamps. This "V" category represents around one quarter of installations;
- Minor roads – have lower wattage lamps than main roads. This "P" category represents around three quarters of installations; and
- Other public places – this includes parks and other public areas. This represents a relatively small portion of installations.

Lighting services may also be provided for private property using public lighting assets (supports) – for example public buildings, sports arenas, shopping centres and car yards. These services are provided as separate contestable services and are outside the scope of alternate control public lighting services.

1.3.4 Public Lighting Management Plan

Essential Energy's [2]Public Lighting Management Plan (PLMP) addresses Essential Energy's management structure for street lighting, equipment selection and replacement approach, design and construction approach, maintenance programs and reporting mechanisms.

Essential Energy's objectives in providing street lighting are to:

- Provide street lighting services that meet customer needs for effective lighting, reliability, energy efficiency and environmental performance;
- Maintain a street lighting system that is safe for the community, customers and staff;
- Fulfil its regulatory requirements as established in the NSW Public Lighting Code;
- Minimise the costs to Essential Energy and consequent impacts on pricing for its customers; and
- Recover the costs of the service from the users of the service.

1.3.5 Asset Management Plan – Public Lighting Equipment

Essential Energy maintains a comprehensive asset management plan which is periodically updated to reflect the asset condition, selection and installation.

[1] The requirements for different categories of public lighting are set out in *AS/NZS1158 Lighting for Roads and Public Spaces*.
[2] Available at http://www.essentialenergy.com.au/asset/cms/pdf/electricitynetwork/CEOP1023.pdf

The document is registered as CEOM8018.14 and can be found in the Essential Energy Business Management System (Policy Library).

1.3.6 Service elements

Delivery of public lighting services requires the design, financing, procurement, and construction of public lighting installations, as well as their on-going maintenance and operation. Each installation has a number of components as detailed in Table 2 below.

Table 2 - Lighting installation asset components

Asset	Description
Lamp	Lamp type (technology) and nominal rating (wattage).Higher wattage lights required for main roads. Integrated lamp/luminaires are referred to as lanterns.
Luminaire/lantern	Lamp housing and reflector, which vary depending on lamp type and rating, ballast or electronic control gear, cover or visor. New luminaires are integrated with Photo-electric (PE) cells.
Connection	Electrical connection between lamp and network.
Bracket	Connects luminaire with support (pole) and varies by shape and length
Support	Pole or other support – various types and may be shared with distribution supports or dedicated

1.3.7 Future Technology

Essential Energy has trialled LED lighting and is continuing to do. Whilst there is still suitability and reliability questions needing answers, LED technology looks promising as a public lighting source.

Benefits include reliability improvements for the maintenance provider and energy savings for the customer.

We are actively investigating the addition of this lighting to our standards lists and if or when it is accepted we will commence discussions with interested parties regarding its adoption and implementation.

1.3.8 Key inputs

The expected economic life of assets and asset types may vary depending on construction, location and design life. As a result depreciation rates vary considerably. Supports have low depreciation rates, while luminaires have medium depreciation rates.

Standard asset lives and implied depreciation rates are given in Table 3 below (based on the last AER final determination).

Table 3 - Depreciation rates applied in AER decision

Standard asset life (years)	AER	Depreciation
Luminaire	20	5.0%
Bracket[3]	35	2.9%
Support	35	2.9%

[3] Note that in the AER decision the assumed asset life for pre July 2009 brackets is 20 years.

Connection	20	5.0%

On-going maintenance activities are summarised in Table 4 below.

Table 4 - Maintenance activities

Outage detection	Operation of call centre for reporting of lamp or other outages
Luminaire maintenance	Cleaning, inspection and replacement of lamps and PE Cells
Condition monitoring	Monitoring assets and scheduled maintenance
Vegetation management	This applies to dedicated supports
Spot lamp replacement (SLR)	Spot replacement of lamps, PE Cell and cleaning of diffuser on notification
Bulk lamp replacement (BLR)	Bulk replacement of lamps, PE Cell and cleaning of diffuser on scheduled cycles

As explained in the Public Lighting management Plan (PLMP), BLR cycles are determined by average failure rates and the fact that output from lamps declines over time. Reduced output eventually breaches relevant Australian standards and corresponding service level requirements under the NSW public lighting code.

Delivery of public lighting services requires systems for detecting and replacing failures of individual lamps (spot failures). Systems include night patrols alongside the operation of a call centre and dispatch system for responding to spot failures identified by customers and the general public. Main roads are inspected half yearly. Under the NSW public lighting code, public lighting service providers are obliged to remedy spot failures within eight days of their notification.

In addition, public lighting delivery incurs various overhead costs, including procurement of outsourced public lighting services and on-costs for internal staff. Other overhead costs include creation and maintenance of public lighting asset inventories, as well as pricing, regulation and customer liaison.

1.4 Regulation of public lighting services

1.4.1 Jurisdictional regulation

Public lighting service levels are subject to a voluntary 2006 NSW public lighting code, which establishes key service parameters. The code references the Australian Standard (AS1158) for public lighting which details the illumination and other technical requirements. Compliance with the code is not a licence condition under the NSW Electricity Supply Act 1995.

The Code defines public lighting services to include:

- Operation of Public Lighting Assets, including handling enquiries and complaints about Public Lighting, and dispatching crews to repair Public Lighting Assets;
- Maintenance, repair, alteration, relocation and replacement of Public Lighting Assets;
- Design of new Public Lighting Assets;
- Installation of new Public Lighting Assets; and
- Financing of Public Lighting Assets.[4]

A requirement of the public lighting code is for each public lighting provider to prepare a public lighting management plan setting out how performance requirements will be met and providing a framework for

[4] See page 11 of the NSW Public Lighting Code, 1 January 2006.

on-going public performance reporting. Essential Energy has in place a current Public Lighting Management Plan and a Public Lighting Asset Management Plan.

As the public lighting business forms part of Essential Energy, it is obliged to meet commercial objectives established under the NSW Energy Services Corporations Act. The principal objectives of energy distributors are:

(a) to be a successful business and, to this end:

(i) to operate at least as efficiently as any comparable businesses,

(ii) to maximise the net worth of the State's investment in it,

(iii) to exhibit a sense of social responsibility by having regard to the interests of the community in which it operates in,

(b) 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 ,

(c) to exhibit a sense of responsibility towards regional development and decentralisation in the way in which it operates,

(d) to operate efficient, safe and reliable facilities for the distribution of electricity and other forms of energy,

(e) to be an efficient and responsible supplier of electricity and other forms of energy and of services relating to the use and conservation of electricity and other forms of energy,

(f) to be a successful participant in the wholesale and retail markets for electricity and other forms of energy and for services relating to the use and conservation of electricity and other forms of energy.

1.4.2 Service level information

Essential Energy has adopted the minimum standards and guaranteed service level of the NSW Public Lighting Code in formulating the total costs in this regulatory proposal. In summary, key maintenance requirements of the NSW Public Lighting Code that the maintenance program must include are as follows:

- Outage detection and service availability requirements
- Lamp replacement and disposal
- Luminaire cleaning and inspection
- Vegetation management strategies, including informing customers of their responsibilities
- Inspection, test, repair, and replacement of equipment
- Condition monitoring
- Maintenance recording and performance review, and
- Modifications of maintenance program as required.

Essential Energy's approach to each of these items is summarised in its Street Lighting Management Plan, available on Essential Energy's website.

1.4.3 National Electricity Customer Framework (NECF)

As part of NECF requirements, if Essential Energy fails to repair faulty street light in 8 days or before the date agreed between Essential Energy and a customer, the customer will be paid compensation of a minimum of $15. Payment will only be made when the customer's premises abutts the part of the street that, but for the fault, would ordinarily be illuminated by the street lighting. The customer service standards under our distributor licence remain unchanged as a result of the NECF.

