Analysis of Essential Energy Proposal to the Australian Energy Regulator (AER)

Submitted to
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by
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2 Introduction

This report has been commissioned by the Central New South Wales Regional Organisation of Councils (CENTROC) on behalf of other Regional Organisations of Councils (ROCs) including Riverina Eastern Regional Organisation of Councils (REROC), Riverina and Murray Regional Organisation of Councils (RAMROC) South East Regional Organisation of Councils (SEROC), Mid North Coast Regional Organisation of Councils (MIDROC) and Northern Rivers Regional Organisation of Councils (NOROC) and of course the Councils they represent, which are outlined in Appendix 2.

Strategic Lighting Partners Ltd (SLP) has been commissioned to analyse Essential Energy's "Public Lighting Proposal" to the Australian Energy Regulator (AER) identified as "Attachment 8.1" dated May 2014. Essential Energy's proposal to the AER submits that Essential Energy should increase its charges to the 100 Local Governments[1] using public lighting serviced by Essential Energy by 67% (incorrectly calculated as 64% and reported as 62% in their submission[2]) from $9.1 million in 2013-2014 to $15.3 million for the 2015-2016 year. However, according to Essential Energy spreadsheets the difference in Operational Costs that Essential Energy is proposing across all 100 Councils is an *average* of 94% more than the actual costs charged in 2013-14[3].

SLP's task is to identify whether these increases are justified, based on the information provided by Essential Energy and the relevant ROCs and Councils, together with SLP's international and Australasian experience and knowledge of the public lighting industry.

This report identifies the major issues for councils in the Essential Energy public lighting service area to consider for their submission to the AER. More detailed "second order" issues are located in the Appendices together with the terms of reference and SLP consultant profiles.

2.1 Disclaimer

The very limited time available to SLP to undertake this exercise has been insufficient. The large amounts of raw data and information to analyse in the short time available has been challenging. The important information gaps identified and further requests from Essential Energy have also been challenging for all parties. The compressed time frame has been unsatisfactory for respondents and the public interest served by the AER.

This work was nevertheless performed with due care and in accordance with professional standards. However, the views expressed in the document are solely those of Strategic Lighting Partners Ltd. Any representation, statement, opinion or advice, expressed or implied in this publication is made in good faith but on the basis that Strategic Lighting Partners are not liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement or advice referred to here.

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[1] Excluding the four State Government Authorities of Queensland Department of Transport, NSW Trade and Investment, NSW Roads and Traffic Authority and the NSW State Rail Authority.

[2] Essential Energy's submission compares proposed 2016 revenue with *2015 proposed* revenue instead of ***2014 actual*** revenue. This same mistake applies to the model for all 104 individual organisations using public lighting.

[3] This figure is calculated from Essential Energy's spreadsheet called "Attachment 8.2 FY16 19 Councils Impact FY2016.xlxs". The total opex charges (excluding capex charges) of $12,737,113 are proposed for the 2015-16 year. In 20013-14 actual total public lighting costs (including capex charges) were $9,077,045. Without more information, to get an estimate of the actual opex costs paid, the proposed 2014-15 capex figure of $2,527,933 is used. When this is subtracted from the total $9,077,045 the actual opex estimated for 2013-14 is $6,549,112. Thus the proposed opex of $12,737,113 is 94% greater than the 2013-14 estimated opex of $6,549,112.

3 Executive Summary

Strategic Lighting Partners Ltd has analysed the Essential Energy Public Lighting Proposal - Attachment 8.1 for the 2015/2019 regulatory period. SLP concludes that Essential Energy's proposal to increase total public lighting costs by an average of 67% (total $6.2 million) or 94% (operating $6.5 million) across all councils is not justified on the evidence presented.

The limited time available to complete this report has been inadequate to analyse the large quantity of information, making it also very difficult to identify key areas of information deficiency.

Technology delays

Despite rapid acceptance of LED lighting worldwide, and to a lesser extent in Australia, Essential Energy appears to have no plans in place to replicate the mass deployments that are occurring elsewhere to take advantage of the more than 50% savings in both energy and maintenance offered by LED lighting.

For example, the replacement of 140,000 streetlights with LED was completed in mid 2013 in the City of Los Angeles resulting in a 63% energy saving. Greater savings are possible with the use of intelligent lighting control systems, but the evidence shows that Essential Energy has not acknowledged the opportunities of this major technology revolution, which would have substantial cost reducing impacts for its captive customers.

Councils in Essential Energy's region have tried to convince Essential Energy to convert to LED, and in one case installed their own small fully functional LED street lighting network in frustration with the lack of progress.

Essential Energy is requesting large increases but at the same time it has made virtually no progress towards technologies that would save its customers equally large sums of money. This omission is in contradiction to Essential Energy's Statement of Corporate Intent as well as not being in the New South Wales public interest.

NSW Public Lighting Code

Council feedback from Essential Energy's claimed compliance with the New South Wales Public Lighting Code of 2006 is unenthusiastic at best, and at worst, dissatisfied. Probably the greatest source of dissatisfaction is the lack of meaningful knowledge provided by Essential Energy whose "reports" are more like "data dumps" lacking interpretation or advice.

AER compliance

The evidence presented raises serious doubts about whether Essential Energy has been in compliance with AER requirements including whether Bulk Lamp Replacement programmes are consistently applied across the region over the last four years. Other significant observations include an almost three times greater failure rate for 70W HPS lamps (14% vs 4% to 5% industry standard) and extraordinarily low productivity for remote lamp replacements (14 versus Victoria's 51 replacements per day) and in a sample of 4 rural councils analysed by SLP, about half of all spot replacements were completed within one to two days instead of eight days, strongly suggesting that Essential Energy's maintenance practices are not efficient.

In addition Essential Energy's proposal to increase a charge for corporate overheads from 0% to 41% has not been justified other than on the basis of its own general policy. In contrast to the AER, Essential Energy also rejects the need to benchmark against other DNSPs. The reason given is that it is unique in its low density network, but the AER went to significant effort in 2009 to demonstrate and subsequently reject, Essential Energy's claim for increased costs at that time.

The evidence presented does not achieve the transparency required for a monopoly service that is requesting dramatic increases of 67% average total, or 94% average operating expenses, for its public lighting services to captive customers.

SLP recommends that CENTROC and its allied Regional Organisations of Councils strongly reject Essential Energy's proposals for public lighting.

4 Background

Essential Energy[4] has responsibility for about 150,000 public lights. As a regulated monopoly, Essential Energy comes under the oversight of several statutory State and Commonwealth organisations. In common with all three New South Wales electricity network companies (called Distribution Network Service Providers or DNSPs), Essential Energy is required to efficiently price its public lighting services in order to ensure that existing *and future* users of that service receive an appropriate level of lighting service at a fair, appropriate and "efficient" cost. This means that pricing has to be neither too low, meaning that future users will receive an inferior service or experience sudden price rises or require cross-subsidisation from other services, nor too high, potentially allowing Essential Energy to engage in subsidisation of other classes of service it provides at the expense of public lighting users.

The Australian Energy Regulator (AER) was established in 2005 and was made responsible for DNSP pricing two years later. DNSPs are required to present to the AER a Public Lighting pricing model to cover a 5-year period. Essential Energy submitted its proposal (Attachment 8.1 Public Lighting Proposal) to the AER in May 2014, for the 5 year period ending 30th June 2019. This proposal is the subject of public consultation until 8 August 2014. This document is Strategic Lighting Partners (SLP) Ltd's analysis for the preparation of a submission to that proposal on behalf of a group of Regional Organisations of Councils in New South Wales as identified in the introduction above.

4.1 Essential Energy obligations

In simplified terms Essential Energy is required to comply with the following obligations, listed in order of statutory oversight:

i. National Electricity Laws (NEL) set by the Commonwealth Government;

ii. National Electricity Rules (NER) set by the Australian Energy Market Commission (AEMC);

iii. Determinations made by the Australian Energy Regulator (AER) whose guiding principles are set by the NEL and NER;

iv. In the case of Public Lighting[5], the AER makes determinations (alongside those for all other "Control Services" or electricity network services) referred to as "Regulatory Determinations" for 5-year "Regulatory Periods". The last determination[6] was made in April 2009[7] with which Essential Energy was required to comply. Essential Energy's 2014 proposal is their suggested plan to replace the last AER determination, and this document is SLP's analysis for submissions on that proposal and of their compliance with the last AER determination;

v. New South Wales Public Lighting Code administered by the NSW Department of Resources and Energy. This is a voluntary code, but there would need to be substantial public interest reasons for it not to be followed. Essential Energy states that it is in full compliance with this code and this submission therefore comments on that compliance;

vi. New South Wales reform programme to extract $2.8 billion from DNSPs through several actions, including having a single Board of Directors and Chief Executive for all three DNSPs to encourage implementation of efficiencies across the whole State.

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4 Previously known as "Country Energy" and thus abbreviated to "CE". Note that a significant amount of Essential Energy public documentation still refers to "CE" or Country Energy.

5 A class of service called "Alternate Control Services" by the National Electricity Rules.

6 "New South Wales distribution determination 2009–10 to 2013–14" published on 28th April 2009 by the AER

7 With a modification to it made by the Australian Competition Tribunal which increased the Weighted Average Cost of Capital (WACC) from 8.78% to 10.02% in April 2010.

vii. Essential Energy's Statement of Corporate Intent (SCI)[8]. This is effectively a shareholders' agreement between Essential Energy's shareholding Ministers (NSW Minister for Finance and Services, and Treasurer for NSW) and Essential Energy's Board of Directors represented by its Chairman and Chief Executive.

viii. The above SCI requires Essential Energy to write and implement strategic plans in various areas that "outline key initiatives that will deliver improved safety performance, ensure network sustainability from both an asset management and financial perspective, and strive to contain average customer price rises to CPI or below for the next six years commencing July 2013." The Strategic Plans relevant to Public Lighting are:
Customer Value Strategic Plan – to "Improve Customer Value – Deliver customer-focused services and network prices that represent the best value for money for our customers and communities";
Asset Management Strategic Plan – to "Deliver Our Network Plan - Apply best practice asset management principles to create value for customers", and;
Technology Strategic Plan – to "Leverage Technology and enable the transition to a more efficient business model". This submission will therefore comment on Essential Energy's Public Lighting proposal in the context of the above requirements;

ix. Essential Energy has produced a "*Public Lighting: Management Plan 2010*" published on 3 March 2011 which will also be commented on in this submission.

