# Jemena Electricity Networks (Vic) Ltd

## 2021-26 Electricity Distribution Price Review Regulatory Proposal

Attachment 07-12

Public lighting services

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# Glossary

| | |
|---|---|
| Category P | Lighting applicable to roads on where visual requirements of pedestrians are dominant, e.g. minor roads, local roads. |
| Category V | Lighting applicable to roads on where visual requirements of motorists are dominant, e.g., major roads, traffic routes. |
| Current regulatory period | The regulatory control period covering 1 January 2016 to 31 December 2020. |
| Intervening period | The period between 1 January 2021 to 30 June 2021. It covers the time between the current regulatory period and the next regulatory period. The Intervening period arises because of the move from a calendar year regulatory year to financial year regulatory year. |
| Next regulatory period | The regulatory control period covering 1 July 2021 to 30 June 2026. |
| Regulatory proposal | 2021-26 Regulatory Proposal. |
| Street lighting forum | Street lighting forum that was held at JEN's Broadmeadows offices on 24 May 2018. |

# Abbreviations

| | |
|---|---|
| ACS | Alternative Control Services |
| AER | Australian Energy Regulator |
| CPI | Consumer Price Index |
| DNSPs | Distribution Network Service Providers |
| EPV | Elevating Platform Vehicle |
| GIS | Geographic Information System |
| HPS | High Pressure Sodium |
| JEN | Jemena Electricity Networks (Vic) Ltd |
| LED | Light Emitting Diode |
| MV | Mercury Vapour |
| OMR | Operation, Maintenance and Replacement |
| WACC | Weighted Average Cost of Capital |

# Overview

Jemena Electricity Networks (Vic) Ltd. (**JEN**) provides public lighting services to 14 public lighting customers. These include 13 municipal councils and the VicRoads Authority. We expect the number of public lighting customers to remain the same over the 2021-26 regulatory control period (**next regulatory period**).

Currently, we have more than 76,000 public lights comprised of 19 different light types installed in our distribution area to provide public lighting services. These include lights attached to dedicated poles (usually in newer residential estates) and those attached to the power poles of our electricity distribution network.

The specific public lighting services we provide include:

- the operation, maintenance, repair and replacement (**OMR**) services of JEN's installed public lighting assets
- alteration and relocation of our public lighting assets
- new public lighting services including services in greenfield sites
- provision, construction and maintenance of emerging public lighting technology.

As a part of the price review process, we must classify our services. For the next regulatory period, we propose classifying:

- the OMR services as fee-based Alternative Control Services (**ACS**) because the services are mostly homogeneous and it is reasonable to fix a fee for each light type
- the remainder of public lighting services as quoted ACS because the scope and costs of delivering services vary significantly between customer requests. Prices can only be determined when the scope of the work is known.

Our proposed classification of public lighting services aligns with the Australian Energy Regulator's (**AER**'s) preferred approach as outlined in their final Framework and Approach for the 2021-26 regulatory period.[1,2]

The focus of this attachment is to explain how we have derived the public lighting OMR fee-based charges. We have done this by adopting the AER's public lighting model used to set prices in the 2016-20 regulatory control period (**current regulatory period**)[3] and making the following modifications:

- structural changes to accommodate some new light types we are introducing
- changes to the way we determine costs for the replacement of dedicated poles and 'GIS and other' costs
- updates to model inputs with current values to reflect changes in working conditions, cost of material and labour rates
- address the change from calendar year to financial year for setting annual prices
- Modifying the pro-rata ratios that apportion depreciation and return on assets of the public-lighting RAB to non-efficient light types post-2024

We apply the price control formula for fee-based ACS as set out in Attachment 07-07 (section 1.1.3.1). The charges are inclusive of real price escalators (implied X-factors) and forecast Consumer Price Index (**CPI**). Consistent with the approach we follow to setting prices in the current regulatory period, actual CPI will be substituted into the public lighting model once the actual CPI is known to determine the final charges for each

1 AER, *Final framework and approach AusNet Services, CitiPower, Jemena, Powercor and United Energy, Regulatory control period commencing 1 January 2021*, January 2019.

2 For further information regarding classification of our services please refer to Attachments 07-06 (Classification of Services) and 07-11 (Alternate Control Services)

3 AER, *Final Decision Jemena, Public Lighting model*, May 2016.

regulatory year within the next regulatory period and reflected in our annual pricing proposal. Please see Attachment 07-32 for our pricing model for public lighting services which demonstrates the application of the price cap control mechanism specified in Attachment 07-07, section 1.1.3.1.

