Attachment 13.1 Revised Regulatory Proposal

Public Lighting Proposal

January 2019

Contents

1. About this document

This document is a supporting document to Essential Energy's 2019-24 Revised Regulatory Proposal. The Australian Energy Regulator's (AER) Draft Determination was to accept our adoption of component-based pricing for public lighting services, noting that it provides cost transparency to customers. They also accepted our proposed labour rates as they are efficient when compared to rates recommended by Marsden Jacob.

However, they did not accept our calculated public lighting charges on the basis that they considered some of the inputs and assumptions used to calculate these did not reflect efficient costs for the provision of public lighting services. This document seeks to address the specific issues raised in the Draft Determination, focussing specifically on issues raised by Orana Regional Organisation of Councils (OROC) and Riverina Eastern Regional Organisation of Councils (REROC).

2. Background

Essential Energy's public lighting service includes the design, financing, procurement construction and maintenance of public lighting installations. Essential Energy has more than 160,000 public lights, servicing over 100 customers including councils, community groups and government associations across the network footprint.

Following the submission of our Proposal, we received feedback that our pricing model was not easy to navigate and important information for customers was difficult to find. In addition, submissions from OROC and REROC to the AER on our Proposal highlighted several issues that required further investigation.

As a result, we began a targeted public lighting engagement program with OROC (representing 12 councils) and REROC (representing all 41 Councils in the Southern Lights project) and their appointed consultants, who jointly represented approximately 60 per cent of Essential Energy Council areas. An unredacted version of the pricing model was provided for comment with the aim of agreeing a revised public lighting model for submission with our Revised Proposal. AER staff were invited as observers throughout this engagement process.

Four dedicated forums were held where information was shared with stakeholders to address all issues identified in the OROC and REROC submissions. This dedicated forum allowed for constructive engagement and provided clarity and increased transparency to all parties. It also resulted in several important adjustments to our public lighting model that have been factored into our Revised Proposal. As a result, the overall estimated revenue derived from maintenance charges has reduced significantly.

Table 1 – Revenue from maintenance charges

	2019-20	2020-21	2021-22	2022-23	2023-24	NPV
Proposal	$12,931,992	$12,209,803	$10,959,094	$10,488,900	$10,177,326	$48,181,421
Revised Proposal	$11,194,337	$10,881,300	$10,320,077	$10,194,662	$10,183,971	$44,595,132
Reduction $	$1,737,655	$1,328,503	$639,017	$294,238	-$6,645	$3,586,289
Reduction %	13%	11%	6%	3%	0%	7%

3. Issues raised by OROC and discussed in the Draft Determination

The AER's Draft Determination highlighted several specific issues raised by OROC in their submission to our Proposal. This section describes each of these issues, the AER's response to them in their Draft Determination and how we have addressed them in our Revised Proposal.

3.1. AER 1 - Life of wood poles and steel columns

OROC queried using 35 years as the economic life of public lighting poles when the economic life of wood and steel distribution poles is 53.8 years[1]. The AER accepted 35 years as an appropriate asset life for public lighting poles and

[1] Essential Energy Category Analysis RIN 2015/16, 5.2 - Asset Age Profile

steel columns in their Draft Determination. We have maintained our position in our Revised Proposal and provide the following explanation to better explain our approach:

- 35 years is the accepted value for all distributors across Australia
- the useful life of an asset is only one factor considered in the determination of economic life
- increasing the economic life above 35 increases the risk of capital under recovery
- whilst increasing the asset life will decrease the capital recovery tariff, it has the potential to increase tariffs associated with maintenance of these assets

We agree with the AER's approach to the economic life of public lighting supports which are depreciated over 35 years. It should be noted that this length of economic life is only relevant to dedicated streetlighting supports. Where streetlights are installed on shared distribution poles there is no Streetlight Use of System (SLUOS) charge associated with the support.

