ATTACHMENT 17.4
PUBLIC LIGHTING PROPOSAL
2019-24

April 2018

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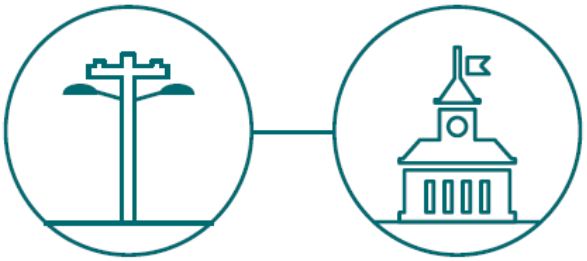
1. Executive summary

Public lighting is a vital community service. Essential Energy's services encompass the construction, operation, inspection, maintenance and replacement of public lighting assets. Road authorities, including Local Government Authorities and Roads and Maritime Services, are responsbile for assessing the need to install public lighting and determining the lighting levels required for the public light installation.



For the coming regulatory period, we propose to move towards cost-reflective network charges for our public lighting services by introducing a component-based charging model. This will optimise decision-making when choosing replacement technologies and simplify the current network charging structure, allowing for greater transparency.

During the current regulatory period, we introduced Light Emitting Diode (LED) lighting into our standard public lighting infrastructure for Category P (minor lighting) installations.

Several Councils have already completed bulk upgrade programs to replace lamp-based luminaires with LEDs, improving maintenance outcomes and reducing their energy costs. We intend to build on this work during the 2019-24 regulatory period and undertake several other activities relating to specific technologies and obsolete installations:

- Where practical, phasing out remaining Incandescent and Low Pressure Sodium (LPS) lamps for environmental and commercial reasons, and further reducing the number of Mercury Vapour lamps.
- In conjunction with our customers, continuing to increase the penetration of LED technology in Category P installations and initiating its application in Category V (major lighting) installations.
- Applying a risk-based approach to the progressive removal of small, cross-sectional copper public lighting mains, redundant control boxes and other miscellaneous hardware that is no longer required for public lighting services.
- Initiating joint investigations with customers to clarify ownership boundaries for some assets, which may entail ownership transfer in some cases.

2. Regulation of public lighting services

The New South Wales (NSW) Public Lighting Code recommends that public lighting service providers should:

- Operate a public lighting scheme safely, efficiently and effectively over its economic life in accordance with the in-service values specified for Category V and Category P lighting in the AS/NZS1158 series of standards pertaining to the lighting of roads and public spaces.
- Operate a 24-hour call centre to receive public and customer fault reports.
- Repair public lighting assets —excluding network supply faults— within eight business days of receiving a fault report (on average, per customer, per year). However, in priority cases, service providers must try to complete repairs more quickly. Priority cases include areas with high crime rates, high night-time activity, supplementary floodlights at pedestrian crossings or groups of three or more lights on Category V roads.
- Undertake cyclic maintenance of public lighting assets to ensure the efficient and safe operation of the system. To achieve the agreed maintenance standards and maintain the designed lighting technical parameters of the luminaire there must be a lamp replacement program, or a similar process aimed at achieving the same or an improved result.

- Provide service drivers by offering compensation if the repair is not carried out within 12[1] business days.

The NSW Public Lighting Code is not mandatory. It is currently under review by the NSW department of Industry, and one of the proposed changes is to make it mandatory. Consultation is presently underway; however proposed changes have not been formalised at the time of preparing this Proposal. Where available, changes will be incorporated into Essential Energy's revised Proposal

We have developed our Proposal based on the recommended service level requirements in the current version of the Code, *NSW Public Lighting Code (2006),* and *Electricity Supply (General) Regulation 2014*, which imposes a Guaranteed Service Level obligation on service providers as follows:

- A distributor who fails to repair faulty streetlighting on or before the date agreed between a small customer and the distributor as the date by which the repair is to be completed must pay to the customer, as compensation for the loss of illumination, not less than $15.
- This clause only applies to, or in respect of, a small customer if the customer's premises abut the part of the street that (but for the fault) would ordinarily be illuminated by the streetlighting.

3. Overview of Essential Energy's public lighting services

3.1 Overall service elements

Public lighting services are defined as:

- The operation, maintenance, repair and replacement of public lighting assets.
- The alteration and relocation of public lighting assets.
- The provision of new public lighting.

