Jemena Electricity Networks (Vic) Ltd

2026-31 Electricity Distribution Price Review Regulatory Proposal

Attachment 11-02

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 covers 1 July 2021 to 30 June 2026.
Next regulatory period	The regulatory control period covering 1 July 2026 to 30 June 2031.
Regulatory proposal	2026-31 Regulatory Proposal.

Abbreviations

ACS	Alternative Control Services
AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
ATO	Australian Tax Office
CFL	Compact Fluorescent
Code	Public Lighting Code
CMS	Central Management System
CPI	Consumer Price Index
DNSPs	Distribution Network Service Providers
EAGA	Eastern Alliance for Greenhouse Action
EPV	Elevating Platform Vehicle
ERG	Energy Reference Group
EV	Electric Vehicle
GIS	Geographic Information System
GSL	Guaranteed Service Level
HID	High Intensity Discharge
HPS	High Pressure Sodium
JEN	Jemena Electricity Networks (Vic) Ltd
LED	Light Emitting Diode
MH	Metal Halide
MV	Mercury Vapour
NEM	National Electricity Market
NPV	Net Present Value
OMR	Operation, Maintenance and Replacement
PTRM	Post-Tax Revenue Model
RAB	Regulatory Asset Base
SLV	Street Light Vision
TAB	Tax Asset Base
WACC	Weighted Average Cost of Capital

Overview

Our Public Lighting service

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 next regulatory control period (next regulatory period). Currently, we have more than 78,500 public lights, comprising 19 different light types, installed in our distribution area to provide public lighting services. These public lights are attached to dedicated poles (usually in newer residential estates) and power poles that are part of our electricity distribution network.

The specific public lighting services we provide include:

- Operation, maintenance, repair, and replacement (**OMR**) public lighting services
- Alteration and relocation of public lighting assets
- New public lighting services, including greenfield sites & new light types
- Provision, construction, and maintenance of emerging public lighting technology

Engaging with our customers

We have extensively engaged with our customers and various customer engagement groups that we set up as part of this price review process on public lighting services to understand their preferences better and help shape our proposal. Our customers told us that energy efficiency, utilising technology, security, lighting colour, managing decorative poles and having options on rolling out Light Emitting Diode (**LED**) luminaires were important to them. We have reflected this feedback in the public lighting proposal.

Proposed OMR prices

For the next regulatory period, we propose to vary the prices we charge for OMR services relative to those approved by the AER in the current regulatory period, as shown in Table OV–1.

Table OV–1: Proposed indicative annual change in prices over the next regulatory period (%, nominal)

Type of lights	Price change	
	From 2025-26 to 2026-27	2026-27 to 2030-31
Legacy lights	1.3%	2.5%
Energy efficient lights	43.2%	2.5%
Council – funded energy efficient lights	-10.1%	2.5%

List of public lighting related attachments

Our public lighting proposal outlined in this attachment is supported by a body of materials, forecasts and models. The key documents are outlined in Table OV–2.

Table OV–2: List of the public lighting supporting materials

Attachment	Name	Author
Att 11-05M	ACS Public lighting model	JEN
Att 11-06M	Public lighting inputs model	JEN

1. Engaging with our customers

1.1 Our proposed approach to public lighting is customer driven

Our approach to public lighting is customer-driven. We aim to ensure that our proposal reflects our customers' expectations and priorities. We have undertaken a comprehensive engagement exercise with our public lighting customers, Table 1–1 shows our engagement timelines with our public lighting customers.

Table 1–1: Engagement with public lighting customers

Date	Detail
August 2023	Council forum (understanding councils' issues to help shape our Plan)
May 2024	Workshop with public lighting customers (understanding their issues in more detail)
August 2024	Draft Plan consultation (seeking high-level feedback on JEN's proposed approach)
September 2024	Public Lighting consultation paper (seeking more detailed feedback on JEN's proposed approach)
October-November 2024	Three meetings with Hume City Council and Eastern Alliance for Greenhouse Action (understanding council's recommendations)

These engagements helped us to clearly understand our customers' expectations with regards to public lighting services and we have captured these expectations in this regulatory proposal.

We anticipate further consultation will take place with our public lighting customers throughout 2025 and prior to the AER making its price reset determination for the next regulatory period to refine the services and prices.

1.1.1 Workshop with public lighting customers

In May 2024, JEN facilitated a workshop for our public lighting customers. JEN wanted to seek feedback on our proposed public lighting program and identify opportunities to tailor our services and pricing arrangements to deliver better customer outcomes while also meeting our compliance obligations.

A particular area of focus for this workshop was to consider whether a more proactive approach to technological changes for the next regulatory period is warranted and, if so, how best to introduce change to meet the needs of our customers and the general public. Below are some of our public lighting customers' suggestions at a high level:

Feedback

- There should be greater standardisation of lighting levels, and JEN should adopt 3000K lighting on local roads as a default
- JEN should improve its communication and information sharing with public lighting customers
- JEN could improve its existing services through shorter response time to queries and by providing a more workable solution for decorative lighting and a better process for replacing damaged lights
- Councils are interested in smart lighting technologies
- Councils support new pilot schemes, including alternative funding options or grants for smart/remote control lighting.

1.1.2 Draft Plan and Public lighting consultation paper

Further, and in response to the Draft Plan and our Public Lighting consultation paper, our public lighting customers:[1]

- expressed their interest for JEN to accelerate the Light Emitting Diode (**LED**) rollout in a planned, coordinated and cost-effective manner (that is, to mitigate cross-subsidisation) during the next regulatory period
- requested the option for councils to fund or co-fund the accelerated LED rollout
- reiterated their support for the introduction of smart lighting technologies and treating wildlife-sensitive lighting as a standard offering.

1.1.3 Further engagements with our customers

Hume City Council and the Eastern Alliance for Greenhouse Action (**EAGA**) engaged with us to discuss their recommendations in more detail. As part of this engagement, the EAGA surveyed the 13 councils within our distribution area. EAGA's survey aims to gather councils' views and establish whether there is a common view for the accelerated LED rollout, introduction of smart lighting technologies and treating wildlife-sensitive lighting as standard offerings. The survey results show that all 13 councils are generally supportive of these initiatives for the next regulatory period. A summary of the survey results is provided in Table 1–2 below:

Table 1–2: Public lighting customer survey questions and responses

Survey Questions	Response
Do you agree with the proposed approach to bulk LED upgrades?	100% Favourable
Do you agree that councils should be given the option to include smart lighting within their bulk upgrade (and beyond)?	100% Favourable
Do you support a working group to be established to gather Council feedback and fine tune the approach with Jemena?	100% Favourable
Do you agree that Jemena should offer 3000K versions of each light?	92% (8% Unfavourable)

With near unanimous survey results, we have a very clear direction that our public lighting customers expect on the types of service we will include in this regulatory proposal.

In terms of funding, while councils are open to funding the accelerated LED rollout some of them cannot fully commit at this stage given the timing of their internal budget processes.

1.1.4 Our Energy Reference Group's feedback aligns with our customers' views

We also obtained feedback from the Energy Reference Group **(ERG)**, which we established to provide expert advice and insights on the key issues relating to our plans for the next regulatory period. The ERG provided feedback from the perspective of end-use customers, stakeholders and the broader community. The feedback from the ERG closely aligned with the feedback from our public lighting customers.

[1] JEN, *2026-31 Draft Plan*, August 2024; JEN, *2026-31 Electricity Distribution Price Reset, Public lighting, Consultation Paper*, September 2024. We received submissions from the Northern Alliance for Greenhouse Action, Greenhouse Alliances, Hume City Council, Darebin City Council and Hobsons Bay City Council.

For the next regulatory period, we have developed public lighting plans that reflect the feedback provided by our public lighting customers and the ERG.

Further details on our customers' feedback is provided in the Chapter 2 and in *JEN – Att 02-01 – Customer engagement*.

Feedback from the Energy Reference Group

In terms of approach, the ERG identified the following factors that it regarded as key in developing JEN's public lighting program for the next regulatory period:[2]

- **Emerging Technologies**: It is essential to stay informed about advancements in lighting technologies and integrate these into the program as they become viable. Examples include smart lighting systems that offer improved efficiency and control.
- **Regulatory Compliance**: JEN must ensure continued compliance with evolving regulations and standards, such as the Minamata Convention and the Code.
- **Customer Feedback**: Feedback from customers regarding their needs and preferences should be incorporated into the program. This includes standardising lighting levels, implementing smart lighting controls, and considering wildlife-friendly options.
- **Cost Efficiency**: Different lighting solutions and maintenance strategies should be evaluated to balance performance, reliability, and expense effectively.
- **Sustainability Goals**: It is crucial to align the public lighting program with broader sustainability goals, including reducing energy consumption and greenhouse gas emissions.

