INDEPENDENT PRICING AND REGULATORY TRIBUNAL
OF NEW SOUTH WALES

PRICING OF STREETLIGHTING SERVICES - 1998/99

Introduction

The Independent Pricing and Regulatory Tribunal (IPART) conducted a major inquiry into the pricing of declared monopoly electricity services in NSW which resulted in the March 1996 Determinations[1]. Streetlighting services were not included in the 1996 Determinations because the Tribunal had been advised that these services would become contestable in the new future.

The Tribunal issued Determination 5.2 for streetlighting services in July, 1997 because contestability had not been implemented as scheduled. This Determination applied price caps[a] for 1997/98 as an interim measure.

Subsequent to the release of Determination 5.2, 1997, the distributors raised some concerns about the price levels that had been determined. This led the Tribunal to commission an independent review. Coopers & Lybrand in conjunction with Worley Consultants were appointed to conduct the review.

Summary of Consultant's Recommendations

The consultant's key recommendations were:

- Existing total price caps should continue until 30 June, 1999, with some adjustments[b] to the individual components.

- From July, 1999, the Energy component for streetlighting should be regulated within the retail revenue cap pending the contestability of streetlighting services. Similarly, the network component for streetlighting should be regulated within the network revenue cap.

The above recommendations reflected "...the imperfect nature of the data available and an inability to establish an acceptable level of confidence in this information..." by the consultants[2]. The consultants also noted that "...the distributors believe that the existing price caps and associated side constraints

[1] See Attachment for list of relevant determinations relating to electricity services.
[2] Coopers & Lybrand and Worley Consultants, IPART – Streetlighting Review Final Report, March 1998, Summary Page 3.

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which form the streetlighting price regulation prevent the distributors from recovering appropriate capital charges in full. We have not been able to verify this conclusion from the data available to us."[3]

Other recommendations of the consultants included:

- The ODRC approach to asset valuation using standard asset lives and values should be adopted.

- Resolution of the ownership of existing streetlight assets may require negotiations between the customers for streetlighting services (mainly local councils) and the distributors' shareholders.

- More information about the charges for streetlighting services should be provided to customers. This would assist customers in monitoring the components of charges and how they relate to the services provided.

Comments on Consultant's Report[4]

As stated earlier, the consultants highlighted difficulties with the distributors' data. Notwithstanding this, the Tribunal notes that there are large differences between the benchmark distributors and the NSW distributors for O&M[5] costs and estimated capital expenditure[6] cost for new works. This raises concerns about whether the NSW distributors are operating at minimum cost.

The change from claiming depreciation for small repairs and replacement costs to expensing such expenditure could bring forward the recognition of some costs, increasing costs at the time of the transition.

The Tribunal remains concerned about the reliability of the DORC estimates and the weight to be placed on the DORC method of asset valuation in the regulatory context. The rate of return on asset values is one of a number of financial indicators that the Tribunal considers. The issue of determining the regulatory asset base is best considered as part of the Tribunal's major inquiry into the pricing of electricity services which commenced on 16 February, 1998.

The real pre-tax rate of return of up to 11.25% argued for by the distributors is excessive. Recent work by the Tribunal has indicated that 7.5% - 9.5% may be a reasonable range for the real rate of return. In any case, the Tribunal would wish to examine a range of financial indicators rather than rely on the rate of return approach alone.

[3] Ibid, Summary Page 5.
[4] This report is available on the Tribunal's homepage, see footer.
[5] Coopers & Lybrand, OpCit, Section 7.
[6] Ibid, Section 8.

Taken together, these factors suggest that costs may be overstated by distributors.

Tribunal's Proposed Approach

Submissions are invited to this Statement and the consultancy findings.

Regulation beyond June, 1999 will be considered in the major electricity inquiry into the pricing of electricity services including streetlighting services.

The Tribunal does not endorse the consultant's recommendation on using the DORC approach for valuing assets. The question of the value of the assets and the role of asset values in the determination of regulated revenues and prices will be considered in the major inquiry.