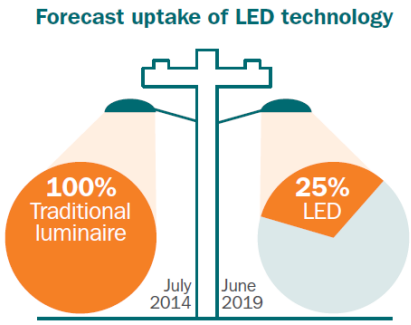
Public lighting services are regulated as an Alternative Control Service[2] under a price-capped regime. The AER has proposed including emerging public lighting technology as part of the lighting services group. Emerging technology relates to luminaires that NSW distributors did not provide at the time of the distribution determination.

This Regulatory Proposal applies to all streetlighting in the Essential Energy distribution area that we own and/or are responsible for maintaining. It does not apply to security lighting (which will become regulated as an Alternative Control Service – Ancillary Network Services), some non-standard decorative lighting or other special purpose lighting.

3.2 Key service parameters

Essential Energy services 95 per cent of the NSW geographic footprint. Within this service territory, we service around 160,000 streetlights serving more than 80 Councils. Approximately 70,000 poles or columns are dedicated streetlight supports.

The lighting technology used for public lighting continues to change. As at 1 July 2017, LED-based luminaires accounted for around 4 per cent of public lighting installations. This is expected to increase to 25 per cent by 30 June 2019.



[1] The Public Lighting Code suggests a scheme similar to the Guarantee Service Level (GSL) scheme that Essential Energy is obliged to comply with under its Licence. Whereas the GSL scheme focuses on the member of the public impacted by the outage, the Public Lighting Code targets the streetlighting customer, again suggesting 12 business days. Where lists of defects are provided, a negotiated time of up to 30 days is recommended. Essential Energy has used the 12-day value when setting internal objectives.

[2] *AER's Framework and Approach for Ausgrid, Endeavour Energy and Essential Energy - July 2017*

Over the life of this regulatory period, Essential Energy's objectives include:

- Meeting public lighting customer and local community needs for effective, reliable and energy-efficient lighting of roads and public spaces.
- Maintaining a safe public lighting system that complies with AS/NZS 1158.
- Fulfilling all regulatory requirements, including those established in the NSW Public Lighting Code by the NSW Department of Industry.
- Minimising the cost to serve for our public lighting customers.
- Providing clear, transparent and cost-reflective pricing mechanisms, highlighted through the component-based network charges outlined in this Proposal.
- Increasing the penetration of LED technology in Category P installations and initiating its application in Category V installations.
- Continuing to reduce the proportion of mercury vapour lamps, to improve environmental outcomes.
- Reducing LPS and incandescent lamps, replacing them with more effective and efficient technology solutions.
- Initiating work programs to remove redundant streetlight control wires, and pot belly/triangular columns, ensuring the ongoing safety of Essential Energy employees and members of the public.

As specified in *AS/NZS1158 Lighting for Roads and Public Spaces*, there are two lighting categories:

- Category V lighting schemes, also known as "major", which apply to major roads and highways.
- Category P lighting schemes, also known as "minor", which apply to non-Category V road installations and other public spaces with pedestrian and cycling activity.

Population by Category

Category Breakdown	Category V (Major)	Category P (Minor)	Total
Asset Database July 2017	39,772	119,416	159,188

3.3 Public lighting installation components

Delivery of public lighting services requires the design, financing, procurement and construction of public lighting installations, as well as ongoing maintenance, inspection, and operation. Each public lighting installation has several asset components. The major components provide the framework for component-based pricing.

Public Lighting Components

Component	Description
Lamp	Lamp type (technology) and nominal rating (wattage). Higher wattage lights are required for main roads. Integrated lamps, such as LED technology, are referred to as luminaires.
PE cell	Performs the switching functionality of the luminaire under low light conditions.
Luminaire/lantern	Apparatus that distributes, filters or transforms the light transmitted from a light source, including lamps or LED modules. Current era luminaires also include control gear and circuit protection in the housing and a photoelectric (PE) cell socket for connecting individual PE cells for luminaire control.
Bracket	Connects luminaire with support (pole) and varies by shape and length. Most steel columns have an integrated bracket.
Support	Pole or other support, usually made of wood, steel or concrete. May be shared with assets used for distribution services or dedicated solely to public lighting.