To address supply constraints on legacy public lighting types, the ERG recommended the following approaches:

1. **Technology Transition Plan**: Accelerate the transition to LED and other emerging lighting technologies. This plan should include a timeline for replacing outdated lighting types with newer, more efficient options while considering supply chain issues.
2. **Inventory Management**: Develop strategies for managing and optimising the inventory of legacy lighting components. This might include stockpiling critical components or identifying alternative suppliers.
3. **Collaborative Procurement**: Explore opportunities for collaborative procurement with other councils or agencies to leverage economies of scale and secure better supply terms.
4. **Flexible Procurement Policies**: Implement flexible procurement policies that allow for quick adaptation to changes in supply availability and pricing.

We can confirm that ERG's suggested approaches to managing legacy public lighting are already reflected in our asset management plans. In relation to the technology transition plan, we intend to transition our public lights to LED by 2031.

In relation to specific initiatives, the ERG unanimously supported JEN obtaining funding for the next regulatory period for trials to explore and implement new technologies. In supporting these initiatives, the ERG noted the following benefits:

[2] See *JEN - Att - 02-23 Energy Reference Group Report*

1. **Innovation and Improvement**: Securing trial funding could support the adoption of cutting-edge lighting technologies and smart controls, leading to enhanced efficiency and improved functionality of our public lighting systems.

2. **Risk Management**: By exploring new technologies through controlled trials, JEN can mitigate risks associated with large-scale implementation and ensure the technology is fully vetted before broader deployment.

3. **Partnership Opportunities**: Engaging in trial projects opens up opportunities for collaboration with councils, parks departments, and other relevant stakeholders, facilitating the exploration and adoption of innovative solutions.

4. **Customer Engagement**: Conducting trials will provide valuable insights into customer preferences and needs, allowing us to refine and enhance public lighting services to meet community expectations better.

We welcome the feedback from the ERG and our public lighting customers. As discussed above, we are proposing to implement SLV during the next regulatory period and have included the associated costs in our proposal. In response to the EAGA's survey, the 13 councils have expressed support for JEN to seek funding for the implementation of smart lighting technologies.

2. Our public lighting proposal

2.1 Classification of regulatory services

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**) as these 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 as the scope and costs of delivering these services vary significantly between customer requests, which means that 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 next regulatory period.[3,4]

2.2 Deploying street lighting technology

In response to our public lighting customer feedback, we have explored new technologies to better operate and maintain our fleet of public lighting, but also to give our customers the opportunity to manage their energy needs. Street Light Vision (**SLV**) is an advanced smart street lighting solution that uses connected technology to provide a range of benefits for municipalities, utilities, and urban planners. This system leverages Internet of Things (**IoT**) devices and cloud-based software to monitor and manage streetlights in real-time. We elaborate on this requirement in section 3.2 below.

2.3 Charges arrangements and proposed changes for OMR services

We propose to change our approach to setting prices for public lighting services in the next regulator period to use the AER's post-tax revenue model (**PTRM**) rather than the cost build-up model used to determine prices for the 2021-26 regulatory control period (**current regulatory period**). All else being equal, this change in approach should flatten public lighting prices over a longer period.[5]

Our approach involved starting with the latest version of the AER's PTRM, amending it to allow for our proposed LED roll-out and council-funded lights, and then developing a separate model to compile the inputs to the PTRM. We retained many of the same methods and assumptions as that adopted for the current regulatory period when establishing the opening regulatory asset base and forecasting capital and operating expenditure. Some changes were necessary, however, including to reflect more recent information. We discuss our modelling further in section 4.

At a high level, our public lighting modelling assumes the following as per our public lighting customers' recommendations:

- JEN to continue with its bulk replacement of T5 luminaires and mercury vapour (**MV**) luminaries with LED lights.
- Councils to fund the accelerated LED rollout
- Street light vision (**SLV**) is to be implemented, and to save on deployment costs, the relevant hardware will be installed when field crews are on site installing new or replacing existing lights.

3 AER, *Final framework and approach AusNet Services, CitiPower, Jemena, Powercor and United Energy, Regulatory control period commencing 1 July 2026*, July 2024.

4 Further details on our service classification are provided at *JEN - Att 04-01 Classification of services - 20250131 - Public*

5 A key reason for this is that the AER's PTRM uses real straight line depreciation (and indexation) to determine the return of capital. This defers the return on capital when compared with the *nominal* straight line depreciation approach used in the cost build-up model, all else held constant.

We will continue to apply the price control formula for fee-based ACS as set out in Attachment *JEN – Att 11-01 Alternative Control Services*. 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, the actual CPI will be substituted into the public lighting model once the actual CPI is known to determine the final charges for each regulatory year within the next regulatory period and reflected in our annual pricing proposal.[6]

2.3.1 Proposed OMR prices

For the next regulatory period, we propose to vary the prices we charge for OMR services relative to those approved by the AER in the current regulatory period, as shown in Table 2–1.

Table 2–1: Proposed indicative annual change in prices over the next regulatory period (%, nominal)

Type of lights	Price change	
	From 2025-26 to 2026-27	2026-27 to 2030-31
Legacy lights	1.3%	2.5%
Energy efficient lights	43.2%	2.5%
Council – funded energy efficient lights	-10.1%	2.5%

Refer to Table A1–1 for our proposed OMR pricing and to Table A2–1 for the OMR pricing for the current regulatory period).

The key drivers for the increase in public lighting OMR charges include:

- JEN must comply with the Minamata Convention to replace all MV and Compact Fluorescent (**CFL**) luminaires containing mercury with a non-mercury equivalent
- JEN is proposing to replace T5 fluorescent luminaires with LED during the next regulatory period for operational and performance reasons. This approach is supported by our public lighting customers.
- Accelerated LED rollout resulting to written down value of legacy lights moving to the asset base for energy-efficient lights
- Implementation of smart lighting technologies as per our public lighting customers' recommendations
- Increases in field-worker labour and material rates
- Accelerated deployment of LED light types, which are more expensive than legacy light types.

We elaborate on the differences in price changes across the three categories in section 4.5.

2.4 Charges for other public lighting services

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 requests. This approach is consistent with the existing charging arrangements.

[6] See Attachment *JEN – Att 11-05M ACS Public Lighting Model* for our pricing model for public lighting services which demonstrates the application of the price cap control mechanism specified in Attachment JEN – Att 11-01 Alternative Control Services.

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, contractor services, quoted services margin and tax in accordance with the price cap formula for quoted alternative control services set out in Attachment *JEN – Att 11-01 Alternative Control Services*.[7]

[7] see Attachment *JEN – Att 11-04M ACS Fee based services model* for our pricing model for quoted services which demonstrates the application of the price cap control mechanism.

3. Developing our public lighting plans

The purpose of this section is to explain how we have developed these plans having regard to:

- our compliance obligations
- technology and market developments
- our recent operating experience
- feedback from our public lighting customers including the ERG.

We discuss each of these elements in turn below.

3.1 Compliance obligations

JEN has obligations under the Public Lighting Code (the **Code**) published by the Essential Services Commission in December 2015 to provide public lighting services. The purpose of the Code is to regulate the provision of public lighting by specifying minimum standards and obligations for distribution businesses and public lighting customers. The objective of the Code is to ensure that public lighting provides a safe visual environment for pedestrian and vehicular movement during times of inadequate natural light. JEN supports the Code and complies with it.

The Code sets out minimum standards which are intended to capture key elements of good asset management and encourage innovation in the provision of public lighting services, without being overly prescriptive. These minimum standards are[8]:

(a) operate a 24-hour call centre to receive public and public lighting customer reports of public lighting faults

(b) repair or replace standard fittings within 7 business days of a fault report and use best endeavours to repair or replace non-standard fittings within 7 business days of a fault report subject to the availability of fittings

(c) replace non-major road lamps at least every 4 years or otherwise as required by public lighting standards

(d) clean, inspect for damage and repair luminaires during any re-lamping

(e) replace photo-electric cells at least every 8 years or otherwise as required by public lighting standards

(f) routinely patrol major roads at night to inspect, replace or repair luminaires at least 3 times per year

(g) replace luminaires with appropriate new luminaires at the end of their economic life.

JEN is also subject to guaranteed service level (**GSL**) obligations under the Code, which impose a financial penalty on JEN if it does not repair a public light within two business days of a fault report or a period otherwise agreed with the customer. While the GSL is a performance standard rather than a compliance obligation, it reasonably reflects our customers' service expectations. As such, the GSL is an important consideration in the development of our replacement and expenditure plans.

In addition to these obligations, JEN must also comply with the Minamata Convention, which Australia adopted on 17 March 2022. The Minamata Convention is an international treaty designed to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. The Convention

8 Essential Services Commission, Public Lighting Code, December 2015, clause 2.3.

aims to eliminate this source of mercury pollution by prohibiting the manufacture and trade of certain lamps containing mercury.

> Our proposal includes the replacement of MV and Compact Fluorescent (**CFL**) luminaires containing mercury with their equivalent LED consistent with the Minamata Convention. This approach is supported by our public lighting customers.

3.2 Technology and market developments

In considering JEN's streetlighting plans, it is useful to have regard to technology and market developments internationally, as well as initiatives that are underway in the National Electricity Market (**NEM**).