1.4.4 Delivering required levels of service

As discussed more fully in the Street Lighting Management Plan, for each of the required service levels under the NSW Public Lighting Code, Essential Energy has implemented initiatives in the following areas:

- Outage detection and service availability requirements;
- 24-hour call centre and resident education about outage reporting mechanisms
- Night patrols for main roads
- Lamp replacement and disposal
- Spot outage lamp replacement
- Bulk lamp replacement
- Lamp recycling
- Luminaire cleaning and inspection
- Luminaire cleaning and inspection as part of the progressive introduction of bulk lamp replacement programs
- Ingress protection
- Vegetation management strategies, including informing customers of their responsibilities
- Safety and maintenance-related vegetation management
- Light distribution-related vegetation management
- Inspection, test, repair, and replacement of equipment
- Associated equipment inspection and maintenance
- Condition monitoring
- Improved maintenance recording and analysis
- Maintenance recording and performance review;
- Modifications of maintenance program as required.

To achieve the objective of continuous improvement in the management of street lighting maintenance, maintenance data, customer feedback and technology developments are regularly reviewed by Essential Energy and the management plan is updated accordingly.

1.5 Existing price regulation

1.5.1 Current tariff structure

Table 5 – Tariff Terminology

Term	Description
Tariff Structure	Refers to the Structure of Tariffs
Tariff	Refers to the individual codes that are applied to each light installation. Tariff Rates are a subset of the tariff Structure.

The current price controls for public lighting were finalised in April 2010 and apply to the period from 1 July 2009 to 30 June 2014. This followed changes to the AER's final determination dated April 2009, in line with orders made by the Australian Competition Tribunal varying the 2009 determination with respect to the applicable WACC from 8.80 per cent to 10.02 per cent.

In line with the AER's 2009 determination[5], the tariff structure for public lighting services is, as shown in Table 6 below.

Table 6 Current tariff structure

Tariff	Install Date	Capital Provision	Maintenance Responsibility	Replacement Responsibility
Rate 1	<=1 July 2009	Essential Energy	Essential Energy	Negotiable
Rate 2	<= 1 July 2009	Customer	Essential Energy	Essential Energy
Rate 3	> 30 June 2009 <=2014	Essential Energy	Essential Energy	Negotiable
Rate 4	> 30 June 2009 <=2014	Customer	Essential Energy	Negotiable
Rate 6	N/A	Customer	Customer	Negotiable

Tariff Rate 1

Lights that were installed prior to July 2009 and were funded by Essential Energy or its predecessors. These lights attract a capital recovery and the maintenance rate for pre 2009 lights.

Tariff Rate 2

Lights that were installed prior to July 2009 and were funded by the customer and gifted to Essential Energy or its predecessors. These lights do not attract any capital recovery but do attract the maintenance rate for pre 2009 lights.

These are a special class as not only was the current fitting funded by the customer but the next replacement will be funded by Essential Energy as if the customer had funded it.

Tariff Rate 3

Lights installed after the 1 July 2009 but before 30 June 2015 and were funded by Essential Energy. These lights attract a capital recovery and the maintenance rate for post 2009 lights.

Tariff Rate 4

Lights installed after the 1July 2009 and were funded by the customer and gifted to Essential Energy. These lights do not attract any capital recovery but do attract the maintenance rate.

Tariff Rate 6

This tariff does not attract SLUOS charges. It is in the system for lights that are connected unmetered to the low voltage network and as such we still need to calculate their consumption and retail and network charges but we do not do the maintenance and we do not charge SLUOS.

A key feature of the current tariff structure is that the form of control varies between assets that were in place at the start of the present regulatory period and those that have been installed since. For the former category, annual price caps are set for each customer, whereas for the latter category, annual prices caps are set for individual assets.

For pre 1 July 2009 assets, capital costs are capped as determined by the AER.

[5] See table 17.2 on page 334 of the AER's decision

For post 30 June 2009 assets, price caps for capital costs are set on the basis of an annuity model. Maintenance costs are also on a per asset basis. This means overall capital and maintenance charges with respect to a given installation will depend on the particular combination of assets in place.

Key inputs for both per customer and per asset capital tariffs are identical. These include depreciation rates (expected economic lives), labour rates, materials and volume, and the cost of capital.

1.5.2 Implementation of 2009 AER decision

For the capital component of Essential Energy's streetlight asset base, a fixed RAB was determined and apportioned across the asset base for all assets installed prior to 1 July 2009 and an annuity based capital building block was used for assets installed on or after 1 July 2009

The maintenance component is the same for all assets based on the asset type.

Price schedules are updated each year via annual network pricing proposals. These are prepared in accordance with the price control mechanisms defined in the 2010 final determination.

1.5.3 Procedures for mediating disputes

The AER's guideline on alternate control services requests that information be provided regarding procedures for mediating disputes and remedies where service levels have not been met. Essential Energy proposes to use its existing dispute resolution process as outlined in CEPG2042 Procedural Guideline: Customer Complaint Handling.

1.6 Future pricing proposal

1.6.1 Action undertaken to reduce costs

Essential Energy acknowledges that its historical cost base may have been higher than an efficient cost base. Accordingly, it has undertaken the following steps to reduce its historical cost base which are reflected in Table 8 below:

- New billing process that provided full reconciliation between asset management and invoicing
- The Streetlight Business unit was restructured to better address current billing and data and process quality issues
- All Streetlight Business unit processes were mapped- reengineered and remapped
- A rationalised set of street light standards was introduced to reduce stock holding and increase economies of scale in procurement
- Refined the defect process to ensure its history is accurately recorded and we are repairing lights not being charged for
- Implemented a system where street lights not repaired in a timely manner where escalation for attention
- Created data store of street light information from which all street light reports are drawn to improve accuracy and consistency
- Creation of a suite of street light data quality exception reports run on a weekly and monthly bases to identify inaccuracies in data
- Conduct a Bulk Luminaire Replacement project to assist in the standardisation of the lighting inventory and provide energy efficient lighting for the participants
- Capturing failure rates by luminaire and type to enable the setting of accurate maintenance costs in future determinations.

1.6.2 Framework and approach determination

In its March 2013 Framework and Approach determination, the AER determined that public lighting services in NSW would continue to be subject to direct control but classified as alternate control services. This classification means public lighting is subject to direct control under the National Electricity Rules

(NER), but is regulated separately from standard control services (ordinary distribution charges). This is a continuation of the classification applied during the current regulatory period.

The AER also determined that the price control mechanism under clause 6.2.5(c)(2) of the Rules would consist of a cap on the prices of individual services. The price control formula sets price caps for each defined service in a base year. Thereafter the cap is modified based on changes in the CPI, an X factor and an adjustment factor. The adjustment factor may include but is not limited to, adjustments for residual charges when consumers choose to replace assets before the end of their economic life.

The proposed price control mechanism does not apply for the transitional regulatory control period. As specified in the transitional rules, the applicable price cap will be the prices from the final year of the 2009-14 regulatory period, escalated by CPI.

For price regulation purposes, public lighting services are defined as:

> The operation, maintenance, repair and replacement of public lighting assets;

> The alteration and relocation of public lighting assets; and

> The provision of new public lighting.

In addition, the AER proposes including emerging public lighting technology (emerging technology) as part of the lighting services group. Emerging technology relates to luminaires that the NSW distributors do not provide at the time of the distribution determination. Emerging technology may, however, become available during the next regulatory control period.

The form of regulation is a set of scheduled nominal prices for the first year of the regulatory period with subsequent adjustments as determined under defined price control formulae.

1.6.3 Schedule of prices for transitional year (FY14/15)

The proposed price schedule and price levels for the transitional year are the same as those that applied for the period to 30 June 2014 and approved by the AER Price schedules have been adjusted by estimated CPI for the period.

The proposed Council price schedules for the transitional year are set out in out in Appendix 2.

1.6.4 Proposed price path (2015/16-2018/19)

In line with AER guidance, the proposed price path following the transitional year will retain the existing tariff structure. There will be an additional new annuity related tariff where the installation is funded by Essential Energy that will apply to post 30 June 2015 assets. The maintenance only Tariff Rate 4 will continue for assets installed after 2015. This is summarised in the table below.