[8] SCI signed 30th June 2014

5 Compliance with AER Determination on Public Lighting 2009

5.1 Introduction

In 2009 the AER clearly laid out the requirements for Essential Energy to follow, as shown in Table 1 below. Unfortunately, in its 2014 proposal, Essential Energy has not provided information that can be easily compared to the AER's requirements so compliance is not readily assessed.

It is important that Essential Energy's case for increases in rates is fully transparent because its contention that "*Current public lighting tariffs substantially under-recover the efficient cost of providing the service*[9]" is in contrast to: previous AER investigation and determination; Victoria, where DNSPs of similar customer densities exist; Essential Energy's "sister" NSW companies Ausgrid and Endeavour Energy; and to international experience.

Despite this, Essential Energy has proposed an average increase in operations charges (Opex[10]) of 94% across all its customers. With such an "outlier" proposal it is very important that the data inputs and methodology, are clearly demonstrated to be in the public interest.

	Country Energy
Nominal vanilla WACC	8.78%
Pre–tax real WACC	6.76%
Forecast inflation	2.475%
Percentage of real labour escalation rate applied to maintenance charge	65%
Bulk lamp replacement rate	4 year BLR cycle to apply to 150W, 250W and 400W HPS, compact fluorescent and fluorescent lamps. 5 year BLR to twin arc lights 3 year BLR cycle to apply to all other lamps.
Cost of BLR under contract ($,2009–10)	–
Bulk replacements made per day	62.4
Spot replacements per day	18.5

	Country Energy
Spot replacements per day	18.5
Spot lamp failure rate	–
Spot failure improvement rate under a 3 year bulk lamp replacement cycle	–
Number of luminaires replaced in a day under a bulk luminaire regime	12
Design costs	Apply effective labour rate of $89.65 (including vehicle)
Overhead rate applied to plant/stores	30%
Overhead rate applied to materials and elevated work platform	30%
Bracket Life[a]	35 years

Table 1 AER 2009 Determination rates for Essential Energy[11]
(Source: AER Determination, Table 17.15, page 400[12])

5.2 Essential Energy Increases Average Operational Prices by 94%

Essential Energy provides a table in its executive summary, shown in Table 2 which appears to transparently explain why it is proposing an increase in the average total[13] cost of public lighting services of 67% (calculated from its submitted spreadsheets, not 64% or 62% as variously identified in its proposal) or an average increase of 94% on the operating costs[14] (not identified anywhere).

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9 Section 1.6.6.2 on page 15 of Essential Energy's proposal.

10 ie excluding the capital charges and calculations shown in footnote 3.

11 NB "Country Energy" is the previous name for "Essential Energy"

12 Note that a subsequent re-determination as a result of an appeal resulted in a change of figures for Ausgrid (Energy Australia) and an increase in the Weighted Average Cost of Capital (WACC) from the 8.78% shown above to 10.02%.

13 All components of capital charges and operational charges

14 Excluding charges for returns of and returns on capital

Unfortunately the term "on cost" when referring to "Materials", "Labour", and "Plant" is not defined in the proposal nor in the AER determination document and cannot be found in a Google search. Failing a definition, SLP assumes that this is the overhead charge added to the original cost of the materials, labour and plant hire.

Other un-defined terms used in this executive summary table, to which the rest of the proposal never refers, but which are likely to play a significant part in an increase of 94% in operations charges are: "Old Value"; "Standard Labour Rate"; and "Contract bulk unit rate".

These issues are important because some of these rates are regulated by the AER, but others are not, and the proposal does not make this clear, as it should. There is no explanation of the relationship between AER's determination in Table 1 and Essential Energy's proposal in Table 2. SLP submits that for the large increases Essential Energy has proposed, they should provide transparency and accountability by carefully comparing the two and justifying the differences - both increases and decreases[15].

For example, if the "Old Value" for "Div & Corp Overheads" of 0% refers to the rate which the AER has required Essential Energy to use, then the increase to 41% should be justified more robustly than the statement in the proposal that "*Corporate and Divisional Overheads have been adjusted to the current rates as detailed in the Corporate Allocation Methodology (CAM)*"[16]. According to their profit and loss figures[17], this one corporate overhead change appears to cause a $4.19 million increase in expenses in 2012-13 corresponding to 68% of the $5.757 million "loss" Essential Energy is supposed to have incurred[18]. However, the AER determination makes no reference to such a "corporate overhead" charge, so it is impossible to analyse how Essential Energy can justify this large difference.

Essential Energy's "*Streetlight Business Income and Expenses*" shown in Table 3 below also raises other questions. For example, despite the AER 2009 determination making it mandatory for Bulk Lamp Replacements (BLR) to be taking place and Essential Energy claiming that these BLR programs are in place, the line item "*Bulk Replacement (BLR)*" starts at $3.55 million in 2010/11 and reduces every year to $200,000 in 2013/14. This is a large 94% decrease over the 4 years and is not explained by their Footnote 10 which says "*From the Streetlight Profit and Loss used in the preparation of the RIN*" or Footnote 11 which says "*The value for Bulk Lamp replacements was reduced in FY11/12 and FY12/13 due the takeup in Bulk Luminaire program*". No compensating increase is seen other than a "contingency" figure in 2013/14 of $3.78 million for "*complete Bulk Lamp cycle*" which is not explained. Note that their Footnote 11 confusingly refers to a "Bulk ***Luminaire*** Program" (SLP emphasis) as opposed to "Lamp". This is not explained.

These are important and highly relevant issues which the AER has researched and analysed deeply so the onus is on Essential Energy to present a robust case if it thinks the real costs of providing Public Lighting is much greater than that accepted by the AER. For example, the regulator said in 2009 that "*The AER has applied the bulk lamp replacement benchmarks approved in Victoria to calculate Country Energy's and Integral Energy's maintenance charges. That is, for energy efficient luminaires the urban benchmark (77) has been applied to Integral Energy and an average of the rural and remote benchmarks (67.5) has been applied to Country Energy. For the 80W MV lamp the AER has applied the urban benchmark (90) to Integral Energy*

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15 As Essential Energy identifies, the importance of correct pricing is that it is "cost reflective" so that captive customers pay no more, or less than it really costs to provide the service.

16 Ibid., Section 1.6.7, Tariff Model Summary, Page 21

17 ibid., Table 8 - Streetlight Business Income and Expenses, page 15

18 The 2013-14 year was not used as this year has a substantial unexplained charge for "Contingency for complete Bulk Lamp cycle" of $3.78 million

and an average of the rural and remote benchmarks (67.5) to Country Energy. These benchmarks include the time it takes to travel between bulk lamp replacements"[19].

The AER has demonstrably used many sources of information to come to its decisions and conclusions, and it takes particular interest in how all the DNSP's in its jurisdiction compare against each other. For example in the 2009 decision they said noted that "*The AER has examined the differences in tariffs between its final Victorian decision on energy efficient lights and its final decision for the NSW DNSPs. The AER acknowledges that the tariffs that it has established for the NSW DNSPs, while reduced from its supplementary draft decision, remain higher than those approved by it for the Victorian DNSPs for energy efficient lights. However, care needs to be taken in comparing the charges between NSW and Victoria and adjustments need to be made in order to obtain a like for like comparison.* ***Where differences between the Victoria and NSW public lighting tariffs remain, the AER considers that these result from the different inputs and assumptions but that these have been reviewed by the AER in the context of the NSW DNSPs' operating environment and found to be reasonable***."[20] (SLP's emphasis.)

In contrast to this robust benchmarking process, a request to Essential Energy for the benchmarking analysis claimed to have been done in section 1.6.6.3 of the proposal met the response "*Due to Essential Energy's unique geographic distribution external bench marking was not thought to be prudent. As such we have conducted internal time and motion bench marking*."[21]

Component	Old Value	New Value
On Cost Materials Rate	30%	7.94%
On Cost Labour Rate	130.93%	56.95%
On Cost Plant Rate	30%	30%
Div *& Corp Overheads	0%	41.25%
WACC	8.07%	7.09%
EWP Rate	$62.17	$53.84
Standard Labour Rate	$34.54	$38.76
Pole Maintenance Frequency	4.5 years	4 years
Timber Pole Maintenance Costs	$9.98	$13.35
Bulk Lamp Replacement Frequency	4 years	3 years
Approximate average defect rate	3.6%	7.9%
Contract bulk unit rate	$16.88	$28.66

Table 2 Essential Energy Summary of increases and decreases (Source: Essential Energy Proposal to the AER**)**

[19] ibid., AER Conclusions, page 347

[20] ibid., AER Conclusion, page 356

[21] E-mail response 6 August, from Manager, Manager Streetlight Business (Network Support)

Table 8 - Streetlight Business Income and Expenses

$m (Nom)	FY10/11	FY11/12	FY 12/13	FY 13/14
Public lighting revenue[6]	7.550	8.320	8.910	8.940
Less Capital Recovery component of tariff (estimate 28%)[7]	2.110	2.330	2.500	2.500
Net Operating Revenue	**5.440**	**5.990**	**6.410**	**6.440**
Spot Repairs[8]	9.133	7.740	5.300	4.890
Dedicated Pole Inspections[9]	0.710	0.710	0.710	0.749
Bulk Replacement (BLR)[10] [11]	3.550	1.658	1.710	0.200
Fault & Emergency	.411	.405	0.440	0.440
Night Patrols[12]	0.100	0.100	0.100	0.100
Total Direct Expenses	**13.904**	**10.613**	**8.260**	**6.379**
Contingency for complete Bulk Lamp cycle				3.780
Total After Contingency	**13.904**	**10.613**	**8.260**	**10.159**
Overhead (Divisional and Corporate)	5.242	3.853	3.907	4.191
Total Loaded Costs	**19.146**	**14.466**	**12.167**	**14.350**
Economic Profit/(Loss)	**(13.705)**	**(8.476)**	**(5.757)**	**(7.910)**
Divisional & Corporate Overhead Rate from CAM	*0.377*	*0.363*	*0.473*	*0.4125*
Department 411 costs[13]	**.793**	**.853**	**.616**	**.774**

Table 3 Essential Energy: Profit & Loss from its proposal to the AER (Source: Proposal Table 8, page 15**)**

5.3 Price Comparison

Without the ability to analyse the assumptions made in Essential Energy's proposal, one way to obtain an indication of what DNSP customers are paying for Public Lighting operating costs is to use the figures published by the AER.

