EnergyAustralia Public Lighting Operating Expenditure Submission to AER for Re-Determination 2010-14

Reassessment of Recommendations

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1 Engagement

Energy and Management Services Pty Ltd (EMS) has been requested by the Australian Energy Regulator (AER) to reassess its original recommendations as described in the *Original EMS Review*[1] in light of submissions made by EnergyAustralia and interested parties.

Principal references for this reassessment report are the AER's *Draft Decision*[2], EnergyAustralia's O*riginal Submission*[3] and EnergyAustralia's *Response Submission*[4]. Only matters relating to public lighting operating expenditure are considered.

The Terms of Reference for the engagement are shown in Appendix A.

[1] EMS, *EnergyAustralia Public Lighting Submission to AER for Re-Determination 2010-14, Review of Operating Expenditure,* 23 February 2010. This document is referred to as *Original EMS Review* throughout this reassessment report.

[2] AER, *EnergyAustralia Draft distribution determination 2009-10 to 2014-15, Alternative control (public lighting) services,* 23 February 2010. This document is referred to as *Draft Decision* throughout this reassessment report.

[3] EnergyAustralia, *Submission for the AER's re-determination of public lighting prices 2010-2014,* January 2010. This document is referred to as *Original Submission* throughout this reassessment report.

[4] EnergyAustralia, *Submission responding to the AER's February 2010 decision - public lighting prices 2010 to 2014,* March 2010. This document is referred to as *Response Submission* throughout this reassessment report.

2 Executive Summary

In accordance with the Terms of Reference, EMS has reassessed its original recommendations in light of EnergyAustralia's *Response Submission.* EMS revised recommendations are summarised below. Recommendations that represent a change from the *Original EMS Review* are underlined.

Bulk Maintenance Cycles

1. That the original recommendation remains unchanged: that a four year bulk replacement cycle be adopted for all HPS lamps in TRL installations and a three year bulk maintenance cycle be adopted for all other lamp types.

General Assumptions

2. That EnergyAustralia's public lighting opex modelling be based on FY10 labour rates of $55 per hour for normal time and $71 per hour for overtime.

3. That the assumption of $45 per hour for EWP costs be adopted without change.

4. That the assumptions regarding non-lamp material costs be accepted without change.

5. That the overtime proportion assumption of 17.4% be retained without change.

6. That the assumption of 65% labour in total opex be retained without change.

7. That the overhead rate assumption of 25% be retained without change.

8. That EMS's original recommendation on the cost of quarterly patrols be disregarded.

Spot Maintenance Assumptions

9. That the staffing assumption for spot maintenance (two staff generally and three when the work is on a traffic route) be retained without change.

10. That the time requirement assumptions in the *Cost Model* be adjusted to 31.7 minutes for lamp and PE cell replacements and that EnergyAustralia's proposal for 10 minutes for other maintenance tasks be accepted.

11. That the failure rates adopted in the *Cost Model* be EnergyAustralia's 4 year rates for HPS lamps in TRL routes and EnergyAustralia's 3 year rates for all other lamps, where available, and the AER rates otherwise, subject to adjustments to correctly deal with multi-lamp configurations.

12. That the average PE cell failure rate of 1.42% be retained without change.

13. That the 'other component' failure rate of 1% be retained without change.

14. That the connection repair unit rate assumptions be retained without change.

Bulk Maintenance Assumptions

15. That EMS's original recommendation be retained without change: that the bulk replacement cycle assumptions used in the *Cost Model* be adjusted to four years for all HPS lamps in TRL installations and three years for all other lamps.

16. That EMS's original recommendation be retained without change: that PE cell replacement be on the basis of "every visit" for HPS lamps in TRL installations, and "every second visit" for all other lamps. Accordingly, the *Cost Model* should assume a PE cell replacement cycle of four years for all HPS lamps in TRL installations and six years for all other lamps.

17. That the modelling of cycles and unit rates for other bulk replacement tasks be accepted without change.

Parsons Brinckerhoff Benchmarking Study

Having undertaken a more detailed review of Parsons Brinckerhoff's (PB's) benchmarking study, EMS has found no reason to alter its opinion in relation to the interpretation of PB's benchmarking data, and accordingly, no reason to alter its opinion that PB's overall conclusion (that EnergyAustralia is on average operating efficiently in its provision of public lighting services) is somewhat generous.

3 Bulk Maintenance Cycles

Original recommendation:

> That a four year bulk replacement cycle be adopted for all HPS lamps in TRL installations and a three year bulk maintenance cycle be adopted for all other lamp types.[5]

EnergyAustralia disagrees with EMS's recommendation on a number of aspects, as discussed below.

The Costs of Mixed BLR Cycles

EnergyAustralia states "A mixed cycle increases the costs of bulk lamp replacement, through requiring two cycles of different periods within the same location"[6]

EnergyAustralia has a program of replacing MV luminaires that have failed or reached the end of their economic lives, with HPS lamps[7]. As at June 2009, EnergyAustralia's population of 250W and 400W MV luminaires (commonly used on traffic routes in the past) is 35,432 while its population of 150W and 250W HPS luminaires (the respective modern equivalents) is 33,872.[8] EnergyAustralia seeks to imply that the approximately 50/50 populations of old MV and new HPS luminaires creates a situation in which its TRL lighting is highly intermixed with almost random incidence of MV and HPS luminaires to be found on all traffic routes.

From EMS's observations of traffic routes in the Sydney and Hunter regions, the situation is that many routes are illuminated by HPS luminaires only. EMS continues to hold the view that the extent of such routes is sufficient to provide for the implementation of efficient work plans based on a 4 year BLR cycle. However, EMS accepts that older routes that were originally fitted with MV luminaires are becoming more intermixed as MV luminaires that have failed or have reached the end of their economic life are replaced with HPS luminaires.

The *Cost Model*[9] models EnergyAustralia's total public lighting opex and may be configured to provide a cost estimate based on EMS's recommendations by simply assigning 3 or 4 year BLR cycles according to lamp type and location. In actual practice, the development of efficient work plans for traffic routes with mixed lighting, will require EnergyAustralia to decide whether a given route is predominantly HPS (thus adopting a 4 year BLR cycle) or predominantly MV (3 year BLR cycle). Clearly this introduces the risk that the modelling does not precisely match actual practice and the question is: what are the dimensions of the risk?

Put simply, lengthening the BLR cycles reduces the bulk maintenance cost and increases the spot maintenance cost. The net result may be an increase or a decrease in total public lighting opex. EMS's analysis shows that applying the proposed 3 and 4 year cycles (and other inputs in accordance with EMS's recommendations) in the *Cost Model* reduces, rather than increases, the total estimated public lighting opex by approximately $50,000. This is the net result of decreased bulk maintenance and increased spot maintenance. The difference is

[5] *Original EMS Review* p9
[6] *Response Submission* pp 18,19
[7] EnergyAustralia, *Distribution Guideline DG130*
[8] *Response Submission* p19
[9] EnergyAustralia, *Cost build up model. xls.* This document is referred to as *Cost Model* throughout this reassessment report.

less than half a percent of total estimated public opex. Accepting the limitations of the *Cost Model,* it may be that the effects could be twice or three times this amount and could be either gain or loss. Even so, the amount at risk is less than 1%. EMS considers that a risk of ±1% does not justify EnergyAustralia's concern that "too much is at stake to give weight to this consideration". [10]

EnergyAustralia, as Australia's largest and most resourceful DNSP, has the capacity to be a forerunner in determining the most efficient bulk replacement cycles. This would provide highly valuable data upon which sound decisions can be made to the benefit of all DNSPs and their public lighting customers. EnergyAustralia has already undertaken much commendable work as demonstrated by its Public Lighting Management Plan and other documents submitted in support of the *Original Submission.* Having committed so much expenditure and effort to the theoretical analysis of optimum bulk replacement cycles, EnergyAustralia's reluctance to prove its analysis with practical in-field testing is surprising, especially when the risks are demonstrably low.

Potential Breach of Australian Standards

EnergyAustralia state "a mixture of assets on traffic routes… would require EnergyAustralia to replicate the same route twice if a mixed BLR cycle is introduced. If it doesn't, EnergyAustralia falls below agreed levels of reliability and safety based on Australian Standards"[11] The implication is that adopting a 4 year cycle on a mixed route would result in the levels of reliability and safety of the MV lamps to fall below Australian Standards.

EMS is unaware of any Australian Standards requirements that would be breached simply by adopting a 4 year BLR cycle instead of a 3 year BLR cycle. Even if such requirements exist, the reliability and safety standards would be breached only if EnergyAustralia failed to undertake spot maintenance. The additional costs of spot maintenance have been factored into EMS's analysis using the *Cost Model.* As described above, the *Cost Model* yielded a net decrease in costs even allowing for the additional spot maintenance.