Table 7 Proposed tariff structure

Tariff	Install Date	Capital Provision	Maintenance Responsibility	Replacement Responsibility
Rate 1	<=June 2009	Essential Energy	Essential Energy	Negotiable
Rate 2	<= June 2009	Customer	Essential Energy	Essential Energy
Rate 3	> June 2009 <=June 2015	Essential Energy	Essential Energy	Negotiable
Rate 4	> June 2009	Customer	Essential Energy	Negotiable
Rate 5	> June 2015 <= June 2019	Essential Energy	Essential Energy	Negotiable
Rate 99	Was Tariff 6	Customer	Customer	Negotiable

1.6.5 Proposed price schedule assumptions

Tariff Rate 1

As per previous description except in the new pricing model we are applying current labour, plant, on-costs and overheads to the maintenance components and a revised WACC to the capital components.

Tariff Rate 2

As per previous description except in the new pricing model we are applying current labour, plant, on-costs and overheads to the maintenance components.

Tariff Rate 3

As per previous description except in the new pricing model we are applying current labour, plant, on-costs and overheads to the maintenance components and a revised WACC to the capital components.

Tariff Rate 4

Those lights installed after the 1 July 2009and were funded by the customer and gifted to Essential Energy. These lights do not attract any capital recovery but do attract the maintenance SLUOS common to all SLUOS tariffs. In the new pricing model we are applying current labour, plant, on-costs and overheads to the maintenance components.

Tariff Rate 5

Those lights installed after the 1July 2015 and are funded by Essential Energy attract a capital recovery and the maintenance SLUOS rate common to all tariffs.

In the new pricing model we are applying current labour, plant, materials, on-costs and overheads to the capital depreciation and maintenance components.

Tariff Rate 99

This was previously Rate 6 and is a tariff that does not attract SLUOS charges. It is in the system for lights that are connected unmetered to the low voltage network and as such there remains a need to calculate their consumption and retail and network charges however maintenance is performed by other parties and there is no SLUOS charge. This tariff has been renamed to Tariff rate 99 so that it does not get confused with SLUOS related tariffs.

1.6.6 Supporting information

This section sets out information and considerations in support of the pricing proposals outlined above.

1.6.6.1 Pricing objectives

Our proposed changes to pricing schedules reflect the following pricing objectives:

1. Move to cost reflective prices as prices are currently significantly below cost reflective levels. Prices that are materially below efficient costs are inconsistent with the requirement for charging parameters to take into account the long run marginal cost for the service (section 6.18.5(b)(1). Further, prices that are below cost for extended periods may lead to inefficient use of and investment in public lighting services. This also includes adverse impacts for the potential emergence of competition and the timely and efficient introduction of emerging lighting technology.
2. Simplify tariff schedules. The current complex tariff schedules are inconsistent with the principle that tariffs should not be administratively onerous (section 6.18.5(b)(2)). Overly complex tariff schedules also reduce transparency.
3. Continue the recording of actual defect rates by light type to determine the volume of spot replacements. The use of this accurate data ensures that pricing signals are sent where a technology becomes obsolete and inefficient driving its replacement with a modern lower whole of life cost technology.

1.6.6.2 Current public lighting tariffs are well below cost

Current public lighting tariffs substantially under-recover the efficient cost of providing the service. This is contrary to relevant State legislation – the State Owned Corporation's Act – as well as the National Electricity Law (NEL), including the pricing principles set out in Chapter 6(i).

Table 8 below compares actual revenues and costs over the course of the current regulatory period (with the forecast for the remainder of FY2013/14). This demonstrates that aggregate revenues are substantially below the levels required to recover actual costs over the three years to 30 June 2013.

Actual costs take into account and apply the cost allocation methodology (CAM).

Actual and forecast P&L outcomes for the period 2010/11 to 2013/14 are set out in Table 8 below.

Table 8 - Streetlight Business Income and Expenses

$m (Nom)	FY10/11	FY11/12	FY 12/13	FY 13/14
Public lighting revenue[6]	7.550	8.320	8.910	8.940
Less Capital Recovery component of tariff (estimate 28%)[7]	2.110	2.330	2.500	2.500
Net Operating Revenue	**5.440**	**5.990**	**6.410**	**6.440**
Spot Repairs[8]	9.133	7.740	5.300	4.890
Dedicated Pole Inspections[9]	0.710	0.710	0.710	0.749
Bulk Replacement (BLR)[10 11]	3.550	1.658	1.710	0.200
Fault & Emergency	.411	.405	0.440	0.440
Night Patrols[12]	0.100	0.100	0.100	0.100
Total Direct Expenses	**13.904**	**10.613**	**8.260**	**6.379**
Contingency for complete Bulk Lamp cycle				3.780
Total After Contingency	**13.904**	**10.613**	**8.260**	**10.159**
Overhead (Divisional and Corporate)	5.242	3.853	3.907	4.191
Total Loaded Costs	**19.146**	**14.466**	**12.167**	**14.350**
Economic Profit/(Loss)	**(13.705)**	**(8.476)**	**(5.757)**	**(7.910)**
Divisional & Corporate Overhead Rate from CAM	*0.377*	*0.363*	*0.473*	*0.4125*
Department 411 costs[13]	**.793**	**.853**	**.616**	**.774**

1.6.6.3 Benchmarking of costs

Essential Energy has undertaken an analysis of its key input costs compared with relevant benchmarks. This is discussed in the context of the following key cost or charging parameters:

6 From the Gross Margin – SLUOS Dept 400-09040 off the Streetlight Profit and Loss
7 Based on the current years ratio and applied as a percentage across previous years
8 From the Streetlight Profit and Loss used in the preparation of the RIN
9 Based on 63,726 dedicated supports / 4 year cycle * $44 rate per inspection
10 From the Streetlight Profit and Loss used in the preparation of the RIN
11 The value for Bulk Lamp replacements was reduced in FY11/12 and FY12/13 due the takeup in Bulk Luminaire program
12 The value included for Night Patrols is estimated only
13 Department 411 costs are displayed for information purposes only and are taken up in the Divisional Overheads.

1. the expected spot (intermittent) lamp failures between bulk lamp replacements based on actual results for the 2012/13 year and the relationship between the length of a bulk lamp replacement cycle and the number of spot lamp failures
2. the length of the cycle between bulk lamp replacements
3. the number of lamps that can be replaced per day under a bulk lamp replacement regime
4. the number of spot lamp replacements that can be completed per day.

1.6.6.4 Explanation of regulated revenue/cost gap

Table 8 above shows clearly that historical costs exceed regulated revenues.

The principal reasons for this are outlined below;

- Bulk Lamp Maintenance Program
    - The market tested contract rates substantially exceed the current regulated allowance. The contract rates reflect a market test of the cost of serving the specific geography that Essential Energy operates across
    - Market tested contract material costs exceed the current allowance
- Spot Maintenance
    - Luminaire defect rates exceed the current allowance
    - There is significant variance in defect rates between technologies and light types that was not fully incorporated into the current allowance
    - Given the volume of lights, the number of defects per trip that can be repaired is overstated in the current cost model, resulting in higher unit costs than allowed
    - The assumed time to travel to maintain street lights is insufficient

1.6.6.4.1 Bulk Lamp Replacement

Having completed the first full 3 year cycle of Bulk Lamp Replacements it can be shown that the costs allowed for in the last AER determination do not cover the actual costs of this service. This service was secured via an open market tender and is the most efficient available. The materials used in this contract are also from a period contract that was an open market tender.

1.6.6.4.1.1 Labour and Plant Contract Costs

The 2010 AER determination allowed for a total labour and plant cost of $36.90 ($2013/14) per bulk lamp change. [redacted]

1.6.6.4.1.2 Materials Costs

The 2010 AER determination's allowance for total materials costs for the replacement of lamps, PE Cells and other miscellaneous items is also insufficient to cover the actual costs of these items. This varies from light to light and component to component. Refer to the SLUOS Pricing Models for more information.

1.6.6.4.2 Spot Luminaire maintenance

1.6.6.4.2.1 Defects per annum

The regulated tariff models are based on assumptions of the number of defects we will attend in any one year based on the light type and technology.

Data from our asset management systems reveals that we are experiencing materially higher defect rates than the assumed rates used in the models on which current prices were set. The new models submitted with this proposal are based on data rather than assumptions, and take into account forecast changes in

the lighting asset base. Table 9 below details average failure rates for the most common luminaire installations for the 2012/13 year under a three yearly bulk lamp change regime compared to the current AER allowance. It is evident that predicted failure rates in the prior determination are significantly understated resulting in inefficient pricing.