Many cities around the world are investing in "smart city" technologies for street lighting, with sensors and data analytics. LED street lighting have gradually been adopted as LED produces the same level of brightness as high-intensity discharge lighting,[9] but it is highly energy-efficient, reducing energy consumption by up to 70% compared to traditional lighting technologies. LED lighting is also highly versatile, with the ability to produce a wide range of colours and lighting effects, and it can be easily controlled and programmed using smart city technologies.

Many European cities have implemented ambitious plans to transition to energy efficient LED lighting in public spaces and have been at the forefront of research into the use of lighting to enhance public safety and well-being. For example, the city of Copenhagen has installed thousands of energy efficient LED streetlights that can be controlled and dimmed remotely based on traffic patterns and other factors.[10] The city has also experimented with using coloured LED lighting to create unique and artistic lighting installations in public spaces. In Barcelona, the installation of 10,000 LED streetlamps with sensors have enabled dimming, remote management and free WIFI across the city, while additional sensors collect data on air quality.[11]

> In response to our public lighting customers' feedback, we propose to implement Street Light Vision (**SLV**) during the next regulatory period. SLV is a software application that delivers advanced asset management, analytics, and control capabilities to improve energy efficiency and optimise smart streetlight system performance. Once implemented, it will allow councils to manage their public lighting usage directly and reduce costs while improving public safety.
>
> Our proposal includes the costs of implementing SLV. The speed of the implementation of the SLV will depend on the rate of the LED rollout. This is because the required hardware for the SLV will be installed when existing lights are replaced with LED in order to save on costs.

SLV is a cloud-hosted Central Management System (**CMS**) for public lighting control and management and is connected to a distributor's mesh network. Through the CMS, public lighting customers are able to directly dim or brighten their public lights as needed, either in real-time or at scheduled times. To work, the SLV is also comprised of hardware that is directly fitted to a streetlight luminaire. The hardware contains a photo sensor plus a network interface card which enables the automatic or scheduled switching (on/off) of public lights, among other capabilities.

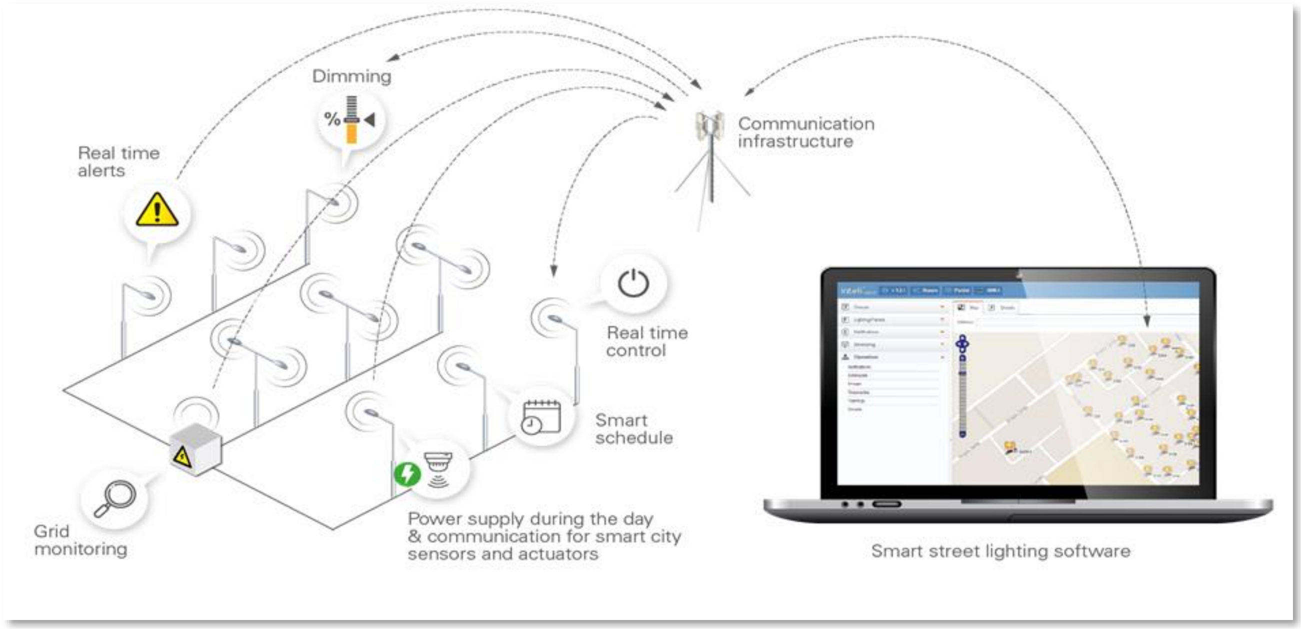
In Figure 3–1 we illustrate how the SLV works at a high level.

9 High intensity discharge (**HID**) lamps are operate by creating an electrical discharge in ionised gas. HID lamps generally used in commercial and industrial applications where high levels of light are required – such as warehouses, outdoor lighting, street lighting and stadium lighting.

10 EDF, Outdoor Lighting Modernisation, accessed 17 January 2025.

11 Minnovation Technologies, Example of a smart city: A case study into Barcelona, accessed 17 January 2025.

Figure 3–1: High-level illustration of how Street Light Vision works



JEN is proposing to deploy the SLV solution over the mesh communication system that it deploys for smart metering to reduce the communication costs and to increase the efficiency in the services provided.

3.2.1 Benefits of smart streetlighting technologies such as SLV

SLV enhances the capabilities of outdoor lighting control by providing more benefits to councils with advanced asset management, analytics and control to improve energy efficiency, optimise system performance and accelerating outage restoration that public lighting customers have asked us to explore. Below, we outline some of the benefits in more detail:

- **Energy efficiency and cost savings** – Through the central management system, street lights can be dimmed or brightened by our public lighting customers based on traffic flow, time of day, or weather conditions. This reduces energy consumption without compromising safety or visibility. By optimising lighting levels and ensuring that lights are only operating at the necessary intensity, councils can lower their electricity bills significantly.
- **Enhanced safety and security** – Lights can be adjusted based on traffic patterns or weather conditions, ensuring optimal visibility for pedestrians and drivers, and enhancing public safety. Areas with well-lit streets have been shown to have lower crime rates. Intelligent street lighting systems can enhance security by providing adequate lighting during night hours or when movement is detected in certain areas.
- **Operational performance** – Through the CMS, the entire lighting system can be adjusted from a single location. Automated systems can adjust lighting based on pre-defined schedules or real-time data, reducing the need for manual interventions.
- **Operational support** – Centralised control allows JEN to monitor street light status in real-time, improving response times to public lighting faults.
- **Reduced carbon footprint** – By decreasing energy consumption through smarter lighting controls (such as, dimming or adaptive brightness), public lighting customers can reduce their overall carbon emissions, helping them to achieve their carbon reduction and sustainability goals.

3.3 Recent operating experience and vendor supply issues

JEN's replacement program in the next regulatory period is driven partly by emerging operational and performance issues with particular lamp types that have emerged during the current regulatory period. With the advancements in LED technology, LED public lighting has become the accepted standard as they require less maintenance, are more energy efficient and are an environmentally acceptable solution.

As discussed above, JEN's approach to achieving compliance with the Minamata Convention is to replace all MV and CFL luminaires containing mercury with their equivalent LED luminaires. In addition to replacing luminaires and lamps in accordance with the Minamata Convention, JEN is currently replacing Metal Halide (**MH**) lamps and intends to replace T5 fluorescent luminaires during the next regulatory period for operational and performance reasons.

The key points to note in relation to our replacement plans for each of these lamp types are summarised below:

- MV lamps contain excessive quantities of mercury beyond the acceptable limits; therefore, manufacturing and installation of these products will cease in Australia.
- CFL lamps, like their tubular fluorescent precursors, contain a small amount of mercury—typically around five milligrams. These mercury levels are in the lower range and considered acceptable within Australia. Other countries, however, have fully moved away from all light types containing mercury. The global demand for CFL lamps has reduced, and, as a result, manufacturers are ceasing production of CFL lighting, terminating future supplies.
- MH lamps are being replaced given their small numbers and inferior performance. MH lamps are failing at higher-than-normal rates, with 15% of our lamps failing prematurely in 2022. Maintaining stock levels is also problematic, with small quantities proving difficult to source from suppliers. For that reason, a proactive replacement program is considered to be prudent and efficient as it will meet our public lighting obligations at the lowest total life cycle costs.
- When developing our regulatory proposal for the current regulatory period, evidence was emerging indicating that the T5 failure rate was significantly higher than expected. In response to performance issues and subsequent advances in LED, recent information from suppliers indicates that the market is phasing out T5 lamps. While the majority of our T5 luminaires are mid-way through their 20-year expected service life, we consider it prudent and efficient to take a proactive replacement approach given the supplier issues.

JEN currently has a bulk re-lamping program that schedules lamp replacement on a 4-year cycle in accordance with the Code requirements. This timing ensures that lamp replacement occurs at a point in time when the light output from the lamp is nearing its minimum required output levels. JEN's transition is to replace CFL, MH, MV and T5 luminaires with LED when the lamps are due for replacement in the bulk re-lamping cycle. This approach reduces costs as lights are replaced just in time and not replaced prematurely.