3.2. AER 2 - AER should not approve the costs associated with removal of stranded assets

This issue centred on whether we should be allowed to recover the safety program costs associated with the removal of control wires, choke boxes, control boxes, pot belly and triangular columns from the public lighting network. We provided further information to the AER on the rationale behind these assets being included as dedicated streetlighting assets and our plans to undertake the removal program in a staged manner and in conjunction with major group lighting upgrade works.

The AER acknowledged in their Draft Determination that they were satisfied with our proposed approach. They agreed that the removal of assets that pose a safety risk to the public and to contractors working on public lighting assets is a prudent step and that scheduling it with other upgrades and repairs is an efficient outcome. We also discussed this approach with customers as part of our engagement process and explained the serious safety issues associated with damaged public lighting assets.

We are aware of one fatality where a member of the public came into contact with a fallen conductor[2]. Further cases of electrocution have been reported which were caused by fallen streetlight mains in Victoria. Whilst there have been no reported electrocutions in Essential Energy's distribution network area from fallen street light conductors, electrical network incident reporting (ENI's) have identified 419 failures of these small diameter streetlight conductors from 2013 to 2016.

These types of conductors often go unreported as they do not supply power to residences, so a fallen conductor can go unnoticed. It is our intention to undertake a further risk analysis to determine where this type of conductor needs to be removed and where simply deenergising the conductor reduces the risk to as low as reasonably practical.

The most significant safety program project we have planned is the removal of redundant public lighting control wire. Although the cost of installation of dedicated control wire was most likely recovered from all customers through the equivalent of standard control services historically, it would not be cost reflective if its removal was included in a standard control service maintenance or capital program given the dedicated nature of the asset.

3.3. AER 3 - Night patrol costs should be recovered for both Cat V and Cat P luminaires

OROC referred to the 2007 annual street light business asset report prepared for Dubbo city council and they understood from that report that night patrols have been carried out on Category P (Minor Lighting) as well as Category V (Major Lighting) roads. This understanding led to the assertion that night patrol costs should also be recovered for Category P luminaires.

The AER sought further information from us on this issue and we clarified that:

- night patrols cover carried highways, collector roads, arterial roads and sub-arterial roads
- the road category determines the major road patrol and not the lighting category
- Category V and Category P may be understood differently by the council compared to the classification in our system.

The AER accepted the costs proposed for night patrols and encouraged us to undertake further discussion with stakeholders.

[2] Government of Western Australia, Department of Commerce, Energy Safety, Electrical Incident Safety Report, Western Australia 2010-11, p.8

It is worth noting that night patrols are currently the main proactive means of streetlight outage detection. The standards pertaining to the lighting of roads and public spaces (AS/NZ1158.1.2:2010 section 14.5.2) suggest that whilst public reports of luminaire outages in residential areas may be sufficient for avoiding the need for patrols on minor roads, patrols or other detection methods are required for lighting installations on major roads.

Further review of our night patrol costs found that repairs were being carried out during night patrols and these costs were erroneously captured under the night patrol category. These repair costs should not form part of the night patrol inspection costs. We can confirm that night patrols should only identify faults and any faults identified are raised as a task for repair at a later stage. We agree that repair costs should be removed from the night patrol modelling as they are already included in spot replacement costs.

The model originally submitted as part of the Regulatory Proposal included a night patrol allowance of $360,860. This allowance has been reduced to $195,468 to account for the removal of repair costs.

3.4. AER 4 - Incorrect labour hours per spot repair and replacement – Opex Input Sheet

The average labour hours per repair in the "Streetlight Fault Repair Maintenance" table in Section 6.3.7 of our Public Lighting Proposal is 1.9 whereas it is 2.2 hours in cell C24 of the Opex Input sheet of our proposed Public Lighting Model. The AER adjusted our model to reflect the figure of 1.9 in their Draft Determination as they considered this to be more appropriate.

