Attachment 8.08

Public lighting capex investment plan summary

May 2014

Contents

Document and Amendment History

Issue No.	Date	Approved By	Summary of Changes
1.0	March 2014	Reg Team	Final
2.0	May 2014	John Bedding	Final with Formatting

Public Lighting Investment Plan – Summary

About this document

This document is a supporting document to Ausgrid's 2014-19 substantive proposal to the Australian Energy Regulator. It provides justification and explanation of a specific capital expenditure program as well as summarising the key financial information of the program.

This document should be read in conjunction with all submission documents, particularly those relevant to public lighting.

Strategic Objective Targets

- Reduction of unscheduled maintenance when compared to existing luminaires which will result in a reduction in Operational Expenditure.
- Potential to increase the Bulk Lamp Replacement (BLR) period from 2.5 years to 4 years.

1. FY15-19 CAPITAL BUDGET

The fundamental objective of Ausgrid's Public Lighting services is to provide the required services at the lowest cost. Ensuring that Ausgrid operates prudently and efficiently is key to this objective. As such Ausgrid's investment decisions are based around reducing the whole of life costs associated with these services whilst maintaining the required lighting standards.

Two significant investment decision made in the period were to move to LED lighting on residential roads and to Active Reactor technology on major roads. Whilst these two investment decisions increased the total capital expenditure compared to the incumbent technologies, they reduced the total operational expenditure to the point where the projects returned a positive NPV.

Attachment 8.12 – Public Lighting Opex Forecast details the opex savings that will be realised if all of the proposed investment plans are rolled out during the FY15 – FY19 regulatory control period. Overall Ausgrid believes that there will be a reduction of 20% in opex once these projects are complete.

The capital budget for public lighting consists of three main categories; New, planned and reactive public lighting. This document in conjunction with the supporting investment plans attempts to justify the figures proposed in the FY15-19 budget (Figure 5).

1.1 New public lighting Budget

This category is for completely new installations, i.e. Greenfield sites. The "New PL Capex" amount included in the budget summary is based on historical expenditure. New public lighting is typically a lower amount than reactive and planned.

1.2 Planned public lighting replacements

Planned public lighting replacements are programs that are in place to replace older, less efficient technology on our network. This is beneficial to both the customers and Ausgrid as the newer technology lowers maintenance costs and provides the same level of lighting compliance whilst using less energy.

During the FY15 – FY19 regulatory control period Ausgrid intends to undertake three significant replacement programs:

1. LED – This project is the replacement of the underperforming 42W compact fluorescent with LEDs. Attachment 8.11 - Public lighting investment plan- Replacement of 42W CFL with LED details the costs and benefits associated with this project.

2. Active Reactor (AR) – This project is the replacement of all high wattage mercury luminaires with high pressure sodium Active Reactor technology. This project is detailed in the investment plan attachment 8.09 - Public lighting investment plan - active reactors.

3. Twin 20 replacement – This project is the replacement of all Twin 20 fluorescent luminaires with LEDs. This project is detailed in the investment plan attachment 8.10- Public lighting investment plan - Replacement of twin 20 luminaires.

1.3 Reactive public lighting Budget

Capital expenses defined as "Reactive Public lighting" are typically the capital expense incurred when replacing a failed luminaire, bracket or support associated with public lighting. This work may be performed by either Ausgrid (Network Operations) or contract (Network Development) staff.

The actual spend on Reactive Public lighting in FY13 was $8,560,509. The majority of this spend was booked to buckets set up for each region where jobs are less than $50K (Figure 1)

Over the course of the next determination period Ausgrid has included in its budget a number of planned capital replacement programs for older style luminaires, namely as described above. It is foreseen that these programs will pick up the majority of what would be considered reactive replacement over the period and as such the reactive replacement figure will be minimal. As the

timing of these programs is not yet certain it is difficult to accurately forecast a yearly budget for reactive work that may not get picked up in the replacement programs.