> Our proposal includes the replacement of CFL, MH, MV and T5 luminaires with LED when the lamps are due for replacement in the bulk re-lamping cycle. This approach reduces cost for or public lighting customers as lights are replaced just in time and not replaced prematurely.
>
> In section 3.4.2 we outlined our public lighting customers' feedback to accelerate the LED rollout during the next regulatory period. Accelerating the LED rollout means that we will also need to replace over 30,000 legacy lights with LED's during the next regulatory period regardless of their existing asset life and condition.

3.4 Feedback from our public lighting customers

JEN is strongly focused on understanding and responding to the needs of local councils and VicRoads through workshop-style events. These workshops enable all parties with an opportunity to collaborate on a broad range of public lighting issues. Given the technological developments described in section 3.2, JEN is particularly keen to ensure that opportunities to proactively embrace opportunities for improved public lighting services are explored with our customers rather than taking a reactive approach to technological change.

In May 2024, JEN arranged a facilitated workshop to seek feedback from our customers on our proposed replacement program and to identify opportunities to tailor our services and pricing arrangement to deliver the best customer outcome, while also meeting with our compliance obligations. A summary of the high-level feedback from our public lighting customers is provided in Table 3–1 below.

Table 3–1: High-level feedback from public lighting customers

Key topic	What our public lighting customers told us
Greater standardisation	Councils considered that there is an opportunity for greater standardisation of lighting levels. For example, it was suggested that adopting 3000K lighting on local roads as a default would avoid JEN holding niche stock for reserves, foreshores and conservation areas.
Communication and information sharing	Councils expect JEN to improve its information sharing, including: • Share the lifecycle of current lights with councils, including failure rates, likely maintenance and replacement options to support planning • Make swifter updates in GIS re: which lighting has been repaired or upgraded • Communicate or prescribe footpath lighting standards • Assist councils in educating communities public lighting standards to help councils set community expectations • Provide guidance on park lighting needs, including in relation to crime prevention.
Service improvement opportunities	Councils identified areas where JEN could improve its existing services, including: • Provide a 'more workable' solution for 'decorative' lighting, including a better process for replacing damaged lights • Response times to address public lighting queries are taking too long, meaning communities are fearing crime and blaming councils.
Cost efficiency	Councils do not support the adoption of the cheapest option. Instead, councils prefer to balance cost with reliability, efficiency, longevity and sustainability (e.g., the protection of fauna).
Technological change and smart lighting	Councils were interested in smart lighting/controls (i.e., shifting from a default-on approach to task-based lighting and helping with grid management). Customers were also interested in other technological developments, including: • 360-degree lighting; • solar panels; • PA warning systems; • CCTV (including with AI); and • Electric Vehicle (**EV**) chargers.
New pilot schemes	Councils support new pilot schemes, including: • Alternative funding options or grants for smart/ remote control lighting, especially on bike paths • Partnering with the council's parks departments and capital works teams to explore opportunities.

In addition, we received the following feedback on specific aspects of our public lighting plans for the next regulatory period in response to the public lighting consultation paper we released in September 2024 and our further engagement with Hume City Council and the EAGA from October to November.[12]

3.4.1 Street lighting

In relation to street lighting, council representatives indicated they were supportive of our proposed replacement program for MV, MH and T5 luminaires by 2031.

[12] JEN, *2026-31 Electricity Distribution Price Reset, Public lighting, Consultation Paper*, September 2024.

It was also agreed that councils should be given the option of 3000k versions of each light, rather than the whiter 4000k lights. They noted that there is some evidence to suggest that the 4000k lights may disrupt the circadian rhythms of animals and increase skyglow.

> Our regulatory proposal maintains our view that MV, MH and T5 luminaires should be replaced during the next regulatory period. Our proposal include these replacements.
>
> We also accepted our public lighting customers' recommendations that we treat 3000k lighting as standard offering starting the next regulatory period.

3.4.2 Minor and major road lighting

In relation to minor road lighting, it was noted that a proactive program for replacing all minor road mercury vapour luminaires with LED luminaires in anticipation of the likely restriction on mercury vapour lamps is needed. However, it was also noted that MV80 lights had been replaced with T5 luminaires, which are now also targeted for proactive replacement. The proposed program reflects changes in the market and that it is appropriate for JEN to take a proactive approach.

In relation to major road lighting, it was noted that three new LED light types were introduced as standard luminaires during the current regulatory period—the lights are named L1, L2 and L4 LEDs. These light types are substitutes for existing MV and HPS luminaires that are 150, 250 and 400 watts. JEN provided an update on this replacement program to councils, which was supported.

> Our view remains that it is more prudent and efficient to transition the LED rollout during the next regulatory period. This means that we will replace the existing lights with LED under our normal maintenance cycles to help reduce costs. But as we noted in the Draft Plan and public lighting consultation paper, our approach to public lighting is customer-driven and that we would work with local councils and VicRoads to ensure that we meet our customers' needs.[13]
>
> We support our public lighting customers' recommendation for the accelerated LED rollout and propose they fund the rollout accelerated LED rollout program. We have developed a pricing model which reflects this approach (see section 4). We will work closely with councils on the process and protocols (regarding specifications, installers and project management) to be followed.

3.4.3 Decorative poles

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. Many of these poles are coming to the end of their lives and the issue for councils is whether to replace them.

The participants at the May 2024 workshop raised concerns that councils are having to spend their own budget on upgrading decorative public lights on existing roads to maintain compliance. As already noted, councils are seeking an improvement in our current processes for replacing damaged lights.

> In our public lighting consultation paper, we asked our public lighting customers whether decorative poles should remain non-standard.[14] In response, they agreed that they should remain non-standard.

13 JEN, *2026-31 Draft Plan*, August 2024, p.135.

14 Greenhouse Alliances, Response to Jemena's Public Lighting Discussion Paper, 7 October 2024; Northern Alliance for Greenhouse Action (NAGA – representing nine inner Melbourne councils), Response to Jemena's Public Lighting Discussion Paper, October 2024.

> For that reason, we propose to continue our current approach of recovering the incremental costs of decorative poles directly from those councils that require decorative replacement poles.

3.4.4 New technologies

The May 2024 workshop discussed new technologies in relation to streetlighting and energy efficiency initiatives. A key focus of the discussion is whether and how JEN may be able to respond to these opportunities in a way that best meets the requirements of its public lighting customers. JEN was particularly interested in hearing from our public lighting customers whether there was an opportunity to embrace technological change proactively during the next regulatory period and, if so, how best to do so.

It was noted that new energy efficient lights may be equipped with smart technology that would allow council to lower lighting levels where and when it is considered appropriate. In particular, central management systems can enable responsive dimming and trimming times to be introduced that can control the lighting intensity and times that the lights are lit by altering illumination levels and switching on/off times. These advances are likely to deliver the following benefits:

- savings in energy costs and greenhouse gas reductions
- improvements in the quality of public lighting outcomes, with more responsive switch on times, whiter light associated with LEDs and technological advancements.

However, the principal area of attention for the next regulatory period was smart lighting, where councils recognised that there are opportunities for smart controls in street lights, including to dim at certain times and/or detect outages. The councils noted that these advances would help reduce maintenance costs, deliver energy/cost savings and reduce community complaints. The councils suggested that:

- JEN should explore jointly-funded pilots, similar to those currently being run in City of Melbourne and other local government areas.
- Councils should be given the option to include smart lighting within their bulk upgrade (and beyond), which would require JEN to include the system set up costs in the next regulatory period.

In response to our public lighting consultation paper and further consultation with councils and the EAGA, they reiterated their support for smart lighting technologies. They also suggested that we adopt a central management system to enable smart lighting technologies. In response to the EAGA's survey, the 13 councils in our service area answered Yes to the question: Do you agree that councils should be given the option to include smart lighting within their bulk upgrade (and beyond)? This means Jemena will include resources from 2026-2031 to set the system up.

> We are supportive of our public lighting customers' recommendations. Our pricing model includes the costs of implementing SLV during the next regulatory period. We note that the speed of the implementation of the SLV will depend on the rate of the LED roll out. This is because the required hardware for the SLV will be installed when existing lights are replaced with LED in order to save on costs.
>
> We provide more information about SLV in section 3.2.

4. Model inputs for public lighting OMR services

We propose to change our approach to setting prices for public lighting OMR services in the next regulatory period by using the AER's PTRM rather than the cost build-up model used to determine prices for the current regulatory period (cost build-up model). All else being equal, this change in approach should flatten public lighting prices over a longer period.[15]

At a high level, our approach involved:

- developing a PTRM inputs model (*Attachment Att 11-06M*) that collates and calculates the inputs needed for the PTRM, including the opening RAB, forecast capital and operating expenditure, estimated 2025-26 prices, and forecast volumes
- adopting version 5 of the AER's PTRM for electricity distribution network service providers and amending it so that it can calculate cost-reflective starting prices (*Attachment Att 11-05M*).