[a]

Tribunal's 1997/98 Price Caps by Streetlighting Component and Average Total Price

$/MWh	NUOS	SLUOS	Energy	Ave Total Price
EnergyAustralia	$59	$112	$39	$210
Integral Energy	$39	$162	$39	$240
NorthPower	$44	$157	$39	$240
Great Southern Energy	$43	$128	$39	$210
Advance Energy	$43	$128	$39	$210
Australian Inland Energy	$40	$131	$39	$210

[b]

Consultant's Recommendation for 1998/99 Price Caps by Streetlighting Component and Average Total Price

$/MWh	NUOS	SLUOS	Energy	Ave Total Price
EnergyAustralia	$44	$131	$35	$210
Integral Energy	$32	$172	$36	$240
NorthPower	$54	$149	$37	$240
Great Southern Energy	$43	$131	$36	$210
Advance Energy	$43	$130	$37	$210
Australian Inland Energy	$41	$131	$38	$210

ATTACHMENT

Related Publications Issued By Ipart

TransGrid's Charges
Determination No. 2.1, March 1996
Determination No. 5.1, July 1997

Distributors' Prices
Determination No. 2.2, March 1996
Determination No. 5.3, July 1997

Pricing for Capital Contributions and Recoverable Works
Determination No. 10, December 1996
Determination No. 5.4, July 1997

Streetlighting Charges
Determination No. 5.2, July 1997

These documents are available on request from the IPART. Please telephone 02-9290 8400. These documents may also be accessed via the Internet at the Tribunal's website, www.ipart.nsw.gov.au.

REPORT to IPART

by

COOPERS & LYBRAND

in conjunction with

WORLEY CONSULTANTS

on

STREETLIGHTING REVIEW

MARCH 1998

INDEPENDENT PRICING AND REGULATORY TRIBUNAL
OF NEW SOUTH WALES

IPART

STREET LIGHTING REVIEW

FINAL REPORT

March 1998

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Appendices

SUMMARY OF RECOMMENDATIONS

1. In the following paragraphs we briefly summarise the major recommendations of this report in respect of the appropriate regulatory parameters for street lighting services in New South Wales.

Regulatory Regime

2. It is our recommendation that street lighting services be regulated within the existing regulatory framework for network and energy services. That is the Network Revenue Cap and Regulated Retail Gross Margin be adjusted to incorporate the use of system and energy components of street lighting services.

3. Under the existing Network Revenue Cap, distributors recover the NUOS, or use of system charges, associated with the transmission and distribution networks. These charges are applied to all customers connected to the distribution network, including street lighting customers. By extending the Network Revenue Cap to recover use of system charges associated with the street light network, the regulatory regime is simplified and the onus is passed to the distributor to justify the appropriate recovery level to the Regulator and the subsequent derivation of street lighting charges to customers. Should the provision of operating and maintenance of street lighting assets become contestable, these services will fall outside of the revenue cap in a similar manner to contestable services for the distribution networks. This maintains the consistency in treatment of the two networks.

4. It is our view that contestability for operating and maintenance services for street lighting assets will be influenced more by the relationship between the owner and the customer than the regulatory regime. That is, the incentives are greater for the customer, seeking to be able to choose a preferred service provider, than the incumbent service provider, the distributor. The ownership review recommended in Section 2 of this report, and summarised briefly in paragraph 9 will facilitate the introduction of contestability by giving the customers the opportunity to clarify ownership and establish service provision agreements.

5. One alternative option, ring fencing street lighting services under the Accounting Separation Code will, in our opinion, impose higher compliance costs on distributors, which will subsequently be passed on to customers. It will also tend to result in a more fully allocated cost result than that currently demonstrated by the distributors. We do not believe that this option will provide incentives for contestability which differ from the NRC option.

6. Under the Regulated Retail Gross Margin, the retail arm of the business recovers the services associated with the provision of energy from all non-contestable customers. Currently street lighting customers who are non-contestable are excluded from this margin. Again, our recommendation simplifies the regulatory regime and encourages consistent treatment of street lighting energy supply with other non-contestable customers.

7. In forming these recommendations we note that the existing Accounting Separation Code will need to be amended, and we also note that the Code is currently under review. Currently the Accounting Separation Code ring fences distribution and retail activities and includes street lighting within ancillary services. In addition, we also note that the existing NSW State Electricity Code requires consumption to be metered to enable contestability to be introduced. As most street lighting is not metered, this provides a barrier to the introduction of competition for energy supply for street lighting use. We do understand however that this criteria is being reviewed and that this barrier may be removed during the current industry reform review. In any event, contestability for <160 MWh customers (including street lighting customers) will not apply until July 1999.

Customer Interface

8. We recommend that the information available to customers about the services they receive and the street lighting charges they incur, be improved with additional information to be disclosed during the invoicing process. We also believe that many of the concerns raised by the customers could be alleviated with the negotiation of formal or semi-formal customer agreements covering the range of services to be provided, the level of services offered and the derivation of the charges to be applied.