It should be noted that failures may be of many types and affect different components, including lamps, ballasts, connections, fuses, diffusers, seals and vandalism etc. and is not limited to lamp failure but rather to any failure of the installation. The application of an overly optimistic nominal lamp failure rate from a manufacturer significantly understates the in service performance of the installation as a whole.

Table 9 - Average defect rates for light types in our inventories

Luminaire Type	Number of Luminaires	Actual failure rates (%)	Set AER failure rates (%) (SLUOS model)
Fluorescent 42	55060	7.70	4.00
High Pressure Sodium 70	28570	13.94	3.20
High Pressure Sodium 250	22496	6.01	3.20
Mercury Vapour 80	20635	4.37	4.00
High Pressure Sodium 150	9398	4.83	3.20
High Pressure Sodium 50	2918	6.65	3.20
Mercury Vapour 50	2275	4.03	4.00
High Pressure Sodium 400	2004	7.97	3.20

The proposed new tariff rates reflect the actual defect rates as detailed in Table 9 above.

1.6.6.4.2.2 Defects per Trip

With Essential Energy's very large geographic area and light inventory of only 150,000 lights across 95% of NSW it is unlikely that any two adjacent defects will happen on any one day and even if batched to occur just in time would never reach the concentration of defects the AER has approved in the last determination.

The previous models allowed for 18 defects to be completed in a day, and the average time allowed to complete including travel is 26 minutes task duration. This 26 minutes task duration includes provision for the fixed effort of mobilising, plant checks, travel and demobilising spread across each of 18 repairs.

In Essential Energy's circumstance given the geographic spread and volume of lights to repair, for the most part, we have one mobilise, plant check, travel and demobilise unit for each repair. This overhead of mobilise, plant check, travel and demobilise adds significantly to the cost of conducting repairs in Essential Energy's environment. Put simply the cost to spot repair one or two lights can never be as efficient as a full day's work repairing 18 lights.

For the most part we will attend on average one light per trip. With a Public Lighting Code and a service level expectation to correct defective lights in 8 days it stands to reason that the vast bulk of street light repair activity will be to attend to a single light with all the overhead of mobilisation, plant checks, travel and demobilisation to be recovered from a single repair. Please refer to Appendix 3 for more detail on the number of defects per mobilisation.

The proposed new tariffs reflect a more realistic time to attend to each spot repair taking into account the low volume of tasks and resultant higher unit costs per average repair.

1.6.6.4.2.3 Time to complete maintenance tasks

All streetlight repairs must be conducted as if live and the repairs must be carried out with personal protective equipment including insulating gloves. Every street light job requires the replacement of the lamp, PE cell and a cleaning of the diffuser. The current allowance of 13.5 minutes elapse time is insufficient as there are many tasks that must be accomplished.

Furthermore Essential Energy does not for the most part have dedicated street light crews as our light inventory and defect rates do not cost justify it.

A typical street light EWP is telescopic and with no stabiliser legs (spring locks only) whereas Essential Energy line work EWPs are often knuckle type with front and rear stabilisers. This results in additional setup time. This is unavoidable given it is not dedicated plant and dedicated plant cannot be justified.

A desk assessment of likely times to complete tasks has been conducted with the results summarised in Table 10 below.

Table 10 - Time and motion study findings

Worksite Activities for Streetlight Lantern maintenance		
		effort minutes
	Routine Activities per Streetlight	
1	**Completion of** HIRAC and notation of any adjustments	2
2	Safe approach **test for column**	1
3	Placement of signs and traffic barriers (witches hats)	3
4	Positioning of EWP and stabilisers engagement	3
5	Harness and gloves - checking and application	1
6	Testing of lantern prior to **maintenance**	1
7	Manoeu**vr**ing of Boom,	2
8	Testing/checking of standard and wiring prior to repair	1
9	Additional HIRAC entry to recognise successful isolation	
10	**Replace lamp, PE Cell,** clean the diffuser **and minor repairs**	**7**
11	Completion of Streetlight Maintenance Task Log	1
12	Removal of traffic barriers, disengage EWP stabilisers, gear onto EWP	3
	Total	25

The analysis indicates that the allowance of in 13.5 minutes (27 man minutes) to repair a light is not realistic. Based on our analysis, alongside benchmarking of other public lighting businesses, Essential Energy suggests a more realistic estimate would be 25 minutes per light (50 man minutes).

1.6.6.4.2.4 Time to travel to lights

Essential Energy demonstrates that it spends more time traveling to and from our streetlight jobs than is currently allowed in the pricing models.

As discussed above we also stress that each trip we make will be to repair a small number of lights making the average travel costs per repair higher than is allowed for in the models.

Table 11 below shows that while the bulk of street lights are located within 0 to 5km's of the works depot many are remote with the remotest street light some 270km's for the local works depot.

Table 11 - Average time to travel to a light (one-way).

Distance range from depot	No of streetlights	Average travel speed km/hr	Average Time taken to travel to or from streetlight (one way) Minutes
0 to 5km	109,054	26.7	5.5
6 to 10km	12,176	37.0	12.9
11 to 15km	6,536	43.0	18.1
16 to 20km	7,028	49.0	22.0
21 to 30km	10,581	57.5	26.5
31 to 40km	5,197	65.0	32.8
41 to 50km	1,723	70.0	39.0
51 to 100km	1,526	78.8	56.0
101 to 270km	172	80.0	123.3
Weighted Averages	**153,993**	**45.9**	**10.3**