Many of the same inputs are used under our proposed approach as would have been applied if the cost build-up model were retained. However, the change has allowed us to give effect to requests made by our public lighting customers.

The next two sub-sections explain why we propose adopting the PTRM to set prices for public lighting OMR services and the additions (or changes) we have made to it. The third sub-section then steps through the inputs that we have used.

4.1 Why adopt the PTRM

We propose using the PTRM for three key reasons:

- The PTRM model is being used to determine prices for our standard control services and our ACS metering prices. Using it to determine prices for our public lighting OMR services will help us further standardise the way that prices are determined across all of the services we provide.
- The PTRM is regularly reviewed and updated by the AER, with input from stakeholders, which ensures that it remains relevant and consistent with regulatory best practice. In contrast, the cost build-up model has not been subject to the same level of review or stakeholder input.
- The PTRM allows us to incorporate the proposed accelerated roll-out of LEDs and the self-funding of LEDs requested by some councils. Incorporating these components into the cost build-up model would require developing a new cost model because that model does not pool costs in the same way that the PTRM does. In effect, the cost build-up model would not do what our public lighting customers asked of us.

We also consider that the cost build-up model is complex and difficult to follow, making it challenging for stakeholders to engage with. This is especially so given that the model tends to evolve from one regulatory period to the next by adding new inputs and calculations rather than resetting the model for each period (as is done with the PTRM).

[15] A key reason for this is that the AER's PTRM uses real straight line depreciation (and indexation) to determine the return of capital. This defers the return on capital when compared with the *nominal* straight line depreciation approach used in the cost build-up model, all else held constant.

4.2 Changes made to the PTRM

Consistent with past AER guidance,[16] we have constrained our additions to a single sheet (named 'Supporting information'), which we then link to from the 'PTRM input' sheet.

The additions are needed so that we can:

- model the transfer of the written down value of legacy lights to the prices for energy efficient lights when replaced as part of the LED roll-out
- determine cost-reflective starting prices that recognise the roll-out and provide lower prices for councils that fund their own LED lights.

The additions are described below.

4.2.1 Transfer of written down value

The first section of the 'Supporting information' sheet (rows 5:31) calculates the written down value of legacy lights that is projected to be transferred from the existing lights asset class to the energy efficient lights asset classes for each year of the next regulatory period.

It starts by first calculating the RAB roll-forward for the existing lights asset class for each year using calculations included elsewhere in the PTRM (e.g., in the 'Assets' sheet). Depreciation is calculated (at row 12) using the projected remaining lives (at row 15), which is picked up at row 414 of the 'PTRM input' sheet.[17] A written down value per light is then calculated by dividing the opening RAB value for each year by the forecast number of legacy lights at the start of the year. That value is presented in both nominal and real 2026 dollar terms.

The written down value per light for each year (in real 2026 dollars) is then multiplied, separately, by the projected number of JEN-funded and council-funded (i.e., self-funded) lights for each year as part of the LED roll-out. Those aggregate amounts are then treated as asset disposals against the legacy light asset class (at row 170 of the 'PTRM input' sheet) and gross capex against the energy efficient light asset classes (at rows 63:64 of the 'PTRM input' sheet). The amounts offset each other such that net capex across all asset classes from the transfer is $0 in each year.

The impact of the transfer is that the closing RAB value for legacy assets is $0 by the end of the next regulatory period. This can be seen at cell K13 of the 'Support information' sheet.

4.2.2 Starting prices

The remaining 5 sections of the 'Supporting information' sheet (rows 32:257) calculate the starting prices that are input to the 'PTRM input' sheet.

Starting prices are calculated using 5 steps:

- **Step 1.** The capital components of building blocks revenue, by year, are broken down by asset class (at rows 90:132) using the RAB breakdown by asset class (at rows 32:89). The capital components include return on capital, return of capital, and the net tax allowance. Operating costs are left aggregated.
- **Step 2.** Cost allocators are determined (at rows 133:187) based on assumptions that map the asset classes (and operating expenditure) to one or more of three light groups: (1) legacy lights, (2) JEN-funded energy efficient lights, and (3) self-funded energy efficient lights. Forecast volumes for those groups are used to translate these assumptions into allocation percentages.

[16] See: AER, *Guidance note – Amendments to NER PTRM for determinations under the Electricity Infrastructure Investment Act and Regulations*, November 2024, pp. 12–13.

[17] To avoid circularity, depreciation is calculated within the 'Supporting information' sheet and then input to the 'PTRM input' sheet (as a year-by-year tracking method input). A circularity would arise if the depreciation where instead sourced from the 'Assets' sheet because it would be affected by the transfer of the written down value.

- **Step 3.** Building block costs are then allocated across the three light groups (rows 189:208) using the breakdown from Step 1 and the allocation percentages from Step 2. This gives forecast building block revenue by year for each group.
- **Step 4.** Forecast building block revenue from step 3 is then converted to an amortised cost per light group (at cells F211:F214) by dividing the net present value (**NPV**) of that revenue by the NPV of forecast volumes. The amortised cost is then translated into a scalar for each light group by dividing that cost by the volume-weighted average price for 2025-26 (at cells H211:L214).[18] The model user can override a calculated scalar by inputting a value at cells K212:K214. The override is a form of rebalancing to address public lighting customer concerns about rate differentials between tariffs, especially when customers change the light types being installed.[19]
- **Step 5.** Finally, the scalars from Step 4 are applied to the 2025-26 charges to determine the starting prices (at rows 219:257) that are then input to the 'PTRM input' sheet (at cells F532:F565).

This approach ensures that the starting prices reflect the projected costs of delivering OMR services over the next regulatory period. It also ensures that those prices reflect cost differences between the three light groups; namely, that legacy lights are phased out over that period and that self-funded energy efficient lights are cheaper for JEN to service than JEN-funded energy efficient lights. Finally, the approach retains relativity between the 2025-26 prices for each light type within the groups.

4.3 Inputs

Key inputs for the next regulatory period are:

- The opening public lighting regulatory asset base, or RAB, has been established by applying the method used in the AER's final decision public lighting model for the current regulatory period adjusted with an additional half-year capex and depreciation for the intervening period (see section 4.3.1)
- The nominal vanilla weighted average cost of capital (**WACC**) has been updated. Consistent with the approach taken in the current regulatory period, the inputs used to calculate the WACC are the same as those used for determining standard control services prices (see section 4.3.2)
- Forecast CPI has been applied. This forecast will be adjusted when the actual is known and demonstrated in our annual pricing proposal (see section 4.3.2)
- Forecast capital expenditure is derived, which covers the capital cost of new or replaced lights as well as poles and brackets, SLV costs, and the cost of billing system changes and system deployment. Costs for self-funded energy efficient lights are not included (see section 4.3.3)
- Forecast operating expenditure is calculated by applying the method used in the AER's final decision on the public lighting model for the current regulatory period adjusted for more recent information on labour and material costs and replacement activities that better reflect our experience (see section 4.3.4)
- The forecast volume of each type of light over the next regulatory period is based on forecast residential population growth and forecast replacement of existing lights due to failure or as part of the LED roll-out (see section 4.3.5).

Further detailed information is provided in the remainder of this section.

18 The volume-weighted 2025-26 price for self-funded energy efficient lights is set equal to that for the JEN-funded energy efficient lights because there are no separate prices for self-funded energy efficient lights in that year.

19 We have adopted 1.3x override value for legacy lights, leaving the calculated values to apply to JEN funded and council funded energy efficient lights. The override was adopted to promote fairness between charges for legacy and energy efficient lights. Absent this override, councils facing the legacy charges would benefit from the continued depreciation of the underlying capital value of legacy lights, while those on new energy efficient lights would be facing the capital costs of newer lights.

4.3.1 Opening regulatory asset base

We established the opening RAB as at 1 July 2026 by applying the method used in the AER's final decision public lighting model for the current regulatory period adjusted with an additional half-year capex and depreciation for the intervening period. The calculations are included in the 'RAB roll-forward' sheet of the PTRM inputs model (*Attachment Att 11-06M*).

To apply this method we:

- started with the year-by-year tracking approach adopted in the cost build-up model for the current regulatory period,[20] which covered the period from calendar year 2005 to financial year 2025-26
- extended the depreciation projection out to financial year 2060/61 to cover the period over which capital expenditure incurred up to 2025-26 is fully depreciated
- added new asset classes for replaced self-funded energy efficient lights, street light vision, SLV devices, and in-house software, which are used over the next regulatory period
- incorporated actual and estimated net capital expenditure for period from calendar year 2020 through to financial year 2025-26, including the half-year for the intervening period.

This method uses nominal straight-line depreciation to roll-forward the RAB without any indexation. However, by adopting the PTRM for the next regulatory period, we are (implicitly) also proposing to switch to using real straight-line depreciation and indexation to roll-forward the RAB. This switch has the effect of deferring return of capital, which flattens out public lighting prices over a longer period.