Asset Ownership

9. Currently there appears to be a level of confusion and disagreement between the distributors and their customers in respect of the ownership of the existing street lighting networks. We believe that future arrangements between the parties will be assisted by a one-off ownership review, and if necessary, ownership transfer, by identifying the preferred positions of the relevant parties and negotiating an agreed ownership structure. We make no recommendations as to a suggested outcome from this process, as we believe that both the current and historical circumstances differ widely and thus appropriate solutions need to be determined on a case by case basis. We also note that the outcome(s) of this review will not influence the intent of the recommendations included in this report. We do, however, note that the implementation of the suggested review will require pro-active participation from both distributors and street lighting customers.

Capital Charges and Asset Valuations

10. It is appropriate that distributors recover capital charges (return on assets plus depreciation) on the assets that they have funded. We recommend that the ODRC valuation methodology be applied when calculating these charges, as currently set out in the "Guidelines for Optimised Deprival Valuations of Electricity Networks". We acknowledge that IPART have not endorsed the ODRC or DRC methodology, but we believe that this methodology is more robust than pricing off an historic cost accounting base, as the perceived weaknesses associated with ODRC can be overcome through the proper implementation of the methodology and the accurate setting of standard lives and standard values. An appropriate rate of return, (derived using the WACC methodology) should be used in calculating required returns. Again we acknowledge there are commercial conflicts between the interests of IPART and the distributors in determining

an appropriate WACC.

11. We also note that the distributors believe that the existing price caps and associated side constraints which form the street lighting price regulation prevent the distributors from recovering appropriate capital charges in full. We have not been able to verify this conclusion from the data available to us.

1998 Price Cap

12. Our recommendation for the 1998 price cap for street lighting services recognises that the regulatory regime recommendations outlined above will not be able to be implemented in the current year. In the interim, we recommend the following price cap structure:

Table 1 : Recommended 1998 Price Cap ($/MWh)

Distributor	Energy	NUOS	SLUOS	Total
Advance Energy	37	43	130	210
Australian Inland Energy	38	41	131	210
EnergyAustralia	35	44	131	210
Great Southern Energy	36	43	131	210
Integral Energy	36	32	172	240
NorthPower	37	54	149	240

Energy Price Cap

13. The energy price cap has been derived from combined unit vesting contract purchase rates and spot market purchase rates, after making allowances for distributor and retailer margins, the street lighting load profile and system losses. This results in a different price for each distributor due to the effect of the different loss factors reported by each distributor. The appropriate form of cap is the current $/MWh charge as sales volumes are the primary driver of energy costs.

NUOS Price Cap

14. We recommend that the NUOS price cap is derived from the network prices published by each distributor and in particular the appropriate pricing classification which applies to street lighting customers. In support of this we recommend that distributors introduce a street lighting classification into their published list of network prices. The applicable tariff typically is made up of a TOU component and a fixed availability charge. This allows the street lighting load profile, with a higher proportion off-peak consumption than other network customers, to be reflected in the price cap outlined above.

15. The appropriate form of cap is also the existing $/MWh charge, as this is easily applied and interpreted as network prices are published in these units. Alternative cost drivers, such as customer numbers, demand and circuit kilometres are not as appropriate. Each street lighting customer has a number of connection points, where as most other network customers have just one. As consumption is often used as a proxy for demand

and network tariffs are typically expressed (at least partially) as unit charges, transparency of charging is encouraged with the adoption of a $/MWh price cap. The circuit kilometre driver used in the NRC revenue cap is applicable for servicing remote villages which is not appropriate for street lighting.

16. It is to be noted that the NSW Government levy, which was imposed on distributors in 1997 has not been included in the above analysis. This levy is considered to sit outside the framework of the NUOS price cap.

SLUOS Price Cap

17. We have not been able to determine an appropriate level for SLUOS for 1998 based on the information provided. Therefore we recommend that the SLUOS price cap be calculated as the residual value between the existing total price cap and the Energy and NUOS components of the caps presented above. Thus the total cap is to remain unchanged from that determined in 1997. This recommendation is an interim measure, to be applied in the current year, as our previous recommendations for the future form of regulation should apply from 1999.

18. In undertaking our analysis of SLUOS we have concluded that SLUOS costs are more strongly influenced by the number of luminaires than units of energy used. If we were able to recommend an appropriate price cap for SLUOS, we would therefore recommend that it be implemented as a $/luminaire charge. In our opinion in selecting luminaires as the appropriate driver of SLUOS costs, there is little scope for distributors to influence the number of luminaires used in providing street lighting services. Asset configuration is driven primarily by design standards and the requirements of the customer for a specified level of lighting. In most instances there appears to be agreement (albeit informal) between the customer and distributor about the types of assets used in providing the services required, with appropriate consideration of the requirements of the AS1158 design standards. In this respect, there would appear to be significantly more scope for influencing the number and type of lamps in use due to the wide range in lamp types currently in evidence across New South Wales.