Potential Loss of Economies of Scale

EnergyAustralia state "two bulk replacement programs will result in the likelihood of a DNSP incurring additional costs due to a loss of economies of scale."[12] EnergyAustralia has not provided any discussion to support this concern.

The scale of a DNSP's public lighting maintenance function is the combination of bulk replacement and spot repairs. It should be the aim of a DNSP to reduce the scale of its public lighting maintenance function as much as possible through the optimum mix of bulk and spot maintenance. A loss in the economies of scale would follow only if the DNSP then allowed under-utilised staff to continue in its public lighting department without appropriate redeployment.

Potential Increase in Bulk Maintenance Contract Unit Rates

EnergyAustralia claim that per unit rates of bulk replacement contracts may rise as a result of Contractors having to spread their fixed costs over less work and over a longer period of

[10] *Response Submission* p20
[11] *Response Submission* p19
[12] *Response Submission* p18

time. The claim holds true only if EnergyAustralia is the Contractors' only client. EMS is aware that the Contractors that EnergyAustralia currently engages also provide services to other DNSPs, Councils and other utilities. It is highly likely that any gaps in work from EnergyAustralia will be filled by work from other clients. In EMS's view, private sector Contractors always ensure that their workforce is fully employed, thus spreading their fixed costs over the same amount of revenue-earning labour hours whether or not the labour hours are committed only to EnergyAustralia or shared with other clients.

Incentives to Rationalise Assets

In the *Original EMS Review,* EMS considered that the implementation of four year BLR cycles for HPS lamps in TRL areas would provide EnergyAustralia with the incentive for efficiency improvements[13]. This opinion was based on EMS's analysis (using EnergyAustralia's *Cost Model*) which indicated that four year cycles would result in net savings in total public lighting opex. EMS expected that EnergyAustralia would be pleased to test its own modelling and, if the results proved to be in favour of four year cycles, to implement as many four year BLR cycles as possible.

EnergyAustralia already has a program in place that provides for the replacement of MV lamps (with HPS) when they have reached the end of their economic lives. The assessment of economic lives would be enhanced with additional information that factors in the costs of bulk and spot maintenance over a four year cycle. According to whether 4 year or 3 year BLR cycles prove to be the more cost effective, the determination of the economic lives of MV lamps would be adjusted accordingly.

Rather than recognising the opportunity to investigate ways to reduce its own costs, EnergyAustralia has reacted to EMS's suggestion by claiming that it penalises EnergyAustralia for the mix of assets inherited as a result of mergers and customer requests for different luminaire types. Apart from the fact that mergers and special lamp types have very little bearing on TRL installations, EnergyAustralia's argument is based on an assumption that costs will increase if four year BLR cycles for HPS lamps in TRL installations are implemented. EnergyAustralia then continue to discuss the need to recover such cost increases from its public lighting customers.[14]

The fact is, the practical cost outcomes are not known. EnergyAustralia's own *Cost Model* indicates that four year BLR cycles for HPS lamps in TRL areas will result in a net decrease of costs. EMS recognises that in practice, the net result may be a gain or a loss, but as discussed above, the amount at risk is not great. EnergyAustralia has the opportunity to test its extensive theoretical analysis with practical in-field trials leading to the discovery of ways to reduce its own costs. EMS retains its view that the AER should base its costings on four year BLR cycles for HPS lamps in TRL installations.

Recommendation:

- EMS recommends that the original recommendation remains unchanged: that a four year bulk replacement cycle be adopted for all HPS lamps in TRL installations and a three year bulk maintenance cycle be adopted for all other lamp types.

[13] *Original EMS Review* p9
[14] *Response Submission* p20

4 General Assumptions

4.1 Labour Rates

Original recommendation:

> That the FY10 labour rate assumptions be adjusted to $56.97 per hour for normal time and $78.53 per hour for overtime.[15]

4.1.1 The *SKM Review*

EnergyAustralia engaged Sinclair Knight Merz (SKM) to review EMS's calculation of normal time and overtime labour rates and submitted the *SKM Review*[16] in support of its *Response Submission*.

SKM based their assessment on the North Street Light team located at Gore Hill. SKM state: "… the North Street Light team is the only department within EA with the sole responsibility of street light maintenance. It is therefore considered reasonable to base the assessment of the street light maintenance labour rate on the North Street Light team. The costs incurred by this team are wholly representative of the costs of running a street light maintenance business within EA."[17]

To preserve the confidentiality of EnergyAustralia's Award conditions, the details of EMS's assessment of the *SKM Review* are presented in Appendix B (Confidential).

A summary of EnergyAustralia/SKM's assumptions and EMS's assumptions in determining typical labour rates for EnergyAustralia's public lighting crews is provided in Table 4.1.

Table 4.1 Comparison of Labour Rate Assumptions

Matter Considered	EnergyAustralia/SKM Assumptions	EMS Assumptions
Base rates	Include Safety Rules Allowance	Exclude Safety Rules Allowance
Safety Allowances	Included in base rates	Separately added
Tool Allowance	Assume 50% Trade staff	Assume all Non-Trade staff
Electricians Licence Allowance	Assume applicable	Assume not applicable
Asbestos Proximity	Not addressed	Assume not applicable
First Aid Allowance	Assume applies to all workers	Assume applies to all workers
Shift Allowance	Assume 30% loading	Assume Award conditions – set shift allowance
Superannuation	Assume 19.5% contribution	Assume 19.5% contribution
Consumable overhead	Assume 2.5%	Assume captured in corporate overhead No additional overhead
Non-productive time oncost	Assume 51 minutes per day. Factored in as 11.8% oncost in normal time; 22.2% oncost in normal + overtime.	Assume 51 minutes per day. Factored in estimated daily productivity. No additional oncost.

[15] *Original EMS Review* p10
[16] Letter from Sinclair Knight Merz to EnergyAustralia, 11 March 2010. This document is referred to as *SKM Review* throughout this reassessment report.
[17] *SKM Review* p1

Depot support and management overhead	Assume additional to corporate overhead 17.3% overhead rate	Assume no additional overhead
Corporate overhead	SKM: 25% on loaded wage rate EnergyAustralia: 25% on total direct costs	25% on total direct costs

AS detailed in Appendix B, with the advantage of more precision in assessing a typical public lighting team, EMS has re-calculated the oncosted labour rates to be $54.61 per hour for normal time and $71.20 per hour for overtime. These rates are lower than the rates determined the *Original EMS Review* ($56.97 per hour and $78.53 per hour) that were based on broader assumptions.

By comparison, SKM determined the oncosted rates to be $61.19 per hour for a week comprising only normal time, and $67.41 per hour for a week comprising 36 hours normal time and 29 hours overtime.[18]

SKM's normal time rate ($61.19 per hour) is higher than EMS's calculation ($56.97 per hour) due to SKM's use of a base rate that includes the Safety Rules Allowance which then gets factored erroneously into several oncost areas, plus a number of higher allowances which, as summarised in Table 4.1, EMS considers to be incorrect.

It appears from SKM's analysis that the overtime figure ($67.41 per hour) is an average rate for a week comprising both normal time and overtime. It is not an average rate for overtime alone. This is the reason that this figure is lower than EMS's calculation ($71.20 per hour), which is the rate for the overtime component only.

To these rates, SKM added:

- consumables overhead (2.5%);
- non-productive time oncost (11.8% for a 36 hour "all normal time" week and 22.2% for a 65 hour "normal time plus overtime" week);
- depot support and management overhead (17.25%): and
- corporate overheads (25%)

to yield labour rates of $95.80 per hour for a 36 hour "all normal time" week and $105.54 per hour for a 65 hour "normal time plus overtime" week.[19]

EnergyAustralia subtracted the corporate overhead component from these rates to produce its proposed rates of $80.50 per hour for normal time and $88.68 per hour for overtime.[20] In doing so, EMS considers that EnergyAustralia may have misinterpreted the meaning of SKM's overtime rate. In any case, EMS considers that all of the proposed additional overheads are invalid for the reasons discussed in Appendix B.

4.1.2 Summary and Recommendation

EMS's original recommendations for labour rates were $56.96 per hour for normal time and $78.53 per hour for overtime. In the *Draft Decision,* the AER agreed with EMS's view and adopted rounded labour rates of $57 per hour and $79 per hour.[21] With the benefit of more precision provided by the SKM analysis, which SKM attests as being wholly representative of

[18] *SKM Review* p4
[19] *SKM Review* p4
[20] *Response Submission* p22
[21] *Draft Decision* p21

all public lighting crews, EMS has re-calculated the wage rates to be $54.61 per hour for normal time and $71.20 per hour for overtime. Rounding yields rates of $55 per hour and $71 per hour.