4. Technology advancements

Essential Energy is committed to implementing new technologies where they are both commercially and technically viable. These technologies include, but are not limited to:

- Changes in LED technology that offer more efficient and more reliable luminaires as they come onto the market.
- Category V LED implementation as a standard offering on our network.
- Smart controls on streetlighting assets.
- Asset Management Systems that monitor, report and track asset details and maintenance activities.

During the current regulatory period, we introduced LED lighting into our standard public lighting infrastructure, using negotiated charges to support early take-up by Councils during the 2014-19 period. Several Councils have undertaken bulk upgrades to replace lamp-based luminaires with new technology LEDs, contributing to improved maintenance outcomes and lowering their energy costs. We also continued to conduct trials for installing LEDs in Category V brownfield sites.

LEDs are likely to be standard for all streetlighting installations throughout the 2019-24 regulatory period.

With LED technology now economically and technically mature, our focus has moved to smart controls. These are devices that can:

- Control the luminaire i.e. switching and dimming.
- Monitor the luminaire i.e. metering and asset performance monitoring.
- Monitor the surroundings i.e. environmental sensors, CCTV, vehicle and pedestrian movements.

Currently, the most widely-used control method is by an individual PE cell installed on the luminaire. The implementation of LED luminaires has opened avenues for increased control of illumination but using on/off PE cells limits their potential, including dimming.

Our customers are the major driver for investigating smart controls. They want to bring streetlight operational costs down, use the network backbone for interconnected systems and use a smart system to generate other forms of income. We are continuing to consult extensively with our public lighting customers to understand their drivers and needs.

In recognition of ongoing advancements in public lighting technology, the *AER's 2019-24 Framework and Approach* classifies emerging public lighting technology as an Alternative Control Service and enables new services to be introduced mid-period within the regulatory framework.

5. Public lighting maintenance

Public lighting maintenance comprises a range of diverse routine and non-routine activities.

Summary of Routine/Non-Routine Public Lighting Tasks

Tasks	Description
Outage detection	Operation of public fault reporting facilities, including web-based and call centre reports and completion of streetlight night patrols.
Condition monitoring	Monitoring assets through inspection and scheduled maintenance, including luminaires, supports and brackets.
Vegetation management	For dedicated streetlight supports.
Luminaire spot defect replacement	Spot repairs of luminaires, including replacing lamps, PE cells and control gear wiring and cleaning diffusers. Spot defect replacement can result in complete luminaire replacement if the luminaire is unrepairable.

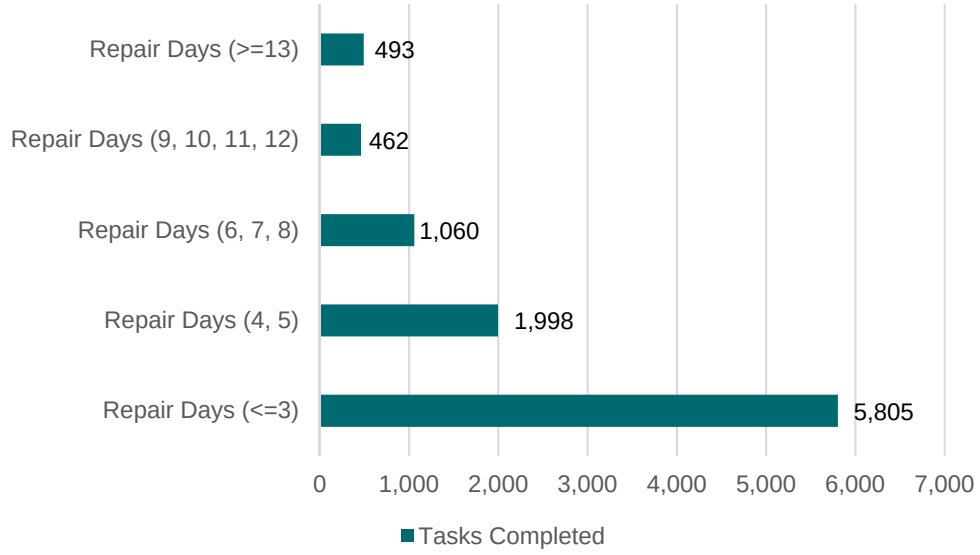
Tasks	Description
Cyclical luminaire maintenance programs	Bulk replacement of lamps and PE cells and cleaning diffusers on scheduled cycles. Bulk maintenance can result in complete luminaire replacement if the luminaire is unrepairable.
Pole/column maintenance	Pole and column maintenance are generally identified through condition monitoring or—in the instance of complete failure—through public report or fault detection. Maintenance activities include bolt-tightening, corrosion removal/treatment, termite treatment and pole staking. Defective assets may require complete replacement, including foundations.
Bracket maintenance	Bracket maintenance is identified through condition monitoring or—in the instance of complete failure—through public report or fault detection. Maintenance activities can include bolt-tightening and corrosion removal/treatment. Defective assets may require complete replacement.