We have reviewed the amount of time on average it takes to complete a spot repair by undertaking further analysis. Our analysis shows that the labour hours for spot repairs should be revised to 1.64. This change reduces the operational revenue by approximately $1 million annually.

It should be noted that our actual average labour hours will be impacted by the NSW Public Lighting Code's new "Individual Fault Standard". The new code, which will be mandatory from 1 July 2019 and form part of Essential Energy's licence conditions, states that General Faults should be repaired within 10 business days or a penalty may be applied.

The large area covered by Essential Energy's network means that having the ability to group repairs is key to efficient cost outcomes for customers. Reducing the maximum time to repair faults reduces the period in which faults can be grouped and in turn increases the average time to repair. We have not factored this new maximum time into our repair calculations as we believe that we will be able to absorb any increase through efficiency gains.

3.5. AER 5 - Comparison on luminaires opex costs between Essential Energy and Endeavour proposed prices for 2019–20

OROC queried the difference in travel time between repairs for Essential Energy and Endeavour Energy. The AER noted in the Draft Determination that the two networks differ geographically, and that they are satisfied with the difference in travel times.

Directly comparing charges for individual components for different electricity distributors can be misleading. Pricing models will be different because there can be significant variations in the way maintenance tasks are allocated across different components. It is worth noting, that a comparison of 2019-2024 Reset RIN data for forecast public lighting operational expenditure, reveals a higher unit rate of expenditure for Endeavour than Essential Energy[3].

3.6. AER 6 - Other maintenance costs $155,124 in cell C351 of "opex input" sheet of attachment 17.5 is incorrect

OROC noted that only $4,063 of the $155,124 in cell C351 of the Opex Input sheet is related to other maintenance costs while the remaining $151,061 relates to either misallocated distribution poles (21m long transmission poles and urban substation poles) or is related to assets already being accounted for in capex.

The AER consulted with us on this issue and we committed to providing further detail in our Revised Proposal. They removed all costs except $4,063 by adjusting cell C351 of the Opex Input sheet in the model accompanying their Draft Determination.

We agree that the items listed in this table were not appropriate in their entirety. This table is used to capture the cost of materials excluding lamps and PE cells used for streetlighting repairs. This table should also not include any items which would be recovered through capital charges, such as new luminaires. The table has been updated and

[3] Comparison of table 2.1.4 – Alternative Control Services opex. NPV (6% discount rate) of 2020-2024 expenditure divided by number of lights maintained reveals a unit rate of $352 for Endeavour and $302 for Essential Energy.

reduced from $155,124.03 to $31,275.76. Costs for these materials are recovered by spreading the average cost of materials per light over the entire population.

3.7. AER 7 - Similar to issue AER 4, but affecting non-PE cell callouts and non-lamp labour

OROC requested that cell C357 of the Opex Input sheet be replaced by $156.29, which they calculated would reduce the figure in cell C358 by $184,795.63. The AER incorporated this change in their Draft Determination, thereby reducing cell C358 to $1,170,520.16.

As noted in Section 3.4, we have reviewed the amount of time on average it takes to complete a spot repair. Whereas our Proposal included an allowance of 2.20 labour hours per repair, the Draft Determination revised this to 1.90 hours. However, after further analysis we have revised this down to 1.64. This has had the impact of further reducing the amount to be recovered for "other maintenance" activities to $1,010,326.32.

3.8. AER 8 - Non PE cell and non-lamp related labour costs (7489 attendances in Cell C356 on opex input sheet) applied evenly across luminaire technology

OROC concluded that cell C362 of the Opex Input sheet is mainly composed of non PE cell and non-lamp callout labour costs and they deemed 7489 callouts to be a large value. Once overheads are accounted for the $9.62 in cell C362 increases to $14.46. This is then evenly applied across all luminaires including LED. OROC were of the opinion that this is particularly inappropriate for LED lights. They claimed that this charge increases the failure rate from around 7.86% to 12.63% and requested that the AER consider the appropriateness of applying this failure rate to LED technology.