These rates differ slightly from SKM's base rates for the reasons described in detail in Appendix B. EMS is of the opinion that each of the components of the distributable proposed by SKM is invalid because the costs that the distributable seeks to recover are recovered elsewhere, either through the corporate overhead or as part of the productivity modelling.

- EMS recommends that EnergyAustralia's public lighting opex modelling be based on FY10 labour rates of $55 per hour for normal time and $71 per hour for overtime.

4.2 EWP Rate

Original recommendation:

That the EWP rate assumption of $45 per hour be accepted.[22]

EMS accepted EnergyAustralia's original proposal and no information has been received which indicates that the figure should be adjusted.

- EMS recommends that the assumption of $45 per hour for EWP costs be adopted without change.

4.3 Non-Lamp Material Costs

Original recommendation:

That the assumptions regarding non-lamp material costs be accepted.[23]

EMS accepted EnergyAustralia's original proposal and no information has been received which indicates that the assumptions should be adjusted.

- EMS recommends that the assumptions regarding non-lamp material costs be accepted without change.

4.4 Proportion of Overtime

Original recommendation:

That the overtime proportion assumption be amended to 17.4% to reflect historical overtime proportion in 2008-09.[24]

EnergyAustralia has not provided any information that suggests a reconsideration of this recommendation is required.

- EMS recommends that the overtime proportion assumption of 17.4% be retained without change.

[22] *Original EMS Review* p10
[23] *Original EMS Review* p11
[24] *Original EMS Review* p12

4.5 Proportion of Labour in Total Opex

Original recommendation:

That the assumption of 65% labour in total opex be accepted.[25]

EnergyAustralia has not provided any information that suggests a reconsideration of this recommendation is required.

- EMS recommends that the assumption of 65% labour in total opex be retained without change.

4.6 Overhead Costs

Original recommendation:

That the overhead rate assumption of 26.75% be replaced with the previously accepted figure of 25%.[26]

EnergyAustralia has acknowledged that a simple error occurred due to time pressure in the preparation of its *Original Submission* and has accepted the 25% overhead rate.

- EMS recommends that the overhead rate assumption of 25% be retained without change.

4.7 Cost of Quarterly Patrols

Original recommendation:

That an efficient annual cost for quarterly night patrols of Category V lighting would be in the order of $144,000, representing a rate of approximately $1.00 per lamp inspected and that the cost should be specifically identified rather than merging it into overhead costs.[27]

As above, EnergyAustralia has acknowledged that a simple error occurred due to time pressure in the preparation of its *Original Submission.* The costs of quarterly patrols are incorporated into the *Cost Model.* As a result, this recommendation is redundant.

- EMS recommends that its original recommendation on the cost of quarterly patrols be disregarded.

[25] *Original EMS Review* p12
[26] *Original EMS Review* p13
[27] *Original EMS Review* p14

5 Spot Maintenance Assumptions

5.1 Staffing Requirements

Original recommendation:

> That the staffing assumption for spot maintenance (two staff generally and three when the work site is on a traffic route) be accepted.[28]

EMS accepted EnergyAustralia's original proposal and no information has been received which indicates that the assumption should be adjusted.

- EMS recommends that the staffing assumption for spot maintenance (two staff generally and three when the work is on a traffic route) be retained without change.

5.2 Time Requirements

Original recommendation:

> That the time requirement assumption of 40 minutes per spot maintenance task be replaced with an assumption of 30.6 minutes.[29]

EMS originally determined the recommended time requirement on the assumptions of:

- 45 minutes lost time per day in start of shift preparation and end of shift clean up;
- 20 minutes travel time to the first job;
- 10 minutes preparation time;
- 10 minutes actual maintenance time;
- 5 minutes travel between jobs
- 20 minutes return to depot after last job.

EMS appreciates the more detailed analysis undertaken by SKM and accepts that pre-shift and post-shift lost time should be increased to 51 minutes (see Appendix B). EnergyAustralia appears to have accepted EMS's assumption of 20 minutes for travel to the first job and return from the last job. The 10 minutes allowed for site preparation and again for actual repair work were EnergyAustralia's assumptions that EMS accepted (albeit with an opinion that 10 minutes for the average repair task is generous – a view which EnergyAustralia opposes[30]). In any case, the assumptions remain unchanged.

EnergyAustralia is critical of EMS's assumption of 5 minutes average travel time between jobs on the grounds that:

- the time required to safely park the EWP may require as much as 5 minutes;
- the difficulty of identifying, during the day, which street light is at fault;
- the time required to drive a truck in Sydney's congested traffic.

On the first point, EMS considers that the EWP is not 'parked' as such; rather it is located as required to provide access to the street light that is to be repaired. The choice of location is thus very limited and may well be unsafe were it not for the implementation of traffic

[28] *Original EMS Review* p14
[29] *Original EMS Review* p17
[30] *Response Submission* p12

management measures. The time required for traffic management is included in the 10 minute job preparation allowance. EMS does not consider that any additional allowance should be made for EWP parking.

On the second point, EnergyAustralia state that "if a complaint [about a street light] is initiated from an address, a crew must establish which of the lights close to the address is in need of repair. This of itself could take more than 5 minutes."[31] EMS understands that the procedure for such events in residential areas, is to place a cover, held by a rod from the ground, over the PE cell and wait for 20 to 30 seconds to observe the operation of the light. At most, three street lights would require testing. The total time required, allowing for progress by foot between adjacent lights, would in EMS's opinion be under 3 minutes. Considering that this procedure would be required only on relatively rare occasions, the time for locating faulty lights when averaged across all spot maintenance tasks would not be significant within the accuracy of the modelling.

On the third point, EnergyAustralia states "driving a large truck through urban and CBD environments… it is likely that the maximum driving distance for an EWP for 5 minutes is between 2-3km"[32]. EMS notes that the North Street Light team, which is attested by SKM to be wholly representative of the street light maintenance business within EnergyAustralia, includes a permanent afternoon shift from 3.00pm to midnight. Thus a significant proportion of work is undertaken after 7.00pm when traffic congestion is minimal. However, accepting EnergyAustralia's claim that the typical distance covered in 5 minutes by an EWP in congested traffic is 2-3km, the critical issue then becomes the bundling of jobs.

In the *Original EMS Review,* EMS compared EnergyAustralia's average time to repair (currently 3.4 days) with that agreed with its public lighting customers (8 days). EMS accepted that some of the reduction from 8 days to 3.4 days will flow from the fact that quarterly patrols provide a natural bundling of repair tasks, but pointed out that low average times can also result from a management policy that prioritises repair rate over cost efficiency. An average repair time of 3.4 days when 8 days are available may indicate a lack of focus on the need to bundle jobs in order to reduce costs. EMS expressed the view that EnergyAustralia's public lighting customers should not be expected to pay for a higher level of service than that which they settled on when the Public Lighting Management Plan was finalised. EMS continues to hold that view.

In contrast, EnergyAustralia states that they are proud of their achievement of reducing the repair time from 8 days to 3.4 days and criticises EMS's view by suggesting that EMS is "effectively saying that customers should not be expected to receive any better service than the one they pay for."[33] This is an incorrect re-phrasing of EMS's statement. EMS's view was, and is, that customers should not be forced to pay for a higher level of service unless they specifically request it. EnergyAustralia's achievement of a higher level of service is commendable only if it is achieved at no additional cost to the customer. As it is, EnergyAustralia is proposing that its customers be made to pay for a level of service that they did not ask for and about which they have not been consulted. EMS continues to hold the view that the capacity exists for EnergyAustralia to increase the level of task bundling

[31] *Response Submission* p13
[32] *Response Submission* p13
[33] *Response Submission* p13

and remain within its 8 day commitment. As a result, EMS maintains its opinion that a five minute allowance for travel between jobs, on average, is a fair assumption.

EMS's revised assumptions on spot maintenance time requirements are

- Start of shift and end of shift lost time 51mins
- Travel to first job site 20mins
- Site preparation 10mins
- Repair work 10mins
- Travel to next job 5mins
- Repeat site preparation, repair work, and travel to next job 'n' times
- Return to depot from last job site 20mins.

Calculations will show that on the basis of these assumptions, the number of spot maintenance tasks per 7.2 hour day is 13.64. For the purposes of the *Cost Model*, the average time per task is 7.2 hours divided by 13.64; that is, 31.7 minutes. This is an increase on the EMS's original recommendation of 30.6 minutes, due to the additional allowance for pre-shift and post-shift lost time.