19. Thus the residual SLUOS cap included in Table 1 above can be represented as a $/luminaire charge. Table 2 shows the SLUOS price cap as both a $/luminaire cap and a $/MWh cap for comparison purposes. The relativity of these caps for the distributors varies between the $/luminaire and $/MWh values. This reflects the considerable variance in the lamp characteristics reported by the distributors, resulting in a range of lamp wattages per luminaire.

Table 2 : Residual 1998 SLUOS Price Cap

Distributor	$/luminaire	$/MWh
Advance Energy	60	130
Australian Inland Energy	96	131
EnergyAustralia	77	131
Great Southern Energy	82	131
Integral Energy	82	172
NorthPower	79	149

Data Availability

20. We note that the data available from the distributors in respect of street lighting services varies considerably, and adequate supporting explanations for the data are not always forthcoming. This in part reflects the previous amalgamations of the distributors and the number and range of databases in use. It also reflects the relatively small proportion of the distribution business associated with street lighting services and the tendency of distributors to undertake many tasks associated with operating and maintaining the street lighting networks in conjunction with work undertaken for the distribution network. Thus the costs associated with the street lighting network are often not readily identified and those which are, may be derived by informal means, reflecting the best estimates of staff involved in the respective tasks.

21. In this respect, the levels of cost currently associated with street lighting services tend towards marginal or incremental costs rather than fully allocated cost – although this practice appears to differ between distributors as discussed more fully in Sections 2 and 7 of this report. Our recommendations outlined above support this trend, as we believe that the inclusion of the street lighting use of system charge within the Network Revenue Cap will tend more towards incremental cost allocations than the fully ring fenced option.

22. In gathering information from the benchmark partners located in Victoria, Queensland and New Zealand, it became apparent that the difficulties experienced by the NSW distributors, in particular in identifying costs associated with street lighting services, are also experienced elsewhere. In our view this reflects the significantly lower proportion of costs associated with the street lighting network in relation to the distribution network, and therefore, the lower value to the distributors in allocating resource to identify true costs.

23. The recommendations that we have outlined above reflect the imperfect nature of the data available and an inability to establish an acceptable level of confidence in this information. It is our view that a detailed cost allocation approach to determining appropriate street lighting charges is not valid and inclusion of street lighting within the existing regulatory framework for retail and network activities provides a more appropriate solution for regulating street lighting services.

1. INTRODUCTION

Scope of the Report

1.1 In October, 1997, The Independent Pricing and Regulatory Tribunal of New South Wales (IPART) commissioned Coopers & Lybrand and Worley Consultants to undertake a review of, and provide recommendations for the appropriate approach to be adopted in costing of street lighting services, taking due account of the regulatory environment and the objectives of the tribunal. In addition, the requirements of the consumers of street lighting were to be considered. This report has been prepared at the conclusion of the assignment undertaken over the latter part of 1997 and early 1998.

1.2 The consultancy brief included the following five key objectives.

- Determine the appropriate cost drivers for street lighting services.
- Identify the cost allocation methods used by each distributor and determine whether or not these are appropriate.
- Calculate SLUOS charges resulting from each allocation mechanism.
- Verify the number of street light poles and/or lanterns and the volume of electricity consumed by street lights for each distributor.
- Examine the service practices adopted by each distributor in respect of street lights and quantify the impact of different service levels on cost.

1.3 In addressing each of these objectives, we have developed recommendations for appropriate long term regulatory solutions for street lighting charges, and also recommendations for the immediate requirements for the 1998 pricing determination.

1.4 The report is made up of eight sections, together with the explanatory data contained in the accompanying appendices. Following this introductory section, Section Two discusses our recommendations for the future regulatory framework and approach to be adopted for the regulation of street lighting charges. Section Three covers in more detail all of the issues associated with the asset ownership, valuation and recovery of capital charges which comprise an important element of the suggested long term solutions.

1.5 In Section Four we outline our suggested recommendations for short term solutions within the existing regulatory model. The short term solutions are focused on the pricing determination required for the current year, recognising that it will not be possible to implement the recommendations included in Section Two before the 1998 pricing determination is to be made.

1.6 Sections Five, Six, Seven and Eight provide more detail about the components of the street lighting use of system charges (Energy, NUOS, SLUOS Operating and Maintenance and SLUOS Capital), and the levels of each component for the distributors in NSW along with some discussion of benchmark data. These sections include our recommendations for appropriate cost drivers and the level of price regulation for the coming period.