Applying this method gives the opening RAB as at 1 July 2026 by asset class set out in Table 4–1. We estimated the remaining life for each asset class as the value weighted average of the remaining life for each year of capital expenditure over the period up to 2025-26 (see cells J8:J14 of the 'RAB Roll-Forward' sheet in the PTRM inputs model). We also propose retaining standard lives adopted for the current regulatory period for lights and poles and brackets. For the new asset classes, we propose adopting 20 years for light and SLV devices and 5 years for in-house software and street light vision.

Table 4–1: Opening RAB as at 1 July 2026

Asset class	Opening RAB value ($M)	RAB remaining life (years)	RAB standard life (years)
Poles and brackets	9.76	28.1	35.0
Existing lights - luminaires	2.51	12.0	20.0
Energy efficient lights - luminaires & ballasts	6.51	16.1	20.0
Replaced self-funded energy efficient lights	0.00	n/a	20.0
Street light vision	0.00	n/a	5.0
SLV devices	0.00	n/a	20.0
in-house software	0.00	n/a	5.0
Total	**18.78**	**n/a**	**n/a**

(1) The values are in nominal dollars.

Finally, as well as establishing an opening RAB to input to the PTRM for the next regulatory period, we also need to establish an opening regulatory tax asset base, or TAB.[21] As a simplifying assumption we set the opening TAB values, remaining lives and standard lives to match those for the RAB. We consider this is reasonable given that

20 The year-by-year tracking approach involves depreciating each year of capital expenditure as if it were a separate asset, retaining this breakdown across regulatory periods.

21 A TAB was not needed for the current regulatory period because a pre-tax approach was used to determined allowed revenues.

up to 2025-26 the RAB was being depreciated using a nominal straight-line method, which is consistent with approaches allowed by the Australian Tax Office (**ATO**).[22]

4.3.2 WACC and inflation

We propose using the same WACC and inflation inputs to the PTRM as that adopted for standard control services, which is consistent with how the public lighting prices were determined for the current regulatory period. The parameters are input directly into the PTRM model (*Attachment Att 11-05M*) and are set out in Table 4–2 and Table 4–3 below.

Table 4–2: WACC inputs

Component	2026/27	2027/28	2028/29	2029/30	2030/31
Return on equity	7.67%	7.67%	7.67%	7.67%	7.67%
Value of imputation credits	57.00%	57.00%	57.00%	57.00%	57.00%
Leverage	60.00%	60.00%	60.00%	60.00%	60.00%
Corporate tax rate	30.00%	30.00%	30.00%	30.00%	30.00%
Return on debt	4.75%	4.88%	5.00%	5.18%	5.47%
Nominal vanilla WACC	**5.92%**	**6.00%**	**6.07%**	**6.18%**	**6.35%**

Table 4–3: Inflation inputs

Component	2026/27	2027/28	2028/29	2029/30	2030/31
RBA inflation forecast	2.50%	n/a	n/a	n/a	n/a
Linear glide path	n/a	2.50%	2.50%	2.50%	2.50%
Forecast inflation by year	2.50%	2.50%	2.50%	2.50%	2.50%
Inflation rate	**2.50%**				

(1) Forecast inflation is for the year to June each year.

(2) The inflation rate is calculated as the geometric average of the forecast inflation by year by first adding 1 to the forecast, calculating that average, and then subtracting 1.

(3) Forecast inflation is used to calculate the building blocks and smoothed revenue, and ultimately the X factors, included in the PTRM. Actual prices will be updated from year to year using actual inflation.

4.3.3 Forecast capital expenditure

We have forecast capital expenditure over the next regulatory period by combining forecast costs of JEN-funded new and replaced lights, poles and brackets with those for street light vision and billing changes. The calculations are included in the 'Capital Expenditure' sheet of the PTRM inputs model (*Attachment* Att 11-06M).

Our forecast is split into three components:

- **Lights.** We forecast capital expenditure on JEN-funded new and replaced lights by multiplying the forecast volumes of those lights for each year and light type by assumed unit rates. We excluded lights that were assumed to be funded by councils and those included within our operating expenditure forecast (i.e., replacement of faulty lights). See rows 27:53 of the 'Capital Expenditure' sheet.

[22] This simplification is likely to overstate the value of the TAB because, in practice, some public lighting assets can be depreciated using a diminishing value approach, which tends to speed up depreciation when compared to a straight-line approach. Lights are also typically depreciated over a short period (i.e., 15 years compared with 20 years adopted for regulatory purposes). See: ATO, Effective Life 2015/1, 1 July 2022; Effective Life 2015/1 | Legal database.

- **Poles and brackets.** Similar to our approach for lights, we forecast capital expenditure on JEN-funded new and replaced poles and brackets by multiplying the forecast volumes of those poles and brackets by assumed unit rates. We assumed that JEN would only fund poles and brackets that need replacing. See rows 54:74 of the 'Capital Expenditure' sheet.
- **Other expenditure.** We forecast capital expenditure on SLV and one-off billing changes using bottom-up builds. We forecast expenditure on SLV devices by multiplying forecast volumes by an assumed unit rate.

We explain our proposed unit rates, street-light vision costs, and one-off billing change costs in the sub-sections below. Our forecast light volumes are explained in section 4.3.5. Our resulting capital expenditure forecast by asset class, is set out below in Table 4–4.

Table 4–4: Forecast gross capital expenditure ($Million, Real 2025-26 dollars)

Asset class	2026/27	2027/28	2028/29	2029/30	2030/31	Total
Poles and brackets	1.40	1.40	1.40	1.40	1.40	**6.98**
Existing lights - luminaires	0.00	0.00	0.00	0.00	0.00	**0.00**
Energy efficient lights - luminaires & ballasts	2.84	2.41	2.08	2.09	2.27	**11.68**
Replaced self-funded energy efficient lights	0.01	0.04	0.08	0.12	0.16	**0.40**
Street light vision	0.85	0.00	0.00	0.00	0.00	**0.85**
SLV devices	2.20	3.30	3.34	2.10	1.17	**12.09**
In-house software	0.11	0.00	0.00	0.00	0.00	**0.11**
Total	**7.40**	**7.14**	**6.89**	**5.70**	**4.99**	**32.12**

4.3.3.1 Street light vision costs

Street light vision is a technology designed to enhance how we monitor and manage our street lighting system. It involves implementing advanced software and hardware, including SLV devices, which are capable of real-time data collection and analysis. These devices help improve the efficiency and effectiveness of public lighting system by enabling remote control, automated diagnostics, and predictive maintenance.

Our proposed capital expenditure includes the cost of both the software and the SLV devices. We estimated the cost of the software and the cost of the SLV devices.[23] See rows 75:82, and 102:103 of the 'Capital Expenditure' sheet of the PTRM inputs model.

4.3.3.2 Billing changes

We will need to update our billing system so that we can charge councils different amounts depending on whether they have self-funded their own LED lights or not. Based on our experience with previous billing changes, we estimate that this will cost around $0.1 million (in real 2023-24 dollars). We expect to incur this in the 2026-27 financial year. We also expect to incur an additional ongoing cost associated with half-FTE. See row 104 of the 'Capital Expenditure' sheet of the PTRM inputs model.

4.3.4 Forecast operating expenditure

We propose using the same method to forecast operating expenditure over the next regulatory period as that adopted for the current regulatory period, with some adjustments for updated inputs. The forecast operating expenditure per light is multiplied by forecast lights to derive the total forecast expenditure for each year of the

[23] The unit rate is based from the quote we have received from the SLV supplier, and it excludes the installation costs. We have forecast volumes based on our projected roll-out of LED lights.

next regulatory period. The calculations are included in the 'Operating Expenditure' sheet of the PTRM inputs model (*Attachment* Att 11-06M).

The adjustments made 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 (see section 4.3.4.1)
- changes to the labour rates and material unit cost (see sections 4.3.4.1 and 4.3.4.2)
- the reduced bulk replacement frequency of lamps and PE cells for some lights to align with our intended replacement strategy for the next regulatory period (see section 4.3.4.3)
- the number of light repairs performed in a day has been updated to reflect what can be achieved safely by a two-person crew (see section 4.3.4.3)
- the number of pole inspections performed in a day has been updated to what can be achieved safely in a day (see section 4.3.4.5)
- minor road light failure rates have been updated to reflect JEN's actual failures (see section 4.3.4.6)
- the assumed light locations (between urban and rural) were updated to reflect JEN's current location data (see section 4.3.4.7).

These are described in the following sub-sections. Our resulting operating expenditure forecast for the next regulatory period is set out in Table 4–5.

Table 4–5: Forecast operating expenditure ($Million, Real 2025-26 dollars, excluding debt raising costs)

Component	2026/27	2027/28	2028/29	2029/30	2030/31	Total
Total	4.72	4.55	4.16	3.50	3.12	**20.07**

4.3.4.1 Labour rates and labour escalation

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 to use the most recent information. The labour rate is slightly lower than our estimated labour rate for a field-worker under our fee based services model for ACS, reflecting the slightly less complex nature of a field worker's public lighting tasks.[24]

We have also updated the real labour escalation series to use that adopted when forecasting operating and capital expenditure for standard control services over the next regulatory period.[25] This reflects an average of forecasts developed by Oxford Economics and Deloitte Access Economics.[26]

Consistent with the public lighting model used to determine prices for the current regulatory period, we have applied overheads of 25% for operating expenditures.