EnergyAustralia has revised the average time taken to undertake miscellaneous maintenance task from 40 minutes to 10 minutes to address the fact that mechanical and electrical repairs are frequently done while replacing a lamp or PE cell and require only an incremental increase in the amount of time required to complete the task.[34] EMS agrees with this adjustment and considers that, together with the revised estimate of average task time for lamp and PE cell replacements of 31.7 minutes, the *Cost Model* will be based on appropriate estimates of spot maintenance time requirements.

- EMS recommends that the time requirement assumptions in the *Cost Model* be adjusted to 31.7 minutes for lamp and PE cell replacements and that EnergyAustralia's proposal for 10 minutes for other maintenance tasks be accepted.

In the context of this discussion in the *Original EMS Review,* EMS expressed an opinion regarding efficiencies that may be gained by using other depots and facilities for the street lighting crews in order to reduce travel times, and also the use of PDA devices for job issue and reporting. EnergyAustralia has criticised these suggestions essentially on the basis that no capital allowance has been provided for the establishment of these improvements.

In expressing these views, EMS had in mind the parking of the EWP in an existing depot or facility and the simple provision of a suitable enclosure or locker for imprest stores, the cost of which would be very moderate. The use of PDA devices to eliminate manual data entry may carry a greater cost. However, in both cases, EMS expects that EnergyAustralia would undertake cost/benefit analysis and, if the payback period is satisfactory, then EnergyAustralia would be pleased to implement such efficiency improvements in order to reduce its own costs. EMS continues to hold the view that EnergyAustralia should consider making these investments in improved efficiency.

[34] *Response Submission* p13

5.3 Average Failure Rates of Lamps

Original recommendation:

> That subject to the adjustment of inconsistencies of failure rates in multi-lamp configurations, the failure rates adopted in the *Cost Model* be accepted.[35]

5.3.1 Background

The development of failure rate assumptions for EnergyAustralia's most common lamp types is shown in Table 5.1.

Table 5.1 Annual Failure Rates of EnergyAustralia's Common Lamp Types[36]

Lamp Type	EnergyAustralia June 2008 Proposal	AER April 2009 Determination	EnergyAustralia January 2010 Analysis	
			Failures after 3 years	Failures after 4 years
MBF1x80	6.00%	2.00%	2.43%	2.30%
TF2x20	40.46%	11.00%	11.00%	11.00%
MBF1x250	10.00%	6.00%	1.68%	1.47%
MBF1x50	10.00%	6.00%	1.01%	1.01%
SON1x250	15.00%	5.00%	3.66%	3.65%

EnergyAustralia' June 2008 proposals were based on a technical report prepared in 2004 which the AER considered invalid due to its age and the fact that it did not factor in a number of important changes in EnergyAustralia's public lighting operations.[37] The AER sought information from a lamp manufacturer in relation to the deterioration and failure characteristics of a range of MV, HPS and fluorescent lamps. This limited analysis revealed failure rates considerably lower than EnergyAustralia's June 2008 assumptions. The failure rates adopted by the AER in its April 2009 Determination were based on the manufacturer's data where available. Lamps for which no data were available were assigned an assumed failure rate equal to EnergyAustralia's June 2008 assumptions less 20%.

Failure rate assumptions are a critical input in 'bottom-up' modelling and in recognition of the apparent imprecision of both the June 2008 and April 2009 assumptions, EnergyAustralia undertook its own analysis of 41 lamp types for which "sufficient failure records existed for 24 lamp types to be able to determine statistical parameters for the Weibull distribution that most closely matched the data sets"[38] The analysis revealed failure rates that EnergyAustralia considered to be surprising.[39] In EMS's view, the rates were in line with expectations.[40]

According to EnergyAustralia's Street Lighting MRA Review, the data for the Weibull analysis was taken from notifications of failures from bulk lamp replacement work and from

[35] *Original EMS Review* p18
[36] Data from *Original Proposal* p36 and *Cost Model* as submitted with *Original Proposal*
[37] AER, *Final Decision, New South Wales distribution determination 2009-10 to 2013-14,* 23 April 2009, p344
[38] EnergyAustralia, *Street Lighting, Maintenance Requirement Analysis (MRA)Review,* January 2010, p6
[39] *Original Submission* p35
[40] Refer to discussion in Chapter 3, *Original EMS Review.*

customer complaints.[41] In the *Original Submission,* EnergyAustralia explained: "As a consistency check we reviewed the number of lamp failures recorded against materials in stores. For our 7 largest lamp populations, of the 250,000 lamps booked out of stores, we found that 20,033 (or 8%) were not recorded on our systems (in terms of usage for bulk or spot maintenance or capital works). This could mean that a material proportion of lamp replacements are occurring and no information is being recorded thus distorting the failure rate conclusions to artificially lower rates. Other reasons could include fluctuations in BLR contractor held stock. The extent to which this variance impacts spot failure rates is unclear at this time."[42]

Notwithstanding the possible errors in the data, EnergyAustralia accepted its own analysis and, in the *Original Submission,* adopted its failure rates where known, and the AER's rates otherwise. EMS considers that to be a reasonable approach since a data error of 8% may be expected to affect the calculated failure rate by a similar proportion. For example, a theoretical failure rate of 2.5% may represent an actual rate that varies from 8% lower (i.e. 2.3%) to 8% higher (i.e. 2.7%).

5.3.2 Response Submission

In the *Response Submission,* EnergyAustralia has reversed its position by claiming that the data errors discussed above are such that the extensive analysis submitted in support of its *Original Submission* is no longer valid. EnergyAustralia state: "To test our analysis we have compared the number of work orders which have resulted in the replacement of lamps with the number of lamps being booked in and out of stores. Significantly more lamps are booked out of stores than appear on work orders. As a result, we are convinced that EnergyAustralia's proposal failure rates applied in its opex cost build up model are likely to be systematically low. Until EnergyAustralia has a better understanding for this discrepancy it is not possible to apply the lamp failure rates from its analysis."[43] Instead of using its own extensive analysis, EnergyAustralia now propose to revert to the AER's earlier assumptions.

As seen from Table 5.1, for its most common lamps, EnergyAustralia propose to adopt failure rates that are up to six times greater than those determined from its own analysis. EMS notes that EnergyAustralia has not provided in its *Response Submission,* any quantitative evidence to counter the 8% data error estimation provided in the *Original Submission*. EMS considers that it is most unlikely that additional data errors have been found that would justify such a large alteration in the assumed failure rates.

In the absence of revised quantitative evidence, EMS is of the opinion that the extent of the errors caused by missing lamp replacement data continues to be relatively minor (as in the *Original Submission)* and accordingly, concludes that there are not sufficient grounds for disregarding the failure rates identified by EnergyAustralia's extensive analysis as described in its Street Lighting MRA Review.

[41] EnergyAustralia, *Street Lighting, Maintenance Requirement Analysis (MRA)Review,* January 2010, Appendix 1
[42] *Original Response* p36, including Footnote 65.
[43] *Response Submission* p14

5.3.3 Multi-Lamp Failure Rates

The failure rate of a given lamp type is a physical characteristic that is unaffected by whether the lamp is in a single-lamp or a multi-lamp configuration. EMS identified some inconsistencies in the original version of the *Cost Model* where a given lamp type was assigned the EnergyAustralia failure rate when in a single-lamp configuration, and the earlier AER failure rate when in a multi-lamp configuration. For example, the 80W MV lamp, was assigned a 3 year failure rate of 2.43% in the single-lamp configuration (Item 65) and a 3 year failure rate of 6% when in a 2 lamp, 3 lamp, or 4 lamp configuration (Items 71, 75, 77). Other examples also existed. The inconsistencies were presumed by EMS to be simple data entry errors that would easily be attended to.

It appears that EnergyAustralia has since reviewed the *Cost Model* and found that the number of lamps in multi-lamp configurations is not factored into the calculation of spot maintenance costs. A closer review shows that the number of lamps is factored into materials costs (*Cost Model* 'Calc-Opex" worksheet, cols AQ and BL) but not in to labour or EWP costs.

In order to deal with this error, EnergyAustralia proposes to adopt failure rates for multi-lamp configurations equal to the failure rate of a single lamp multiplied by the number of lamps, as listed in Table 1 of EnergyAustralia's *Response Submission.*[44] This would be correct only if the number of lamps factored into the materials cost is removed. Whilst this would give the correct bottom-line result, the approach is wrong in principle. The failure rate of the lamps is not affected by how many lamps are in the configuration. Rather, the frequency of spot repairs on a particular configuration will determined by the number of lamps in the configuration.

In order to preserve the analytical robustness and flexibility of the *Cost Model*, EMS suggests that EnergyAustralia should adjust the model such that the failure rate for each lamp type listed in the 'Input-Inventory' worksheet is that lamps' correct failure rate, regardless of how many such lamps are in a configuration. The effect of the number of lamps in multi-lamp configurations should then be factored into labour, materials and EWP costs in the 'Calc-Opex' worksheet.