REACTIVE ST LIGHTING REPL (<$50K) - U/H	EA01PC3OPS	Network Operations	342,229
REACTIVE ST LIGHTING REPL (<$50K) - L/H	EA01PC3OPS	Network Operations	865,128
REACTIVE ST LIGHTING REPL (<$50K) - CC	EA01PC3OPS	Network Operations	352,076
REACTIVE ST LIGHTING REPL (<$50K) - NTH	EA01PC3OPS	Network Operations	2,705,782
REACTIVE ST LIGHTING REPL (<$50K) - EAST	EA01PC3OPS	Network Operations	246,431
REACTIVE ST LIGHTING REPL (<$50K) - STH	EA01PC3OPS	Network Operations	577,443
REACTIVE ST LIGHTING REPL (<$50K) - NEWC	EA01PC3OPS	Network Operations	882,673
REACTIVE ST LIGHT'G REPL (<$50K)-DISTRIB	EA01PC3DEV	Network Development	2,337,084
		Total	8,308,847

Figure 1 – Actual Reactive Public lighting Spend

1.4 Pole (steel lighting column) replacement

The budget estimate included in the poles category is for the replacement of condemned public lighting steel poles. This falls under planned replacement work however is somewhat reactive in nature in that it is not the systematic replacement of poles grid by grid. Poles are identified by pole inspectors and are passed on to either Ausgrid staff or contractors to replace. The figures are based on historical replacement quantities. The estimated capital cost for each pole replacement is $11,103, this figure is based on tendered external service provider rates. Expected volumes are listed in figure 2.

Year	2015	2016	2017	2018	2019	Total over the Period
Number of Planned Pole replacements	431.00	444.00	456.00	467.00	478.00	2,267

Figure 2– Planned Public lighting pole replacement

Along with the proactive replacement of condemned steel lighting poles there will also be a volume of poles within the new and reactive categories.

Detailed calculations associated with all new, reactive and planned public lighting works can be found in supporting documentation for attachment 8.08 – Public lighting capex investment plan summary – '2014.05.21 Post June 09 Capex Revenue & Resource V1' (ID00263).

2. Total capital budget

- The total capital budget for FY15-19 is $82,869,944.
- The Actual capital spend from FY10 – 13 is $62,630,349 (Figure 3)
- The estimated capital spend for FY14 is approx $18M
- Actual + estimated spend for FY10-14 is approx $80M

	Total FY10-13	Spend Relative to Determination FY10-13
New Street Lighting (Actual)	$7,252,287	43%
New Street Lighting (Determination)	$16,905,783	
Planned Street Lighting Replacement (Actual)	$14,528,820	46%
Planned Street Lighting (Determination)	$31,527,001	
Reactive Street Lighting Replacement (Actual)	$40,849,242	406%
Reactive Street Lighting (Determination)	$10,052,087	
Total Actual	$62,630,349	107%
Total Determination	$58,484,871	

Figure 3 – Actual Capital Spend FY10-13

3. Total capital budget summary

Year	2015	2016	2017	2018	2019	Forecast Expenditure
Total Capex (Real $FY14)	**$20,507,782.03**	**$25,899,536.99**	**$16,812,571.08**	**$10,461,012.08**	**$9,189,041.85**	**$82,869,944.04**
Investment plan LEDs	$3,054,597.74	$2,583,287.34	$2,184,610.40	$1,847,199.84	$453,088.28	$10,122,783.59
Investment plan AR	$8,752,389.92	$8,971,199.67				$17,723,589.59
Investment plan Twin 20 Replacement	$486,717.41	$5,986,624.18	$6,136,289.78			$12,609,631.37
Reactive Public lighting	$1,100,000.00	$1,100,000.00	$1,100,000.00	$1,100,000.00	$1,100,000.00	$5,500,000.00
Poles	$4,785,719.63	$4,930,068.48	$5,063,313.57	$5,185,454.91	$5,307,596.25	$25,272,152.84
New PL capex	$2,328,357.33	$2,328,357.33	$2,328,357.33	$2,328,357.33	$2,328,357.33	$11,641,786.66