5.1 Spot defect replacement

Essential Energy conducts approximately 25,000 spot repairs annually, meaning 15 per cent of installations require some form of attention each year. Spot defects relate to failed lamps, PE cells or other wiring issues, and/or physical damage to the installation.

Our service level obligations for defect rectification include an average of eight business days and a maximum of 12 business days. During the 2016-17 year, 9,818 defects were raised by customers with 60 per cent of tasks completed within three business days of the fault being reported. The total average repair time for this period was 4.3 business days. To achieve this result, we had an internal rectification timeframe of 10 calendar days.

Days to Repair Defects FY17



To improve efficiency, we propose to re-align our internal rectification timeframes with the Public Lighting Code, changing our internal target of 10 calendar days to 12 business days (or 16 calendar days). Moving from 10 to 16 calendar days will enable field staff to bundle tasks on a weekly or fortnightly basis, depending on the volume of work in that location. This change is projected to improve the average number of tasks completed every day by field staff from 1.48 to 2.74. The average repair time will increase from 4.3 to 7.0 business days but this figure remains below the Public Lighting Code recommendation of an average of 8.0 business days. During our phase 3 engagement program, we sought feedback from our customers on whether they supported the move from four to seven days, with 87 per cent of customers supporting this approach.

5.2 Cyclical maintenance programs

Cyclical maintenance programs maintain light output that is consistent with the installed design standards and reduce spot failures.

They include cleaning fixtures and replacing degraded components, including lamps and PE cells. Lamp output reduces over time, until it eventually breaches the requirements of AS/NZS1158 and corresponding service level requirements under the Public Lighting Code.

We use historical performance and manufacturer data to determine the appropriate periods for cyclical maintenance.

- **Non-LED installations**: lamps are replaced in bulk every four years, with fixtures cleaned at the same time.
- **LED installations**: no lamp replacement is required, and there is an eight-year cleaning cycle.
- **All installations**: an eight-year PE cell replacement program.

Based on the current inventory of non-LED fixtures, we need to replace 40,000[3] lamps each year during the 2019-24 regulatory period.

We adopted the four-year program at the beginning of the 2014-19 regulatory period (replacing the previous three-year program), based on the increased penetration of long-life Compact Fluorescent Light (CFL) and High Pressure Sodium (HPS) lamps, which comprise 81 per cent of the public lighting population.

5.3 Safety programs

Public lighting activities are inherently responsible for a range of potential safety risks identified by Essential Energy's field staff, asset inspectors and others.

Public lighting safety risks

Risk	Description	Mitigation Strategy 2019-2024
Public lighting control wire	Small conductor-type overhead public lighting control wires that are installed on poles and prone to condition failure. As they are now redundant, aged and often in a deteriorated condition, they need to be removed.	Remove in association with bulk luminaire replacement programs supported by specific Operating Expenditure programs. Integrate activities with line inspectors to identify high-risk situations.
Redundant control boxes	Old public lighting systems used external control gear in control boxes mounted on the pole. In some cases, the control was left in situ and may still be energised.	Remove in association with bulk luminaire replacement programs supported by specific Operating Expenditure programs. Integrate activities with line inspectors to identify high-risk situations.
Redundant choke boxes	Various forms of lighting used "choke boxes" to limit current flow. Sometimes when new fixtures have been installed, the choke boxes have been left in situ on poles and/or in the base of columns.	Recover and scrap in conjunction with routine maintenance activities.
Corrosion in some structures - hybrid pillar/columns	Some pot belly and triangular columns mix customer service connections with public lighting supplies, causing potential confusion about connections.	In conjunction with line inspection activities, replace with separate pillar and streetlighting columns.