Table 4 below shows a price comparison of annual costs between the three NSW DNSPs for the three main luminaire types. The total prices include luminaire, bracket and maintenance at Tariff 3 rates, for the 2013/2014 year. Pricing data is sourced from the AER website.

As expected, the operating charges comparison shows that Essential Energy is more expensive across all luminaire types. For 2013/2014 Essential Energy pricing is 13-24% higher than Ausgrid and Endeavour Energy.

These comprehensive and significant price premiums diminish the claim that Essential Energy future price increases are a catch-up measure to recover from previous pricing that was less than cost reflective.

Back in 2009 the AER said, "*It considers that Country Energy's greater network area does not adequately explain the full discrepancy between it and the Victorian rural networks. The AER considers it is appropriate that the Victorian benchmarks be applied to Country Energy's and Integral Energy's models to calculate their public lighting tariffs. Specifically, the AER will apply the urban benchmarks to Integral Energy and an average of the rural and remote benchmarks to Country Energy*."[22]

[22] ibid., AER Considerations, page 347

Luminaire Type	NSW DNSP Comparison	TOTAL PRICE	Essential Energy Price Premium
CFL 42W Costs	Essential Energy	**$ 116.63**	
	Ausgrid	**$ 96.80**	**20%**
	Endeavour Energy	**$ 100.01**	**17%**
150W HPS Costs	Essential Energy	**$ 160.43**	
	Ausgrid	**$ 132.23**	**21%**
	Endeavour Energy	**$ 138.78**	**16%**
250W HPS Costs	Essential Energy	**$ 162.20**	
	Ausgrid	**$ 130.88**	**24%**
	Endeavour Energy	**$ 143.88**	**13%**

Table 4 NSW Street Lighting Pricing Comparison 2013/14
(Source: SLP analysis of AER website**)**

6 NSW Public Lighting Code Compliance

The NSW Public Lighting Code[23] came into effect on 1 January 2006 with the support of the then Department of Energy, Utilities and Sustainability (DEUS, then taken over by Trade & Industry and now by the Department of Resources and Energy), NSW Councils and Local Government NSW and, the commitment of the service providers to fully implement the Code. Implementation was to take place over 12 months for all but one[24] of the Code provisions.

Essential Energy acknowledges the importance of the Code in its submission to the AER and has undertaken on page 6 of Attachment 8.1 – Public Lighting Proposal 2014 to *"Fulfil its regulatory requirements as established in the NSW Public Lighting Code"*.

Essential Energy also acknowledges on page 8 of its submission that reduced street lighting performance from lack of maintenance, *"…eventually breaches relevant standards and corresponding service level requirements under the NSW public lighting code."*

SLP has reviewed key Code measures and Essential Energy's Public Lighting Management Plan[25], posed questions to Essential Energy and collected maintenance information to assess compliance with the Code. A summary of the findings is as follows:

Code Provision	Overall Progress	Notes
Management Plan (7)		Published most recently in March 2011. Unclear if there was meaningful consultation with councils on the most recent version.
Reporting Performance against Management Plan (9.1a)	??	Annual performance report due each July. It is very basic and does not provide useful information that can be used to measure performance.
Provision of current inventories (9.1b)		Copies of current inventories are available to councils.
Minor Capital Works Provision of design, construction, notice and updating of inventory for non-contestable works (10.2 a-d)	??	Councils indicate lengthy delays in completing minor capital works often with significant consequences for other works in the public domain.
Minimum Service Standards 24 hour call centre (11.2a)		No issues identified by councils
Average repair times < 8 days (11.2b)	??	Online reporting of fault repairs provided by Essential Energy for each LGA. Some evidence of probable sub-optimal scheduling of repairs (eg unnecessary rapidity of some fault response times). Councils have raised concerns that data may not be accurate. Overall performance is inconsistent and sometimes longer than 8 days.

Table 5 Score card for NSW Public Lighting provisions

[23] *http://www.resourcesandenergy.nsw.gov.au/energy-supply-industry/legislation-and-policy/electricity-legislation/code-review/electricity_legislation_nsw_public_lighting_code.pdf*

[24] *Coincident with likely bulk lamp replacement schedules, Service Providers were granted up to 48 months to update inventories*

[25] *http://www.essentialenergy.com.au/asset/cms/pdf/electricitynetwork/CEOP1023.pdf*

Code Provision	Overall Progress	Notes
Network supply faults (11.2c)		Councils indicated lengthy delays with underground supply faults. Essential Energy does not appear to have established systems to regularly update councils and RMS on timeframes for such repairs as required.
Bulk lamp replacement (11.2d)	XX	Implementation does not appear to have reached all areas until 2012 (many years after other DNSPs and at least two years after that required by Code implementation provisions). No BLR performed in 2013/14.
Six monthly night patrols on Category V roads (11.1,11.2d & PLMP 3.1)	??	Essential Energy commits to night patrols on Category V roads every 6 months but it is unclear that this has been implemented as it is not reported and there appears to be little feedback to councils.
Guaranteed Service Level (12)	??	It is unclear that payments for non-compliance with guaranteed service level (eg repairs within 12 days) have been implemented as it is not reported in the Annual Report or submissions to AER.
Billing (13.1)		The very basic billing format of Essential Energy manifestly does not meet requirements of Code to provide details of the number of lights and other information reasonably necessary to verify accuracy of the amount charged.
Standard Luminaires (14.1-14.3)		Standard lighting choices are significantly out of date, compared to leading players including its sister company Ausgrid. No evidence of tangible recent progress in updating plans. Public statements on LEDs directly contradict widely accepted modern practice.
Non-Standard Luminaires (15)	??	Councils cite difficulties with non-standard arrangements. Sometimes undertaken as private lighting to avoid complexities.
Implementation		Billing, BLR program and possibly other measures do not meet basics of NSW Public Lighting Code requirements, 8 years after the implementation of the Code.

Table 6 Score card for NSW Public Lighting provisions (continued)

6.1 Conclusion

SLP's overall conclusion is that, on several fronts (eg billing, maintenance and technology selection), Essential Energy does not appear to be meeting the objectives of the NSW Public Lighting Code and, with respect to maintenance, may not be meeting the minimum requirements of AS/NZS 1158. Benchmarking against other NSW utilities suggests that Essential Energy customers are receiving a substantially lower level of service in a number of respects as measured against the Code requirements.

7 New technology delays

Essential Energy, with one of the largest and lowest density networks in the world, has been particularly slow to consider LED street lights. With their extraordinary reliability (Los Angeles reports 0.3% failures over the first 4+ years of a 140,000 LED street lighting deployment), LEDs make greater economic sense for a rural utility than an urban one.

In the recently launched Practice Note 11 "**Towards More Sustainable Street Lighting"** published by the Institute of Public Works Engineers Australia (IPWEA) on 29 July 2014, the Practice Note[26] says:

"*A fundamental transformation in street lighting is now underway with the emergence of energy efficient and cost effective LED lighting, high-reliability electronic power supplies and sophisticated control systems.*

These three major technology changes, all digital in nature, amount to a revolution in street lighting after a long period of relative stagnation. World War II-era lighting technologies, based on gas-filled tubes and ferro-magnetic transformers, have provided most street lighting around the world for the last six decades but are now being rapidly replaced.

LED lighting (also referred to as solid-state lighting) will soon become the dominant technology for most street lighting categories. This transformation will provide a broad range of social, economic, environmental and governance benefits, thereby making street lighting more sustainable."

The key drivers behind the move to LED street lighting are both the potential to reduce energy consumption by 30 to 70% or more (depending on which legacy lighting types are being replaced) and the prospect of dramatic reductions in maintenance costs (estimated at more than 50% compared to the costs of maintaining traditional lighting). Utility maintenance costs for current street lighting often equal or exceed the costs of the energy used.

7.1 LED lighting in Australia

One of the largest LED public lighting deployments in Australia to date is in remote parts of West Australia where Horizon Power has deployed about 4,000 LEDs. The high cost of travelling hundreds of kilometres to a remote community to change a low-cost lamp does not make any economic sense. The superior performance and operating characteristics of LED lighting make it an attractive technology for use in remote areas that are difficult to service, as encountered in Essential Energy's rural areas.

7.2 Essential Energy approach to LED lighting

According to its website (extract shown in Figure 1 below) Essential Energy denies the market readiness of LED road lighting technologies and states that it is considering further rounds of LED trials. In contrast, sister NSW DNSP Ausgrid has discontinued all other types of lighting on residential roads. LEDs are now the default technology across all the 41 councils Ausgrid serves. As both Essential Energy and Ausgrid have the same CEO, the same board and the same owner, it is difficult to understand Essential Energy's reticence in deploying LEDs.

In its proposal to the AER, Essential Energy describes LEDs as "Future Technology."[27] As demonstrated in the sections below, this term is inappropriate and LED street lighting should now be referred to as "Current Technology". Essential Energy also suggests that "Essential Energy has trialed LED lighting and are continuing to do. Whilst there is still suitability and reliability questions needing answers, LED technology looks promising as a public lighting source."[28] As identified below, this statement reflects an alarming lack of awareness of how LED technology could reduce the costs of street lighting to its customers.