5.3.4 Summary and Recommendation

EMS considers that EnergyAustralia's qualitative discussion of data errors in its *Response Submission* is insufficient to override the quantitative evidence of the extent of such errors as provided in the *Original Submission.* The quantitative evidence indicates that the calculated failure rates may be up to 8% understated. This does not justify the proposed reversion to the AER's failure rates which are up to six times higher.

Errors have been found in the *Cost Model* in relation to multi-lamp configurations. EnergyAustralia's proposed adjustments require further adjustments in the calculations worksheet and, in principle, are analytically weak. A better approach would be to adopt consistent failure rates for each lamp type and factor the effect of multi-lamp configurations in the determination of labour, materials and EWP costs in the calculation worksheet.

[44] *Response Submission* p15

- EMS recommends that the failure rates adopted in the *Cost Model* be EnergyAustralia's 4 year rates for HPS lamps in TRL routes and EnergyAustralia's 3 year rates for all other lamps, where available, and the AER rates otherwise, subject to adjustments to correctly deal with multi-lamp configurations.

5.4 Average Failure Rate of PE Cells

Original recommendation:

That the average PE cell failure rate of 1.42% be accepted.[45]

EMS accepted EnergyAustralia's original proposal and no information has been received which indicates that the figure should be adjusted.

- EMS recommends that the average PE cell failure rate of 1.42% be retained without change.

5.5 Average Failure Rate of Other Components

Original recommendation:

That the 'other component' failure rate of 1% be accepted.[46]

In the *Original Submission,* EnergyAustralia proposed, and EMS accepted, the 1% rate as an estimation (rounded-up from 0.83%) of "the annual percentage of other components that failed and were recorded in EA's system (iAMS) as repaired."[47]

Table 5.2 Other Component Failure Rates[48]

Component	Failure/Replacement Rate	Opex Proportion	Original Calculation	New Calculation
Choke	0.23%	66.9%	0.23%	0.2%
Fuse Holder	0.00%	100%	0	0
Bracket	1.82%	25.6%	Excluded	0.5%
Luminaire	12.89%	65.9%	Excluded	8.5%
Service Wire	0.00%	100%	0	0
Shade	0.03%	79.5%	0.03%	0
SL Cable	0.00%	0%	0	0
SL Wiring	0.21%	84.2%	0.21%	0.2%
SL Control Point	0.04%	86.2%	0.04%	0
Starter	0.16%	73.5%	0.16%	0.1
Visor	0.16%	83.3%	0.16%	0.1
TOTAL			**0.83%**	**9.6%**

[45] *Original EMS Review* p19
[46] *Original EMS Review* p19
[47] EnergyAustralia, *EnergyAustralia response to AER's questions received on 9 February 2010,* 12 February 2010, Q4
[48] Details taken from *Response Submission* Table 3, p17 and *EnergyAustralia response to AER's questions received on 9 February 2010,* 12 February 2010, Q4

EnergyAustralia originally excluded brackets and luminaires from the list of other components as they were assumed to be capitalised.[49] In the *Response Submission,* EnergyAustralia has reversed that position as they consider the earlier assumption was incorrect. Instead, EnergyAustralia has proposed that the annual failure rate should be multiplied by the proportion of replacement costs that was expensed in the past. Significantly, EnergyAustralia argue that since 65.9% of luminaire replacements were expensed in the past then the annual replacement rate of 12.89% should be resolved into an opex failure rate of 8.5% (65.9% x 12.89%). EnergyAustralia proposed to treat all other miscellaneous components similarly, as shown in Table 5.2 above.

The failure rates of components are a physical property of the component independent of the allocation of repair costs. EnergyAustralia's advice provided on 12 February 2010[50] indicates that the physical numbers are determined from a count of repairs. EMS considers that it is invalid to use past cost expenditure allocations to modify failure rates determined from actual physical counts of repairs.

Further, even if the modification of failure rates with past cost allocations were considered to be a valid modelling approach, the result in relation to luminaires is intuitively improbable. The figures show that 12.89% of luminaires are replaced annually, of which, according to cost allocations, 34.1% is replacement capex and 65.9% is failure opex. EnergyAustralia claims that this means that 8.5% of luminaires are replaced for reasons of failure every year. That is to say, on average, every luminaire in EnergyAustralia's network fails in service every 11.8 years. It should be noted that this refers to the failure of the luminaire itself – components within the luminaire such as chokes, visors, lamps, starters and wiring are accounted for separately. Almost the only remaining mode of failure of the luminaire itself would be corrosion or breakage of the housing. EMS considers that a rate of 8.5% for this mode of failure is a highly improbable representation of actual luminaire performance.

EMS considers that the failure of a luminaire itself would be a very rare event and, as assumed by EnergyAustralia until now, its replacement would be costed as replacement capex.

EnergyAustralia's records apparently do not provide a breakdown of capital replacements and failure replacements in terms of physical numbers of miscellaneous components. The breakdown provided by past cost allocations, at least in respect of luminaires, is intuitively improbable. It is much more likely, as EnergyAustralia assumed previously, that luminaire failures would be costed as capital replacements. In EMS's opinion, the quantification of luminaire failure replacements in the *Response Submission* is not sound and accordingly, EMS considers that EnergyAustralia's former proposal should remain.

- EMS recommends that the 'other component' failure rate of 1% be retained without change.

[49] *Response Submission* p16
[50] See Footnote 47

5.6 Connection Maintenance Assumptions

Original recommendation:

That the connection repair unit rate assumptions be accepted.[51]

EnergyAustralia has not provided any information that suggests a reconsideration of this recommendation is required.

- EMS recommends that the connection repair unit rate assumptions be retained without change.

[51] *Original EMS Review* p19

6 Bulk Maintenance Assumptions

6.1 Lamp Replacement Cycle

Original recommendation:

> That the bulk replacement cycle assumptions used in the *Cost Model* be adjusted to four years for all HPS lamps in TRL installations and three years for all other lamps.[52]

EnergyAustralia's response to this recommendation is discussed in detail in Chapter 3. EMS's reassessment of the matter in light of EnergyAustralia's response has not caused EMS to vary its opinion.

- EMS recommends that its original recommendation be retained without change: that the bulk replacement cycle assumptions used in the *Cost Model* be adjusted to four years for all HPS lamps in TRL installations and three years for all other lamps.

6.2 PE Cell Replacement Cycle

Original recommendation:

> That PE cell replacement be on the basis of "every visit" for HPS lamps in TRL installations, and "every second visit" for all other lamps. Accordingly, the *Cost Model* should assume a PE cell replacement cycle of four years for all HPS lamps in TRL installations and six years for all other lamps.[53]

EnergyAustralia has not provided any information that suggests a reconsideration of this recommendation is required.

- EMS recommends that its original recommendation be retained without change: that PE cell replacement be on the basis of "every visit" for HPS lamps in TRL installations, and "every second visit" for all other lamps. Accordingly, the *Cost Model* should assume a PE cell replacement cycle of four years for all HPS lamps in TRL installations and six years for all other lamps.

6.3 Cycles and Unit Rates for Other Bulk Replacement Tasks

Original recommendation:

> That the modelling of cycles and unit rates for other bulk replacement tasks be accepted.

EnergyAustralia has not provided any information that suggests a reconsideration of this recommendation is required.

- EMS recommends that the modelling of cycles and unit rates for other bulk replacement tasks be accepted without change.

[52] *Original EMS Review* p20
[53] *Original EMS Review* p21

7 Parsons Brinckerhoff Benchmarking Study

7.1 Background

In the *Original EMS Review,* EMS commented on the Parsons Brinckerhoff (PB) independent review of EnergyAustralia's public lighting costs as submitted in the *PB Review* and the *PB Review Addendum*.[54] In large part, EMS found agreement with PB's conclusions.[55] The two key points of difference were:

- In the review of historic costs, EMS considered that growth and additional requirements under the Public Lighting Code do not account for EnergyAustralia's proposed 52% cost increase, as concluded by PB, and
- In benchmarking with other DNSPs, whilst PB concluded that EnergyAustralia is operating at a reasonable level of efficiency, EMS considered that the evidence presented by PB showed that EnergyAustralia's performance is of the same order as some of the worst performing DNSPs.