1.7 A summary of our conclusions and recommendations is included at the beginning of this report.

Background

1.8 Early in 1996, the NSW electricity supply distributors, responsible for electricity retail and distribution, were amalgamated, resulting in the merging of twenty five distributors into six entities. These six distributors continue to provide connections, supply energy and service the street lighting assets for local body customers.

1.9 In 1997, IPART undertook an initial review of the street lighting services of the distributors to make a pricing determination for the 1997/98 year. The 1997 determination for street lighting services concluded that regulation should be by way of a price cap, even though a revenue cap was IPART's preferred method. Perceived data problems precluded the use of a revenue cap in the 1997 determination. This report has been commissioned as part of a review of the 1997 price determination, and is intended to assist IPART in making a price determination for the current year. It is also intended to provide recommendations about the future direction of price regulation for street lighting services.

1.10 Two levels of price were established for the six distributors for 1997. $210/MWh for each of EnergyAustralia, Great Southern Energy, Advance Energy and Australian Inland Energy. A price cap of $240/MWh was set for Integral Energy and NorthPower to reduce the potential financial impacts for these latter two distributors for the period. (A detailed breakdown of the 1997 price caps is included in Section 4).

1.11 The price caps set by IPART are subject to the following "side constraints".

- No bill to any one council is to increase by more than the 1996/97 CPI (for the same level of consumption).

- The average number of hours of illumination per lamp per day should not be less than 11.5 (with appropriate allowances for outages during capital works).

1.12 It should be noted that the price caps are to apply to the total street lighting revenue earned by each distributor over a twelve month period. Within that cap, there may be justification for recovering an average charge above or below the cap from individual councils. This point does not appear to have been fully appreciated by street lighting customers. We would expect however, that distributors should be able to justify

the basis of charging where it differed from the cap.

1.13 The price cap is made up of three components:

- Energy,
- Network Use of System Charge (NUOS); and
- Street Lighting Use of System Charge (SLUOS).

1.14 The NUOS component is regulated under the existing Network Revenue Cap (NRC), and incorporates the share of the general transmission and distribution network costs assigned to street lighting services. The SLUOS and Energy components were not regulated in a similar manner to NUOS as it was expected that contestability would be introduced for these components. However, competition for these services has not yet evolved, and hence price caps were determined for the remaining components for the 1997/98 period. The Energy component recovers the cost of energy consumed by the street lights. It is regulated separately from the existing Regulated Retail Gross Margin (RRGM) cap of each distributor. SLUOS covers operating, servicing and maintenance of the street lighting network and recovery of appropriate asset related charges.

Data Availability

1.15 In making the price determination in 1997, IPART noted that difficulties in interpreting the data provided had limited the type of determination implemented. It has also been our experience in undertaking this commission, that the data available from the distributors in respect of street lighting varies considerably, and adequate explanations are not always in evidence. This in part reflects the amalgamation of the distributors and the range of data bases in use. It also reflects the small proportion of the distribution activity associated with street lighting and the industry trend to include many street lighting activities within the operation and maintenance of the distribution network.

1.16 The recommendations that we have been able to make in this report have been influenced by the availability of the data we have requested, and the suboptimal level of confidence that we have managed to establish about the information provided. It is for this reason we have prepared two types of recommendations; first, those applicable in the longer term, which focus primarily on the appropriate regulatory approach to be adopted, and second, those which may be applied for the current year in respect of the existing regulatory regime.

Acknowledgments

1.17 In undertaking the commission, we have consulted widely with a number of interested parties, many of whom have attended discussion sessions and also provided us with the information we required to compose this report. We would like to take this opportunity to thank the representatives of the Local Government and Shires Association, Albury City Council, Blacktown City Council, Dubbo City Council, Holroyd City Council, Penrith City Council, Rylstone Shire Council, Tamworth City Council and Tweed Shire Council for their efforts in this respect. In addition, distributors located in Victoria, Queensland and New Zealand have provided us with the benchmark information analysed in the report. And finally, the NSW distributors themselves have had significant demands placed on their resources to provide the detailed information we have required. This generally proved to be difficult for the distributors for a number of reasons, and in some instances we have had to use estimated information as actual data has not been available to us. We thank them for their efforts to meet our demands.

2. FUTURE REGULATORY REGIME

Background

2.1 Street lighting customers have been singled out from other retail and distribution customers with the implementation of the 1997 street lighting price cap determination. All other retail and distribution customers, who are not yet contestable, are regulated under the combined RRGM and the NRC.