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[26] Available at IPWEA's website for free download at: ***www.ipwea.org/PN11***

[27] Section 1.3.7 Future Technology

[28] Section 1.3.7, page 7 of Essential Energy's Proposal to the AER

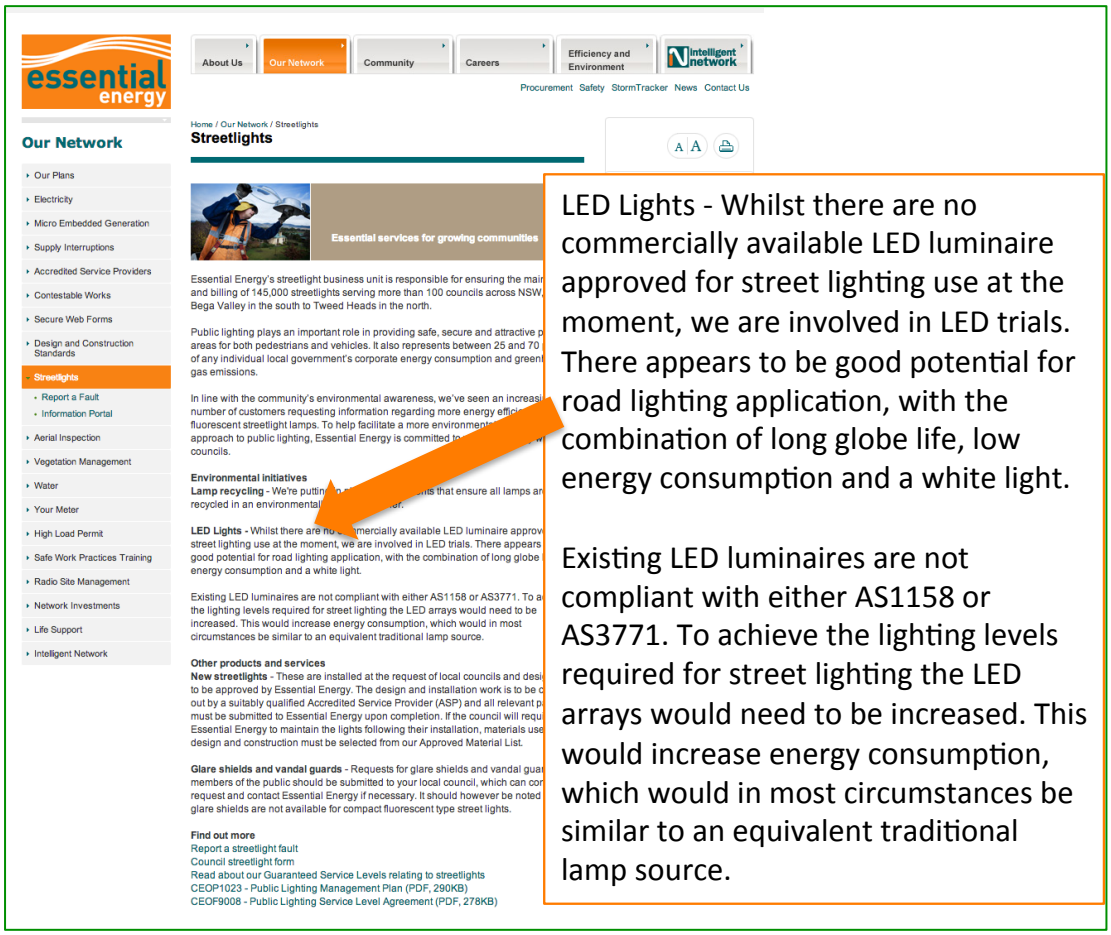

Figure 1 Extract from misleading Essential Energy Website text (Source: Essential Energy Website on Street Lighting extracted 1-8-2014**)**

7.3 "No commercially available approved luminaires"

In contrast to this claim made by Essential Energy on their website, as at 30 July 2014 there are in fact sixteen LED luminaire product families which have been approved by the Australian Energy Market Operator (AEMO), with two more pending approval[29].

There are many approved LED luminaire options as in each of these product families there is usually a range of variants available. These LED luminaire AEMO approvals date from July 2011, so Essential Energy's public claims demonstrate a remarkable lack of awareness of current practice. As can be seen from the range of manufacturers listed on the website[30], these are highly credible suppliers from Australia, USA, Canada, China, Taiwan, Japan and Germany.

7.4 "LED is not ready for mass deployment"

Essential Energy's assertion that LED luminaire technology is not ready for mass deployment is easily rebutted. There are substantial mass deployments either completed or in progress both internationally and in Australia.

In Australia LED mass deployments include[31]:

- City of Sydney: 4,000+ GE R250 LED Luminaires

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29 Refer - AEMO website - Update to NEM Load Table (Unmetered Loads) - Previous Proposals) ***http://www.aemo.com.au/Electricity/Policies-and-Procedures/Metrology-Procedures-and-Unmetered-Loads/Update-to-NEM-Load-Table-Unmetered-Loads-Previous-Proposals***

30 ***http://www.aemo.com.au/Electricity/Policies-and-Procedures/Metrology-Procedures-and-Unmetered-Loads/Update-to-NEM-Load-Table-Unmetered-Loads-Previous-Proposals***

31 IPWEA Practice Note 11 – *Towards More Sustainable Street Lighting* – 29 July 2014, Table 3, Page 26

- Western Australia, installed by Horizon Power: 4,000+ Kingsun Apollo Luminaires[32] further discussed in Section 7.7.
- New South Wales, installed by Ausgrid and Endeavour Energy: 5,000+ Sylvania StreetLED Luminaires

International commitment to LED street lighting is even stronger. The Institute of Public Works Engineering Australasia (IPWEA) has recently published Practice Note 11 which provides a table of the 30 largest committed LED street lighting deployments worldwide[31]. This clearly demonstrates that in clear contradiction to Essential Energy's claim, LED is most certainly in "mass deployment".

7.5 "LED luminaires are not compliant with AS/NZS1158"

While historically and technically correct, Essential Energy's use of this as a justification for avoiding LED technologies is inappropriate.

The luminaire standard AS/NZS1158.6 (one part of a seven-part series of public lighting standards) is a prescriptive document that – contrary to international standards practice – permits the use of any technology only by specific inclusion. This has not been updated since 2010 and as Essential Energy correctly infers, does not include LED or other advanced luminaire or controls technologies.

Nevertheless, in recognition of this part of the AS/NZS 1158 standard series being deficient, on 17 July 2014, Standards Australia announced that this standard would be withdrawn and superseded by international standard IEC60598.2.3 (to be implemented with a full text adoption as a AS/NZS standard) by December 2014 at the latest. This IEC standard is performance based and does not preclude the use of LED technology.

The other design and application parts of the AS/NZS1158 series are technology neutral and thus are no barrier to LED deployment. The outdated and anachronistic AS/NZS1158.6 ("Part 6") has been widely ignored by many designers, DNSPs and councils in Australia but the most recent public statement by Standards Australia[33] fully removes any real or perceived barriers to LED deployment.

7.6 LED would not decrease energy consumption

This assertion[34] is in direct conflict with the many hundreds of LED studies, trials and deployments worldwide and in Australia. Experience has shown that savings of 50%+ are being achieved in practice.

This Essential Energy assertion, at corporate and AER Proposal level, is clearly in conflict with the comments of their own Senior Engineer (as well as international and Australian experience) as stated on the Essential Energy Website post identified in Figure 2 below. With such conclusive and positive trial results produced over two years ago it is surprising that Essential Energy management has failed to progress LED deployment to improve the efficiency of the lighting service they deliver to their customers.

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[32] Horizon Power Western Australia - *LED Street Lighting Specification; Standard Number: HPC-8DJ-14-0001-2013* – Sept 2013 available at ***http://www.horizonpower.com.au/documents/1817184_27y3602_.PDF***

[33] Standards Australia Media Release, 17 July 2014.

[34] The exact quote on the website is shown in Figure 1

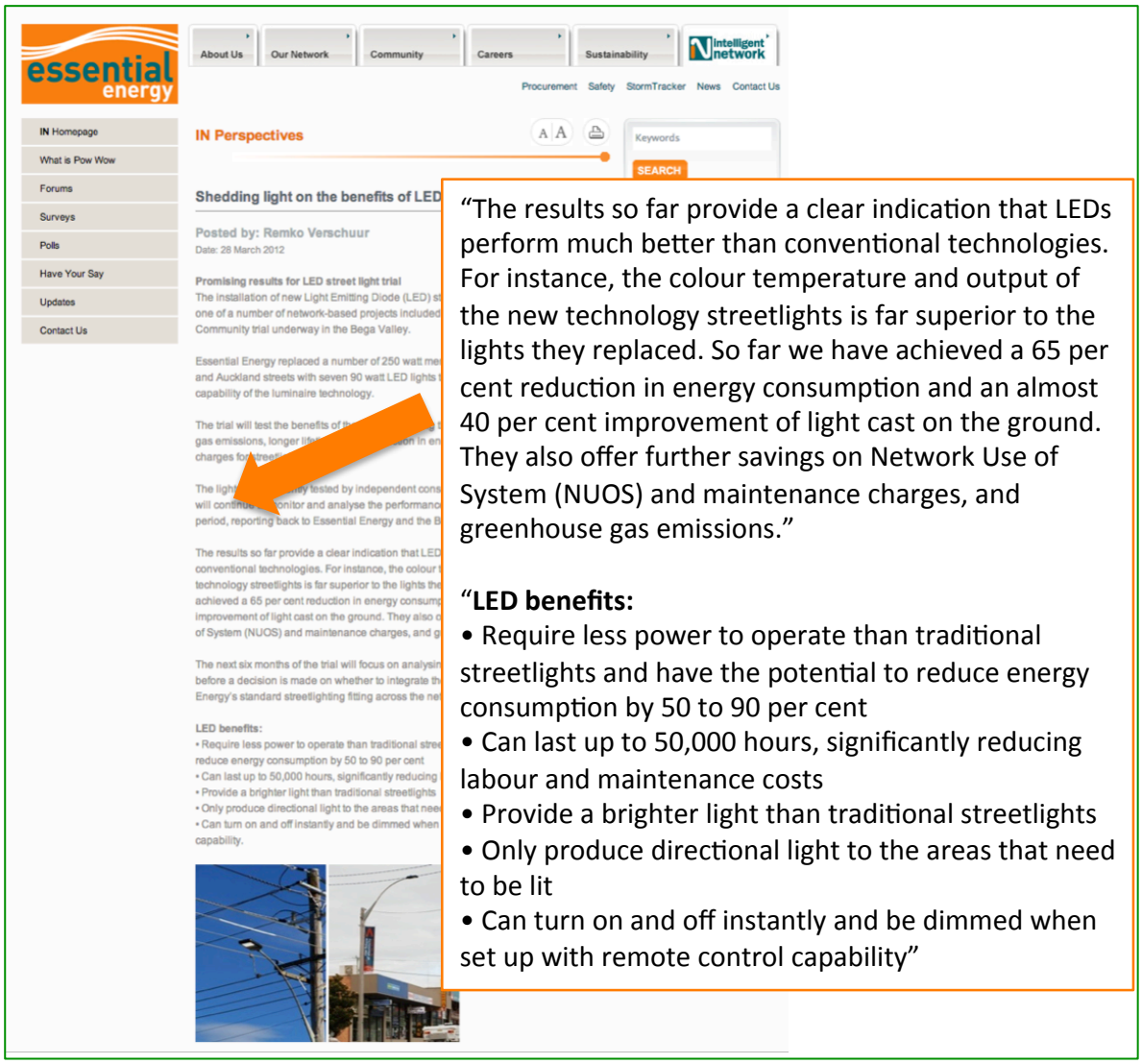

Figure 2 Website posting from Essential Energy Senior Engineer (Source: Essential Energy Website posted 28 March 2012[35]**)**