[3] this number will decline as LED's are installed

5.4 Technology obsolescence

Changing environmental standards and usage patterns are increasing the risk we will no longer be able to source some replacement lamps, or be able to source them from reputable manufactures at reasonable cost. These lamps include:

- **Mercury vapour** – changing environmental standards relating to the use of mercury, particularly in Europe, threaten the ongoing availability of these lamps. Through a bulk replacement program, we have already significantly reduced their use. However, more than 19,000 installations still use this technology. We plan to engage with customers over our goal of replacing at least 20 per cent (approximately 4,000) of these installations during the 2019-24 regulatory period.
- **Incandescent** – while not a site-specific environmental issue, incandescent lamps are inefficient and are relatively costly to maintain because of the short lamp life. We will engage with customers to replace approximately 150 remaining installations throughout 2019-24.
- **LPS** – also not a site-specific environmental issue, but the poor colour rendering of this technology (orange) means its use is declining worldwide. Consequently, the supply of replacement lamps is declining and the cost of replacement lamps is increasing significantly. We will engage with customers to progressively replace the approximately 640 remaining LPS lamps throughout 2019-24.

6. Overview of our network charging model and inputs

6.1 Charging objectives

The proposed changes to our network charging schedules reflect the following objectives:

- **Establish cost-reflective charges at a component level.** This will optimise decision-making when choosing replacement technologies.
- **Simplify network charging schedules.** The current schedules are complex and administratively onerous.
- **Use accurate defect rates by light type to determine the volume of spot replacements.** Using this data ensures we send pricing signals when a technology becomes obsolete and inefficient, encouraging customers to replace it with modern technology that has a lower whole-of-life cost.

6.2 Charging summary

We are proposing several changes to public lighting charges from 1 July 2019 onwards. The most significant are:

- Ending the capital recovery phase of Tariff 1 on 30 June 2019, with these assets attracting a maintenance-only charge after that.
- Moving to a more cost-reflective charging structure based on separate component pricing for poles/structures, brackets and luminaires. This enables customers to replace only part of the installation.

6.3 Quantitative inputs

6.3.1 Asset lives

Capital charges depend on the expected economic life of assets. While the life of individual asset types may vary according to their construction, location and design life, for the purposes of network charges, standard lives are assigned to major components. Supports have long lives, while luminaires have medium lives. The standard asset lives we propose for pricing the capital components of unbundled pricing are:

- Lamp-based luminaires – 20 years.
- LED luminaires – 10 years.
- Brackets – 35 years.
- Supports (including connections) – 35 years.

6.3.2 Bulk lamp replacement

For non-LEDs, bulk lamp replacements are based on a four-year cycle, with cleaning every second cycle. We secured this service through an open market tender and it is the most efficient available. The materials used in this contract are from a period contract that expires in November 2020 and was also an open market tender. LED PE cells are replaced every eight years and fixtures are cleaned at the same time.

6.3.3 Streetlight patrols

To ensure compliance with AS/NZS1158, we undertake twice-yearly night patrols for Category V lighting that ensure 95 per cent uptime for the asset base. The cost in this Proposal is based on our night patrol costs for FY17 and averaging the program cost over the number of assets inspected.

6.3.4 Labour costs

We have applied the same labour pay points as in the 2014-19 AER determination and priced our services in accordance with the current Enterprise Bargaining Agreement.

6.3.5 Materials costs

The current market-based contract rates are used for major materials items such as luminaires, columns and brackets. Where materials are taken from store stock, we applied the current store holding price, plus store on-costs.

6.3.6 Defects rectification

The regulated network charging models are based on assumptions about the number of defects we will attend in any one year for each light type and technology.

We have used manufacturers' failure rates to ensure costs reflect the technology and quality of the specific luminaire. For a small number of lamps where no failure rates could be obtained from the manufacturer, we used maintenance log data.

It should be noted that failures may be of many types and affect different components, including lamps, ballasts, connections, fuses, diffusers and seals, and are not limited to lamp failure but rather to any failure of the installation e.g. vandalism.