PB's overall conclusions were that "EnergyAustralia is on average operating efficiently in its provision of public lighting services" and "EnergyAustralia's forecast of expenditure for public lighting services is efficient."[56]

Considering the importance of the points of difference between EMS's interpretation and PB's interpretation of the data presented by PB relating to the above two points, EMS considered that PB's conclusions were somewhat generous.[57]

In the *Response Submission*, EnergyAustralia did not address the first point of difference but is critical of EMS's view in the second point on the basis that, in EnergyAustralia's opinion, EMS did not properly consider all relevant facts. EnergyAustralia's arguments may be summarised as:

- PB's benchmarking data show EnergyAustralia's public lighting performance is at the median rather than at the worst end of the benchmarked DNSPs;
- EMS's benchmarking against Victorian DNSPs is in error;
- EMS should accept 'opex per customer' as a valid benchmark;
- EMS has not addressed the business characteristics of each DNSP;
- EnergyAustralia considers Integral Energy to be a relevant comparator and therefore more weight should be given to that specific benchmark comparison.[58]

Each of these points is addressed below. It should be noted that EMS's views are based on the data as presented by PB in the *PB Review* and the *PB Review Addendum.* Since no additional data is brought to bear and PB's factual data is accepted, the discussion focuses

[54] Parsons Brinckerhoff, *Independent Review of Public Lighting Costs – EnergyAustralia,* January 2010 and *Independent Review of Public Lighting Costs – Addendum – EnergyAustralia,* 19 January 2010. These two documents are referred to respectively as *PB Review* and *PB Review Addendum* throughout this Chapter. Both documents are confidential.
[55] EMS agrees with all of PB's key findings (*Original EMS Review* pp 24, 25) and, *per se*, with five of PB's seven specific conclusions (*Original EMS Review* pp 25-29).
[56] *PB Review* p26, reflected in *PB Review Addendum* p8
[57] *Original EMS Review* p29
[58] *Response Submission* pp 20-22

on the interpretation of the data rather the data itself. The discussion will be assisted by firstly addressing the latter points of EnergyAustralia's arguments.

7.2 Business Characteristics

PB provided the following data shown in the following Tables. [59] Whilst PB's analysis was based on publicly available data, the report was provided to the AER on a confidential basis and to preserve the confidentiality, DNSPs other than EnergyAustralia are identified as A, B, C, D, E, F, G, H, and J. The benchmarked DNSPs cover NSW, Victoria and Queensland. To illustrate EnergyAustralia's position in relation to the other DNSPs, the columns have been arranged in descending order:

Table 7.1 Total Distribution Customers

EA	A	B	C	D	E	F	G	H	J
1,500,000	1,300,000	853,322	770,000	675,038	650,000	630,000	600,000	305,000	300,000

Table 7.2 Customer Density (customers per sq km)

J	F	H	EA	A	B	G	D	C	E
1911	417	316	**67**	52	35	8	5	1	<0.5

Table 7.3 Street Light Density (lights per sq km)

J	F	H	A	EA	B	G	D	C	E
329	80	78	12	**11**	7	2	1	0.2	0.1

In reviewing the data, PB considers that high customer density "points to increased traffic congestion" whilst high density of street lights "translates to smaller distances between street lamps and therefore should reduce the time required to travel between lamp repairs".[60] PB then state: "It is difficult to form a view as to the trade off between these two phenomena without performing detailed field analysis for each of the DNSPs. In PB's view and without evidence to the contrary it is reasonable to assume that the gains in travel time between lamps are partially if not fully offset by the increased traffic congestion and traffic management requirements of more densely populated network areas."

PB continues: "Of particular interest is the degree of access restrictions that may occur when seeking to repair or replace lamps… PB has no information to assess the impact of access restriction but it seems likely that such restrictions will occur more often in higher density areas and where narrow carriageways are more prevalent. PB concludes that the Sydney urban area with its narrow carriageways and high incidence of one way streets is likely to have more access restrictions than either Melbourne or Brisbane." [61]

In the *Original EMS Review,* EMS stated that "PB made no firm conclusions as to the relative advantages and disadvantages of customer density, traffic factors, etc".[62] EMS accepts that

[59] *PB Review Addendum* pp 4,5
[60] *PB Review* p15
[61] *ibid*
[62] *Original EMS Review* p27

this opinion is an over-simplification of PB's position. A closer review of PB's statements indicates that:

- The gains of high street light density (short distances to and between jobs) and the losses of high customer density (traffic congestion) effectively cancel each other with zero net effect on a DNSP's public lighting opex; and
- In relation to Sydney's narrow carriageways, PB has drawn a conclusion based on no information and apparently no assessment. Since conclusions may be drawn only from actual evidence, PB's conclusion is in fact, an assumption.

EMS accepts that a better summary of PB's position is that the business characteristics discussed by PB have not been demonstrated by either data or analysis to have a bearing on the costs of a DNSP's public lighting opex.

That said, EMS accepts that certain business characteristics do affect public lighting opex.

Movement around a CBD is not easy and while the distances are short, the speed of travel may be very slow. Notwithstanding the claims made by EnergyAustralia about Sydney's congested streets, PB has not provided any information to demonstrate actual differences between the Sydney, Melbourne and Brisbane CBDs and indeed have concluded that in broad terms, the gains of short travel distances equal the losses of slow travel speeds. It is also noted that EnergyAustralia's street light team that services the Sydney CBD has one crew on permanent afternoon shift providing spot maintenance during at least 5 hours per day in relatively low traffic congestion.

It may be that the costs of public lighting maintenance in urban areas are different to CBD areas but neither EnergyAustralia nor PB has provided any information. In urban areas, greater distances are required but faster travel is possible. In the absence of information, no firm conclusions may be drawn as to whether public lighting opex is more or less expensive in urban areas compared to CBDs.

In rural areas however, public lighting maintenance costs are clearly dominated by travel distance. Whilst DNSPs will seek to bundle spot repairs as much as possible, many rural villages have only a few street lights which means the incidence of failures is very low. Thus it is inevitable that crews will be required to travel considerable distances to maintain only one or two lights.

In EMS's opinion, the key business characteristic that differentiates the costs faced by DNSPs in fulfilling their public lighting function is the extent of their rural areas. The cost of maintaining public lighting in CBD/urban areas may be expected to be considerably lower per street light than in rural areas. There are clearly many factors within the inherent cost characteristics. Intuitively, the only generally true differentiator is that DNSPs that predominantly service CBD/urban areas may be expected to face lower costs per street light than DNSPs that service wholly rural areas.

7.3 Opex Per Customer

The fundamental requirement of any performance indicator is a strong link between cause and effect. A ratio of A : B has little or no value as a KPI unless there is a strong causal link between A and B.

EnergyAustralia states "EMS has ignored other relevant measures of efficiency such as 'opex per customer'. On this measure, EnergyAustralia performs better than the majority of distributors."[63] Rather than ignoring the measure, in the *Original EMS Review,* EMS stated that "EMS considers this benchmark to be of little value since the causal link between customer numbers and street light opex is weak."[64]

EnergyAustralia's opex per customer is low because of the prevalence of high-density residential accommodation in Sydney. Apart from traffic issues, which, in PB's view, results in gains equalling losses, it matters not whether a public light that requires maintenance is in a street lined with high-rise apartment buildings or bungalows on large suburban blocks. EMS maintains its view that the casual link between customer numbers and public lighting opex is weak and that a benchmark based on this measure is of little value.

7.4 Benchmarking Against Victorian DNSPs

EnergyAustralia claims that in the *Original EMS Review*, EMS included three Victorian businesses (with lower costs) and excluded the Victorian distributors with higher costs.[65]

EMS is puzzled by this claim. In the *Original EMS Review,* we stated: "In terms of opex per street light (which clearly has a strong causal link) PB found that of eight Australian DNSPs with mostly city and urban distribution areas, EnergyAustralia ranked sixth in terms of public lighting opex per light installed. The actual costs were $25, $29, $33, $43, $58, $59(EA), $60 and $63 per light installed… The worst figures ($60 and $63) relate to Victorian DNSPs, which as PB notes, are based on proposed 2011-16 expenditure rather than AER approved expenditure. The better figures relate to a mixture of Queensland, NSW and Victorian DNSPs."[66]

The discussion clearly includes all Victorian DNSPs including the two with higher costs. In relation to the caveat about the Victorian DNSP's expenditure being "as proposed" rather than "as approved", EMS points out that in the normal course of events, approved expenditure is lower than proposed expenditure. If this turns out to be the case for the Victorian DNSPs then EnergyAustralia's opex per street light will appear even higher by comparison.

7.5 Integral Energy a Relevant Comparator

In the *Response Submission,* EnergyAustralia state: "We consider that Integral is a relevant comparator for our business, as we operate under the same service level framework (NSW Public Lighting Code). The fact that our costs are within the range of costs determined by the AER for Integral Energy, and given that we operate in a highly congested CBD area, suggests that the proposed costs are reasonable from a high level perspective."[67] PB's data show that in terms of 'street light opex per street light', EnergyAustralia's and Integral Energy's benchmarks are very close, and in terms of 'street light opex per customer' EnergyAustralia is well ahead of Integral Energy.

