

Western Power's Fifth Access Arrangement Review

Submission to the
Economic Regulation
Authority

Acknowledgement

The WA Local Government Association (WALGA) acknowledges the Traditional Owners of the land and pays respects to Elders past and present.

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About WALGA

The Western Australian Local Government Association (WALGA) is the peak industry body for Local Government in Western Australia. The Association is an independent, membership-based organisation representing and supporting the work and interests of 138 Local Governments in Western Australia.

The Association provides an essential voice for over 1,200 elected members and approximately 22,000 Local Government employees as well as over 2.5 million constituents of Local Governments in Western Australia. WALGA also provides professional advice and offers services that provide financial benefits to the Local Governments and the communities they serve.

Western Power Network Access Arrangement 2022 – 2027 (AA5)

WALGA provided a submission in response to the Issues Paper published by the Economic Regulation Authority (ERA) on 4 March 2022.

This submission responds to an invitation from the ERA to provide input concerning the Draft Decision (9 September 2022) and Western Power's revised proposal (15 November 2022).

Street Lighting

1. Background

- Western Power provides services in all or part of 112 Local Government areas in the southwestern part of Western Australia.
- Western Power deploys five streetlighting technologies (Table 1).

Lighting Technology	Approximate Number of Installations	Percent of Installations
Mercury Vapour (MV)	132,000	46.8
Sodium (HPS & LPS)	60,000	21.3
Compact Fluorescent (CFL)	45,000	16.0
Metal Halide (MH)	21,000	7.4
Light Emitting Diode (LED)	24,000	8.5
TOTAL	282,000	100.0

Table 1: Approximate distribution of lighting technologies in the Western Power operated streetlight fleet. (Source: Western Power)

- Australia signed the Minamata Convention on mercury in October 2013, committing to refrain from acts that would defeat the object and purpose of the Convention. Australia ratified the Minamata Convention on 7 December 2021 which, amongst other commitments, places controls on manufacture and trade of products containing mercury, including many types of streetlight lamps, particularly MV lamps. Western Power has been well aware of these developments over the past decade.
- Following pilot testing, Western Power introduced CFL technology to replace MV lamps in new and replacement luminaires in residential streets from 2012.
- LED streetlight luminaires were introduced by Western Power in 2019. These luminaires have been installed in new developments, underground power project areas, customer (Local Government) funded projects and to replace failed luminaires. These luminaires with their imbedded LED lighting assemblies are provided to Western Power by specialist lighting manufacturers.
- The proposed Access Arrangement (AA5) published in February 2022 introduced the concept of retrofitting LED globes into streetlight luminaires that currently use a range of different lighting technologies. Apart from some examples in decorative, often historically significant lamp posts, WALGA has been unable to identify a similar, large-scale deployment of screw-in LED lamps in streetlights in any city globally. It is also understood that manufacturers are supplying the LED globe only, with Western Power responsible for compatibility with the existing luminaire proposed for retrofitting.

- Access Arrangement 2017 – 2022 (AA4) describes the streetlighting exit service:

An exit service combined with a connection service and a reference service (metering) at an exit point on the low voltage (415 volts or less) distribution system for the purpose of public streetlighting, plus the service of the provision and maintenance of the streetlighting assets.

These streetlighting assets are designed for the environment they will operate in with input from the user's customer of this service. The streetlighting design occurs in accordance with the applicable streetlighting design standards (including AS/NZS 1158 and AS/NZS 60598) and regulatory requirements at the time of installation.

Western Power will maintain the streetlighting assets to ensure that the streetlighting exit service continues to be provided to design levels. Western Power will:

- *Inspect the streetlighting poles for structural and electrical integrity consistent with good electricity industry practice and relevant standards.*
- *Replace and reinforce the streetlighting poles consistent with good electricity industry practice and relevant standards.*
- *Repair the streetlighting assets including where damage occurs by third parties.*
- *Provide emergency response to incidents involving the streetlighting assets.*
- *Replace or repair the streetlighting lamps, luminaires, control equipment and supply wiring upon failure, damage or at the end of their serviceable life.*
- *Replace or repair the underground streetlighting supply cables and overhead conductors upon failure, damage or at the end of their serviceable life.*
- *Replace or repair the lamps and luminaires where upon investigation the lumen output no longer meets design levels.*
- *Provide a call centre and online facility to receive streetlighting fault information from the public and the user's customer of the exit service (typically the relevant local government authority).*
- *Maintain an inventory of the streetlighting assets to which the exit service applies including the date of installation of each asset, the type of asset, rated power and the location of the asset.*
- *Respond to questions from the user's customer of the exit service (typically the relevant local government authority) about in-service inventory within 20 working days.*