Common Lamp Failure Rates

Luminaire Type	Number of Luminaires	Failure Rates (%)
Compact Fluorescent 42	58,943	4.88%
High Pressure Sodium 70	28,565	14.29%
High Pressure Sodium 250	23,767	5.30%
Mercury Vapour 80	16,132	6.54%
High Pressure Sodium 150	10,225	5.21%
StreetLED 18W	4,654	1.56%
High Pressure Sodium 400	2,664	4.92%
Evolve LED 25W	2,503	3.08%
High Pressure Sodium 50 Twin Arc	2,240	3.01%
Fluorescent 40	1,271	2.98%

6.3.6.1 Defects per trip

We propose to re-align our internal rectification timeframes with the Public Lighting Code recommendation of 12 business days (or 16 calendar days). Moving to 16 calendar days provides greater flexibility to field employees, with the ability to bundle tasks on a weekly basis in higher-volume depots or a fortnightly basis for lower-volume

depots, while still being able to achieve the overall defect completion objectives of 12 business days and an average of eight business days. This change is projected to improve the average number of daily tasks completed by field staff from 1.48 to 2.74.

Our proposed network charges reflect a forecast time for attending to each spot repair, taking into account the low volume of tasks completed across our depots.

6.3.6.2 Time to complete maintenance tasks

All streetlight repairs must be conducted as if there is live electricity and repairs must be carried out with personal protective equipment in place, including insulating gloves.

Essential Energy has no dedicated streetlight crews as our light inventory and defect rates do not support this. A typical streetlight Elevating Work Platform (EWP) is telescopic, with no stabiliser legs (spring locks only), whereas Essential Energy's line work EWPs are often the knuckle type, with front and rear stabilisers. This results in additional setup time but is unavoidable as it is not dedicated plant — dedicated plant cannot be justified.

We have completed a desktop assessment of likely times to complete tasks.

Time and Motion Study Findings

	Routine Activities per Streetlight	Effort Minutes
1	Completing HIRAC and noting any adjustments	2
2	Safe approach test for column	1
3	Placing signs and traffic barriers (witches' hats)	3
4	Positioning EWP and stabiliser engagement	3
5	Harness and gloves - checking and application	1
6	Testing lantern before maintenance	1
7	Manoeuvring boom	2
8	Testing/checking standard and wiring before repair	1
9	Replacing lamp/PE cell, cleaning diffuser and minor repairs	7
10	Completing streetlight maintenance task log	1
11	Removing traffic barriers, disengaging EWP stabilisers, gearing onto EWP	3
	Total	25

Based on our analysis, and benchmarking against other public lighting businesses, Essential Energy recommends a realistic estimate as 25 minutes per luminaire (50 labour minutes in total).

6.3.6.3 Time to travel to installations

Due to Essential Energy's sparse lighting inventory, the average trip will repair only a small number of luminaires, making the average travel costs per repair high. While the bulk of streetlights are located within a 0-5km radius of the works depot, many are remote, with the remotest streetlight some 270km away.

Average Time to Travel to a Light (One-Way)

Distance Range from Depot	Average Travel Speed in Km/hr	Average Time Taken to Travel to/ from Streetlight (One-Way) in Minutes
0 to 5km	26.7	5.5
6 to 10km	37.0	12.9
11 to 15km	43.0	18.1
16 to 20km	49.0	22.0
21 to 30km	57.5	26.5
31 to 40km	65.0	32.8
41 to 50km	70.0	39.0
51 to 100km	78.8	56.0
101 to 270km	80.0	123.3
Weighted Averages	**45.9**	**10.3**

6.3.7 Summary of light maintenance inputs

Streetlight Fault Repair Maintenance

Item	Qty	Additional Information
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 working together as a crew to complete the streetlight repair/replacement tasks.
Time to mobilise (mins)	10	Time taken to prepare the team and truck before 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 each)	25	Weighted average time taken to replace or repair the luminaire.
Travel time between streetlights (mins)	15	Weighted average time taken 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.

Item	Qty	Additional Information
Average time taken per streetlight to complete the task (hours)	0.95	Average time taken to complete one streetlight repair/replacement.
Average labour hours per repair	1.90	Average labour hours to complete one streetlight repair/replacement.