In this regulatory proposal concerning the next regulatory period, we propose to increase the prices we charge for OMR services (see Table A1–1 for our proposed OMR pricing) relative to those approved by the AER in the current regulatory period (see Table A2–1 for our approved OMR pricing). The key drivers for the increase in public lighting OMR charges include:

- JEN received advice from the Federal Government's Department of the Environment and Energy that if Australia ratifies the Minamata Convention on controlling the use of mercury,[4,5] there will be an import restriction on high-pressure mercury vapour lamps—commonly used for street lighting—and this would apply from 1 January 2021. Therefore, over the next regulatory period, we propose to bulk replace all of the remaining mercury vapour luminaires on minor road (approximately 6,000) with Light Emitting Diode (**LED**) type luminaires. Municipal councils in JEN's distribution area are supportive of our proposed replacement strategy (see Table OV–1)
- Currently, we replace unserviceable mercury vapour luminaires on major roads with high-pressure sodium luminaires. Commencing 1 January 2021, we propose to replace all unserviceable luminaires on major roads with LEDs which have a higher unit cost
- Increases in field-worker labour rates
- Changes to the productivity levels assumed in the public lighting model[6] for the current regulatory period —that is, the number of repairs of lights and inspection of poles that can be performed in a day—to reflect safe and reasonable levels of work than reasonably can be achieved.

Further detail regarding the above changes is set out in section 2.

With respect to the remainder of public lighting services (i.e. non-OMR services), we propose that prices are determined on a case-by-case (quoted) basis because the scope of the service would vary significantly between customer requests.

Specifically, we use the applicable labour unit rates approved by the AER—multiplied by the time taken by each applicable labour category—and then add the costs of materials, contractors services, quoted services margin and tax in accordance with the price cap formula for quoted alternative control services set out in Attachment 07-07 (section 1.1.3,2). Please see Attachment 07-30 for our pricing model for quoted services which demonstrates the application of the price cap control mechanism.

### Engaging with our public lighting customers

Local councils told us they preferred regular forums or workshop-style events to engage with us. This preference was based on creating an opportunity for further collaboration across a broader range of public lighting customers. To obtain their feedback, we arranged three council forums over twelve months. We also used our existing channels with local councils to engage with any key contacts who were unable to attend the sessions.

During the customer engagement process, we engaged with VicRoads and all thirteen local councils. Of those, VicRoads, Hume City Council, Maribyrnong City Council, Melton City Council, Moonee Valley City Council and

4 Email from EERLighting@environment.gov.au, sent on 23 July 2018.

5 http://www.environment.gov.au/protection/chemicals-management/mercury.

6 AER, *Final Decision Jemena, Public Lighting model*, May 2016.

Moreland City Council attended the forum held on 24 May 2018. A summary of the key customer engagement topics and how we responded to the feedback is outlined in Table OV–1.

**Table OV–1: Our consultation with public lighting customers**

| Key topic | What our public lighting customers told us | How we reflected what our customers told us in our regulatory proposal |
|---|---|---|
| How to address concerns around the use of decorative poles. | They understand the cost implications of options presented for 'decorative poles' as an alternative to the standard replacement poles under the current OMR pricing arrangement. | We consulted on whether we should incorporate decorative poles in our standard equipment list; however, we could not proceed as we could not reach a consensus amongst the public lighting customers. Instead, councils wanting decorative poles will procure them on an 'as needs' basis, as is the case during the current regulatory period. |
| How to manage the provision of public lighting services with the potential introduction of the Minamata Convention. | Councils and VicRoads supported the option to replace a failed lantern with LED light types on both minor and major roads. | We are introducing three new types of energy efficient lights for major roads as potential replacements for existing old technology light types. |
| Reporting of public lighting faults. | Provided positive feedback about the streetlighting fault reporting application and the Council JEN Viewer application. | JEN has provided councils with access and training to these online resources via 'a convenient 'Single Sign-On' platform. This has been well received, with Councils seeking to continue this service in the next regulatory period. |

### Change from calendar year to financial year for Victorian distributors

On 12 April 2019, the Victorian Minister for Energy, Environment and Climate Change (**Minister**) wrote to the Victorian DNSPs and the AER, announcing a policy to change the regulatory control period to align with financial year-end, rather than calendar year, with the change to take effect from 1 July 2021. The change to the regulatory cycle was proposed to occur by providing a six-month extension to the current regulatory period.

This change creates a 6-month gap (from 1 January 2021 to 30 June 2021) between the end of the current regulatory period and the commencement of the next regulatory period (**intervening period**). Pricing for OMR services and other public lighting services during the Intervening Period is outlined in JEN's regulatory proposal for the Intervening Period.

# 1. Charging methodology for public lighting OMR services

Our charges for OMR public lighting services for the next regulatory period are derived from a limited building block model that takes into account forecast operating and capital expenditure we incur when providing public lighting services as well as the return of, and return on, investment in capital assets. This approach is consistent with the approach taken by the AER to develop OMR public lighting charges for the current regulatory period.