We clarified with the AER that the value in cell C362 is related to material costs, such as diffusers and wiring common to all assets, and therefore applicable to all. The AER agreed with our reasoning and approved this charge in the Draft Determination. They asked that we undertake further discussion with stakeholders while formulating our Revised Proposal.

In further support of our calculations, it is worth noting that the typical sources of these faults include damage to visors through vandalism, supply issues due to fuses failing or underground cable supply failures, and damage to wiring from weather events. We acknowledge OROC's position that older technology will fail at a higher rate than new technology. However, modelling is by technology type rather than age, so applying a lower failure rate to LEDs compared to for example Mercury Vapour luminaires on the assumption that LEDs are newer does not allow for accurate recovery of these costs as LEDs age.

We maintain our position that costs for other failure rates should be applied equally to all luminaire types. If in future submissions there is a reduction, then this will be applied accordingly.

3.9. AER 9 - Opex Input sheet cell C382 shows additional material costs for bulk replacement

Cell C384 of the Opex Input sheet flows into the Opex Calc sheet across all luminaires and is accounted for as additional material cost for bulk replacement. The AER did not consider that these costs were sufficiently justified and removed them from the public lighting tariff calculations in their Draft Determination.

In reviewing the nature of these works, we have identified that these costs consist primarily of labour associated with extra works to upgrade wiring and fuse assemblies during bulk repair works, for which the contractor is entitled to additional cost recovery in line with additional effort.

We currently account for these costs as capital expenditure, but in our Proposal they were mistakenly included as an operating cost for recovery. We have allocated this additional cost as a capital input to the public lighting model in our Revised Proposal. This categorisation is appropriate given that we only incur the cost where we are funding the upgrade of the assets. For newly gifted streetlight assets, or LEDs, upgraded and funded by a capital contribution from Councils, these costs would be incurred by a third party. As such, it is not appropriate to include the cost as an operating input as this would result in double charging for these customers.

3.10. AER 10 - Pole design cost "capex input" sheet cell G45 (cell G46 in revised model). Secondly Merging of Tariff class 3 and 5 to new capital charge is not clear in the public lighting tariff proposal

OROC questioned the pole design cost of $518.88 per light and requested additional information on the design works carried out by Essential Energy for poles. This is reflected in column K of the "Capex build up" sheet showing the design cost of poles. In their Draft Determination, the AER removed the pole design costs from the model calculations

and noted that we should confirm the design costing approach within our Revised Proposal if these are perceived as appropriate costs.

The pole design costs are associated with the electrical, construction and lighting design work involved in installing non-contestable dedicated lighting columns. This work is significant and often involves negotiations with councils and can involve several Essential Energy staff. We acknowledge that this does not occur in all cases, however a cost recovery mechanism needs to be in place for when it does.

We have reviewed these charges and reduced the baseline charge from $518.88 to $448.56. Furthermore, the charge has been removed from smaller steel support types that would typically be used for Category P installations and therefore applies only to Essential Energy funded Category V and decorative steel support installations. In some circumstance's customers may fund new installations. Where design works are undertaken by us for these installations, recovery of costs will be through regulated ancillary charges.

OROC also asked for further information on tariff restructuring due to the introduction of component-based pricing. We provided confidential tariff mapping calculations to the AER. The AER requested that we engage with customers to share more information on the tariff restructure. As also noted in section 3.12 below we will provide customer specific information to individual customers.