[63] *Response Submission* p21
[64] *Original EMS Review* p27
[65] *Response Submission* p21
[66] *Original EMS Review* p27
[67] *Response Submission* p22

EnergyAustralia services the CBDs of Sydney and Newcastle, their extensive urbanised surrounding districts including the NSW Central Coast, and a rural area that extends into the Upper Hunter region. By comparison, Integral Energy services the CBDs of Parramatta and Wollongong, a similarly extensive urban area, and a rural area that extends across the Blue Mountains and along the NSW South Coast. Considering that Integral Energy's ratio of rural area to CBD/urban area is greater than EnergyAustralia's, it may be that Integral Energy's inherent costs are higher. However, as discussed in Section 7.2, no firm conclusions may necessarily be drawn.

EMS notes that Energex provides public lighting services to the Brisbane CBD, the Gold Coast and a rural area of similar proportions to EnergyAustralia's. It may be argued that Energex faces similar inherent costs and yet its street lighting opex per street light is significantly lower than EnergyAustralia's. With respect to the cost burden created by the NSW Public Lighting Code, EMS identified in the *Original EMS Review* that the impact of the requirements may add no more than $0.5mil pa to EnergyAustralia' public lighting opex.[68] If Energex were to implement the Code's requirements, the pro rata cost impact would be even less and certainly insufficient to account for the difference between its opex per street light and EnergyAustralia's opex per street light.

In conclusion, EMS considers that given the multitude of inherent cost characteristics, it is not possible to nominate any single DNSP as a valid comparator. The only approach that has any credibility is to consider all similar DNSPs as a whole. That is, predominantly CBD/urban DNSPs may be compared as a group and wholly rural DNSPs may be compared as a group. Even then, conclusions may be drawn only in the broadest of terms.

7.6 Benchmarking

PB summarised its benchmarking with the statement: "On all indicators, EnergyAustralia's service provision is more efficient than other NSW DNSPs but worse than Victorian and Queensland DNSPs. Taking into account the differences between states that PB is aware of, the benchmarking supports that EnergyAustralia is operating at a reasonable level of efficiency."[69]

EMS notes that the only reference to the difference between States in PB's report is in relation to the NSW Public Lighting Code, which in EMS's opinion, adds no more than $0.5mil (3% to 4%) to EnergyAustralia's costs.

PB based its conclusion on the data shown in Figures 3.7 and 3.8 of the *PB Review*, and updated in Figures 5 and 6 of the *PB Review Addendum.* PB's updated charts are copied as Figure 7.1 and Figure 7.2 below.[70]

[68] *Original EMS Review* p26
[69] *PB Review* p25
[70] In each chart, the data for DNSP 'E' are not directly comparable as that DNSP includes the LV connection as part of the public lighting service provision.

Figure 7.1 Public Lighting Opex per Network Customer

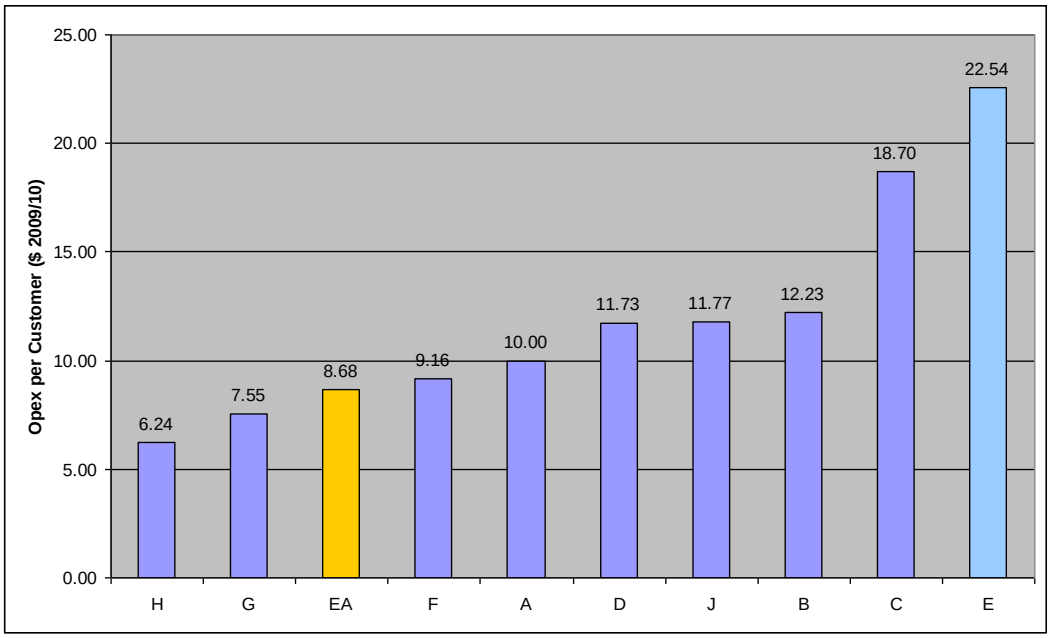
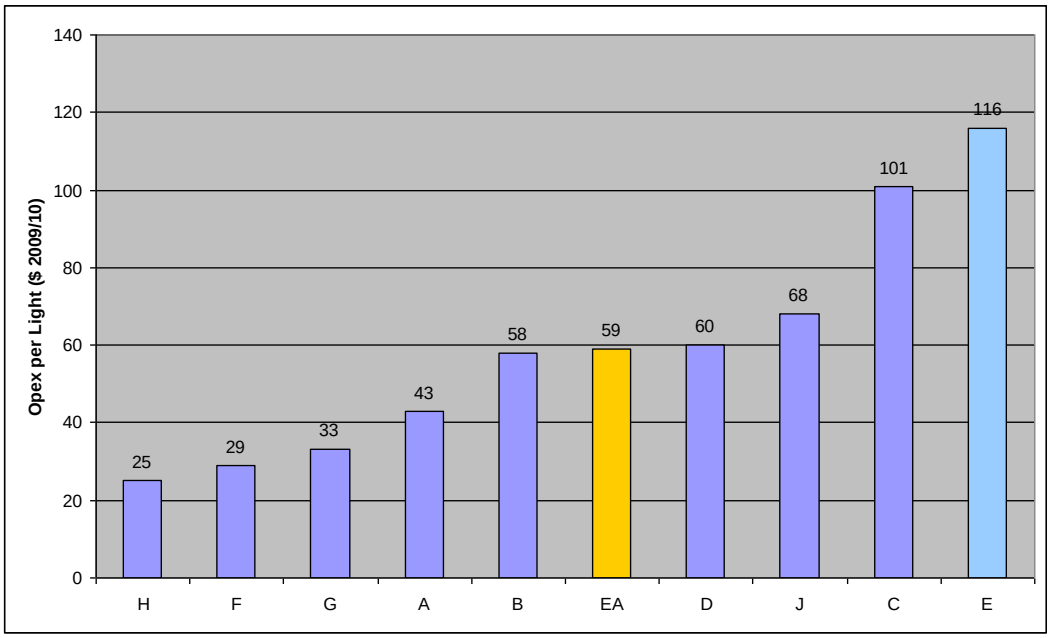


Figure 7.2 Public lighting Opex per Street Light

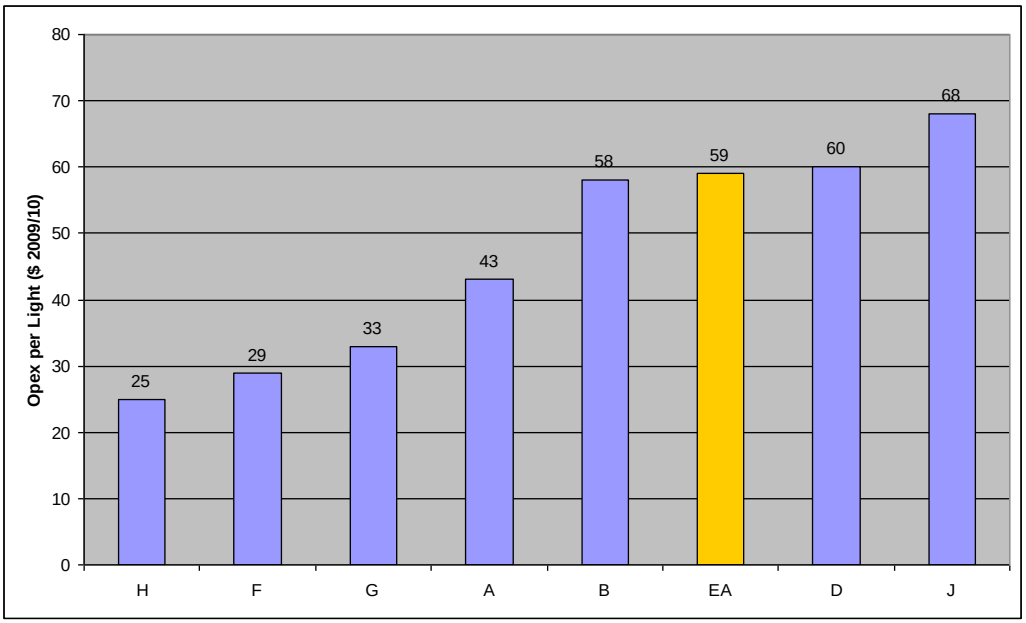


As discussed previously, EMS considers that:

- The causal link between public lighting opex and customer numbers is weak and therefore performance measured in terms of cost per customer is of little value; and
- The inherent cost characteristics of wholly rural DNSPs are such that benchmarking predominantly CBD/urban DNSPs against them is invalid.