With this approach to determining prices, we have adopted the AER's public lighting model used for setting prices in the current regulatory period and adjusted several model inputs.[7] The adjustments to inputs include:

- Escalation factors for labour, consistent with those proposed for standard control services. In addition to inflation, the escalation factors reflect the real cost of providing public lighting services over the next regulatory period[8]
- The real pre-tax weighted average cost of capital (**WACC**) has been updated. Consistent with the approach taken in the current regulatory period, the real pre-tax WACC rate is the same as that used for determining standard control services prices
- Forecast CPI has been applied. This forecast will be adjusted when the actual is known and demonstrated in our annual pricing proposal
- The opening public lighting regulatory asset base has been established by applying the method used in the AER's final decision public lighting model for the current regulatory period[9] adjusted with an additional half-year capex and depreciation for the intervening period
- The forecast volume of each type of light over the Next Regulatory Period is based on the growth trend over the past five years, forecast replacement of existing lights reaching their end of life, and the likely import restriction of mercury vapour (**MV**) lamps and changes in our replacement policy of unserviceable luminaires (section 2.1)
- Changes to the labour rates and material unit cost (see sections 2.2 and 2.3)
- The number of light repairs performed in a day has been reduced to reflect what can safely and realistically be achieved by a two-person crew (see section 2.4)
- The number of pole inspections performed in a day has been reduced, reflecting what can safely and realistically be achieved in a day (see section 2.5)
- Minor road light failure rates have been changed to reflect JEN's actual failures (see section 2.6).

Additionally, we have made the following structural changes to the model by:

- Including additional resources for replacement of dedicated poles (section 2.8)
- Adding three new energy-efficient LED light types for major road Category V lighting (section 2.10.3)
- Unitising the costs related to 'GIS and other' on a dollar per light basis (see section 2.11)
- Modifying the pro-rata ratios that apportion depreciation and return on assets of the RAB of non-efficient light types post-2024 (see section 2.12).

The above changes to the limited building block model are necessary for us to recover our prudent and efficient costs for providing public lighting OMR services.

7 AER, *Final Decision Jemena, Public Lighting model*, May 2016.

8 Details on escalation factors are outlined in Attachment 06-01.

9 AER, *Final Decision Jemena, Public Lighting model*, May 2016.

# 2. Model inputs for public lighting OMR services

This section outlines adjustments made to the public lighting model inputs and other changes we have made to the AER's public lighting model used in the current regulatory period,[10] to derive public lighting charges for the next regulatory period.[11]

## 2.1 Volume forecast

The forecast volume of each type of light over the next regulatory period is based on (i) the forecast growth[12] over the next five years, (ii) the forecast replacement of the existing public lights reaching their end of life, and (iii) the likely import restriction on mercury vapour lamps.

We received advice from the Department of Environment and Energy that, if Australia ratifies the Minamata Convention on mercury,[13] the import restriction on high-pressure mercury vapour lamps will apply from 1 January 2021.

Over the next regulatory period, all of the remaining minor road lights (**Category P**) will require bulk lamp replacements—at which time we propose to bulk replace all minor road mercury vapour lights with their LED equivalent. Consequently, our minor road volume forecast for the next period shows a decline in the number of minor road mercury vapour light types—to zero—and a corresponding increase in the equivalent LED lights.

The LED light volumes for major roads are based on our forecast of high-pressure sodium and mercury vapour lights beyond repair (unserviceable), which we propose to replace with LED light types.

The forecast volumes of lights by type are shown in Table 2–1.

**Table 2–1: Forecast volume (number) of lights by light types**

| Description of lights | FY22 | FY23 | FY24 | FY25 | FY26 |
|---|---|---|---|---|---|
| **Minor road lights (Category P)** | | | | | |
| Mercury Vapour 80 watt | 3,993 | 2,845 | 1,696 | 561 | 0 |
| Mercury Vapour 125 watt | 57 | 40 | 24 | 8 | 0 |
| Sodium High Pressure 100 watt | 1,170 | 1,150 | 1,130 | 1,110 | 1,091 |
| Metal Halide 70 watt | 11 | 10 | 10 | 9 | 9 |
| ***Energy-efficient lights*** | | | | | |
| T5 (2X14W) | 25,722 | 25,306 | 24,896 | 24,493 | 24,096 |
| T5 (2x24W) | 901 | 886 | 872 | 858 | 844 |
| Compact Fluoro 32W | 2,542 | 2,526 | 2,510 | 2,494 | 2,478 |
| Compact Fluoro 42W | 319 | 317 | 315 | 313 | 311 |
| LED 18W (incl. other standard Category P LED variants) | 22,095 | 25,303 | 28,768 | 32,307 | 35,029 |
| **Major road lights (Category V)** | | | | | |
| Sodium High Pressure 150 watt | 15,665 | 15,394 | 15,127 | 14,865 | 14,607 |
| Sodium High Pressure 250 watt | 4,986 | 4,899 | 4,814 | 4,731 | 4,649 |

10 AER, *Final Decision Jemena, Public Lighting model*, May 2016.

11 JEN – *Att 07-32 ACS Public Lighting model* – 20200131 – Public.

12 JEN – *ACIL Allen Att 05-03 Electricity Demand Forecasts* – 20200131 – Public.

13 http://www.environment.gov.au/protection/chemicals-management/mercury.