2.2 As noted previously, the network component of street lighting is regulated under the NRC. Previous electricity price determinations have not included the energy and SLUOS components of street lighting charges within the existing RRGM and NRC because it was expected that competition would be introduced for the energy consumed and the maintenance and servicing of the street lighting assets. This has not yet occurred, and thus in the absence of contestability, future regulation is required.

2.3 Currently, the state of NSW is undertaking a comprehensive mid-term review of the electricity sector regulatory framework. The existing regulations run until June 1999, and it is anticipated that the results of this review will be incorporated into possible amendments to the existing regulations in respect of the RRGM and the NRC.

Energy Component

2.4 There has been some discussion about the appropriate form of regulation for the energy component of street lighting costs, in particular with reference to the RRGM applied to the retail business of the distributors. Intuitively it would appear sensible to incorporate the energy sales to street lighting customers within this margin and regulate them in the same way as other non-contestable customers. This suggestion has been made by the distributors in their earlier submissions to IPART. As retail competition is gradually introduced, the RRGM will apply to fewer customers and will be adjusted accordingly.

2.5 There are barriers to introducing competition for energy supply to street lighting customers, the primary one being that the consumption is not generally metered and therefore does not meet the necessary definition of a “site” under the NSW State Electricity Market Code. While resolution of this issue is outside the scope of this study, we do understand the rules are being reviewed to consider the barriers for contestability for low volume customers. We support the distributors’ suggestions that the energy component of street lighting be considered for inclusion within the RRGM. The appropriate time frame for this inclusion would be from July 1999, once the existing RRGM regulation expires. This time frame coincides with the opening up of the retail electricity market to all users and, accordingly, the inclusion of the energy component under RRGM would only apply if street lighting remained uncontestable.

2.6 With the exception of the unmetered consumption, there do not appear to be any other relevant differences in energy related characteristics between street lighting and

other low voltage customers which would exclude them from the RRGM. In addition, and in the absence of metering data, street lighting consumption levels are significantly easier to estimate accurately than those of other electricity users. Using lamp types and hours of illumination, consumption can be estimated to acceptable levels of accuracy, for the necessary energy purchase time bands.

NUOS Component

2.7 The NUOS component recovers the share of the costs associated with the general distribution and transmission network assets apportioned to street lighting customers for the delivery of energy to the street lighting network. This is currently regulated under the NRC for each distributor and we consider that this is the appropriate form of future regulation for this component. Thus street lighting customers who wish to remain fully serviced by their local distributor would be regulated in the same manner as other customers in respect of network use of system charges as there are no distinguishing characteristics which support alternative regulation.

SLUOS Component

2.8 The SLUOS component incorporates all of the costs associated with the street light network; that is, the recovery of costs associated with the operation and maintenance of the street light network, replacement of assets, administration of street lighting services to customers, including tariff formulation and invoicing, and the recovery of finance charges. In this respect, finance charges include the recovery of depreciation charges and return on assets, but exclude contributions towards the construction of new assets.

2.9 In most instances, with the possible exception of lamp replacement and fault identification, the functions undertaken by the distributor in respect of the street lighting network are similar to the functions undertaken by the distributor for the distribution network and servicing of non-street lighting customers. In many instances, distributors do not have dedicated resources associated with street lighting tasks, as these tasks are undertaken by staff and/or contractors in conjunction with routine work on the distribution network. A typical example of this, for instance, would be tree trimming, where the benefits of tree trimming programmes are shared between the distribution and street light network.

2.10 For this reason, it is difficult for distributors to allocate accurately the costs associated with relevant tasks between the street light and distribution networks. In Section Six we discuss in detail the allocation methods used by each of the distributors and the impacts of these methods on the relative levels of SLUOS of each of the distributors.

2.11 In addition, the street lighting activities are not ring fenced in the same way that retail and distribution functions are under the Accounting Separation Code. Thus to date, there has been no requirement to account separately for the specific costs associated with street lighting services. The street lighting assets have been included in “ancillary services” in the Accounting Separation Code, to ensure that they do not impact on the

Network Use of System charge. However, the Accounting Separation Code currently defines the retail business as incorporating all costs of energy trading and customer billing and enquiries.

2.12 The difficulties encountered by IPART in setting the SLUOS price cap in the 1997 determination, and subsequently experienced during this review, were predominantly influenced by the inability of the distributors to identify adequately the costs associated with SLUOS, for the reasons outlined above. Therefore, it is our view that the future regulatory regime would be greatly assisted by either:

- ring fencing street lighting activities to make the actual costs more readily identifiable; or
- including the SLUOS component within the NRC and deriving appropriate use of system charges for street lighting customers in a similar manner to other low voltage customers.