3.11. AER 11 - Very high failure rate of 70W HPS lamps, when compared with 150W, 250W and 400HPS lamps. Fig 11 on submission shows failure profile for Sylvania brand 70W HPS which is around 6.5% in comparison to 13.2% proposed on Essential Energy PL model

OROC noted that when opex rates for 250W HPS and 70W HPS are compared, the latter is higher. They pointed out that even though 250W HPS is usually installed on major roads requiring traffic controllers it still turns out to have a lower rate than 70W HPS. They also highlighted that our Proposal noted that 70W HPS is a major luminaire in Essential Energy's region implying that Essential Energy currently has a large quantity of these lights in its network

We responded to the AER that the proposed failure rate is the actual rate experienced on our network for 70W HPS lights. In their Draft Determination, the AER noted that in the 2014-19 regulatory period, they approved a 10.88 per cent failure rate for 70W HPS and that more efficient failure rates are being proposed by other networks in the National Electricity Market (NEM). They did not accept the proposed failure rate and have replaced it in the public lighting model

Failure rates of lamps are a function of the lamp technology and the length of time between bulk lamp replacements. We have moved to a 4-year bulk lamp replacement program across our network. Our current LED replacement program is based on installing LEDs in lieu of bulk lamp replacement. This, in some instances, has delayed the bulk lamp replacement which in turn increases the lamp spot failure rate.

Essential Energy have two types of 70W HPS lamps in its network, one which has an internal ignitor and one where the ignitor is external i.e. integral to the luminaire. These lamps have very different survival characteristics, as shown in the following table.

Table 2 – 70W HPS Internal vs External ignitor failure rate comparison

	Sylvania 70W HPS External Ignitor 673260	Sylvania 70W HPS Internal Ignitor 673250
Burn Hours	% survival	% survival
2,000	100.%	99%
4,000	99%	96%
6,000	98%	92%
8,000	97%	87%
12,000	93%	76%
16,000	90%	63%
2,0000	86%	50%

Based on manufacturers failure rates and a bulk lamp replacement period of 4 years (approximately 16,000 hours), the spot failure rate for the internal ignitor lamp is 17.55% compared to 5.11% for the external ignitor lamp.

Essential Energy has provided the manufacturers failure data to stakeholders during consultation and accepts the AER's Draft Determination of 10.88%

3.12. AER 12 - Impact Analysis tool for new tariff structure

OROC requested an impact analysis spreadsheet for public lighting customers assuming static inventory, to help customers understand the impact of Essential Energy's tariff restructure on final charges

The AER asked us to provide tariff mapping analysis showing the impact of price variations. We submitted an exhaustive tariff mapping spreadsheet comparing current charges to the charges under the new component-based tariff structure. Due to the confidential customer information being presented on the tariff mapping spreadsheet, the AER are unable to publish this information.

They have requested that we consider providing tariff mapping information and impact analysis under the new component-based tariff methodology to individual customers. We agree with the recommended approach and will provide customer specific information to individual customers.

4. Additional issue raised in the Draft Determination

4.1. Failure rates

We accept the changes made in the Draft Determination to the failure rates of the 70W HPS, however the AER has applied a 5.01% failure rate to 250W and 400W Mercury Vapour (MBF) lamps and has made no distinction between low and high wattage. There has been little advancement in high wattage mercury lamps in recent years in contrast to low wattage mercury lamps. This should be considered when applying lamp failure rates to calculate maintenance costs. Table 3 details the difference in failure rates for currently available Mercury Vapour lamps.

Table 3 – Manufacturer Mercury Vapour lamp failure rates

Hours of operation	% failure	
	Long life 50, 80, 125W MBF	250 & 400W MBF
4,000 (1 year)	1.00%	4.50%
8,000 (2 years)	3.00%	8.50%
12,000 (3 years)	4.50%	18.50%
16,000 (4 years)	10.00%	28.00%
20,000 (5 years)	19.00%	50.00%

Whilst we agree that the lamp failure rates of 50, 80, and 125W MBF lamps should be in the order of 5% per year, we consider that a similar failure rate cannot be applied to 250W and 400W MBF lamps. Modelling based only on theoretical information suggests that the lamp failure rate (without other component failures) would be in the order of 13% p.a. when these lamps are subject to a four-year bulk lamp replacement period which aligns with our Proposal. Reducing the maintenance costs associated with inefficient technology sends the wrong price signals to councils when deciding if and when they should move to LED.