2. Matters in Contention

The Economic Regulation Authority (ERA) draft decision published September 2022 requires Western Power provide evidence that the proposed reactive replacement of failed globes with screw-in LED lamps will meet current streetlighting standards and has the lowest life-cycle costs.

2.1 Lighting Performance

Western Power has provided confidential information assessing the proposed replacement LED lamp against criteria for:

- height, length, and general geometry (can it be fitted into the luminaire);
- lumen output;
- directionality of light output;
- heat produced by lamp;
- weight of lamp;
- availability; and
- history of use in Australia.

In its submission to the ERA Western Power claims “equivalence of the lighting profile was a requirement of Western Power’s tender for the supply of LED globes”. It has subsequently been confirmed that the lighting performance of the proposed LED globes within the proposed luminaires has not been assessed. Only the gross lumen output of the lamp and directionality of the light was considered.

Streetlight luminaires use internal reflectors and visor indentations to provide a spread of light to achieve design outcomes. The source centre of the light and obstructions are important in determining the effectiveness of the light. Some LED lamps are designed with significant parts that light will not pass through which potentially impacts the light output and its distribution.



Figure 1: An example of an LED lamp with extensive parts that will not allow light to pass through.

It is not possible to determine the lighting performance of a luminaire with a retrofitted LED lamp based only on lumen output, light directionality and shape. Full scale testing is required that is equivalent to what manufacturers would supply with a purpose-built LED lamp and luminaire assembly.

Additionally, characteristics such as the colour temperature of the light produced significantly impact on the performance of the lighting solution.

Community expectations regarding streetlighting include:

- adequacy of lighting for the situation;
- absence of spill lighting (onto private property);
- minimal glare;
- even light distribution;
- minimal impact on fauna;
- minimal impact on night skies as set out in the WA Planning Commission Position Statement: [Dark sky and Astrotourism \(January 2022\)](#).

It is critical that the streetlighting service standards provided in AA5 recognise that the community expectations are more than just every installed streetlight is on at night.

2.2 Service Expectations

Streetlighting is provided to:

- improve safety for all road users including pedestrians, cyclists and eMobility users;
- increase security and reduce street crime; and
- improve night time amenity of public places.

Local Governments recognise that existing pole spacing of legacy installations may constrain the achievement of lighting that meets current minimum lighting of the roadway requirements set out in the Australian Standards. While it is agreed that it will not be widely cost effective to relocate poles just to improve lighting levels on the roadway, the choice of luminaires and lamps determines performance against important criteria including upward light ratio, luminous intensity and discomfort glare. Values for these lighting performance criteria are set out in AS1158 and AS4282. These considerations assess the quality of lighting provided, and its externalities including spill, glare and up lighting. The customer expectation is that changes made, including installing new lamps or new luminaires, must lead to an outcome closer to the Australian Standards than what previously existed.

The Reference Service description must be as clear as possible and operational policies must be aligned with this. The Reference Service specifies that Western Power replaces or repairs lamps and luminaires. It relies on advice from the public to monitor performance of the lighting service, specifically in relation to faults. The proposed amendments to the Reference Service Description clarify that Western Power is in the best position to effectively respond to public complaints in relation to the adequacy of, or excessive (nuisance) lighting. The complaints will primarily arise when the lighting has not been maintained (typically reported as inadequate lighting) and when new (potentially inappropriate) lights are installed. During AA4 all matters relating to inadequate or excessive lighting have been referred to Local Governments. The proposed amendment of the Reference Service Description includes responding to these types of complaints (not referring them to Local Governments).

If the Reference Service description is to refer to the Lighting Standards prevailing at the time of installation this assumes that the date of installation is known and would potentially undo investments made by the user's customer (Local Governments) over time, to improve the standard of lighting provided (for example installing additional lights or installing higher light output luminaires).