Further details are provided in Attachment 17.5—Public Lighting Model and Attachment 17.4.1 – Public Lighting Asset Management Plan.

7. The new network charging system

7.1 Existing charging system

Since 1 July 2015, Essential Energy has had six public lighting charging systems in place, with nearly 900 individual charges.

The factors influencing the charging system that applies to a particular installation are:

- Responsibility for capital provision.
- Responsibility for maintenance.
- Responsibility for replacing the installation.
- Date of installation.

Responsibility for Maintenance, Capital and Replacement - Existing Network Charges

Tariff	Install Date	Capital Provision	Maintenance Responsibility	Replacement Responsibility
1[4]	<=June 2009	Essential Energy (concludes 30 June 2019)	Essential Energy	Negotiable
2	<= June 2009	Customer	Essential Energy	Essential Energy
3	> June 2009 <=June 2015	Essential Energy	Essential Energy	Negotiable
4	> June 2009	Customer	Essential Energy	Negotiable
5	> June 2015 <= June 2019	Essential Energy	Essential Energy	Negotiable
6		Customer	Customer	Negotiable

Under this arrangement, the costs associated with the installation—including maintenance and capital recovery of components such as poles/supports, wiring and luminaires—are bundled into a single charge. This approach reduces the customer's flexibility around replacing selected components such as luminaires.

[4] The capital recovery phase of Tariff 1 ends on 30 June 2019.

From 1 July 2019, Essential Energy proposes to introduce component-based charges instead.

7.2 New component-based charging system

Essential Energy will introduce a new component-based schedule of network charges for the 2019-24 regulatory period. Our objectives are to simplify streetlighting charges for both Essential Energy and Councils, and to make our streetlighting charges more transparent.

The component model will break the charge into three components (luminaire, bracket and pole), ultimately displaying the maintenance and capital cost for each component.

Despite the new component-based method, the proposed model still contains the core logic and bottom-up approach of the approved 2015 network charges.

Only assets previously on Tariff 3 or Tariff 5 will attract capital recovery. With Tariff 1 capital recovery ending on 30 June 2019, assets on it will attract a maintenance-only charge after this date. If a component on a previously maintenance-only charging system needs replacing, an individual component (such as the luminaire) can now attract maintenance *and* capital components without the whole assembly requiring a change of charging system (i.e. the pole and bracket can still be on maintenance-only charges). Assets previously on Tariff 2 will be flagged to ensure no capital recovery is applied at the next luminaire upgrade.

Charges will be applied on a per-unit basis for each component included in the installation, with capital charges only applicable where we have funded the installation of that component.

New Component-Based Pricing Elements ($18/19)

Components	Capital Charge (per unit/p.a.)	Maintenance Charge (per unit/p.a.)
Support Type		
7.5m Steel Column Single Outreach	$207.37	$13.16
11m Timber Pole	$154.06	$15.26
Bracket Type		
Streetlight Bracket Category P	$50.89	$0.00
Streetlight Bracket Category V	$84.39	$0.00
Luminaire Type		
42W CFL Standard	$32.29	$64.09
17W LED Gerard StreetLED	$70.15	$39.68

Our proposed public lighting charges are provided as Attachment 4—Indicative Public Lighting Pricing Schedule in our Tariff Structure Statement.

7.3 Residual capital

Where Essential Energy funded the construction or replacement of a public lighting asset, capital and maintenance charges apply. Where customers choose to replace a public lighting asset subject to capital recovery charges before the end of its economic life, a residual value charge will be applied that represents the remaining undepreciated value of the asset. This charge ensures that Essential Energy recovers the cost of capital not yet recovered for the particular installation.