2.13 Based on the discussions outlined in the following paragraphs, we recommend that the second option, including the SLUOS within the NRC as part of the forthcoming regulatory review.

Compliance Costs

2.14 The relative merits of the two options, may differ for the distributor and the customer. The first option, ring fencing street lighting, requires a significant redrafting of the Accounting Separation Code This would be expected to result in the distributors having to make substantial changes to their existing accounting systems and the processes by which information is recorded by relevant staff in order that the data is captured in the required format. It would be reasonable for the distributors to recover the costs of administering the additional data capture from the street lighting customers.

2.15 By incorporating SLUOS within the NRC, (the second option), minor alterations to the Accounting Separation Code would be required, to remove the public lighting definition from ancillary businesses. It is also unlikely that the distributors would need to make significant changes to their existing accounting systems. Thus the compliance costs of the second option would be lower than the first. It should be noted that the Accounting Separation Code is currently under review.

2.16 However street light customers have slightly different requirements to other low voltage customers, specifically relating to service levels. This could be addressed through the use of Service Level Agreements specifically covering fault response and repair, and a supporting tariff structure. Both of these issues are discussed later in this section.

Level of Allocation

2.17 If street lighting services were ring fenced, we would anticipate higher SLUOS costs would be identified for some distributors than those currently assumed reflecting the more Fully Allocated Cost (FAC) approach which we believe would result. It should, however, also result in a decrease in NUOS charges, although this may not be of an equal magnitude as relevant NUOS costs may be shared across other network customers. This need not mean that resources, for example maintenance staff, need to be dedicated to street lights, but it does imply discrimination between street light and other costs and improved cost capture of street light activity costs. Job costs (labour, material, etc.) and other street light costs are captured into separate accounts which relate to street lights. Currently for some distributors, the marginal costs of maintaining the street lighting network over the distribution network have not been fully allocated to street lighting customers due to the relatively immaterial portion of the expenditure in relation to that associated with the distribution network, and current reporting systems which do not identify the relevant portion of the expenditure. Thus we might expect the ring fencing option to result in a more FAC approach than either the current position, or the NRC option.

2.18 The distributors have indicated that they would generally support this idea if it was possible to adopt systems that were straightforward to implement and easy to use. However, they have also highlighted the difficulties of capturing accurate job related information especially with regard to tasks shared with the distribution network where the portion associated with street lighting is relatively small. The benefits of improved cost capture include a better understanding of street light costs, and a greater ability to target improvements in street light productivity and practices.

2.19 It is noted that either one of two approaches to the allocation methodology can provide sensible and defensible solutions. A FAC approach typically allocates costs either directly to a customer or amongst customers on the basis of drivers, chosen to reflect the extent to which each customer (or group of customers) gives rise to or uses the cost or service. The resulting allocations are highly dependent on the choice of drivers. On the other hand, Avoidable Cost Allocation (ACA) allocates items on the basis of assessing what items would be avoided if the entity did not operate the specified business or activity. The latter approach provides a useful means of identifying any cross subsidies between customers

2.20 The current situation, in many instances, tends to reflect the ACA approach which identifies only those significant items of expenditure which would be avoided if street lighting services were removed from the distributors range of responsibilities. Items which may be identified under a FAC approach, which have not been allocated to street lighting will, by elimination, be included in the costs recovered under the NRC. Section Seven of this report describes in detail the level of recovery of street lighting costs which the NSW distributors currently estimate they have allocated to SLUOS.

2.21 Under the second option, where SLUOS is included within the NRC, the level of cost allocation to street lighting customers will be determined by how the revenue cap is allocated between customers in setting appropriate use of system charges. Within this

allocation process, there remains scope for tariffs within the FAC-ACA range to be implemented. However, in recommending the NRC option, we are accepting that it is more likely that ACA approaches will be adopted than the alternative ring fenced option.

Contestability

2.22 By including the recovery of street lighting operating and maintenance costs under the NRC, the introduction of contestability for these services is more likely to be influenced by the introduction of contestability for distribution services than if the street lighting services were regulated separately. By ring fencing the street lighting services and regulating them separately from the NRC, contestability of street lighting may more readily be considered independently from other distribution network activities. However, it is our view that clarification of ownership, as recommended later in this section, will provide stronger incentives for the introduction of contestability than either regulatory pricing option.

Accountability

2.23 Under the ring fencing option, the cost allocations to street lighting services would become transparent, and assuming the Accounting Separation Code was able to adequately define how the allocations to the street lighting business were to be made, the basis of allocation for all distributors in NSW should be the same.