Recommendation

The Reference Service A9 in AA5 must include a requirement that:

- any change impacting on streetlighting (such as replacing globes, replacing luminaires, relocating or replacing poles etc) must result in an outcome that is more closely aligned to the latest, relevant lighting standard for that particular type of road than previously existed; and
- Western Power is responsible for effectively dealing with public complaints about inadequate or excessive lighting, where the light output is different from the original design standard.

Reference Service Name:	Reference Service A9 – Streetlighting Exit Service
Reference Service Description:	<p>An <i>exit service</i> combined with a connection service and a <i>reference service (metering)</i> at an exit point on the low voltage (415 volts or less) distribution system for the purpose of public streetlighting, plus the service of the provision and maintenance of the streetlighting assets.</p> <p>These streetlighting assets are designed for the environment they will operate in with input from the user’s customer of this service. The streetlighting design occurs in accordance with the applicable streetlighting design standards (including AS/NZS1158 and AS/NZS 60598) and regulatory requirements at the time of installation.</p> <p>Western Power will maintain the streetlighting assets to ensure that the streetlighting exit service continues to be provided to design levels. Western Power will:</p> <ul style="list-style-type: none"> • Inspect the streetlighting poles for structural and electrical integrity consistent with good electricity industry practice and relevant standards. • Replace and reinforce the streetlighting poles consistent with good electricity industry practice and relevant standards. • Repair the streetlighting assets including where damage occurs by third parties. • Provide emergency response to incidents involving the streetlighting assets. • Replace or repair the streetlighting lamps, luminaires, control equipment and supply wiring upon failure, damage or at the end of their serviceable life. • Replace or repair the underground streetlighting supply cables and overhead conductors upon failure, damage or at the end of their serviceable life. • Replace or repair the lamps and luminaires where upon investigation the lumen output no longer meets original minimum design levels. • Provide a call centre and online facility to receive streetlighting fault information from the public and the user’s customer of the exit service (typically the relevant local government). • Resolve complaints from the user’s customers and the public regarding nuisance and inadequate lighting arising from the maintenance of, or lack of maintenance of streetlights. • Maintain an inventory of the streetlighting assets to which the exit service applies including the date of installation of each asset, the type of asset, rated power and the location of the asset. • Respond to questions from the user’s customer of the exit service (typically the relevant local government) about in-service inventory within 20 working days.
Eligibility Criteria:	<p>Users are eligible to use this service if:</p> <p>The streetlight is a Western Power streetlight; and</p> <p>Each of the following does not apply under an agreement with Western Power:</p> <p>The tariff that determines the charge is different to the Applicable Reference Tariff for this service; or</p> <p>The user is to receive delivered electricity at a service standard different to the Applicable Service Standard Benchmarks for this service.</p>
Applicable Reference Tariff:	“RT9” in the applicable Price List published in Appendix F of the access arrangement.
Applicable Standard Access Contract:	“Electricity Transfer Access Contract” published in Appendix A of the access arrangement.
Applicable Service Standard Benchmarks:	As set out in sections 4.2 and an amended Section 4.4 of the access arrangement.

2.3 Efficient (cost effective) Streetlight Service Provision

The November 2022 revised Proposed Access Arrangement responds to the ERA request to demonstrate that screw in LED globes provide the most efficient solution by providing the information summarised in Table 2.

	Assumed Life	Cost per installation	Cost over 20-year life
Base Case	5 years	\$313	\$1,252
Screw in LED Globes	10 years	\$341	\$682
Replacement LED Luminaires	20 years	\$866	\$866

Table 2: Comparison of unit rates and service life of streetlight replacement options (from Western Power Table 5.24 p87)

This table is claimed by Western Power to be the basis of the conclusion that screw-in LED globes offer the lowest cost option. Sensitivity of the conclusions to key assumptions is not tested. At least one of the recommended LED globes (18W) is reported to have a 25,000 hour / 5 year life. Depending on the cost of the lamp and its installation, this may impact on the relative cost effectiveness of the proposed approach.

It is WALGA’s view the additional supporting evidence that LED globes provide the lowest lifecycle cost, consistent with the Draft Decision required amendment, has not been adequately demonstrated. It is WALGA’s view that a comprehensive lifecycle cost analysis of the options that are available, including sensitivity analysis to key assumptions is required. Some of the important factors and assumptions that must be considered are identified below.