This residual value charge will be calculated using the following formula:

Residual Value Charge = (Useful Life – Installed Life) x Rate

Where:

- **Useful life** = the determined useful life applicable to the asset component being replaced
- **Installed life** = number of years the asset component has been installed
- **Rate** = the AER approved capital recovery rate for the asset component being replaced at the time of replacement

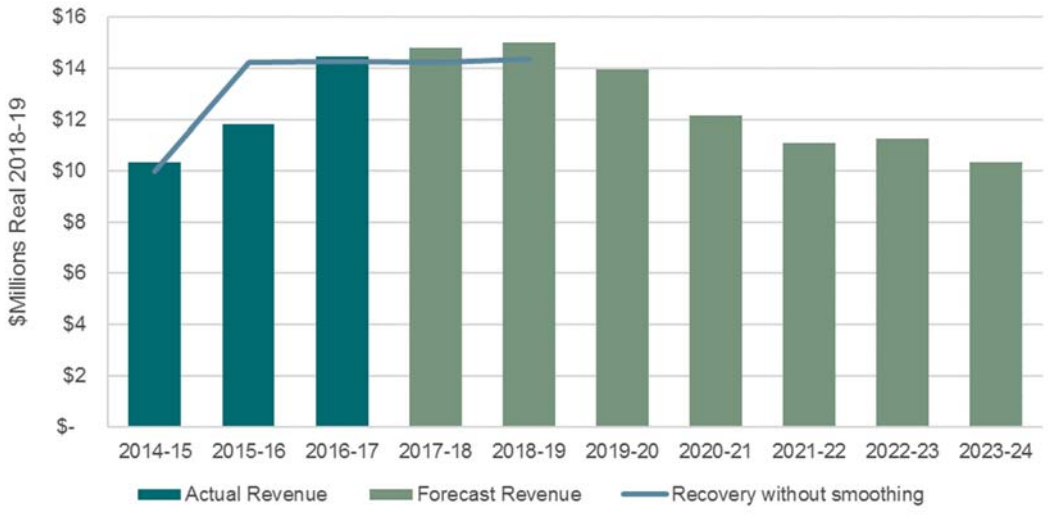
8. Public lighting revenue

Actual and forecast revenue for the current regulatory period (2014-19) and forecast revenue for the future regulatory period (2019-2024) is provided below for comparative purposes. The network charging outcomes we propose for 2019-24 are below those we forecast for the 2014-19 regulatory period due to the end of price smoothing arrangements and introduction of LED technology.

Price smoothing was introduced across the 2014-19 period to reduce the impact of network charge changes on public lighting customers, with increases applied progressively over the determination period rather than a large step change in 2015/16.

Essential Energy forecast an increased penetration of LED lighting over the 2019-24 regulatory period, resulting in reductions in public lighting revenue. Network charges proposed for LED installations are lower than traditional luminaires due to reduced maintenance activity associated with this technology.

Forecast Public Lighting Revenue ($M real, 2018/19)



Public Lighting Revenue ($M real, 2018/19)									
14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24
$10.3	$11.8	$14.5	$14.8	$15.0	$13.9	$12.1	$11.1	$11.2	$10.3

Our proposed component based public lighting charges are provided as Attachment 4 – Indicative Public Lighting Price Schedule in our Tariff Structure Statement.

9. New services identified within a regulatory period

The AER's *2019-24 Framework and Approach* paper classifies emerging public lighting technology as an Alternative Control Service and enables new services to be introduced mid-period within the regulatory framework.

Where we identify a new service that falls within an existing service group classification, but for which no network charge has been approved, we propose to develop charges in a manner that is consistent with other services in the same grouping.

We propose to create new network charges using the AER-approved public lighting models, adding inputs as required. Where the approved model is not conducive to developing the required network charges, we will validate our development methodology by consulting with public lighting customers.

This approach provides us with the flexibility to provide new services to customers and gives customers the protection of a regulated charging mechanism.

10. Compliance with AER's control mechanisms

The AER has decided to cap Essential Energy's network charges for public lighting services in the 2019-24 regulatory control period[5] and has set out its proposed formulae for the control mechanism[6].

We have adopted the AER's approach to the proposed formulae and will demonstrate our compliance through our published lists of Alternative Control Services charges during the annual Pricing Proposal assessment process.

Clause 6.2.6(b) of the National Electricity Rules (NER) provides that, for Alternative Control Services, the basis of the control mechanism must be stated in the distribution determination, and that the basis of control may use elements of Part C of the NER. Part C outlines the building block approach for Standard Control Services.

In deriving prices for Alternative Control Services so we can demonstrate compliance with the control mechanism, we have adopted a cost build-up approach to setting these charges, which is similar to the building block approach prescribed for Standard Control Services.

[5] AER, F&A, p

[6] AER, F&A, p