Figure 4 – Total Capital Budget FY15-19

Year	2015	2016	2017	2018	2019	Forecast Expenditure
New	$2,328,357.33	$2,328,357.33	$2,328,357.33	$2,328,357.33	$2,328,357.33	$11,641,786.66
Planned	$13,538,109.55	$13,901,268.15	$5,063,313.57	$5,185,454.91	$5,307,596.25	$42,995,742.43
Reactive	$4,641,315.15	$9,669,911.51	$9,420,900.18	$2,947,199.84	$1,553,088.28	$28,232,414.96
Total Capex (Real $FY14)	**$20,507,782.03**	**$25,899,536.99**	**$16,812,571.08**	**$10,461,012.08**	**$9,189,041.85**	**$82,869,944.04**

Figure 5 – Total Capital Budget FY15-19 Summary

4. Capital Revenue and associated Annuity capital pricing model

4.1 Annuity pricing model

Ausgrid proposes to retain the form of modelling used for the 2010 determination and has updated the 2010 models to reflect changes that have taken place in the intervening period. Assets installed post July 2009 are priced using a cost build up model which then calculates an annuity based on the expected life of the asset. This model is attached at 8.13 – 'Post June 2009 Annuity Prices.xls'.

The functionality of the model remains as it was proposed in the 2010 determination however two key input changes have been made to this model:

1. The allocation of labour to the installation of a luminaire and bracket has been split to better reflect the volumes of this work in reality. The 2010 determination split was 90% to the bracket and 10% to the luminaire. This did not allow for accurate cost reflectivity as brackets are not often replaced with luminaires and therefore only 10% of the labour is recovered in the annuity price when a luminaire is installed without a new bracket. The split proposed is 70% to the luminaire and 30% to the bracket.

2. Overheads and oncosts associated with capex, as well as a proportion of overtime labour has been included to better reflect the true costs associated with the installation of these assets. The calculations associated with oncosts and overtime are detailed within supporting documentation for attachment 8.12 - Public Lighting Opex Forecast - '2014.04.29 Public Lighting Opex - Consolidated Supporting Figures v1' (ID00262), and the overhead calculation is detailed within supporting documentation for attachment 8.08 – Public lighting capex investment plan summary – '2014.05.21 Post June 09 Capex Revenue & Resource V1' (ID00263).

The total cost of installation of a component is given by the formula:

Total cost = Materials cost + Labour + EWP cost + overheads on capital

Customer annuity repayments are calculated by:

$$P = \frac{r(PV)}{1-(1+r)^{-n}}$$

$$P = Payment$$
$$PV = Present\ Value$$
$$r = rate\ per\ period$$
$$n = number\ of\ periods$$

Where PV = Total cost

The estimated revenue from the annuity model if all capital replacement programs are completed as scheduled is tabled below. Revenue is dependent on the population of assets, therefore these revenues are variable and estimates only.

Revenue ($m)	FY15	FY16	FY17	FY18	FY19
TOTAL	6.80	9.15	10.66	11.58	12.51

The revenue tabled above includes post 2009 assets installed on Ausgrid's network. Revenue associated with assets installed prior to July 2009 is generated from the return on the regulatory asset base. This is applied to the customer as a single fixed charge.

4.2 Pricing model inputs

Inputs into the model consist of the following:

- WACC (Pre tax real)
- Standard asset lives
- Labour rates
- Hours to install new components and the proportion of work performed in overtime rates
- Pole establishment costs
- Elevated work platform rates
- Material prices
- Allocations of labour to brackets and luminaires
- Overheads and;
- Inflation

4.2.1 Standard asset lives

The table below details the component lives in the annuity model. These are the expected lives of the asset and are the number of years used in the annuity model calculations.

Component	Asset life (years)
Luminaire	20
Bracket	35
Support	35
Connection	20

4.2.2 Labour rates

A comprehensive analysis was carried out which involved determining a labour rate for overhead linesmen for particular cost centres who would be involved in public lighting work. The rate was drawn from information provided by Ausgrid's SAP accounting system. This rate represents the cost of employing the linesman for normal time working hours. This rate is the direct award rate of pay for linesman only and does not include oncosts or overheads. See supporting documentation for attachment 8.12 - Public Lighting Opex Forecast – '2014.04.29 Public Lighting Opex - Consolidated Supporting Figures v1' (ID00262).