| Description of lights | FY22 | FY23 | FY24 | FY25 | FY26 |
|---|---|---|---|---|---|
| Sodium High Pressure 400 watt | 368 | 362 | 355 | 349 | 343 |
| Mercury Vapour 250 watt | 53 | 38 | 23 | 7 | 0 |
| Mercury Vapour 400 watt | 70 | 50 | 30 | 10 | 0 |
| Metal Halide 150 watt | 66 | 62 | 59 | 55 | 52 |
| Metal Halide 250 watt | 36 | 33 | 31 | 29 | 28 |
| ***Energy efficient lights*** | | | | | |
| L1 – LED light for major roads (Cat V) 70W (replacement of 150 HPS) | 722 | 838 | 963 | 1,090 | 1,188 |
| L2 – LED light for major roads (Cat V) 155W-162W (replacement of 250 HPS) | 196 | 228 | 262 | 297 | 324 |
| L4 – LED light for major roads (Cat V) 275W (replacement of 400 HPS) | 3 | 4 | 4 | 5 | 5 |
| **Total** | **78,975** | **80,291** | **81,888** | **83,591** | **85,053** |

## 2.2 Labour rates

Our public lighting crews consist of staff and contractors skilled as line workers because public lighting work generally involves working around bare high and low voltage conductors in an elevating platform vehicle (**EPV**). Our work practices—designed to ensure the health and safety of those working on our assets and the broader community—require a public lighting crew to be qualified line workers. It is not safe to employ staff with any lesser qualification given the significance of the safety implications in this line of work.

We have updated the labour rate in the public lighting model by aligning the labour rate of a field-worker that was derived from our quoted services model for ACS.[14] We consider this rate to be an efficient rate for the provision of line worker services.[15]

JEN's public lighting model for the current regulatory period applied overheads of 25 per cent for operating expenditures and zero for capital expenditures. Given overheads of 25 per cent are already in the AER's public lighting model—which we have adopted for the next regulatory period—our labour rate input to the public lighting model[16] is 25 per cent lower than our proposed field worker labour rate for fee-based and quoted alternative control services.

## 2.3 Material costs

We have updated the cost of lighting components, including poles and brackets.

We note the cost of LED luminaires are lower now than what was forecast over the current regulatory period while the cost of T5 and compact fluorescents have increased, which we believe is mainly driven by the prevalent use of LEDs and phasing out of MV80, T5 and compact fluorescents luminaire technologies.

We have included the cost of two lamps for T5 luminaire in the 'Inputs | O & M' sheet of our public lighting model as it has two lamps—rather than one—and both the lamps are replaced during repairs and scheduled bulk lamp replacement. For repairs, this approach is more efficient than multiple attendances to site for the replacement of what is effectively a 'consumable' item.

[14] JEN - *Att 07-30 ACS Quoted Service Model* - 20200131 - Public.

[15] For further details on how we developed our fieldworker labour rate for alternative control services, see section 2 of Attachment 07-11.

[16] JEN - *Att 07-32 ACS Public Lighting Model* – 20200131 – Public.

The costs of some lighting components (e.g. lamps, PE cells) have decreased while others have increased; this reflects changes in the rates we have been able to negotiate with suppliers[17].

## 2.4 Light repairs performed in a day

The AER's public lighting model[18] for the current regulatory period assumes a different number of repairs per day by a two-person crew can be achieved for each of the MV80, T5 and LED18 light types on minor roads. The assumed repairs per day are set out in Table 2–2.

We believe it is not feasible to safely repair the number of T5 and LED light types in an 8-hour day in an urban area, as assumed in the public lighting model[19]. We consider the assumption in the model significantly under recovers our efficient costs of repairs of minor road light types.

In practice, the time taken to repair a minor road light is approximately the same – regardless of the light type. Repair work generally involves removing the light fitting cover, diagnosing the problem, replacing the faulty components, cleaning and testing the light. We estimate a reasonable time to undertake the repair of a light is 10 minutes and about 22 minutes to travel to the next work site—the same as the total time contemplated in the AER's public lighting model[20] for MV80.

Analysis of the time allowed in the public lighting model, and what we consider is a reasonable time to undertake repair is shown in Table 2–2.

**Table 2–2: Analysis of the number of minor road light repairs per days**

| Light type | Number of repairs per 8-hour day assumed in the current regulatory period | | | Our proposed repairs per 8-hour day for the next regulatory period | |
|---|---|---|---|---|---|
| | Repairs | Total time assumed per repair (minutes)[21] | Travel time per repair (minutes)[22] | Repairs | Total time proposed per repair (minutes) |
| MV80 (urban) | 15 | 32.0 | 22.0 | 15 | 32.0 |
| MV80 (rural) | 12 | 40.0 | 30.0 | 12 | 40.0 |
| T5 (urban) | 20 | 24.0 | 14.0 | 15 | 32.0 |
| T5 (rural) | 15 | 32.0 | 22.0 | 12 | 40.0 |
| LED 18W (urban) | 26 | 18.5 | 8.5 | 15 | 32.0 |
| LED 18W (rural) | 21 | 22.9 | 12.9 | 12 | 40.0 |

(1) Travel time per repair = minutes assumed per repair less 10 minutes to undertake the repair of a light.