Figure 1- Average time taken to travel to and from streetlights

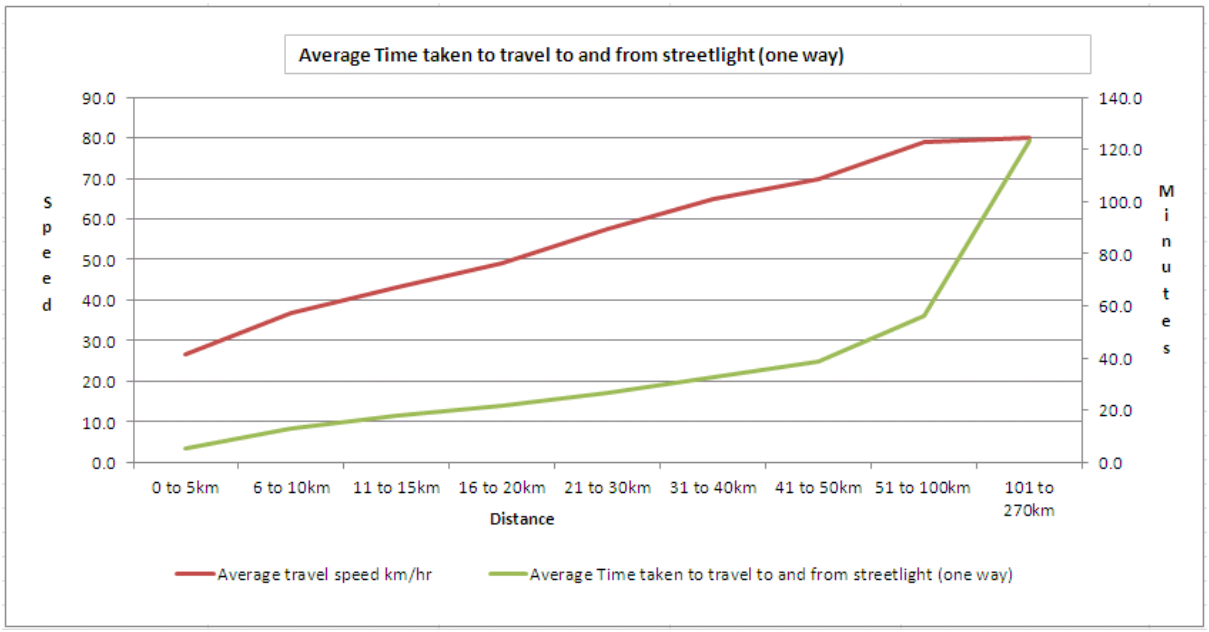

Table 12 - Time and motion study of light maintenance times

SPOT - Streetlight fault repair maintenance		
Inputs		
Item	**Qty**	**Additional information**
Task: No of streetlights to repair (quantity)	1.5	The number of streetlights being repaired and/or replaced in one "run".
No of field staff working together	2	The number of field staff that are working together as a crew to complete the task of streetlight repairs / replacements
Time to mobilise (mins)	10	Time taken to prepare the team and truck prior to leaving the field service centre
Travel time to site (mins)	10.3	Weighted average time taken to travel from the field service centre to the faulty streetlight(s)
Time to repair luminaire (mins ea)	25	Weighted average time taken to replace or repair the luminaire
Travel time between streetlights (mins)	15	Weighted average time to travel between two faulty streetlights requiring repair or replacement
Travel time from site (mins)	10.3	Weighted average time taken to travel to the field service centre from the faulty streetlight(s)
Time to demobilise (mins)	10	Time taken to demobilise the team and truck after arriving back at the field service centre
Time taken to complete the task (hours)	**1.43**	Total time taken to complete the number of streetlight repairs / replacements as per the quantity shown at cell B5
Average Time taken per streetlight to complete the task (hours)	**0.95**	Average time taken to complete one streetlight repair / replacement
Man hours to complete task	**2.85**	Man hours taken to complete the number of streetlight repairs / replacements as per the quantity shown at cell B6. (Time taken times number in crew)
Average man hours per repair	**1.90**	Average man hours to complete one streetlight repair / replacement

Established that we will, on a weighted average basis, travel 10.3 minutes each way to a defective street light. The distances expressed here are “as the crow flies” and in many cases would materially underestimate the travel times.

We further contend that given our inventory, geographic footprint and volume of defects reported each year it can be shown that it is rare that we will be called to attend more than one light in any one trip. This is demonstrated in Table 10 above.

1.6.7 Tariff Model Summary

As discussed above Essential Energy has evaluated the current approved tariff models and identified the following material shortcomings:

- The allowed installation defect rates do not correlate with service data in our asset management systems;
- The allowance for bulk lamp replacement (labour and plant) is significantly less than the current competitively determined contract rate;
- The elapsed time allowance for spot maintenance given the low volume of tasks is not adequate to provide for mobilisation and demobilisation and

- Travel time given the low lighting facility population density is inadequate for both spot and bulk maintenance.

The proposed tariffs are based on the approved 2010 models with the following material adjustments:

- Materials costs have been updated to current contract rates;
- Labour rates have been adjusted to current industrial rates;
- Corporate and Divisional Overheads have been adjusted to the current rates as detailed in the Corporate Allocation Methodology (CAM);
- Defect rates have been updated based on actual 2012/13 history resulting in significant differences between technologies;
- The allowance for labour and plant for bulk luminaire maintenance (BLR) has been updated to align with current contract rates achieved through open tender;
- The allowance for elapsed time to complete spot maintenance (SLR) has been updated to reflect the low volume of tasks per mobilisation and demobilisation; and
- The allowance for travel time has been updated to reflect the actual light density.

The material adjustments above have been compared to actual direct costs from the project costing module of the financial system PeopleSoft to ensure that the proposed tariff recovery is equal to the actual costs which Essential Energy demonstrates are efficient given the specific circumstances and procurement processes detailed in the above sections.

Appendix 2 – Comparison of Council charges 2015/16 (shown in 2013/14 dollars) details the change in annual charges between 2014/15, the transitional year and 2015/16 using the inventory by Council as at 16/04/2014. It is apparent that there are significant differences between Councils and this is due to using actual defect rates by technology and light type.

The use of actual defect rates from 2012/13 assists in identifying inefficient technologies where consideration should be given to bulk replacement to a new technology which has a lower whole of life cost. The transitional year 2014/15 with the current locked in methodology will, where appropriate; provide time for Essential Energy and Councils to consider options for bulk luminaire replacement and consequent whole of life savings.

1.6.8 Component pricing schedules

Essential Energy will introduce a new component based pricing schedule in relation to the determination period. The objective is to simplify street lighting charges for both Essential Energy and the Councils and to make pricing for streetlighting more transparent.

This schedule will apply to all tariff classifications. However, different rates will apply in line with the parameters determined for:

> Pre 2009 assets;

> Post 2009 assets; and

> Post 2014 assets

The component model will provide street lighting maintenance services in a less complicated manner, by breaking the charge into three components, with the light, bracket and pole charged separately and reducing the number of tariffs required. This has been designed such that the charges compared to the previous period for any particular scenario will not vary except for any increases approved by the AER as an outcome of this determination.

There are currently nearly 900 street lighting tariffs on our price list. These tariffs represent variations of light types on poles in single, dual, triple and quadruple configurations for our four current funding models.

For example where we have

- 4 x MV 400 watt lights on a steel pole with a 3.5 meter outreach. The customer is charged for 4 installations of a MV 400 watt each with a quarter share of the steel pole costs;
- 3 MV 400 watt lights on a timber pole with a 3.5 meter outreach. The customer is charged for 3 installations of a MV 400 watt each with a third share of the timber pole costs; and
- 2 MV 400 watt lights on a timber pole with a 3.5 meter outreach. The customer is charged for 2 installations of a MV 400 watt each with a half share of the timber pole costs;
- a single MV 400 watt on a steel column with a 3.5 meter outreach.

The customer invoice looks like:

MV 400 watt on steel pole (1of 4)	Qty 4	$xxx
MV 400 watt on timber pole (1of 3)	Qty 3	$xxx
MV 400 watt on timber pole (1of 2)	Qty 2	$xxx
MV 400 watt on steel pole (1of 1)	Qty 1	$xxx

Under the componentised model their invoice would look more like this:

MV 400 watt	Qty 10	$xxx
Steel Pole	Qty 2	$xxx
Timber Pole	Qty 2	$xxx
3.5 meter outreach	Qty 10	$xxx

We will also be introducing a new set of tariff codes to cover assets funded by Essential Energy and installed post 2014

1.6.9 Allocation of shared costs

We propose no change to the allocation of shared costs (e.g. the call centre) to public lighting as set out in the AER's 2009 final determination and in accordance with the Cost Allocation Methodology (CAM) approved by the AER in May 2014.

1.6.10 Proposed actions to reduce costs

Essential Energy is of the belief that we have streamlined our processes to be optimal and our cost base will remain stable and propose increases in tariffs to achieve more cost reflectivity.

1.6.11 Outlook for future cost drivers

Key drivers of future costs

- Future labour costs
- Future contract costs
- Demand growth
- Capital contributions
- Equipment usage charges
- Future cost of materials and components
- Impact of new technology – risk of accelerated depreciation of lamps and luminaires

1.6.12 The proposed Pricing Models

The pricing models submitted with this proposal have been through the following assessment and adjustments.

1. The models have been audited by Ernst and Young for numerical and formulae accuracy
2. We have brought the models up to date with the following adjustments

a. Defect frequency rate by technology and luminaire type
b. CPI and Labour escalators where applicable
c. Current Overhead rates
d. Current labour and stores on cost rates
e. Material and labour rates
f. Inventories
g. Travel and effort durations

3. We have adjusted the relevant components retaining copies of each model and the affects it has had on the costs to Councils.
4. We have available the following sets of models
    a. The original approved model at the end of 2013/14
    b. The CPI adjusted model for the transition year 2014/15
    c. The Cost Reflective model for 2015/19

See the Appendixes for samples of the affect the model changes have had on Councils and tariffs.

1.6.13 Forecast OPEX and CAPEX in Direct $m

Forecast cost drivers for 2015-2019 (all)						
$M 2014	FY15	FY16	FY17	FY18	FY19	Totals
Opex	10.16	10.16	10.25	10.34	10.45	51.36
CAPEX	4.27	2.92	2.98	3.05	3.11	16.33

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1.6.14 Forecast OPEX and CAPEX including Divisional and Corporate overheads in $m

Forecast cost drivers for 2015-2019 (all)						
$M 2014	FY15	FY16	FY17	FY18	FY19	Totals
Opex	14.35	14.35	14.47	14.61	14.76	72.54
CAPEX	6.03	4.13	4.21	4.31	4.39	23.07

The figures in Table 1.6.14 have been escalated with a Divisional and Corporate overhead rate of 1.4125.