24 *JEN - Att 11-04 ACS Fee-Based Services Model*.

25 *JEN - Att 06-03M SCS Opex Forecast Model*.

26 For further details on how we developed our labour escalation forecast, refer to Attachment *JEN – Oxford Economics Att 05-07 Real cost escalation report*.

4.3.4.2 Material costs

We have updated the cost of lighting components, including poles and brackets, to reflect the most recent information.

We have included the cost of two lamps for T5 luminaire in the 'Operating Expenditure' sheet of our PTRM inputs 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.

The unit cost of miscellaneous materials for the current regulatory periods is still appropriate and has therefore kept it for the next regulatory period.

4.3.4.3 Light replacement frequency

We have reduced the assumed frequency replacement of lamps and PE cells for S-HP 150, S-HP 250, and LED 70W lights to match those for MV80, T5, and LED 18W lights. This better aligns with our intent to adopt the same replacement frequency for all light types over the next regulatory period. Our proposed frequency of replacement (in years) are set out in Table 4–6.

Table 4–6: Frequency of replacement (years)

Light	Lamps		PE cells	
	Current regulatory period	Next period	Current regulatory period	Next period
MV80	4	4	8	8
S-HP 150	5	4	10	8
S-HP 250	5	4	10	8
T5	4	4	8	8
LED 18W	n/a	n/a	8	8
LED 70W	n/a	n/a	10	8

The change in frequency of replacement for S-HP150 and S-HP 250 lamps is to make them consistent with our bulk lamp replacement program for the next regulatory period, which in turn is consistent with the requirements of the Public Lighting Code.[27] The frequency of replacement for PE cells for S-HP150, S-HP 250 and LED 70W is to make them consistent with the requirement of the Public Lighting Code.

4.3.4.4 Light repairs performed in a day

We have retained the assumed number of light repairs made in a day for MV80 and LED 18W lights from those adopted for the current regulatory period. We have, however, reduced the assumed number of light repairs for T5 lights (Table 4–7) and refreshed the percentage of repair assumptions for MV80 and T5 lights (Table 4–8) to better reflect our experience with these assets.

[27] ESC, Public Lighting Code, December 2015, section 2.3.

Table 4–7: Proposed number of minor road light repairs per day

Light type	Number of repairs per 8-hour day assumed		
	Repairs	Total time assumed per repair (minutes)[28]	Travel time per repair (minutes)[29]
MV80 (urban)	20	24.0	14.0
MV80 (rural)	16	30.0	20.0
T5 (urban)	15	32.0	22.0
T5 (rural)	12	40.0	30.0
LED 18W (urban)	20	24.0	14.0
LED 18W (rural)	16	30.0	20.0

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

Table 4–8: Percentage of light repairs

Component	MV80 and T5 lights		LED18 lights	
	Previous and current regulatory periods	Next period	Previous and current regulatory periods	Next period
Lamps	60.0%	70.0%	n/a	n/a
PE cells	50.0%	85.0%	50.0%	50.0%
Luminaires	15.0%	5.0%	15.0%	15.0%
Other	10.0%	21.0%	10.0%	10.0%

4.3.4.5 Pole inspections performed in a day

The public lighting model for the current regulatory period assumes a dedicated pole inspection rate of 37 poles in a day. Analysis of our records indicates about 30 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 or less if excavation is required.

Our asset management records, as at 2024, indicate that on average about 30 poles can be inspected in an 8-hour day. Therefore, we have assumed the number of dedicated pole inspection rate to 30 poles in a day for the next regulatory period.

We have also updated the assumed proportion of lights on dedicated poles to 41% (up from 33.6%) and lowered our inspection unit costs for crew and vehicles as reflected in our records.

[28] Eight hours multiplied by 60 minutes and divided by the number of repairs.

[29] Travel time is the total time assumed per repair less 10 minutes.

4.3.4.6 Light failure rates

We have updated the assumed failure rate of lights and lamps for MV80 and T5 lights to reflect more recent information. Table 4–9 shows the forecast for minor road light failures for the previous and current regulatory periods and those proposed for the next regulatory period.

Table 4–9: Failure rate of minor road public lights

Type of light	Previous regulatory period (2016–21)	Current regulatory period (2021–26)	Next regulatory period (2026–31)
MV80			
Lights (until bulk change)	25.6 %	17.0%	13.2%
Lamps (per year)	6.4%	4.3%	3.3%
T5			
Lights (until bulk change)	11.4 %	32.3%	10.8%
Lamps (per year)	2.9%	8.1%	2.7%
LED18			
Lights (until bulk change)	10.0 %	9.9%	9.9%
Lamps (per year)	1.3%	1.2%	1.2%

(1) The failure rate for MV 80 and T5 lights are for the period before the bulk lamp change period of 4 years. The failure rate for LED18 lights is for the period before the bulk PE cell change period of 8 years.
(2) The annual failure rate for lamps over the previous and current regulatory periods were calculated by dividing the failure rate until bulk change by the number of years before bulk lamp change. The annual failure rates for the next regulatory period were calculated by dividing the average number of failures per year by the population of lights.

4.3.4.7 Light locations

We propose updating the assumed split of lights between urban and rural areas for our S-HP 150, S-HP 250, T5, and LED 70W lights to better reflect our current records. Our proposed split is set out in Table 4–10.

Table 4–10: Assumed location of lights

Light	Urban		Rural	
	Current regulatory period	Next period	Current regulatory period	Next period
MV80	97.0%	97.0%	3.0%	3.0%
S-HP 150	95.0%	89.8%	5.0%	10.2%
S-HP 250	92.0%	87.9%	8.0%	12.2%
T5	92.0%	85.5%	8.0%	14.5%
LED 18W	92.0%	92.0%	8.0%	8.0%
LED 70W	95.0%	58.0%	5.0%	42.0%

4.3.5 Volume forecast

JEN's forecast volume of lights reflects the expected growth over the next regulatory period and our replacement program, which was discussed in the previous section. The forecast volumes of lights by type are shown in Table 4–11 and Table 4–12.

This shows that legacy lights are forecast to be progressively replaced with energy efficient lights, either when replaced upon fault or as part of the LED roll-out. It also shows that energy efficient T5 and compact fluoro lights are replaced by LED lights over the period, especially 18W LEDs (and variants).

A more detailed breakdown of these volumes into the changes from one year to the next are included in the 'Forecast Volumes' sheet of PTRM inputs model (Attachment Att 11-06M).

Table 4–11: Forecast light volumes summary (number)

Description of lights	FY27	FY28	FY29	FY30	FY31
Opening balance	82,777	84,326	85,841	87,353	88,859
Add new lights					
JEN funded	396	0	0	0	0
Customer funded	1,153	1,515	1,512	1,506	1,503
Add replacement lights					
JEN funded fault replacement	7,130	6,436	5,497	5,369	5,784
JEN funded LED roll-out	0	0	0	0	0
Customer funded LED roll-out	5,031	12,634	13,821	6,218	0
Remove disposed lights					
Faults	(7,130)	(6,436)	(5,497)	(5,369)	(5,784)
JEN funded LED roll-out	0	0	0	0	0
Customer funded LED roll-out	(5,031)	(12,634)	(13,821)	(6,218)	0
Closing balance	**84,326**	**85,841**	**87,353**	**88,859**	**90,363**

Table 4–12: Forecast closing balance of lights by light types (number)

Description of lights	FY27	FY28	FY29	FY30	FY31
Legacy lights					
Mercury Vapour 50 watt	1	1	1	0	0
Mercury Vapour 80 watt	3,502	2,066	538	0	0
Mercury Vapour 125 watt	42	19	0	0	0
Mercury Vapour 250 watt	25	6	3	0	0
Mercury Vapour 400 watt	42	26	8	0	0
Fluorescent 40 watt	10	5	1	0	0
Sodium High Pressure 100 watt	846	637	260	0	0
Sodium High Pressure 150 watt	13,301	10,231	4,237	0	0
Sodium High Pressure 250 watt	3,824	2,774	1,071	0	0
Sodium High Pressure 400 watt	300	283	139	0	0
Metal Halide 70 watt	6	3	0	0	0
Metal Halide 150 watt	73	48	12	0	0
Metal Halide 250 watt	14	7	1	0	0

Description of lights	FY27	FY28	FY29	FY30	FY31
Sub-total	**21,984**	**16,103**	**6,269**	**0**	**0**
Energy efficient lights					
T5 2X14W	14,794	5,097	6	0	0
T5 (2x24W)	367	69	0	0	0
Compact Fluoro 32W	134	91	37	0	0
Compact Fluoro 42W	177	78	0	0	0
LED 18W (incl. other standard Category P LED variants)	34,707	38,092	39,396	39,489	39,489
LED 70W	3,645	3,645	3,645	3,645	3,645
LED 118W, 155W, 162W	1,600	1,600	1,600	1,600	1,600
LED 275W	338	338	338	338	338
Sub-total	**55,762**	**49,010**	**45,022**	**45,073**	**45,073**
Council funded energy efficient lights					
LED 18W (incl. other standard Category P LED variants)	4,347	13,730	20,432	22,073	23,227
LED 70W	0	0	0	0	0
LED 118W, 155W, 162W	0	0	0	0	0
Sub-total	**6,580**	**20,729**	**36,061**	**43,785**	**45,289**
Total	**84,326**	**85,841**	**87,353**	**88,859**	**90,362**

4.4 Forecast revenue

Our proposed forecast revenue for the next regulatory period is set out in Table 4–13. This is calculated within the public lighting PTRM (Attachment Att 11-05M) by combining the return on capital, return of capital, operating expenditure and net tax allowances into a single building block revenue forecast for that period.