### Travel time between streetlight repairs have increased

It is noteworthy that since the start of the current regulatory period, road traffic has increased and we expect this to deteriorate over the next regulatory period. In the recent *Road Congestion in Australia* report, published by Australian Automobile Association in October 2018, it notes that "Melbourne's average speeds barely changed

17 The adjustments to material costs are shown in Attachment 07-32 Public Lighting Model.

18 AER, *Final Decision Jemena, Public Lighting model*, May 2016.

19 AER, *Final Decision Jemena, Public Lighting model*, May 2016.

20 AER, *Final Decision Jemena, Public Lighting model*, May 2016.

21 Eight hours multiplied by 60 minutes and divided by the number of repairs.

22 Travel time is the total time assumed per repair less 10 minutes.

from 2013 to 2015, but there has been a marked decline since 2016. The city's 8.1 per cent fall in average speeds is the worst decline among all capitals"[23].

Given this evidence of increased traffic on the roads, we consider a reasonable time to undertake the repair of a light is 32 minutes—10 minutes to undertake the repair and 22 minutes travel time to the next work site—in an urban area, as contemplated in the AER's public lighting model[24] for MV80. This equates to 15 repairs in a day in urban areas and 12 in rural areas. Given the similarities in the effort required to repair the various minor road light types, we have assumed this rate of repair for T5 and LED18 light types.

## 2.5 Pole inspections performed in a day

The public lighting model for the current regulatory period assumes a dedicated pole inspection rate of 75 poles in a day. Analysis of our records indicates about 37 poles are inspected in a day.

The effort to inspect public lighting poles varies with the age of the pole. Poles which are ten or more years old require excavation around the base to expose the underground portion of the pole to see if there are any rust or holes; and if they are less than ten years old, the poles are only visually inspected. In an 8-hour day, they can inspect about 60 poles if no digging is required and 30 poles if excavation is required.

Our asset management records, as at 2018, indicate 65 per cent of the dedicated public lighting poles are ten or more years old. Given the average age of our poles, we estimate about 37 poles can be inspected in an 8-hour day. Therefore, we have assumed the number of dedicated pole inspection rate to 37 poles in a day in the public lighting model for the next regulatory period.

## 2.6 Light failure rates

During 2014 and 2015, JEN replaced mercury vapour lights on minor roads with T5 energy-efficient lights at the request of several councils. These light types were relatively new, meaning there was not a lot of credible—field-based—performance data available on failure rates. When deciding on the failure rate during the current regulatory period, the failure rate of T5 lights was assumed to be 11.4 per cent over a four year period, which was based on the manufacturers' data because we did not have any performance data to base the actual failure rate on.

With T5 lights in the field since 2015, we are now able to identify the actual failure rates. Evidence shows that we are experiencing significantly higher lamp failure rates of T5 lights than those used in the public lighting model for the current regulatory period[25], which results in significant under-recovery of our efficient costs of repairing T5 lights.

Our forecast failure rate of T5 light types for the next regulatory period is based on four years weighted average—to give more weighting to failures in recent years—of the observed failure rates. We have applied the same approach to forecasting the failure rates of MV80 and LED18 lights. Analysis of our actual failures of minor road light types indicates the failure rate of MV80 lights is lower than the forecast approved by the AER for the current regulatory period, while the failure rate of T5 lights is significantly higher. The actual failure rate of minor road LED 18W lights is close to the forecast adopted during the current regulatory period.

To ensure we recover our efficient costs going forward, we have proposed forecast failure rates of MV80, T5 and LED minor road lights based on the actual failures we have observed over the 2015 to 2018 period in our public lighting model for the next regulatory period.

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23 *Road congestion in Australia* report, October 2018, p 16. See, https://www.aaa.asn.au/wp-content/uploads/2018/10/AAA-Congestion-Report-2018-FINAL.pdf.

24 AER, *Final Decision Jemena, Public Lighting model*, May 2016.

25 AER, *Final Decision Jemena, Public Lighting model*, May 2016.

Table 2–3**Error! Reference source not found.** shows the forecast for minor road light failures for the current regulatory period and our proposed forecast for the next regulatory period.

**Table 2–3: Failure rate of minor road public lights**

| Type of light | Forecast failure rare 2016-20 | Proposed forecast failure rate 2021-26 |
|---|---|---|
| The proportion of MV80 lights that fail before the bulk lamp change period of 4 years | 25.6 % | 17.0% |
| The proportion of T5 lights that fail before the bulk lamp change period of 4 years | 11.4 % | 32.3% |
| The proportion of LED18 lights that fail before bulk PE cell change period of 8 years | 10.0 % | 9.9% |

(1) The proposed forecast failure rates for the 2021-26 period is the weighted average of the data in Table 2–4.

To demonstrate our proposed forecast of minor road light failure rates, we provide the actual failure rates we have observed on minor road light types over the 2015 to 2018 period as outlined in Table 2–4.