1.6.15 Basis for calculation of Tariff 1

The RAB for Tariff Rate 1 lights has been used based on the approved RAB from the 2009 determination.

Financial Year ($M nominal)	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Opening value of fixed assets	15.9	14.5	13.0	11.5	10.0	8.4
Indexation	0.39	0.36	0.32	0.28	0.25	0.21
Capex/Additions (net of cap cons)	0.00	0.00	0.00	0.00	0.00	0.00

Depreciation before deferral	1.83	1.83	1.83	1.83	1.83	1.83
Closing value of fixed assets	**14.5**	**13.0**	**11.5**	**10.0**	**8.4**	**6.7**

This RAB roll forward model was included in the AER Determination 2009 and has been replicated here for information purposes only.

1.7 Stakeholder consultation

1.7.1 Tariff Transparency

Essential Energy is conscious of the complicated nature of its tariff structure and has received and responded to many letters on this topic, despite the fact that it does meet the requirements of the Public Lighting Code.

To address this Essential Energy has implemented several service enhancements for the Councils

- We provide a full inventory report electronically that coincides with the billing cycle monthly
- We provide a full Graphic Information System information file at least every year and on request through-out the year

Essential Energy propose to introduce a new tariff structure that will make the identification of lights and charges much less complicated and transparent as described previously in this document. The componentised tariff model significantly simplifies the tariff structure and of itself does not result in any winners or losers.

Essential Energy has informed its customers of the pricing componentised proposal outlined above. This has been by way of a circular transmitted via email to all of its customer representatives on the 10th April 2014. To date we have received various positive responses and will in due course provide more detailed information to the Councils as it becomes available.

1.7.2 Service levels

Essential Energy meets the service levels as set out in our Public Lighting Management Plan and this serves as the Service Level Agreement with our Councils for these services. We are committed to adhering to the Public Lighting Code and we are also compliant with our AER and NECF requirements as far as reporting and compensation for non-performance.

Costs could be reduced further by reducing public lighting performance outcomes. This however entails varying from the Public Lighting Code.

Based on consultation with its customers, Essential Energy considers that any material reduction in current service levels, as specified in the NSW public lighting code, would not be sustainable. Accordingly, Essential Energy does not consider that the current price/cost gap can be addressed by reducing service levels.

Appendix 1
Regulatory requirements for alternate control proposal

Clause 6.2.6 of the Rules establishes that a determination for alternative control services may utilise elements of Part C, in relation to a Building Block Determination for standard control services.

This proposal for public lighting as an alternative control service will not be subject to all of the provisions that apply to a building block proposal. Nevertheless, the AER is expected to subject the associated expenditures to a similar review process. Accordingly, this proposal has been designed to meet the following Rules requirements for supporting information that apply to a building block determination.

Clause 6.8.2(3A)(i) of the rules requires that a public lighting proposal must contain:

- the proposed control mechanism (refer to Section xx)
- a demonstration of the application of the proposed control mechanism (refer to Section xx), and
- the necessary supporting information.

S6.1.1 Information and matters relating to capital expenditure

(2) the method used for developing the capital expenditure forecast;

(4) the key assumptions that underlie the capital expenditure forecast;

…

(6) capital expenditure for each of the past regulatory years of the previous and current regulatory control period, and the expected capital expenditure for each of the last two regulatory years of the current regulatory control period, categorised in the same way as for the capital expenditure forecast and separately identifying for each such regulatory year:

(7) an explanation of any significant variations in the forecast capital expenditure from historical capital expenditure;

S6.1.2 Information and matters relating to operating expenditure

(1) a forecast of the required operating expenditure that complies with the requirements of clause 6.5.6 and identifies the forecast operating expenditure by reference to well accepted categories such as:

(i) particular programs; or

(ii) types of operating expenditure (eg. maintenance, payroll, materials etc), and identifies in respect of each such category:

(iii) to what extent that forecast expenditure is on costs that are fixed and to what extent it is on costs that are variable; and

(iv) the categories of *distribution services* to which that forecast expenditure relates;

(2) the method used for developing the operating expenditure forecast;

(3) the forecasts of key variables relied upon to derive the operating expenditure forecast and the method used for developing those forecasts of key variables;

(4) the method used for determining the cost associated with planned maintenance programs designed to improve the performance of the relevant distribution system for the purposes of any service target performance incentive scheme that is to apply to the Distribution Network Service Provider in respect of the relevant regulatory control period;

(5) the key assumptions that underlie the operating expenditure forecast;

(6) a certification of the reasonableness of the key assumptions by the directors of the Distribution Network Service Provider;

(7) operating expenditure for each of the past regulatory years of the previous and current regulatory control period, and the expected operating expenditure for each of the last two regulatory years of the current regulatory control period, categorised in the same way as for the operating expenditure forecast;

(8) an explanation of any significant variations in the forecast operating expenditure from historical operating expenditure.

S6.1.3 Additional information and matters

(7) the Distribution Network Service Provider's calculation of the regulatory asset base for the relevant distribution system for each regulatory year of the relevant regulatory control period using the roll forward model referred to in clause 6.5.1 , together with:

(i) details of all amounts, values and other inputs used by the Distribution Network Service Provider for that purpose;

(ii) a demonstration that any such amounts, values and other inputs comply with the relevant requirements of Part C of Chapter 6 ; and

(iii) an explanation of the calculation of the regulatory asset base for each regulatory year of the relevant regulatory control period and of the amounts, values and inputs referred to in subparagraph

Appendix 2 Comparison of Council charges 2013/14 vs 2014/15 vs 2015/16

	2013/14 Actual income		2014/15 Proposed income		2015/16 Proposed income				Variance FY2016 v FY2015	
Council	**2013/14 inventory Sum of Count STL**	**Sum of Total Income**	**April 2014 inventory Sum of Count STL**	**Sum of Total Income (2013/14 plus CPI)**	**April 2014 inventory Sum of Count STL**	**Sum of CAPEX total income**	**Sum of OPEX total income**	**Sum of Total Income**	**Variance $**	**Variance %**
Armidale Dumaresq Council	2419	$278,642	2,415	$285,124	2,415	$ 173,956	$ 161,838	$ 335,794	$ 50,670	18%
Ballina Shire Council	2918	$170,311	2,918	$174,562	2,918	$35,186	$ 265,526	$ 300,712	$126,150	72%
Balonne Shire Council	27	$2,037	27	$2,088	27	$ 828	$ 2,499	$ 3,327	$1,239	59%
Balranald Shire Council	269	$ 12,075	269	$ 12,376	269	$ 416	$24,211	$24,626	$ 12,250	99%
Bathurst Regional Council	6050	$465,039	6,050	$476,647	6,050	$ 211,456	$ 424,348	$ 635,805	$159,158	33%
Bega Valley Shire Council	2706	$123,981	2,699	$126,747	2,699	$ 3,996	$ 224,127	$ 228,123	$101,376	80%
Bellingen Shire Council	783	$ 39,048	783	$ 40,023	783	$ 4,948	$65,613	$70,561	$ 30,538	76%
Berrigan Shire Council	1068	$ 48,315	1,068	$ 49,521	1,068	$ 1,332	$95,352	$96,684	$ 47,163	95%
Bland Shire Council	711	$ 30,966	711	$ 31,739	711	$ 428	$66,401	$66,829	$ 35,090	111%
Blayney Shire Council	730	$ 43,428	730	$ 44,512	730	$12,192	$63,986	$76,179	$ 31,666	71%
Bogan Shire Council	445	$ 19,582	445	$ 20,071	445	$ 211	$41,432	$41,644	$ 21,573	107%
Bombala Shire Council	258	$ 11,077	258	$ 11,354	258	$ 139	$21,035	$21,173	$9,819	86%
Boorowa Council	244	$ 10,568	244	$ 10,832	244	$77	$22,582	$22,658	$ 11,826	109%
Bourke Shire Council	526	$ 37,736	526	$ 38,678	526	$15,840	$47,392	$63,232	$ 24,554	63%
Brewarrina Shire Council	219	$ 13,408	219	$ 13,743	219	$ 3,989	$19,361	$23,350	$9,607	70%
Broken Hill City Council	1974	$ 85,629	1,974	$ 87,767	1,974	$ 1,750	$ 193,565	$ 195,314	$107,548	123%