The overtime rate considers the amount of work performed at 1.5x, 2.0x and 2.5x. A weighted average of 1.89x was calculated and used for this assumption. See supporting documentation for attachment 8.12 - Public Lighting Opex Forecast – '2014.04.29 Public Lighting Opex - Consolidated Supporting Figures v1' (ID00262).

Both normal and overtime labour rates are consistent with the labour rates used in the opex cost build up model.

4.2.3 Hours to install new components and the proportion of work performed in overtime rates

The manhours to install a new light is 2.01 hours for a residential road and 3.02 on a traffic route. The difference is due to the requirement of additional linesman on traffic routes.

The time to complete a number of various tasks was the subject of a substantial study undertaken by Ausgrid and is detailed within supporting documentation for attachment 8.12 - Public Lighting Opex Forecast – Public Lighting Time in Motion study (ID00266).

The proportion of public lighting task completed in overtime to standard time was calculated using actual data from FY13 to YTD 2014. Supporting documentation for attachment 8.12 - Public Lighting Opex Forecast – '2014.04.29 Public Lighting Opex - Consolidated Supporting Figures v1' (ID00262) details these calculations.

4.2.4 Pole establishment costs

In the annuity pricing model labour is recovered by allocations of labour to the bracket and luminaire. As such when a new support is installed a specific capex amount needs to be included in the total cost to recover the costs associated with its installation. The specific capex amounts inputs are averages for the replacement of both in ground mounted and rag bolt assembly steel columns. This figure has been obtained by contractor tendered rates found within supporting documentation for attachment 8.12 – Public Lighting Opex Forecast (ID93656 Public lighting tender assessments) and the calculation of the unit rate is detailed within supporting documentation for attachment 8.12 - Public Lighting Opex Forecast- 'Unit price per steel street light column replacement' (ID00260).

4.2.5 Elevated work platform rates

All public lighting tasks require the use of an Elevated work platform (EWP). Ausgrid has three sizes of EWP's. Supporting documentation for attachment 8.12 - Public Lighting Opex Forecast – '2014.04.29 Public Lighting Opex - Consolidated Supporting Figures v1' (ID00262) details the sizes and the population of our fleet. A weighted average was calculated and included in the cost build up model. The FY14 hourly rate calculated is $29.73.

4.2.6 Material prices

Material prices for the majority of equipment used for public lighting are sourced by competitive tender. Attachment 8.12 – Public Lighting Opex Forecast (ID93656 Public lighting tender assessments), includes tender documentation and recommendations to award for all public lighting materials. Where equipment is no longer purchased or used but is still required for price modeling, the last known price is used or the 2010 AER determination figure is carried over.

4.2.7 Allocations of labour to brackets and luminaires

The allocation of labour to brackets and luminaires has been calculated by the number of brackets installed to the number of luminaires over the FY10 – FY14 period. The allocation in the 2010 determination was 10% to the luminaire and 90% to the bracket. This allocation saw an under recovery of actual labour expense as there were a significantly greater proportion of luminaires installed to brackets. The actual calculated ratio of luminaires installed to brackets was 72:28. These figures have been used in the calculation of annuity prices.

4.2.8 Overheads

Overheads on capital for public lighting are tabled below and can be found within supporting documentation for attachment 8.08 - Public lighting capex investment plan summary – '20140505 Total Capex, disposals and capital contributions FY15 to FY19 v3' (ID00264).

Overheads on capital (Public lighting) $,000	FY15	FY16	FY17	FY18	FY19
TOTAL	$731	$785	$652	$793	$258

A single rate to recover these overheads based on forecast capital installations has be calculated and is detailed within supporting documentation for attachment 8.08 - Public lighting capex investment plan summary – '2014.05.21 Post June 09 Capex Revenue & Resource V1' (ID00263).

4.2.9 Inflation

CPI figures have been provided by CEG. Annuity component pricing from FY16 onwards are inflated by CPI only.

Wage escalation is 0%. Any increase over CPI will be offset by efficiency gains.