7.7 Essential Energy Standard Lists for LED

In its Proposal to the AER, Essential Energy states "*We are actively investigating the addition of this lighting to our standards lists.*"[24] No evidence is presented to show this is being progressed and Essential Energy's reticence to embrace well-proven LED technology (as demonstrated in sections above) suggests this is an unlikely claim which is further reinforced by their statement that "*…if or when it [LED] is accepted we will commence discussions with interested parties regarding its adoption and implementation*".

In the hope of discovering a strategic initiative which had not yet found its way to the operational arm, SLP searched Essential Energy's website for the "Technology Strategic Plan" mentioned by the 2013 Statement of Corporate Intent (finishing in June 2014) and the 2013/14 Half Yearly Report to Shareholders (The NSW Parliament)[36]. When none was found a request was made to the manager in charge of Street Lighting who indicated it did not exist

[35] ***http://blog.intelligentnetwork.com.au/2012/03/28/SheddingLightOnTheBenefitsOfLEDStreetlights.aspx***

[36] Visible at: ***https://www.parliament.nsw.gov.au/Prod/la/latabdoc.nsf/0/319f4419c04e48ffca257cd000239ae8/$FILE/Essential%20Energy%20Half%20yearly%202013.pdf***. Page 5 of this report suggested that "To ensure these outcomes are delivered, as part of the 2013/14 corporate planning process, seven strategic plans were developed with supporting priority actions to drive transformational change in these areas.

under that title and referred us back to the AER,[37] so this line of investigation is not promising.

In marked contrast to Essential Energy, Horizon Energy, the DNSP responsible for the Northern parts of Western Australia (covering an area greater than the whole of New South Wales[38]), has embraced LED technologies. In 2013 it published a 44 page document called "*Specification – LED Street Lighting*"[39] which *"… covers Horizon Power's technical requirements for the manufacture, supply, testing and delivery of street light Luminaires using LED (light emitting diode) technology and associated accessories. The Luminaires are to be used for lighting roads and public spaces and pathways shared by roads and public spaces*". Horizon Energy is clearly committed to delivering LED lighting for its customers.

Pricing of LED street lights has shown a remarkable reduction in recent times and therefore on this point alone DNSP's should have LED luminaires on their standard lists. As an indication of this, an announcement in August 2013 by CREE[40], an integrated[41] LED luminaire manufacturer, announced breakthrough pricing in the USA of US$99/unit (~AU$107) "in quantities" for the 70W HPS equivalent CREE 24W XSPR Luminaire shown in Figure 3.

Such aggressive and game-changing pricing from international industry leaders has sent shockwaves through the worldwide industry and has drawn product pricepoints generally down to levels that provide for the lowest life cycle costs of any lighting technology in 2014. Initial prices for Australian-sourced LED luminaires have not yet filtered down to such levels, but prices are steadily decreasing, and performance is increasing.

Figure 3 CREE XSPR 42/25 Watt LED Luminaire US$99 "in quantities" (Source: CREE USA[40])

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[37] The response was: "It is my understanding that this document has been superseded by a revised asset management framework and forms part of the Tier 2 set of documents Asset management plans, systems strategy and business plans. ***http://www.aer.gov.au/sites/default/files/Essential%20Energy%20-%20further%20supporting%20information%20list%20of%20documents%20-%20May%202014.docx*** " . Unfortunately this link refers to a single page document which suggests: "Essential Energy provided further supporting information which SLP have not published on our website. However, if you wish to obtain a copy of this material, please email ***AERinquiry@aer.gov.au***." In the short time available it may not be possible to obtain this before the AER submission closing date.

[38] Horizon Energy: 1 million km^2, New South Wales: 800,000 km^2

[39] Available at: ***http://www.horizonpower.com.au/documents/1817184_27y3602_.PDF***

[40] ***http://www.cree.com/News-and-Events/Cree-News/Press-Releases/2013/August/XSPR***

[41] Manufactures all parts of an LED Luminaire from the semiconductor LED chip through to the luminaire body. This means they have complete control of the value chain and can price simply to reflect the commercial opportunity available to them.

7.8 Control technology

In addition to the lighting technology, street lighting services are also being "revolutionised" by the introduction of other information and communication technologies (ICT) that have been present in other industry sectors for decades.

The introduction of these technologies will provide significant further benefits to council customers:

a) A further 15% to 30% reduction in energy usage on top of the reductions enjoyed due to the use of LED lighting;
b) Lengthening of the life of LED lights;
c) Elimination of the need for night patrols and call centre staff dedicated to street lighting;
d) Elimination of Photoelectric (PE) Cells and their associated maintenance;
e) Reduced spot maintenance activity in urban areas, and possible elimination of spot maintenance in rural areas through the use of performance monitoring and predictive maintenance software.

7.8.1 Port Macquarie Trial

Essential Energy undertook a trial of intelligent controls systems in 2012-2013 and published a report called "*Streetlight and Intelligence Control Systems Technology Trial*"

This trial evaluated two types of Radio Frequency controlled internet-based Central Management Systems (CMS), also known as Telemanagement systems.

The report states that "*Energy savings of 31.0% for the CityTouch system and 14.4% for the LeafNut system were realised. The success of both the Harvard LeafNut and Phillips CityTouch system in terms of reducing energy via dimming presents a strong argument for the future exploration of using telemanagement systems on a wider scale. The potential for maintenance cost savings is highest in terms of reducing or even eliminating the need for spot audits to determine if a street light is working*."

This trial concluded in mid-2013, but Essential Energy's proposal to the AER does not mention anything about these significant conclusions. Such remote monitoring techniques should be urgently explored as a potential countermeasure against the Essential Energy maintenance cost escalations.

7.8.2 Constant Lumen Output Control – (Active Reactor) HPS Luminaires

Constant Lumen Output Control (ie Active Reactor) is a well-established control gear technology for HPS luminaires that reduces energy use and light pollution by eliminating over-lighting in the early phase of the lamp use cycle.

The AEMO load tables confirm demonstrated energy savings of 23-26% for 150W, 250W and 400W HPS Active Reactor luminaires

This technology has been very successfully implemented by Ausgrid across its entire service territory (41 LGAs) as the primary default lighting type for all three sub-categories of main roads and has been implemented at other Australian DNSPs (eg ActewACT). Importantly, Ausgrid's pricing proposal to the AER for this technology demonstrated its lower total cost of ownership than standard HPS.

Essential Energy have not implemented or even trialled or this technology, a surprising omission considering the common ownership, governance and management linkages with Ausgrid.

SLP notes that HPS Active Reactor is an extremely reliable technology that also provides for greatly reduced strain on the lamps. With longer average travel times for remote location repairs, Essential Energy and its customers would therefore have more to gain from HPS Active Reactor than would an urban utility. In not investigating and adopting this technology, Essential Energy again appear to have failed to keep up with technical developments or made reasonable efforts to minimise the total cost of service.

7.9 Council frustration with lack of progress to LED

Several Councils have expressed frustration with Essential Energy's lack of action on LED lighting. Cowra Council has gone as far as setting up its own small network. It has deployed new lighting columns, LED luminaires and underground power cables. Cowra Council offered this project to Essential Energy as an LED trial, but received no response, and the fact that they proceeded is a measure of their frustration with Essential Energy.

7.10 Conclusion: Without currently available technologies, Essential Energy's Pricing is not "Efficient"

Essential Energy's proposal suggests that it needs to increase public lighting prices by an average of 64% on its *total* charges (capital *and* operational charges) but its own spreadsheets show the average increase is actually 67%. However, more startling is that if the capital charges are subtracted, the same spreadsheets show that proposed *operational* charges are being increased by 94% in "order to attain cost reflectivity". The evidence provided by Essential Energy ignores the 50% to 70% cost-reducing effects of LED lighting and ICT control systems on energy *and* maintenance used widely in "mass deployments" in Australia and Internationally.

SLP submits that the purpose of the AER process is to ensure that captive customers do not pay for such inefficient monopoly management practices.

8 Maintenance

As the AER observes in its 2009 Determination[42] "*There are four key components that influence how the maintenance charge is calculated:*

1. *the length of the cycle between bulk lamp replacements*
2. *the number of lamps that can be replaced per day under a bulk lamp replacement regime*
3. *the expected spot (intermittent) lamp failures between bulk lamp replacements and the relationship between the length of a bulk lamp replacement cycle and the number of spot lamp failures*
4. *the number of spot lamp replacements that can be completed per day*"

In order to make a convincing case for an average 94% increase in operational charges, Essential Energy need to demonstrate that their maintenance practices are at least *good* practice. Ideally they should be *best* practice before the AER allows such a large increase. Otherwise completely captive customers are being forced to pay for inferior maintenance practices.