Assumed Life

Heat has a major impact on the life of an LED globe. Ensuring that there is adequate heat dissipation within a weather sealed luminaire (that previously held a gas discharge globe) is potentially difficult to achieve. Western Power’s testing report concludes that in-field monitoring of heat behaviour is important but no evidence of the results of that testing have been provided. If heat build-up results in the life of the screw-in LED globe falling from the estimated 10 years to 7 years, then the cost over 20-year life would be \$974 or around 12% higher than using a new LED luminaire. If the LED globe life is shorter, then the life-cycle cost of this option is even higher.

Commercial information has not been provided. However, it should be noted that LED streetlight luminaires are typically provided with a 10-year manufacturer’s warranty. It is not known what warranty if any is provided on LED lamps.

Cost of Luminaire Repairs or Adjustments

The proposed LED globes require the IP rating of the luminaire with a visor. If the visor is absent, which is not uncommon, there is a possibility of moisture entering the LED arrays in the lamps and/or that the cooling air passages become blocked or electrically shorted. The cost of replacing the visor and seal must be included when considering the economic viability of installing an LED globe. If fitting of an LED globe requires that a

shield also be fitted, then this cost should also be considered in determining if this is the most effective solution.

Residual Values

The revised Proposed Access Arrangement identifies that 70% of luminaires are less than 20 years old and therefore any replacement with a new luminaire would trigger an asset write-off. A more detailed examination by luminaire type indicates that 40% of MV luminaires are currently more than 20 years old and therefore have no residual value and that this increases to 55% of MV luminaires (all other things remaining unchanged) by the end of AA5.

2.4 Billing and Asset Management

If adopted, the proposed policy to install screw in LED globes into existing luminaires will require the creation of up to 16 new services with associated regulated (Z) tariffs. The cost stack for these new products should reflect reduced energy consumption, use of system and maintenance costs relative to the old lamp type; partly offset by the higher initial cost of the lamp compared to the one replaced.

The Western Power revised, proposed Access Arrangement, published 15 November 2022 does not identify any additional streetlighting products or the calculated cost stack for those products. This is critical information to assist the customer assess the value of the proposition.

Synergy has advised that engagement with Western Power about potential new products (such as a MV luminaire holding an 18 watt or 28 watt LED globe) has commenced but that due to the system changes required it is unlikely new products can be billed before mid-2024. Assuming a typical five-year life of a streetlight globe, 20% of lights would be replaced each year. This indicates that by the time accurate billing for the proposed new product can commence, 40% of non-LED lights, equating to over 100,000 lights will be incorrectly billed at a higher cost to Local Governments and subsequently rate payers each month.

Local Governments are interested in both the cost of streetlighting services, and the Scope 2 greenhouse gas emissions associated with lighting. Consequently, it is critical that accurate records are maintained in the streetlight database as each luminaire may include a different lamp.

Currently Western Power is proposing to offer a service that cannot be billed and will be overcharging Local Governments each time a LED globe is installed in an old luminaire. This must be effectively resolved as soon as possible.

3. A Way Forward

The Association recognises that screw-in LED globes may be the most cost-effective solution in some specific situations.

The ERA is urged not to accept the proposed LED globe installation at this time as the solution:

- Has not been demonstrated to provide lighting compliant with relevant Australian Standards including AS/NZS1158 and AS/NZS60598;
- Has not been demonstrated to provide a cost effective solution given the simplistic modelling approach; and
- Indicatively provides a marginal cost advantage over alternatives with higher uncertainty and risk.

Recommendation

Before proceeding with the LED globe strategy, Western Power should be required to provide independent verification that the proposed LED globes installed in the range of luminaires provides lighting performance that is at least equal to the performance of the existing lighting relative to each of the measures set out in the relevant Australian public lighting standards.

That Western Power transparently develop and apply a methodology to determine which situations justify the use of a screw in LED globe.

In conjunction with Synergy, Western Power should be required to develop and demonstrate how customers will be accurately billed and provided with accurate energy consumption (for Scope 2 greenhouse gas emissions accounting purposes) information when screw in LED globes are used.

Once these preconditions have been established, then the solutions need to be evaluated in the field (potentially trial locations) to verify that the performance assumptions are achieved. The data and analysis undertaken should be shared with the customers.