Byron Shire Council	1649	$ 87,022	1,648	$ 89,140	1,648	$12,966	$ 141,655	$ 154,622	$ 65,482	73%
Cabonne Shire Council	765	$ 54,754	765	$ 56,120	765	$24,059	$65,441	$89,501	$ 33,380	59%
Carrathool Shire Council	325	$ 14,886	325	$ 15,258	325	$ 215	$30,084	$30,299	$ 15,041	99%
Central Darling Shire Council	253	$ 10,699	253	$ 10,966	253	$ 419	$22,969	$23,388	$ 12,422	113%
City Of Albury	7687	$398,881	7,687	$408,837	7,687	$43,113	$ 621,860	$ 664,973	$256,136	63%
City Of Wagga Wagga	6597	$322,292	6,596	$330,286	6,596	$20,786	$ 594,828	$ 615,614	$285,328	86%
Clarence Valley Council	3770	$230,235	3,768	$235,857	3,768	$62,939	$ 316,307	$ 379,246	$143,390	61%
Cobar Shire Council	752	$ 34,809	752	$ 35,678	752	$ 2,494	$71,048	$73,542	$ 37,864	106%
Coffs Harbour City Council	4242	$425,298	4,242	$435,913	4,242	$ 267,966	$ 365,460	$ 633,427	$197,514	45%
Conargo Shire Council	20	$ 941	20	$ 965	20	$ 120	$ 1,629	$ 1,749	$784	81%
Coolamon Shire Council	336	$ 15,254	336	$ 15,635	336	$ 921	$32,341	$33,262	$ 17,628	113%
Cooma-Monaro Council	921	$ 50,005	921	$ 51,253	921	$ 8,990	$79,410	$88,401	$ 37,148	72%
Coonamble Shire Council	522	$ 24,476	519	$ 24,942	519	$ 952	$51,016	$51,968	$ 27,026	108%
Cootamundra Shire Council	809	$ 36,350	808	$ 37,211	808	$ 350	$72,751	$73,101	$ 35,889	96%
Corowa Shire Council	1213	$ 57,697	1,213	$ 59,137	1,213	$ 2,102	$ 110,703	$ 112,806	$ 53,669	91%
Cowra Shire Council	1415	$137,740	1,415	$141,178	1,415	$78,265	$ 113,762	$ 192,026	$ 50,848	36%
Deniliquin Municipal Council	826	$ 36,521	826	$ 37,432	826	$ 699	$75,018	$75,717	$ 38,285	102%
Department Of Transport Qld	44	$3,586	44	$3,676	44	$ 1,413	$ 5,284	$ 6,697	$3,021	82%
Dubbo City Council	4878	$248,160	4,878	$254,354	4,878	$23,091	$ 476,158	$ 499,249	$244,895	96%
Dungog Shire Council	492	$ 35,274	492	$ 36,155	492	$17,167	$35,029	$52,196	$ 16,041	44%
Eurobodalla Shire	3644	$179,803	3,644	$184,291	3,644	$19,499	$ 309,012	$ 328,512	$144,221	78%
Forbes Shire Council	1135	$ 68,261	1,135	$ 69,965	1,135	$24,651	$88,049	$ 112,700	$ 42,735	61%

Gilgandra Shire Council	562	$ 26,635	562	$ 27,300	562	$ 1,194	$55,286	$56,479	$ 29,179	107%
Glen Innes Severn Shire Council	831	$ 55,328	831	$ 56,709	831	$26,693	$50,664	$77,357	$ 20,648	36%
Gloucester Shire Council	491	$ 38,051	491	$ 39,001	491	$18,426	$33,672	$52,098	$ 13,097	34%
Goondiwindi Regional Council	986	$ 71,975	985	$ 73,697	985	$31,485	$70,789	$ 102,274	$ 28,577	39%
Goulburn Mulwaree Council	3028	$142,620	3,028	$146,180	3,028	$ 5,625	$ 283,919	$ 289,544	$143,364	98%
Great Lakes	3152	$245,281	3,151	$251,323	3,151	$ 114,955	$ 221,187	$ 336,141	$ 84,818	34%
Greater Hume Shire Council	813	$ 36,714	812	$ 37,584	812	$ 2,129	$71,607	$73,736	$ 36,152	96%
Greater Taree	4104	$257,235	4,103	$263,592	4,103	$72,766	$ 346,253	$ 419,018	$155,427	59%
Griffith City Council	2903	$140,655	2,903	$144,166	2,903	$ 2,572	$ 273,733	$ 276,305	$132,139	92%
Gundagai Shire Council	407	$ 17,949	407	$ 18,397	407	$77	$39,007	$39,084	$ 20,686	112%
Gunnedah Shire Council	1198	$ 81,501	1,198	$ 83,536	1,198	$37,660	$73,254	$ 110,913	$ 27,378	33%
Guyra Shire Council	392	$ 27,412	392	$ 28,096	392	$12,214	$26,923	$39,137	$ 11,041	39%
Gwydir Shire Council	477	$ 36,628	477	$ 37,542	477	$19,061	$29,378	$48,439	$ 10,896	29%
Harden Shire Council	431	$ 19,002	431	$ 19,476	431	$ 266	$39,666	$39,932	$ 20,456	105%
Hay Shire Council	529	$ 26,462	529	$ 27,122	529	$ 1,752	$49,079	$50,831	$ 23,709	87%
Inverell Shire Council	1242	$ 90,415	1,241	$ 92,597	1,241	$43,448	$82,276	$ 125,724	$ 33,127	36%
Jerilderie Shire Council	208	$ 10,029	208	$ 10,280	208	$ 311	$21,820	$22,131	$ 11,852	115%
Junee Shire Council	539	$ 25,038	539	$ 25,663	539	$ 277	$44,367	$44,644	$ 18,981	74%
Kempsey Shire Council	3139	$278,950	3,139	$285,913	3,139	$ 149,549	$ 219,391	$ 368,940	$ 83,027	29%
Kyogle Shire Council	590	$ 29,814	590	$ 30,558	590	$ 4,676	$52,183	$56,859	$ 26,300	86%
Lachlan Shire Council	989	$ 78,250	987	$ 80,041	987	$35,865	$85,166	$ 121,031	$ 40,990	51%
Leeton Shire Council	1502	$ 76,525	1,502	$ 78,435	1,502	$ 4,828	$ 153,084	$ 157,912	$ 79,477	101%
Lismore City Council	3254	$189,806	3,253	$194,484	3,253	$47,352	$ 288,641	$ 335,993	$141,509	73%

Liverpool Plains Shire Council	751	$ 32,860	751	$ 33,680	751	$ 1,113	$66,870	$67,983	$ 34,303	102%
Lockhart Shire Council	339	$ 14,135	339	$ 14,488	339	$ 181	$27,466	$27,647	$ 13,159	91%
Mid-Western Regional Council	1575	$ 73,103	1,574	$ 74,880	1,574	$ 3,463	$ 147,151	$ 150,614	$ 75,734	101%
Moree Plains Shire Council	1786	$108,161	1,785	$110,799	1,785	$31,679	$ 158,959	$ 190,638	$ 79,839	72%
Murray Shire Council	732	$ 36,108	732	$ 37,009	732	$ 2,221	$64,336	$66,556	$ 29,547	80%
Murrumbidgee Shire Council	292	$ 13,710	292	$ 14,052	292	$ 878	$25,155	$26,033	$ 11,981	85%
Nambucca Shire Council	1335	$ 94,222	1,333	$ 96,429	1,333	$40,670	$83,752	$ 124,423	$ 27,994	29%
Narrabri Shire Council	1555	$ 92,787	1,554	$ 95,042	1,554	$27,094	$ 130,154	$ 157,248	$ 62,206	65%
Narrandera Shire Council	726	$ 37,561	726	$ 38,498	726	$ 5,089	$64,561	$69,650	$ 31,152	81%
Narromine Shire Council	774	$ 33,678	774	$ 34,518	774	$ 398	$74,360	$74,758	$ 40,239	117%
NSW Trade and Investment			34	$ -	34	$ 197	$ 2,371	$ 2,568		
Oberon Council	476	$ 24,126	476	$ 24,728	476	$ 4,384	$41,662	$46,046	$ 21,318	86%
Orange City Council	4724	$431,005	4,724	$441,763	4,724	$ 217,218	$ 394,955	$ 612,174	$170,411	39%
Palerang Council	643	$ 29,653	643	$ 30,394	643	$ 714	$58,509	$59,224	$ 28,830	95%
Parkes Shire Council	1580	$162,337	1,580	$166,389	1,580	$93,038	$ 120,681	$ 213,720	$ 47,331	28%
Port Macquarie - Hastings Council	6597	$460,886	6,578	$471,029	6,578	$ 154,831	$ 575,484	$ 730,314	$259,285	55%
Queanbeyan City Council	4227	$204,066	4,227	$209,159	4,227	$ 2,203	$ 411,713	$ 413,916	$204,757	98%
Richmond Valley Council	1675	$ 97,717	1,674	$100,096	1,674	$25,856	$ 144,546	$ 170,402	$ 70,305	70%
Roads & Traffic Authority	1232	$ 69,366	1,232	$ 71,098	1,232	$ 1,670	$ 152,145	$ 153,815	$ 82,717	116%
Shoalhaven City Council	11	$ 476	11	$ 488	11	$-	$ 953	$ 953	$465	95%
Snowy River Shire Council	522	$ 24,508	522	$ 25,119	522	$ 978	$44,908	$45,886	$ 20,766	83%
Southern Downs	18	$ 951	18	$ 975	18	$ 205	$ 1,470	$ 1,675	$700	72%