The Essential Energy Proposal to the AER contains a number of apparently inappropriate labour productivity and maintenance costs assumptions which cannot be conclusively proven until Essential Energy provide significantly more operational information.

8.1 HPS Lamp performance data

There are distinct performance differences and maintenance requirements (and thus costs) between different types of HPS Lamps. This information is important as the failure rates and service intervals - and thus costs - differ significantly for each type. It appears that Essential Energy is using a lowest "first cost" product which probably generates higher lifetime maintenance costs than more optimised options.

8.2 Bulk Lamp Replacement

As the AER observes, "There is a direct relationship between the length of a bulk lamp replacement cycle and the number of spot failures that can be expected to occur. In general, the longer the bulk lamp replacement cycle the higher the spot failures that can be expected"[43].

AER's determination incorporates different failure rates between lighting types and therefore requires that 70W HPS are replaced on a "bulk replacement" programme[44] every 3 years. All other HPS wattages are to be replaced on a four year cycle.

The Essential Energy Proposal to AER does not provide any information on its compliance or otherwise with the 2009 AER determination of two separate BLR rates. This is an important omission as if an incorrect 4 year BLR rate is applied (instead of the 3 year one), then more lamps will be failing before they are replaced, which will in turn require an expensive "spot replacement" trip to rectify. Thus if lamps are not replaced on a "bulk lamp" programme, or replaced too infrequently, the failure rate will be high and the cost of maintenance will rise.

For very mature-technology HPS lamps, a high failure rate is indicative of poor maintenance practice. Essential Energy claims that the failure rate for the 70W HPS is 14%. This is extraordinarily high and almost three times the rate that should be experienced. Lacking the information to make any judgement, it is reasonable to suggest that the maintenance

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[42] AER *New South Wales distribution determination 2009–10 to 2013–14,* 28 April 2009, Section 17.5 Maintenance charges, page 341

[43] Ibid, "AER Considerations" page 342

[44] "Bulk Lamp Replacement" or BLR refers to the replacement of a lamp at a given time after it has been installed – in the expectation that the failure rate is within acceptable limits. Over a large number of street lights, this is the most economic method of maintenance as otherwise each lamp needs a special trip to be replaced – referred to as "spot replacement".

programme is at fault. It is Essential Energy's responsibility on behalf of its customers to rectify the problem, and this cost should not be passed on to customers.

8.3 150/250/400W HPS Twin Arc lamps

The AER 2009 determination suggests that efficient maintenance with HPS Twin Arc lamps can reduce replacements down to that yielded by a five year Bulk Lamp Replacement programme. This is because this product is longer-lasting and would therefore cost less to maintain. Essential Energy has been asked whether this product[45] has been considered from a cost/benefit perspective. Essential Energy have stated that such lamps have been evaluated at Coffs Harbour but "*There is no plan to roll them our any further whilst we are running a 3 year replacement cycle."* The exact outcome of the evaluation was unstated but it is clear that Essential Energy are not taking advantage of the opportunity to embrace the potential for extended lamp lifetimes and lower overall maintenance costs.

8.4 Material Costs

Essential Energy claim that "*The 2010 (sic)[46] AER determination's allowance for total materials costs for the replacement of lamps, PE Cells and other miscellaneous items is also insufficient to cover the actual costs of these items*."[47] However, no information is provided to corroborate this claim even though it is clear that AER has obliged the DNSPs to base their pricing on "efficient material and installation costs"[48].

The information required to check whether Essential Energy's claim that this cost recovery was "insufficient" includes whether open competitive tenders were called for and how many responses were considered, and what prices were paid according to types, brands and specifications. Given the dramatic departure from other DNSP pricing that Essential Energy proposes (increasing operational costs by about an average of 94%), it is in the public interest for AER and Essential Energy's customers to closely scrutinise all aspects of costing, including material costs.

This is especially important if SLP's understanding that Essential Energy has only a single majority supplier is correct. Best practice suggests that for large quantity procurement – as required by Essential Energy – two to three suppliers should be used to keep commercial offerings visibly competitive, and to deliver best value for customers of a monopoly.

8.5 Lamp/Luminaire Defects rate

Essential Energy claim that "*Data from our asset management systems reveals that we are experiencing materially higher defect rates than the assumed rates used in the models on which current prices were set*." SLP submits that the onus is on Essential Energy to investigate the cause of this observation given that the AER set the pricing model after much analysis and consultation with stakeholders. In section 17.5 of its 2009 determination the AER has 15 pages (page 341 to 356) and six tables of detailed information to justify its carefully determined acceptable defect rates.

In contrast, Essential Energy appears to dismiss the outcome of this detailed AER work across several DNSPs and proposes that observed and apparently non-analysed defect rates with their substantial associated costs be simply passed on to captive customers. No effort appears to

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[45] See ***http://www.sla.net.au/SLAstores/PRODUCTS/Categories/315/ATTRFILE_SupportDocument/SHP%20T%20Twinarc%20LU%20Standby%20Extra.pdf***

[46] The AER determination was made on 28 April 2009, not 2010. The subsequent Appeal to the Australian Competition Tribunal was made and their orders varied the AER determination on 25 November 2009. That decision's only relevant change to Essential Energy was an increase of the Weighted Average Cost of Capital (WACC) to 10.02%.

[47] Essential Energy proposal to the AER Attachment 8.1, Section 1.6.6.4.1.2 on page 14.

[48] AER *New South Wales distribution determination 2009–10 to 2013–14,* 28th April 2009, Table 17.2, page 334

have been taken, or if taken, no disclosure has been made on any investigation to identify the root causes of these high failure rates.

Essential Energy also state that "*It should be noted that failures may be of many types and affect different components, including lamps, ballasts, connections, fuses, diffusers, seals and vandalism etc. and is not limited to lamp failure but rather to any failure of the installation*."

Through CENTROC, SLP requested details of failure rate analysis regarding which components were failing, at what rate, and what steps had been taken to rectify the problem or change supplier but Essential Energy's response was "*We do not keep specific information about defect rates on individual components of a streetlight installation as the costs of doing so would outweigh any benefits derived from it."*[49] This is unfortunate for three reasons:

i. this does not comply with the requirements of AS/NZS1158.1.2 Section 14.5.9 maintenance records and performance review, with which Essential Energy claims to comply;

ii. it suggests that Essential Energy feel it is sufficient to "observe" a problem without analysis and simply pass the cost of that problem on to captive customers; and

iii. Essential Energy is claiming that the cost of such analysis would not cover the benefit, but the "benefit" is a lowering of a very large 94% increase in operational charges to its customers.

8.6 Replacement cost

Clearly Essential Energy has a challenging set of operating conditions. They operate a network that is one of the most spread out in the country, and possibly, the world. Nevertheless, this does not absolve them from benchmarking comparisons with other similar areas in Australia to ensure that the public interest is being served.

As the AER suggests "*The AER considers it is practical and sensible to directly compare the performance of the NSW DNSPs against one another, on the basis that direct comparison provides a reasonable gauge of the NSW DNSPs' respective efficiency. In doing so, the AER accepts that public lighting services in each distribution area are different for a number of reasons including geographical and operating environment considerations*."[50]

In 2009 the AER also observed "*The comparison indicates that Country Energy*[51] *is significantly less productive when compared to Integral Energy* [now called Endeavour Energy*] and rural zones in Victoria. However, the AER is also mindful that Country Energy has a unique network and that other rural distributors are unlikely to have the geographical spread of Country Energy's network*."

"*Table 17.4* [Table 7 in this document) *indicates that Country Energy undertakes 31 bulk lamp replacements per day while Integral Energy undertakes 73 per day. These replacement rates per day also include the time it takes to travel between lamps*."[52]

In contrast to the AER's careful analysis in 2009, Essential Energy's proposal in 2014 only makes brief wide ranging observations to justify its proposal for substantial price increases such as "*With Essential Energy's very large geographic area and light inventory of only 150,000 lights across 95% of NSW it is unlikely that any two adjacent defects will happen on any one day and*

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[49] Email from Essential Energy Manager Streetlight Business (Network Support) on 1st August, 2014.

[50] AER *New South Wales distribution determination 2009–10 to 2013–14,* 28th April 2009, 17.4.8 Comparisons between NSW DNSPs, Page 340.

[51] All references to "Country Energy" are now superseded by "Essential Energy"

[52] AER *New South Wales distribution determination 2009–10 to 2013–14,* 28 April 2009, Section 17.5.1.2 Number of bulk lamp replacements made per day, "AER Considerations", page 346.

even if batched to occur just in time would never reach the concentration of defects the AER has approved in the last determination."[53]

Essential Energy also make several statements that appear to undermine their own case for a price increase due to unreasonable costing:

- More than two thirds of their lights are located "*within 5km radius of a service depot*"
- "*For the most part we will attend on average one light per trip*"
- *"Essential Energy does not for the most part have dedicated street light crews as our light inventory and defect rates do not cost justify it"*
- *"Every street light job requires the replacement of the lamp, PE cell and a cleaning of the diffuser"*
- *"A typical street light EWP is telescopic and with no stabiliser legs, whereas Essential Energy line work EWPs are often knuckle type with front and rear stabilisers. This results in additional setup time. This is unavoidable given it is not dedicated plant and dedicated plant cannot be justified"*

Despite Essential Energy's lower productivity described by AER in 2009 shown in Table 7 (of this document) Essential Energy is now suggesting in Table 10 of their proposal (page 18) that their productivity is almost *half* of that already low rate with 25 minutes taken per light. For a 6 hour working day used in AER's assumptions[54] this corresponds to 14.33 light replacements per day. This compares very poorly with the "remote" Victoria worst rate of 51 per day as shown in Table 7 below.

Essential Energy presents several tables that identify important information such as defects analysis Table 9, Time and motion study Table 10, Average time to travel to a light in Table 11, and Time and motion study of light maintenance times in Table 12. This is excellent data, but it is not knowledge. This data needs to be turned into knowledge to justify the increase of $6 million per year on the current charges.