We have then translated that revenue forecast into a smoothed revenue forecast by adopting X factors of 0% from 2027-28 onwards. Our proposed 2026-27 prices are back solved so that the NPV of the smoothed and building block revenue is the same. These prices are shown in Appendix A.

Table 4–13: Forecast revenue ($Million, nominal dollars)

Component	2026/27	2027/28	2028/29	2029/30	2030/31	Total
Return on capital	1.08	1.49	1.86	2.20	2.50	**9.14**
Return of capital	0.50	0.83	0.99	1.14	1.28	**4.74**
Operating expenditure	4.73	4.57	4.18	3.52	3.15	**20.15**
Net tax allowance	0.02	-	-	-	-	**0.02**
Building block revenue	6.34	6.89	7.03	6.87	6.92	**34.05**
Smoothed revenue	**7.99**	**7.70**	**6.91**	**5.91**	**5.24**	**33.76**
X-factors	n/a	0.00%	0.00%	0.00%	0.00%	**n/a**

(1) Expenditure is in nominal dollars.
(2) Operating expenditure includes an allowance for debt raising costs.

4.5 Relative price impacts

We have modelled the OMR prices across the three light classes; these include Legacy Lights and Energy Efficient Lights, which exist in the current regulatory period, and Customer Funded rollout lights, which have been introduced in the next regulation period. We group charges into these three classes as they are homogeneous and reflect the distinct levels of timing and of investment made by our public lighting customers into the public lighting system. Grouping in these three categories reduces the potential for cross-subsidisation of costs between public lighting customers.

If the public lighting volume of any public lighting asset class falls below 20% in the next regulatory period, we will rebalance our tariffs across all classes to recover the residual asset value of past investments made by JEN. This is the same principle is afforded to other elements of DNSP's regulatory proposal, including standard control services and Vic AMI metering services.

The indicative price change across each class of light is outlined in Table 4–14 below.

Table 4–14: Indicative price change (Percent, Nominal)

	FY26	FY27 to FY31
Legacy Lights	1.3%	2.5%
Energy Efficient Lights	43.2%	2.5%
Customer Funded rollout lights	-10.1%	2.5%

Prices across these three lighting classes change significantly in the first year of the next regulatory period. The key drivers for this include:

- Legacy Lights
  - The declining population, relatively low unit costs and low remaining asset value results in a relatively lower asset value to recover.
- Energy Efficient Lights
  - Replacing all legacy lights when attending site results in an acceleration of the replacement capital expenditure for the three years of replacing legacy lights with LED lights.
  - The accelerated rollout cost is compounded by a higher unit cost per luminaire and installation of the SLV devices relative to lights in the legacy category.
- Customer Funded rolled-out lights
  - Capital expenditure for this category is very low as all new light installations are gifted to JEN.

Appendix A
Current and proposed public lighting OMR charges

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. However, if the public lighting volume of any public lighting asset class falls below 20% in the next regulatory period, we will rebalance our tariffs across all classes.

Table A1–1: Proposed indicative public lighting OMR charges for the next regulatory period (nominal dollars)

Light Type	FY27	FY28	FY29	FY30	FY31
Legacy lights					
Mercury Vapour 50 watt	82.16	84.21	86.32	88.47	90.69
Mercury Vapour 80 watt	65.74	67.38	69.07	70.79	72.56
Mercury Vapour 125 watt	96.62	99.04	101.51	104.05	106.65
Mercury Vapour 250 watt	138.87	142.34	145.90	149.54	153.28
Mercury Vapour 400 watt	156.21	160.12	164.12	168.22	172.43
Sodium High Pressure 100 watt	195.33	200.22	205.22	210.35	215.61
Sodium High Pressure 150 watt	142.59	146.16	149.81	153.56	157.39
Sodium High Pressure 250 watt	144.64	148.26	151.96	155.76	159.66
Sodium High Pressure 400 watt	192.38	197.19	202.12	207.17	212.35
Metal Halide 70 watt	168.94	173.16	177.49	181.93	186.47
Metal Halide 150 watt	316.55	324.46	332.57	340.89	349.41
Metal Halide 250 watt	310.99	318.77	326.73	334.90	343.28
Fluorescent 40 watt	82.16	84.21	86.32	88.47	90.69
Energy efficient lights					
T5 (2 x 14 W)	115.73	118.62	121.59	124.63	127.74
T5 (2 x 24 W)	130.33	133.59	136.93	140.35	143.86
Compact Fluoro 32W	109.73	112.47	115.28	118.17	121.12
Compact Fluoro 42W	109.73	112.47	115.28	118.17	121.12
LED 18W (incl. other Category P LED variants)	56.71	58.13	59.58	61.07	62.60
LED 70W	104.33	106.93	109.61	112.35	115.16
LED 118W, 155W, 162W	105.81	108.46	111.17	113.95	116.80
LED 275W	118.94	121.91	124.96	128.08	131.28
Self-funded energy efficient lights					
LED 18W (incl. other Category P LED variants)	35.59	36.48	37.40	38.33	39.29
LED 70W	65.48	67.12	68.79	70.51	72.28
LED 118W, 155W, 162W	66.41	68.07	69.77	71.52	73.31
LED 275W	74.65	76.51	78.43	80.39	82.40

Source: Attachment JEN – Att 11-05M ACS Public Lighting Model.

A2. Indicative 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, excluding GST)

Light Type	FY22[30]	FY23[31]	FY24[32]	FY25[33]	FY26 (estimated)[34]
Legacy lights					
Mercury Vapour 50 watt	72.35	72.41	75.39	79.46	81.10
Mercury Vapour 80 watt	57.88	57.93	60.32	63.58	64.89
Mercury Vapour 125 watt	85.08	85.15	88.66	93.45	95.38
Mercury Vapour 250 watt	119.09	121.02	127.38	133.69	137.07
Mercury Vapour 400 watt	133.97	136.14	143.29	150.39	154.20
Sodium Low Pressure 90 watt	128.48	130.70	138.61	145.49	149.19
Sodium High Pressure 100 watt	166.05	168.92	179.14	188.03	192.81
Sodium High Pressure 150 watt	121.21	123.31	130.77	137.26	140.75
Sodium High Pressure 250 watt	124.05	126.06	132.68	139.25	142.77
Sodium High Pressure 400 watt	164.99	167.66	176.47	185.21	189.90
Metal Halide 70 watt	148.75	148.88	155.01	163.39	166.76
Metal Halide 150 watt	269.08	273.74	290.30	304.71	312.46
Metal Halide 250 watt	266.71	271.03	285.27	299.40	306.98
Fluorescent 20 watt	72.35	72.41	75.39	79.46	81.10
Fluorescent 40 watt	72.35	72.41	75.39	79.46	81.10
Fluorescent 80 watt	72.35	72.41	75.39	79.46	81.10
Incandescent 100 watt	90.29	90.37	94.09	99.18	101.22
Incandescent 150 watt	112.86	112.96	117.61	123.97	126.52
Energy efficient lights					
T5 (2 x 14 W)	61.61	65.61	72.52	77.18	80.83
T5 (2 x 24 W)	69.38	73.89	81.67	86.92	91.03
Compact Fluoro 32W	58.41	62.21	68.76	73.18	76.64
Compact Fluoro 42W	58.41	62.21	68.76	73.18	76.64
LED 18W (incl. other Category P LED variants)	28.43	30.85	34.64	37.37	39.61
LED 70W	53.61	57.78	64.48	69.17	72.87
LED 118W, 155W, 162W	54.17	58.47	65.32	70.12	73.91

30 JEN, Schedule of charges effective from 1 July 2021 to 30 June 2022.

31 JEN, Schedule of charges effective from 1 July 2022 to 30 June 2023.

32 JEN, Schedule of charges effective from 1 July 2023 to 30 June 2024.

33 JEN, Schedule of charges effective from 1 July 2024 to 30 June 2025.

34 We estimated the 2025-26 prices by rolling forward the 2024-25 actual prices by the allowed X factor and estimated inflation to December 2024 (of 2.6%).

Light Type	FY22[30]	FY23[31]	FY24[32]	FY25[33]	FY26 (estimated)[34]
LED 275W	59.14	64.52	72.67	78.50	83.07