That being the case, EMS considers Figure 7.1 is of little benchmarking value and omits DNSPs C and E due to their being wholly rural. The remaining elements of PB's benchmarking that provide a reasonable comparison are as shown in Figure 7.3.

Figure 7.3 Public Lighting Opex per Light - Reasonable Comparison Basis



In reviewing PB's benchmarking analysis, EMS considered that: "PB's conclusion [that EnergyAustralia is operating at a reasonable level of efficiency] is somewhat misleading in that EnergyAustralia's performance in terms of opex per street light for city/urban DNSPs is of the same order as some of the worst performing DNSPs."[71]

EMS's conclusion was based on PB's own data and related only to the benchmarking study. As discussed previously, EMS considers that the benchmarking undertaken by PB did not sufficiently take into account all factors that contribute to a DNSP's inherent costs. A broad comparison of predominantly CBD/urban DNSPs is the best that can be achieved. However, to the extent PB was prepared to draw a conclusion on the evidence of the above charts, that EnergyAustralia is operating at a reasonable level of efficiency, EMS challenged that conclusion since in its opinion, the above charts indicate instead that EnergyAustralia's performance is of the same order as some of the worst performing DNSPs. EMS considers that its opinion in relation to PB's benchmarking study, remains valid.

7.7 Overall Conclusion

As discussed in Section 7.1, EMS's interpretation of historic costs and benchmarking differ considerably from PB's. Since these are key elements of PB's cost review, EMS considered that PB's overall conclusions, that "EnergyAustralia is on average operating efficiently in its provision of public lighting services" and "EnergyAustralia's forecast of expenditure for public lighting services is efficient" to be somewhat generous. Having completed a more detailed review of PB's benchmarking study, EMS has found no reason to alter that opinion.

[71] *Original EMS Review* p28

8 Shortened Forms

AER	The Australian Energy Regulator
BLR	bulk lamp replacement
capex	capital expenditure
Consent Award	EnergyAustralia, *EnergyAustralia Agreement 2008*
DNSP	distribution network services provider
Draft Decision	AER, *EnergyAustralia Draft distribution determination 2009-10 to 2014-15, Alternative control (public lighting) services,* 23 February 2010
EA	EnergyAustralia (NSW)
EMS	Energy and Management Services Pty Limited
Original Submission	EnergyAustralia, *Submission for the AER's re-determination of public lighting prices 2010-2014,* January 2010
PB	Parsons Brinckerhoff Australia Pty Limited
PB Review	Parsons Brinckerhoff, *Independent Review of Public Lighting Costs – EnergyAustralia,* January 2010 (Confidential)
PB Review Addendum	Parsons Brinckerhoff, *Independent Review of Public Lighting Costs – Addendum - EnergyAustralia,* 19 January 2010 (Confidential)
Response Submission	EnergyAustralia, *Submission responding to the AER's February 2010 decision - public lighting prices 2010 to 2014,* March 2010
SKM	Sinclair Knight Merz Pty Limited
SKM Review	Letter from Sinclair Knight Merz to EnergyAustralia, 11 March 2010 submitted by EnergyAustralia in support of its *Response Submission*
TRL	Traffic Route Lighting (Category V under AS/NZS 1158)

Appendix A – Terms of Reference

Respond to submissions on the AER's public lighting draft decision (opex only)

- EMS is required to review its original recommendations in relation to the assumptions and inputs applied in EnergyAustralia's operating expenditure (opex) model in light of submissions made by EnergyAustralia and interested parties.

- EMS's report is to set out those recommendations that remain unchanged and why it considers that its original recommendation remains appropriate. EMS is also to set out those recommendations that (based on submissions received and potentially further analysis) it believes are no longer appropriate, the reasons for the change and what the amended input or assumption should be as a result of EMS's further review.

- EMS is to document its review in a brief report to the AER in a format that is consistent with its original report to the AER.

Appendix B – Labour Rates (CONFIDENTIAL)

Appendix C – About EMS

The Business

Energy and Management Services Pty Ltd (EMS) is an energy consultancy established in 1996 specialising in providing assistance to commercial and industrial clients, agribusinesses, and small/medium enterprises in their dealings with energy companies. Our key personnel are people who have lengthy experience in the electricity distribution industry and in recent years have changed the direction of their careers to work instead as consultants for the customers rather than executives and engineers for the distributors.

EMS offers extensive experience, insight and competence from both sides of the market divide: on the one side, extensive knowledge of the DNSP operations; and on the other, practical experience of the real economic effects in, and responses of, the marketplace flowing from electricity network pricing determinations.

EMS has been engaged by the AER on several occasions since the transfer of electricity distribution regulation responsibilities to the AER from the State Authorities. EMS undertakes reviews of DNSP's submissions and proposals, provides peer assessments of other Consultant's reviews, and responds to a wide range of ad hoc enquiries and requests for advice.

The Personnel

The personnel involved in this engagement have a combined experience in the electricity distribution industry of over 80 years, encompassing both urban and rural networks.

PETER HALYBURTON
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Master of Business Administration, University of Newcastle
Fellow, Institution of Engineers Australia

Peter Halyburton founded Energy and Management Services after leaving Advance Energy in 1996. His career in the electricity distribution industry spanned 34 years and covered three separate DNSPs. At Shortland County Council he held several engineering positions before being appointed Assistant Divisional Engineer - Design. Peter headed a specialist group to take control of the Hunter Valley 132kV system and augment its capacity by over 200MVA to cater for coal mining expansion. In 1984 he was appointed as Deputy Chief Electrical Engineer at Peel-Cunningham County Council and in 1987 he moved to Macquarie County Council (Western Power) initially as Chief Electrical Engineer and then became the first General Manager. In 1995 he was appointed by the Minister as CEO of MidState Energy (which became Advance Energy), the successor of five DNSPs covering the Central Western area of NSW.

Peter was a Board Member of the Electricity Supply Engineers' Association for eight years and served as its President in 1992. He was Chairman and Member of a number of State Committees including the Uneconomic Lines Working Group, the Community Service

Obligations Working Group, the 132kV Assets Transfer Working Group and the Electricity Industry Insurance Working Group. He was also a Member of the Committee of Enquiry into Broken Hill City Council and Electrification of the Far Western Region in 1991.

RON CRAGGS
Bachelor of Engineering (Honours), NSW Institute of Technology (UTS)
Graduate Diploma of Management, Capricornia Institute (UCQ)
Fellow, Institution of Engineers Australia

Ron's 40 years experience in the electricity supply industry has spanned technical, engineering, administrative, and senior executive roles. After 15 years in Sydney he took up a position with a NSW rural electricity distributor with responsibility for designing and installing electrical protection systems, metering and communications, OH&S training and implementation, standardisation, procurement and logistics, pricing, economic analysis, marketing, regulatory strategy, and energy advisory services. The major re-structuring of the electricity supply industry in the mid-90s resulted in the formation of a new corporatised entity, NorthPower. Ron gained a senior management role in the new organisation, with the key tasks of establishing the wholesale trading function and merging the widely varying cultures, systems, policies and procedures in the retail side of the corporation. In 1997, Ron was appointed Corporate General Manager and Company Secretary. This role continued into Country Energy, formed in 2001 to provide energy services to all of rural and regional New South Wales.

Ron represented NSW electricity distributors as a Councillor on the Electricity and Water Ombudsman of NSW Council from its foundation in 1997 to 2005. He was appointed by the NSW Minister for Education as a member of the Council of the North Coast Institute of TAFE from 2003 to 2006.

In 2005 Ron concluded his DNSP career to seek opportunities as an engineering and management consultant. He commenced with Energy and Management Services in 2006.