For example, this data needs to be compared with other DNSPs and analysed to discover whether Essential Energy maintenance practices are inefficient, or as it claims necessary for the extremely difficult conditions, or other DNSP's are unusually and unreasonably doing things more quickly and economically. The analysis is not presented to explain how such large $6 million total price increase is justified. This is too much to be taken on trust.

[53] Essential Energy Proposal to AER, Section 1.6.6.4.2.2 Defects per Trip, page 17

[54] ibid., 17.7.4.1 Costs associated with an installed luminaire, page 384 suggests an average 8 hour day is made up of 1.25 hrs breaks and 0.75 travelling.

Table 17.4: Comparison of bulk lamp replacement costs and replacements per day

	Country Energy	EnergyAustralia	Integral Energy	Victoria
Number of bulk replacements per day	31	N/A	73	Urban 77[a] Rural 64[a] Remote 51[a] Urban 90[b] Rural 75[b] Remote 60[b]

Source: AER, *Energy Efficient Public Lighting Charges–Victorian Final Decision*, February 2009; and ESCV, *Review of public lighting charges excluded service charges, Final decision*, August 2004.
Note: Number of bulk replacements per day - Country Energy, Pre 1 July 2009 public lighting model; and Integral Energy, Pre 1 July 2009 public lighting model.
(a) Relates to the 2 *14W TF lamp and the 2 * 24W T5 lamp.
(b) Relates to the 80W MV lamp.

Table 7 AER comparison of Essential Energy bulk replacement rate in comparison to Victoria and Endeavour Energy (Source: AER 2009)

8.6.1 Spot Maintenance

Spot maintenance is generally the most expensive type of maintenance. As the AER has identified, the way it is managed will have a significant impact on the cost of the public lighting service provided.

The NSW Public Lighting Code requires the repair of any light within eight days of it being reported, regardless of its location. SLP suggests that for a rural area – especially a "remote" one – this may be an overly costly standard to achieve. A few more days would allow scheduling repairs to be made together to minimise the number of times travel is done to replace a single lamp. This is corroborated by an Albury City comment suggesting that "*there doesn't seem to be any indication from Essential Energy the level of service they are proposing is what Councils would like – it could be we will accept a lower level of service for a lower cost, however the proposal sets a certain standard and then justifies the price for achieving that standard*"[55].

Setting this issue aside, Essential Energy actually appears to be *over*-performing on the speed of repair and therefore needlessly over-spending. Data analysed from the councils of Temora, Tumut, Junee and Lockhart shows that more than half of the repairs had response times of a day or less. If this analysis is representative across Essential Energy's area, this would be costing much more than an "efficient maintenance" service should cost, especially in light of the observation that *"It is rare that we will be called to attend more than one light in any one trip."*

This potentially expensive over-performance is corroborated by Essential Energy's own observation that *"The bulk of street lights are located within 0 to 5km's of the works depot"*[56]. Thus servicing these should result in excellent labour productivity and reasonable costs. From SLP's perspective, our experience and the evidence presented suggests there are grounds for suspecting an unnecessarily expensive "gold plated" service.

The other third of the lights are clearly very spread out as observed by Essential Energy that *"Many are remote with the remotest street light some 270km's for (sic) the local works*

[55] E-mail 6 August 2014 to RAMROC

[56] ibid., Section 1.6.6.4.2.4 Time to travel to lights, page 18. The proposal elsewhere identifies that proportion is two thirds .

depot". To SLP *t*his underscores the need for high-reliability LED luminaires to reduce the need for such tasks in the first instance. This would largely eliminate the offending low reliability items and replace with improved technology items with extended service intervals.

9 Conclusion and recommendations

Strategic Lighting Partners Ltd has analysed the Essential Energy Public Lighting Proposal - Attachment 8.1 (and associated documents) for the 2015/2019 regulatory period. SLP concludes that Essential Energy's proposal to increase total public lighting costs by an average of 64% across all councils is not justified on the basis of the evidence available.

Price Increases

SLP's analysis of Essential Energy's spread sheets show that Essential Energy has understated the impact of their increases and the figure should be 67%, but more significantly, excluding increases in capital charges, the average increase in operating charges appears to be about 94% ($6.5 million) on the actual 2014 charges provided by Essential Energy spread sheets.

Technology delays

The evidence shows that Essential Energy is virtually ignoring the dramatic reductions in energy use and maintenance costs which arise from the conversion to LED lighting over conventional HPS lighting. These benefits are being enjoyed worldwide, and to a lesser extent in other parts of Australia, and offer Essential Energy's customers major benefits.

Essential Energy's apparent lack of any plan to rapidly mass deploy LED lighting is a serious and fundamental issue for AER to address in-depth. Essential Energy is requesting large increases but at the same time it has made virtually no progress towards technologies that would save its customers equally large sums of money. This omission is in contradiction to Essential Energy's Statement of Corporate Intent as well as not being in the New South Wales public interest.

AER Determination Compliance

The evidence presented raises serious doubts about whether Essential Energy has been in compliance with AER determination requirements including whether Bulk Lamp Replacement programmes have been consistently applied across the region over the last four years. In SLP's view Essential Energy's proposal to increase their charge for corporate overheads from 0% to 41% has not been justified, nor have most other proposed increases, or the few decreases either.

Transparency

The evidence available does not meet the expected levels of transparency required for a regulated monopoly service, and in particular one that is requesting the dramatic increases of 67% average total, or 94% average operating expenses, for its public lighting services to captive customers.

Recommended Action

SLP recommends that CENTROC and its allied Regional Organisations of Councils strongly reject the Essential Energy Public Lighting Proposal and seek AER investigation into the Essential Energy business model that is now fundamentally flawed.

This action should be followed by measures to provide strong expressions of support for the Network NSW Pty Ltd collective procurement program for LED luminaires and associated equipment. This is an initiative that should accelerate tangible moves towards higher performance and lower cost public lighting services.

10 Appendix 1 – Terms of reference

10.1 Proposed Methodology

The following proposal outlines our recommended approach for preparing a response to challenge the 64% (subsequently actually 67%) price increase proposed by Essential Energy.

10.2 Project Purpose

To identify, analyse, benchmark and critique the underlying assumptions and principles behind the Essential Energy submission to the Australian Energy Regulator (AER) (Attachment 8.1 - Public Lighting Proposal and related documents) to be able to assertively challenge the "cost reflective" claims by Essential Energy that they use to support a proposed 64% tariff increase from 1 July 2015. Then, based on this review, prepare an analysis for a submission for the AER that challenges the Essential Energy Proposal approaches to technology implementation, maintenance labour productivity and other cost calculation assumptions used by Essential Energy.

10.3 Deliverables

A draft CENTROC et al analysis for submission for the AER that clearly presents the above assessment and arguments.

11 Appendix 2 - ROCs

Regional Organisation of the 71 Councils Represented by the 6 ROCS making this submission (as originally provided by the NSW Division of Local Government, Department of Premier and Cabinet[57] but corrected by ROCs)

Central NSW Regional Organisation of Councils	CENTROC	
Bathurst Regional		15
Blayney		
Boorowa		
Cabonne		
Central Tablelands County		
Cowra		
Forbes		
Lachlan		
Lithgow		
Oberon		
Orange		
Parkes		
Upper Lachlan		
Weddin		
Young		
Riverina Eastern Regional Organisation of Councils	REROC	
Bland		13
Coolamon		
Cootamundra		
Goldenfields Water County		
Gundagai		
Junee		
Lockhart		
Riverina Water County		
Temora		
Tumbarumba		
Tumut		
Urana		
Wagga Wagga		
Riverina and Murray Regional Organisation of Councils	RAMROC	
Albury		18
Balranald		
Berrigan		
Carrathool		
Conargo		
Corowa		
Deniliquin		
Greater Hume		
Griffith		
Hay		
Jerilderie		
Leeton		
Murray		
Murrumbidgee		
Narrandera		
Urana Shire		
Wakool		
Wentworth Shire		

[57] ***http://www.dlg.nsw.gov.au/dlg/dlghome/dlg_LocalGovDirectory.asp?index=3#737*** . RAMROC did not include Urana Shire and Wentworth Shire

South East Regional Organisation of Councils	SEROC	
Bombala		12
Boorowa		
Cooma-Monaro		
Eurobodalla		
Goulburn Mulwaree		
Harden		
Palerang		
Queanbeyan		
Snowy River		
Upper Lachlan		
Yass Valley		
Young		
Mid Coast Regional Organisation of Councils	MIDROC	
Bellingen		8
Coffs Harbour		
Gloucester		
Great Lakes		
Greater Taree		
Kempsey		
Nambucca		
Port Macquarie-Hastings		
Northern Rivers Regional Organisation of Councils	NOROC	
Ballina		7
Byron		
Kyogle		
Lismore		
Richmond Valley		
Tweed		
		72

12 Appendix 3 – HPS 70W defects

High Pressure Sodium (HPS) 70W Lamp Performance Analysis

SLP note the very high defect rate of 70W HPS luminaires (13.94%) and have sought to analyse the cause. SLP have asked Essential Energy for information on the nature of the faults but Essential Energy claim it is uneconomic to keep records of which components are failing and thus cannot provide us with this information. SLP assume that the failures are mainly lamp-related.

Essential Energy has confirmed that Sylvania brand 70W HPS coated elliptical lamps are being used, operating in conjunction with electromagnetic reactor/ignitor control gear. As Sylvania Lighting Australasia (SLA) list only one such lamp on their website (Cat. No. 673260) SLP are assuming that this is the lamp concerned. This particular lamp type exhibits average performance (20,000 Hr Average Life), with Essential Energy undertaking maintenance on a 3 Yr BLR.

SLP has sought further details from Essential Energy on the quantity and nature of the 70W HPS defects. The numerical data received is inconsistent with the data in the Proposal.

Details from Essential Energy response to question is as follows -

"The HPS 70 defect rate in FY 12/13 for standard maintenance is 888 and minor is 192 and in FY13/14 for standard maintenance is 2317 and minor is 315. The failure rates were calculated for the 12/13 year as this was post the bulk luminaire replacement program. Data for other years would require further analysis but we would not expect any material difference."

For HPS 70W - The EE Proposal Page 17 "Table 9 – Average defect rates …" states that the actual defect rate is 13.94% from a stock of 28,570 luminaires which is 3,982 defects.