**Table 2–4: Minor road light failure volumes**

| Minor road lights | CY15 | CY16 | CY17 | CY18 |
|---|---|---|---|---|
| Number of lights installed - MV 80 | 14,751 | 6,396 | 6,277 | 5,944 |
| Number of failures - MV 80 | 577 | 356 | 281 | 215 |
| Number of lights installed - T5 | 27,787 | 27,949 | 27,685 | 27,279 |
| Number of failures - T5 | 549 | 1,748 | 2,626 | 2,579 |
| Number of lights - LED 18 | 6,723 | 12,886 | 13,961 | 15,431 |
| Number of failures - LED 18 | 40 | 151 | 174 | 195 |

Source: JEN SAP

## 2.7 Luminaire replacements performed in a day

The AER's public lighting model[26] for the current regulatory period assumes 16 luminaire replacements per day by a two-person crew.

In practice, the time taken to replace a luminaire is longer than for the repair of a light. The work is intricate as it involves the replacement of the supply cable—in circumstances where they are mounted on power poles and exposed to inclement weather—in addition to the luminaire.

Given this additional effort, we have proposed 12 luminaire replacements in an 8-hour day in an urban area—that is, a total of 40 minutes per luminaire based on 20 minutes to replace the luminaire and 20 minutes travel time between work sites. Based on this performance, we have proposed 10 luminaire replacements in an 8-hour day in a rural area.

## 2.8 Resourcing levels for the replacement of dedicated public lighting poles

The AER's public lighting model[27] for the current regulatory period assumes a two-person crew in an EPV is capable of replacing four poles in a day. Below, we demonstrate that this estimate of the number of resources assumed is too low and that more staff are required to undertake the work.

[26] AER, *Final Decision Jemena, Public Lighting model*, May 2016.

[27] AER, *Final Decision Jemena, Public Lighting model*, May 2016.

Replacement of a public lighting pole consists of the following activities:

- Work preparation and planning at the worksite
- Traffic management devices and signs are put in place. Flashing arrow signs are deployed on major roads to divert traffic
- Supply cables are disconnected from the old pole and luminaire removed
- A mobile crane lifts the pole out of the ground making sure other underground utility assets that may be laid close to the pole are not damaged. Manual digging may be required if other assets are close to the pole.
- The pole hole is cleaned out with an auger
- A new pole is lifted into position by a mobile crane
- Crushed rock is tipped into the hole and compacted with the mechanical compactor to secure the pole in position
- The luminaire and cables are reinstalled to the new pole and commissioned.

At a minimum there are four field workers involved in replacing a pole—two in an EPV; one crane operator; one person driving a tipper loaded with crushed rock and mechanical compactor—plus an external traffic management service provider where flashing arrow signs are deployed. Traffic management is an integral part of our work activities where work is performed in a road reserve.

The public lighting model for the current regulatory period assumes four poles can be replaced in a day. However, we consider this is only possible if the poles are relatively close to each other. In most instances, there are significant travel times involved between work sites. We typically replace three poles in a day because the work planning and preparation involved and travel time of the work party between work sites.

Accordingly, we have proposed standard of three-pole replacements per day and included the additional resources noted above in the 'Inputs|Capex' and 'Calc|Capex 2021-26' sheet in JEN's public lighting model for the next regulatory period provided in Attachment 07-32.

## 2.9 Replacement of dedicated decorative public lighting pole

Dedicated public lighting poles are mainly installed in residential real estate developments that have underground electricity distribution networks. The development of underground reticulated residential estates commenced in the early 1980s, and some councils approved the installation of decorative poles. A large number of these poles are coming to the end of their lives.

We held a **street lighting forum** at our Broadmeadows offices on 24 May 2018. At the forum, we engaged with VicRoads and local councils. Representatives from VicRoads, Hume City Council, Maribyrnong City Council, Melton City Council, Moonee Valley City Council and Moreland City Council were present.

We consulted with councils on whether we should incorporate decorative poles in our standard public lighting equipment list. We presented three options for the replacement of dedicated decorative poles for consideration and sought views from councils. Options included:

1. Adding a decorative pole as a standard pole and the cost of it recovered through the OMR pricing arrangements.
2. Adding a painted standard pole as standard under OMR pricing arrangements.

3. No change to current OMR pricing arrangements—where the replacement pole is a standard galvanised pole—and councils pay at the outset for the incremental costs of any decorative poles.

We advised decorative poles are generally more expensive than a standard galvanised pole. The public lighting customers understood the cost implications of 'decorative poles' as an alternative to the standard poles under the current OMR pricing arrangement. The majority of the councils represented were opposed to adding a decorative pole as a standard public lighting pole because it would lead to an increase in public lighting OMR charges for all councils.[28] Given this view, and consistent with the practice used in the current regulatory period, we propose to recover the incremental costs of decorative poles at the outset directly from those councils who require decorative replacement poles.