Regional Council										
State Rail Authority	10	$ 564	10	$ 578	10	$-	$ 1,155	$ 1,155	$577	100%
Tamworth Regional Council	5476	$243,940	5,473	$249,892	5,473	$ 7,026	$ 464,610	$ 471,636	$221,745	89%
Temora Shire Council	597	$ 26,062	597	$ 26,712	597	$ 209	$57,981	$58,190	$ 31,478	118%
Tenterfield Shire Council	793	$ 51,408	793	$ 52,691	793	$20,942	$50,989	$71,931	$ 19,239	37%
Tumbarumba Shire Council	236	$ 10,160	236	$ 10,413	236	$77	$20,979	$21,055	$ 10,642	102%
Tumut Shire Council	1033	$ 49,047	1,032	$ 50,223	1,032	$ 3,374	$95,096	$98,470	$ 48,247	96%
Tweed Shire Council	5730	$369,358	5,730	$378,578	5,730	$ 106,654	$ 492,019	$ 598,673	$220,095	58%
Upper Hunter Shire Council	198	$8,282	198	$8,489	198	$-	$17,712	$17,712	$9,223	109%
Upper Lachlan Council	585	$ 25,759	585	$ 26,402	585	$ 267	$51,653	$51,920	$ 25,519	97%
Uralla Shire Council	311	$ 20,586	311	$ 21,100	311	$ 8,374	$21,779	$30,154	$9,053	43%
Urana Shire Council	291	$ 13,362	291	$ 13,695	291	$ 1,615	$23,732	$25,347	$ 11,652	85%
Wakool Shire Council	450	$ 19,802	450	$ 20,296	450	$ 469	$41,894	$42,363	$ 22,067	109%
Walcha Shire Council	318	$ 23,859	318	$ 24,455	318	$12,004	$20,529	$32,533	$8,078	33%
Walgett Shire Council	871	$ 53,432	871	$ 54,766	871	$16,593	$73,228	$89,821	$ 35,055	64%
Warren Shire Council	388	$ 21,155	387	$ 21,628	387	$ 2,077	$38,009	$40,086	$ 18,458	85%
Warrumbungle Shire Council	747	$ 31,094	747	$ 31,870	747	$ 615	$67,332	$67,947	$ 36,078	113%
Weddin Shire Council	456	$ 33,041	456	$ 33,866	456	$14,655	$40,361	$55,016	$ 21,150	62%
Wellington Shire Council	1206	$ 48,709	1,206	$ 49,925	1,206	$ 139	$ 105,953	$ 106,092	$ 56,167	113%
Wentworth Shire Council	736	$ 35,754	736	$ 36,646	736	$ 2,236	$65,307	$67,543	$ 30,897	84%
Yass Valley Council	902	$ 39,672	902	$ 40,663	902	$ 940	$76,990	$77,930	$ 37,267	92%
Young Shire Council	981	$ 45,588	980	$ 46,678	980	$ 2,486	$87,217	$89,703	$ 43,025	92%
Grand Total	**149,294**	**$9,079,113**	**149,270**	**$9,301,920**	**149,270**	**2,527,933**	**12,737,113**	**15,265,047**	**$ 5,963,126**	**64%**

Appendix 3 – Defects per Depot per mobilisation.

Depot	Tasks/ mobilisation
Albury Depot	10.13
Armidale Depot	1.86
Ballina Depot	5.60
Balranald Depot	1.00
Barham Depot	1.00
Barraba Depot	1.00
Bathurst Depot	3.82
Bega Depot	1.81
Berrigan Depot	1.00
Blayney Depot	1.00
Bombala Depot	1.00
Bonalbo Depot	1.00
Boorowa Depot	1.00
Bourke Depot	1.67
Braidwood Depot	1.00
Broken Hill Depot	2.72
Bulahdelah Depot	1.00
Buronga Depot	1.00
Canowindra Depot	1.00
Casino Depot	1.00
Cobar Depot	1.19
Coffs Harbour Depot	3.98
Condobolin Depot	1.00
Coolamon Depot	1.00
Cooma Depot	1.00
Coonabarabran Depot	1.00
Coonamble Depot	1.00
Cootamundra Depot	1.00
Corowa Depot	1.00
Cowra Depot	2.70
Crookwell Depot	1.00
Culcairn Depot	1.00
Darlington Point Depot	1.00
Deniliquin Depot	1.00
Dorrigo Depot	1.00
Dubbo Depot	9.82
Dunedoo Depot	1.00
Dungog Depot	1.00
Ewingsdale Depot	1.57
Forbes Depot	1.11
Forster Depot	2.70
Gilgandra Depot	1.00
Glen Innes Depot	1.00

Gloucester Depot	1.00
Goondiwindi Depot	1.14
Goulburn Depot	2.44
Grafton Depot	2.64
Grenfell Depot	1.00
Griffith Depot	2.38
Gundagai Depot	1.00
Gunnedah Depot	1.00
Guyra Depot	1.00
Harden Depot	1.00
Hay Depot	1.00
Hillston Depot	1.00
Inverell Depot	1.00
Jindabyne Depot	1.00
Junee Depot	1.00
Kempsey Depot	2.96
Kyogle Depot	1.00
Lake Cargelligo Depot	1.00
Leeton Depot	1.14
Lismore Depot	3.30
Lockhart Depot	1.00
Maclean Depot	1.58
Menindee Depot	1.00
Molong Depot	1.00
Moree Depot	1.11
Moruya Depot	4.93
Moulamein Depot	1.00
Mudgee Depot	2.40
Murwillumbah Depot	1.00
Nambucca Heads Depot	1.11
Narrabri Depot	1.28
Narrandera Depot	1.00
Narromine Depot	1.00
Nyngan Depot	1.00
Oberon Depot	1.00
Orange Depot	5.40
Parkes Depot	1.14
Peak Hill Depot	1.00
Port Macquarie Depot	3.72
Queanbeyan Depot	2.95
Quirindi Depot	1.00
Stroud Depot	1.00
Tamworth Depot	3.54
Taree Depot	3.80
Temora Depot	1.00
Tenterfield Depot	1.00
Texas Depot	1.00
Tooleybuc Depot	1.00

Tottenham Depot	1.00
Trundle Depot	1.00
Tumbarumba Depot	1.00
Tumut Depot	1.00
Tweed Heads Depot	5.24
Wagga Wagga Depot	9.68
Walcha Depot	1.00
Walgett Depot	1.00
Warialda Depot	1.00
Warren Depot	1.00
Wellington Depot	1.29
Wentworth Depot	1.00
West Wyalong Depot	1.00
Wilcannia Depot	1.00
Woodburn Depot	1.00
Yass Depot	1.00
Young Depot	1.01
Defects per depot per work day	1.34