Customers should be engaged in the development of the **Western Power Public Lighting Strategy**, it should be regularly updated as pricing and technology changes and should be public.

4. Cost Allocation

In developing the cost model Western Power shows the proposed total recovery of efficient costs of \$345 million over AA5 from streetlight customers (from Access Arrangement Table 3.8) over the following cost pools.

Cost Pool	Customer Class Streetlights	Percent of Total
Low Voltage Asset costs	\$11 m	3.2
Metering cost of service	\$51 m	14.8
Streetlight cost of service	\$143 m	41.4
Administration	\$140 m	40.6
TOTAL	\$345 m	100.0

4.1 Metering Cost of Service

The total metering costs of \$266 million over AA5 have been allocated between customer classes on the basis of share of total number of connections. This seems illogical in the case of streetlights as they are not metered at all, and so should not be allocated a share of metering costs.

4.2 Administration Costs

Western Power proposes that Administration Costs of \$731 million over AA5 are allocated on the basis of number of connections, resulting in 19% of Administration costs being allocated to a customer class (streetlights) that delivers 2% of distribution revenue. This seems completely out of proportion. It is recommended that each Local Government be considered one connection from the perspective of allocating Administration Costs.

4.3 Use of System

The Access Arrangement proposed by Western Power sets out the calculated and forecast energy consumption of streetlights (Table 3)

Streetlight Energy Consumption (GWh per year)		
	AA5 Proposed April 2022	AA5 Proposed November 2022
2023/24	143	138
2024/25	146	140
2025/26	149	142
2026/27	153	144

WALGA calculations estimate that if all existing Western Power streetlights were replaced with the currently recommended LED luminaire for that application, streetlight energy consumption would be reduced by around 30% to approximately 100 GWh/yr. This would be partly offset by the forecast 2% per year growth in the number of streetlights. Energy consumption forecasts would be slightly higher if less energy efficient screw-in LED lamps are installed rather than LED luminaires. Nevertheless, given that the expected life of non-LED lamps is of the order of five years, the transition to LED globes and/or LED luminaires should result in a reduction in energy consumption over the coming five years and a corresponding reduction in the use of system costs applied to streetlighting.

Recommendation

The ERA should require Western Power to provide the building block costs making up a proposed price schedule for each luminaire – lamp combination for the period to 2027/28 to illustrate the impact of technology choice on the streetlight tariff (which is ultimately set by Government through Synergy).

5. Streetlight Repair Time for Cable Faults

Local Governments have identified that the service standards measurement approach does not adequately encourage Western Power to repair streetlight cable faults that typically result in failure of multiple adjacent lights. Not uncommonly these are observed on roads with high traffic volumes, introducing significant road safety risks.

The current measures encourage simple lamp replacements to be prioritised. It is unclear whether the repair times for cable faults are included in the streetlight repair time as currently measured.

Recommendation

That in addition to the current street lighting repair time measures (Metropolitan and Regional) that a new measure of timeliness to repair streetlights with cable faults be added as follows:

Σ Number of business days to repair each streetlight with cable fault

Number of streetlights with cable faults repaired

The definitions of days and areas are to be consistent with existing measures.

The “faulty streetlight” definition would be changed for this measure to include only fault reports identifying a cable fault.

The service standard benchmark for streetlight cable fault repairs should be:

Region	For each financial year ending 30 June
Metropolitan area	10 business days
Regional area	20 business days

6. *Unmetered Supply (RT10)*

There are approximately 20,000 unmetered connection points to the network, many of which are for Local Governments.

The Revised Proposed Access Arrangement sets out that, “any unmetered supply point who connects with facilities and equipment deemed to be associated with streetlights will be placed on the streetlight tariff rather than this tariff.” (page 53)

It is not appropriate that the streetlight tariff, that largely reflects the return on capital and depreciation of a Western Power owned asset, and costs of maintenance undertaken by Western Power, would apply to an asset owned and maintained by a Local Government. It needs to be clarified what this means in practice.

Currently the standard operation to de-energise and re-energise an unmetered supply requires application through the full design process, which is not efficient for Local Governments or Western Power.

Recommendation

A Reference Service to De-energise and Re-energise Unmetered Supply should be added, and efficient pricing regulated.