## 2.10 Minor and major road LED lights

### 2.10.1 Street lighting forum

At the street lighting forum, we presented our replacement policy to replace luminaires that are beyond repair (unserviceable) with LED equivalents on minor and major roads and invited attendees to provide their feedback. Further, we proposed that we will replace MV80 lights with LED at the time of bulk lamp replacements. Council representatives indicated they were all supportive of our replacement policy. We have reflected this policy change commencing 1 July 2021 in our public lighting model for the next regulatory period.

### 2.10.2 Minor road LED lights

Most of the minor road mercury vapour MV80 lights have been bulk-replaced with T5 luminaires over the past years at the request of the local councils we provide public lighting services to, and about 5,900 MV80 light remain in services at the end of CY2018. From 1 July 2021, we propose to bulk-replace all minor road mercury vapour luminaires with LED luminaires at the time the luminaires are scheduled for bulk lamp replacement due to the likely import restriction on mercury vapour lamps[29].

Our current policy is to replace unserviceable minor road luminaires with LEDs. We propose to extend this policy to all unserviceable minor road lights because our analysis indicates the operation and maintenance of LED luminaires are much lower than T5 luminaires due to higher failure rates[30] and material costs[31] of T5.

### 2.10.3 Major road LED lights

In response to VicRoads and local council feedback at the street lighting forum, we are introducing three new types of energy-efficient lights for major roads as potential replacements of existing old technology lights. JEN has approved three new LED light types for major roads lighting (**Category V**) as standard luminaires for use in its distribution area—the lights are named L1, L2 and L4 LEDs[32]. These light types are for deployment on major roads and are substitutes for existing mercury (MV) and high-pressure sodium (**HPS**) luminaires that are 150, 250 and 400 watts.

At the forum, we also proposed that we intend to replace unserviceable major road lights with LED equivalents. VicRoads and councils supported our replacement policy of major road lights.

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28 JEN – *Att 02-01 Our customer, stakeholder and community engagement* – 20200131 – Public.

29 Refer to section 2.1 of this attachment.

30 Refer to section 2.6 of this attachment.

31 Refer to section 2.3 of this attachment.

32 'L' denotes LED and '1' denotes the luminaire is suitable replacement for existing 150 watt luminaires; '2' and '4' denote replacement of existing 250 and 400 watt luminaires respectively.

To develop the OMR charges for L1, L2, and L4 LEDs, we have adopted the same approach to determining the charges for the HPS lights in the public lighting model for the current regulatory period, except that the inputs used in the model for lamps have been removed.

## 2.11 Other direct costs

The public lighting model[33] for the current regulatory period provides a fixed amount each year, for updating the Geographic information system (**GIS**) records regardless of the volume of lights managed by JEN. This approach does not allow us to recover our efficient costs related to the increase in the number of lights over the regulatory period. To address this, we have modified the way the cost is calculated for 'GIS and other' costs. In our public lighting charges model, we unitised the costs related to 'GIS and other' on cost per light basis by taking the approved allowance 'GIS and other' for 2018 and dividing by the total number of lights.

## 2.12 Modification to the pro-rata ratios to distribute the depreciation and return on assets

The public lighting model uses the 2001-2004 RAB depreciation values of the reference lights to apportion the depreciation and return on assets of the RAB post-2004 to each of the light types. An issue arises as the 2001-2004 RAB value for the reference MV80 becomes zero after FY2023 thereby preventing the fair apportionment of the depreciation and return on assets of the RAB post-2004 to each of the non-efficient lights. To resolve the issue, we have held the pro-rata ratios constant from FY2023 for all non-efficient lights.[34] See template 'Calc | RAB 2001 to 2004' in the public lighting model for the next regulatory period.

[33] AER, *Final Decision Jemena, Public Lighting model*, May 2016.

[34] Details of the changes are shown in template 'Calc | RAB 2001 to 2004' of the public lighting charges model, Attachment 07-32.

# Appendix A
# Proposed public lighting OMR charges

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# A1. Proposed public lighting OMR charges for the next regulatory period

Our indicative charges for public lighting OMR services for the next regulatory period are set out in Table A1–1. The actual prices will vary based on updates to the rate of return and CPI each year.