The response above tells us that the figures in the Proposal are for FY 12/13.

Essential Energy's response to SLP's queries above contradicts the Proposal figures by saying that the standard maintenance defects for FY 12/13 were 888 luminaires which corresponds to only a 3.1% defect rate. This is quite different to the 13.94% (3,982) in the Proposal. (Ignoring the influence of the minor maintenance for vandalism etc). SLP have not had time to investigate this difference.

SLP have observed that there may have been some delays with the commencement dates of the 2009-2014 BLR cycle which, if substantiated, may account for the higher than expected defect rate as the lamp population will be operating well into the high failure rate time zone. Notwithstanding this, SLP have sought to identify alternative 70W HPS lamp types with higher performance that may help to lower the high defect rate.

The SLA website does not list a higher specification coated elliptical lamp. SLP have researched the Havells Sylvania International website) and identified two internationally available Sylvania 70W HPS coated elliptical lamps with significantly improved specification and performance potential. See Appendix 3 for technical and performance details.

SLP consider that upgrading to higher performing and longer life 70W HPS lamp types should be a precursor to, and a preventative measure for, the seeking of price increases to cover the costs of greater maintenance activity.

Possible higher performing options of the incumbent lamp type are - (with the currently used lamp listed for reference)

12.1 Business As Usual Lamp - 3 Year BLR

Sylvania Australasia - Standard SA SHP 70W/CO/E E27 SLV Cat No. 673260

This currently used coated, elliptical, 20,000 Hr HPS lamp with a 3 Yr BLR is of average specification and with a 13.94% (Luminaire) defect rate in the field there is clearly some irregularity of application or maintenance. SLP believe that Essential Energy could consider upgrading to higher performing lamp types to reduce maintenance requirements and consequent costs.

12.2 Alternative Lamp Option 1 - 4 Year BLR

Havells Sylvania - Standard SA SHP 70W/CO/E E27 SLV Cat No. 0020555

A coated, elliptical, high xenon, 24,000 Hr, HPS lamp with a 4 Yr BLR performance.

12.3 Alternative Lamp Option 2 - 5 Year BLR

Havells Sylvania - Twin Arc SA SHP-TS 70W E27 SLV Cat No. 0020718

A coated, elliptical, high xenon, 55,000 Hr, HPS lamp with a 5 Yr BLR performance (AER 2009), manufacturer claimed 6 Yr BLR cycle.

12.4 Alternative Brand - Option - 4 Year BLR

Osram Vialox NAV-E 70W Super 4Y - HPS

A coated, elliptical, high xenon, 24,000 Hr, HPS lamp with a 4 Yr BLR performance.

In addition to the incumbent brand, there are several other reputable brand options that could also be considered as part of a competitive procurement process.

13 Appendix 4 - In-depth Data on 70W Lamp Options

Lamp Data

13.1 Business As Usual Lamp - 3 Year BLR

Sylvania Australasia - Standard SA SHP 70W/CO/E E27 SLV Cat No. 673260

http://www.sla.net.au/SLAstores/PRODUCTS/Categories/316/ATTRFILE_SupportDocument/SHP%20SHP%20T%20LU%20Standard.pdf

Data Sheet Last Updated - V.1.0 March 2014

Description

E27 Elliptical, Coated

Lamp Performance Parameter Overview

- At 3 year BLR. Operating hrs 4357Hrs x 3 Yrs = 13,000 hrs (AER 2009 Hr Determination)
- Average Rated Life = 20,000 Hrs
- Initial Lumen Output = 5800 lm
- Luminous Efficacy = 83 lm/W
- Lamp Lumen Maintenance Factor (LLMF) = XX @ XX,000 Hrs (Not Available)
- Lamp Survival Factor (LSF) = XX @ XX,000 Hrs (Not Available)
- Mercury Content = XX mg (Not Available) (Not Enviro Friendly)

13.2 Alternative Lamp Option 1 - 4 Year BLR

Havells Sylvania - Standard SA SHP 70W/CO/E E27 SLV Cat No. 0020555

http://www.havells-sylvania.com/media/product-data-sheets/en/0020555-data-sheet.pdf

Data Sheet Last Updated - 29 July 2014

Description

E27 Elliptical, Coated

Lamp Performance Parameter Overview

- At 4 year BLR. Operating hrs 4357Hrs x 4 Yrs = 18,000 Hrs (AER 2009 Hr Determination)
- Average Rated Life = 24,000 Hrs
- Initial Lumen Output = 5900 lm
- Luminous Efficacy = 84 lm/W
- Lamp Lumen Maintenance Factor (LLMF) = 0.89 @ 18,000 Hrs
- Lamp Survival Factor (LSF) = 0.72 @ 18,000 Hrs
- Mercury Content = 10.8 mg

13.3 Alternative Lamp Option 2 - 5 Year BLR

Havells Sylvania - TwinArc SA SHP-TS 70W E27 SLV Cat No. 0020718

http://www.havells-sylvania.com/media/product-data-sheets/en/0020718-data-sheet.pdf

Data Sheet Last Updated - 29 July 2014

Description

E27 Elliptical, Opal Coated

Lamp Performance Parameter Overview

- At 5 year BLR. Operating hrs 4357Hrs x 5 Yrs = 22,000 hrs (AER 2009 Hr Determination)
- At 6 year BLR. Operating hrs 4357Hrs x 6 Yrs = 26,000 hrs (AER 2009 Hr Determination)
- Average Rated Life = 55,000 Hrs (Claimed 6 Yr BLR cycle)
- Initial Lumen Output = 6500 lm
- Luminous Efficacy = 92 lm/W
- Lamp Lumen Maintenance Factor (LLMF) = 0.89 @ 20,000 Hrs (published)
- Lamp Lumen Maintenance Factor (LLMF) 5 Yr = 0.89 @ 22,000 Hrs (by graphical interpolation)
- Lamp Lumen Maintenance Factor (LLMF) 6 Yr = 0.89 @ 26,000 Hrs (by graphical interpolation)
- Lamp Survival Factor (LSF) = 0.93 @ 20,000 Hrs
- Mercury Content = 21.6 mg

13.4 Alternative Brand Lamp Option - 4 Year BLR

Osram Vialox NAV-E 70W Super 4Y - HPS High Xenon, Four Year BLR Cycle

Osram Datasheet

http://www.osram.com/osram_com/products/lamps/high-intensity-discharge-lamps/high-pressure-sodium-vapor-lamps-for-open-and-enclosed-luminaires/vialox-nav-e-super-4y/index.jsp

Data Sheet Last Updated - 2014

Description

E27 Elliptical, Opal Coated

Lamp Performance Parameter Overview

- At 4 year BLR. Operating hrs 4357Hrs x 4 Yrs = 18,000 hrs (AER 2009 Determination)
- Average Rated Life = 24,000 Hrs
- Initial Lumen Output = 6300 lm
- Luminous Efficacy = 90 lm/W
- Lamp Lumen Maintenance Factor (LLMF) = 0.855 @ 18,000 Hrs
- Lamp Survival Factor (LSF) = 0.925 @ 18,000 Hrs
- Mercury Content = 19 mg

14 Appendix 5 - SLP

Strategic Lighting Partners Ltd (SLP)

Strategic Lighting Partners Ltd (SLP) is a New Zealand management and marketing consultancy. Its principals are Bryan King, Godfrey Bridger and Crystal Beavis. SLP and its principals have compiled strategic reports for the NZ Transport Agency and NZ city councils to upgrade their street lighting to LED, and organised Australasia's inaugural and very successful road lighting conference on the 10th and 11th March 2014 at the Langham in Auckland, NZ.

14.1 People

Godfrey Bridger ME(Elect), MBA(Exec), MIEEE, Managing Director

Godfrey is an experienced CEO and senior manager with over 15 years' management consultancy experience. Godfrey is a former CEO of the Energy Efficiency & Conservation Authority (EECA), former board member of Mercury Energy (the then largest NZ Electrical Utility), Business Development Manager for Counties Power, an electricity network distribution company, and former elected member of the Auckland Regional Services Trust, which then owned Auckland's independent public service businesses including Ports of Auckland, Watercare Services, and the Yellow Bus Company. Godfrey has Bachelor's and Master's degrees in Electrical Engineering and an Executive MBA, all from the University of Auckland, NZ.

Bryan King MBA(Exec) DipBIA, NZCE, MIESANZ, MIESNA, Director

Bryan is a highly experienced practitioner and recognised Australasian authority on worldwide road lighting practices. Bryan is a member of the AS/NZS1158 Road Lighting Standards committee and is Convenor of the AS/NZS1158 Lighting Controls Working Group. He has a thirty year history of leadership and governance in luminaire design, manufacture and application and consultancy businesses for the professional and municipal lighting sectors. Bryan was founding Chairman and is current Executive Director of Lighting Council NZ and is a member of the Illuminating Engineering Society of ANZ and North America and the Energy Management Association of NZ. Bryan is currently completing a Master of Technology degree in Energy Management at Massey University.

Graham Mawer, B.A.Sc, MBA, Project Collaborator

Graham has spent the past 18 years consulting on energy efficiency and renewable energy projects in the Australian utilities sector. He leads Next Energy's street lighting practice and is Program Manager of a major street lighting initiative for 35 local governments in the Sydney area. He also works for other private and public sector clients on a range of street lighting projects. His street lighting work includes technology reviews, LED lighting trials, maintenance monitoring, service level negotiations with utilities, preparation of management plans and regulatory filings on behalf of local governments. Graham has a B.A.Sc. in Mechanical Engineering from the University of Toronto and an MBA from McGill University in Montreal.

Crystal Beavis MA(Hons), MPRINZ, Director

Crystal has more than 25 years' experience in marketing communications, public relations, advertising and journalism in New Zealand and the UK. Crystal has worked or consulted for organisations operating across a range of technical and industrial sectors including educational and research organisations, health, electrical utilities and financial services. In 2014 Crystal won the Public Relations Institute Award for best project or event for the conference organised by SLP *Road Lighting 2014: Innovation • Efficiency • Safety* in March 2014.