5. Additional changes included in our Revised Proposal

5.1. Recovery of non-system overheads

Non-system assets (fleet, building, ICT, tools, equipment, furniture and fittings) are used in performing public lighting work, however the costs for this expenditure were mistakenly excluded from the public lighting model in our Proposal.

Our non-system capital recovery rate is designed to ensure that the non-system capital investment costs incurred in delivering public lighting services are rightly recovered from public lighting customers.

To derive our proposed non-system capital expenditure recovery rate, we entered the non-system capex allocated to public lighting under our CAM (Cost Allocation Methodology), into a copy of the PTRM (Post Tax Revenue Model). We applied the same asset lives and WACC (Weighted Average Cost of Capital) components as used in the standard control services PTRM. This calculated a 'synthetic' RAB (Regulatory Asset Base) from which we could derive an annual capital cost recovery amount by using the sum of the 'return of' and 'return on' capital components.

These annual amounts were then divided by the total forecast public lighting direct costs for each year to derive an annual recovery rate. The 2019-24 recovery rates were then averaged to calculate a single (smoothed) non-system capital recovery rate to be applied to each dollar of direct public lighting costs across the 2019-24 period.

We will run a 'synthetic' RFM (Role Forward Model) model during the 2019-24 period that will allow for the actual public lighting non-system capital costs to be carried into the 'synthetic' RAB and used in the derivation of public lighting prices for the next regulatory period. We think this is the fairest way of ensuring that these non-system capital costs are spread between all the public lighting customers who 'use' these services and the smoothing over the asset lives avoids penalising customers in regulatory periods of high non-system capital investment.

The recovery of non-system capex for public lighting was missed in our 2014-19 regulatory period, so this is a new cost within our calculations. We have applied the approach to the recovery of Metering and ANS non-system capital spend as well. This methodology was accepted by the AER for Metering in its Draft Determination.

5.2. High bracket installation costs

The original proposal modelled bracket installation as if they were installed in isolation to the luminaire. This incorrectly allocated labour and traffic control to luminaires and brackets and would thus result in some level of double counting if a luminaire and bracket were installed at the same time. As brackets are normally installed at the same time as a luminaire, the model has been updated to reflect this and has significantly reduced the annual charge for brackets.

5.3. Residual value mechanism

Section 7.3 in Attachment 17.4 of our Regulatory Proposal deals with the calculation of the residual value payable if assets are replaced before the end of their economic life.

The mechanism initially proposed was:

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

Upon further review we found that the proposed control mechanism does not take into consideration Essential Energy's cost of capital. The residual value charge mechanism should be the present value of future annuities as per the formula below.

$$\boldsymbol{Residual\ Value\ Charge} = \boldsymbol{P}\left[\frac{\boldsymbol{1-(1+r)^{-n}}}{\boldsymbol{r}}\right] * \boldsymbol{(1+n)}$$

P = Annual capital annuity charge for the year the asset is replaced

r = Pre-tax real WACC

n = Remaining life of the asset at the end of the financial year it is being replace

5.4. Nightvision

Essential Energy provides security lighting as a service to several public and private customers under the commercial name Nightvision. Nightvision has been provided as an unregulated service and revenue accounted for under the Shared Assets Guidelines. For the 2019-24 regulatory control period this service will be provided as a regulated service and classified as an Alternative Control Service.

Our Regulatory Proposal calculated charges for Nightvision, using the same control mechanisms as public lighting, however this was an error. Unlike public lighting, the commercial risk of not fully recovering capital expenditure is much more significant and as such the recovery period needs to be lower than that applicable to public lighting. Nightvision costs have been removed from the public lighting model and are calculated using the Ancillary Services model templates. This new model will form part of our Revised Proposal.

Essential Energy raised this during our consultation with OROC and REROC and there were no concerns with this approach.