**Table A1–1: Proposed indicative public lighting OMR charges for the next regulatory period ($ June 2021, dollars)**

| Light Type | FY22 | FY23 | FY24 | FY25 | FY26 |
|---|---|---|---|---|---|
| Mercury Vapour 80 watt | 58.35 | 56.57 | 54.81 | 55.66 | 55.60 |
| Mercury Vapour 125 watt | 85.77 | 83.15 | 80.57 | 81.83 | 81.74 |
| Mercury Vapour 250 watt | 118.02 | 115.93 | 114.43 | 115.86 | 116.23 |
| Mercury Vapour 400 watt | 132.77 | 130.42 | 128.74 | 130.34 | 130.76 |
| Sodium High Pressure 100 watt | 164.68 | 162.31 | 160.07 | 162.11 | 162.76 |
| Sodium High Pressure 150 watt | 120.21 | 118.48 | 116.84 | 118.33 | 118.80 |
| Sodium High Pressure 250 watt | 122.94 | 120.76 | 119.20 | 120.68 | 121.07 |
| Sodium High Pressure 400 watt | 163.51 | 160.62 | 158.54 | 160.51 | 161.03 |
| Metal Halide 70 watt | 149.96 | 145.38 | 140.85 | 143.06 | 142.90 |
| Metal Halide 150 watt | 266.86 | 263.02 | 259.39 | 262.69 | 263.74 |
| Metal Halide 250 watt | 264.32 | 259.64 | 256.28 | 259.47 | 260.31 |
| T5 (2 x 14 W) | 63.61 | 65.73 | 67.65 | 69.43 | 71.07 |
| T5 (2 x 24 W) | 71.64 | 74.03 | 76.19 | 78.20 | 80.05 |
| Compact Fluoro 32W | 60.32 | 62.32 | 64.14 | 65.84 | 67.39 |
| Compact Fluoro 42W | 60.32 | 62.32 | 64.14 | 65.84 | 67.39 |
| LED 18W (incl. other Category P LED variants) | 29.51 | 31.53 | 33.31 | 34.94 | 36.38 |
| L1 – LED light for major roads (Cat V) 70W (replacement of 150 HPS) | 57.74 | 62.04 | 65.81 | 69.03 | 71.66 |
| L2 – LED light for major roads (Cat V) 155W-162W (replacement of 250 HPS) | 60.10 | 65.07 | 69.39 | 73.06 | 76.02 |
| L4 – LED light for major roads (Cat V) 275W (replacement of 400 HPS) | 61.38 | 63.51 | 68.12 | 72.04 | 75.18 |

Source: Attachment 07-32 ACS Public Lighting Model.

# A2. Public lighting OMR charges for the current regulatory period

Table A2–1 sets out the public lighting charges for the current regulatory control period.

**Table A2–1: Public lighting OMR charges for the current regulatory period ($ nominal, dollars)**

| Light Type | CY16 | CY17 | CY18 | CY19 | CY20 |
|---|---|---|---|---|---|
| Mercury Vapour 80 watt | 48.21 | 51.31 | 54.14 | 55.05 | 55.40 |
| Mercury Vapour 125 watt | 70.86 | 75.42 | 79.59 | 80.92 | 81.44 |
| Mercury Vapour 250 watt | 92.65 | 92.96 | 97.08 | 98.26 | 99.18 |
| Mercury Vapour 400 watt | 104.23 | 104.59 | 109.22 | 110.54 | 111.57 |
| Sodium High Pressure 50 watt | 119.16 | 119.61 | 124.87 | 126.38 | 127.59 |
| Sodium High Pressure 100 watt | 130.60 | 131.09 | 136.86 | 138.52 | 139.84 |
| Sodium High Pressure 150 watt | 95.33 | 95.69 | 99.90 | 101.11 | 102.07 |
| Sodium High Pressure 250 watt | 96.51 | 96.84 | 101.13 | 102.36 | 103.31 |
| Sodium High Pressure 400 watt | 128.36 | 128.79 | 134.50 | 136.13 | 137.40 |
| Metal Halide 70 watt | 123.89 | 131.86 | 139.14 | 141.47 | 142.39 |
| Metal Halide 150 watt | 211.63 | 212.42 | 221.78 | 224.46 | 226.59 |
| Metal Halide 250 watt | 207.50 | 208.20 | 217.42 | 220.06 | 222.12 |
| Fluorescent 40 watt | 60.26 | 64.14 | 67.68 | 68.81 | 69.25 |
| T5 – 2 x 14 watt | 32.03 | 34.20 | 36.61 | 37.68 | 38.35 |
| T5 – 2 x 24 watt | 36.07 | 38.51 | 41.23 | 42.44 | 43.20 |
| Compact Fluoro 32 watt | 27.62 | 29.49 | 31.57 | 32.50 | 33.08 |
| Compact Fluoro 42 watt | 31.16 | 33.26 | 31.57 | 36.66 | 37.31 |
| LED 18 watt (incl. other Category P LED variants) | 18.69 | 20.56 | 23.27 | 24.54 | 25.13 |
| Fluorescent 20 watt | 60.26 | 64.14 | 67.68 | 68.81 | 69.25 |
| Fluorescent 80 watt | 60.26 | 64.14 | 67.68 | 68.81 | 69.25 |
| Mercury Vapour 50 watt | 60.26 | 64.14 | 67.68 | 68.81 | 69.25 |
| Sodium Low Pressure 90 watt | 101.05 | 101.43 | 105.89 | 107.17 | 108.19 |
| Sodium High Pressure 100 watt | 130.60 | 131.09 | 136.86 | 136.13 | 139.84 |
| Sodium High Pressure 250 watt (24 hours) | 150.56 | 151.07 | 157.76 | 159.67 | 161.16 |
| Induction 55 watt | 60.26 | 64.14 | 67.68 | 68.81 | 69.25 |
| Incandescent 100 watt | 75.20 | 80.04 | 84.46 | 85.87 | 86.43 |
| Incandescent 150 watt | 94.00 | 100.05 | 105.5 | 107.34 | 108.04 |