2.24 If the NRC option was adopted, additional accountability criteria should be determined in order that the street lighting customers were able to monitor the tariffs charged. In this respect we suggest that additional information be made to street lighting customers about the tariffs/charges they incur. We have included suggested information requirements later in this section.

Customer Agreements

2.25 As a result of the discussions with distributors and councils over the past months, we have discovered that only informal agreements exist between the customer and the service provider in respect of street lighting services. Appendix B summarises the nature of these informal agreements. In our view, this has resulted in some misunderstanding and dissatisfaction on behalf of both parties about the level of service provided, the costs of providing that service, and most recently, how the 1997 price cap has been implemented. It is our recommendation therefore that future regulatory reform can only be strengthened by formal or semi-formal customer agreements between the two entities.

Customer Charges

2.26 If SLUOS charges were to be included within the NRC, information disclosure to street lighting customers would assist customers in regulating the charges they incur. In any event, more information about the charges made for street lighting services would assist the customer in understanding the components of the charges and how these relate

to the services provided. Details of the existing charges made for street lighting services are included in Appendix A. These are summarised in Table 2.1 below. Charges tend to be either fixed or variable or a combined fixed/variable charge for operating and maintenance cost recovery, including energy supply, network services and street lighting network operation and maintenance. Capital contributions are typically recovered by a full level of recovery although some distributors offer partial recovery options.

Table 2.1 : Form of Existing Street Lighting Tariffs

Recovery of:	**Distributor**	**Tariff Option**
Combined NUOS, SLUOS and Energy	AE, eA and AIE (south)	Combined Fixed and Variable Tariff
	IE, NP	Fixed Tariff
	GSE	Variable Tariff
	AIE (north)	Lump Sum
Capital Contributions	All Distributors	Full Recovery

EA also include a demand component in their NUOS tariff
AE, AIE and NP report regional variations in tariffs
NP, EA, and IE also offer partial recovery of capital contributions as an alternative option.

2.27 As demonstrated in Appendix A, there is little detail provided to the customers about the individual components of the charges.

2.28 As a minimum we suggest that the revenue recovered by distributors from each customer should be identified, on each invoice, into its major components, being:

- Energy
- NUOS
- Street Light Network Operations and Maintenance (part of SLUOS)
- Street Light Network Finance Charges (part of SLUOS)
- Other Charges (such as capital contributions, although these may be invoiced separately)

2.29 In addition, the number and type of lamps, luminaires and/or poles should be included depending on which data has been used to derive the unit tariffs. The energy consumption estimates used to derive the energy charge should also be supplied.

2.30 If specific service agreements are reached, then information concerning the individual costs of each specified service should be made available to the customer. As a minimum, the customer should have access to enough information to determine what services are incorporated into the Operations and Maintenance component of the SLUOS charge.

Ownership

2.31 Finally, one of the major issues emerging from the discussions and research we have undertaken are the fundamental questions concerning street light asset ownership and valuation. In particular, these issues arise from the differences in both historical and current treatments for contributed and non-contributed assets. In the following paragraphs we outline a suggested framework which may allow these issues to be resolved to simplify the future regulatory process.

2.32 A series of historical events have resulted in asset ownership which is unclear and varied across the distributors and the councils which they service. The recommended form of price regulation of street lighting charges will, by definition, need to incorporate both the services provided for assets which the customer owns and those assets which the service provider owns. Clarification of asset ownership will simplify future pricing, regulation and service provision in respect of street lighting.

2.33 Accordingly, we provide one possible course of action for resolving this issue, as follows:

- Ownership of all existing street lighting assets is negotiated between the distributor and the council. If the council has not claimed ownership in writing by a specified date, then the distributor would be deemed to be the owner of all existing assets.
- The council may seek to own the assets and establish agreements with a specified service provider. Alternatively, the council may elect to vest ownership of all or some of the street light assets with the distributor and to retain ownership of part (or none) of the assets.
- Any assets claimed by the council where a full capital contribution has been paid are transferred to the council without cost. (An agreed administration fee may be negotiated to compensate for costs involved in the transfer of asset register data and other associated costs such as training). Any assets claimed by the Council where less than a full capital contribution has been paid are transferred at a negotiated cost. (Any audit, valuation or other costs associated with this transfer are to be borne equally by both parties). It is recognised that this process may be complicated by the inability of both parties to fully match historical contributions to specific assets. A possible solution would be to negotiate an annual rebate equal to the annuity value of the historical contributions.
- A policy for the ownership of future assets would also be negotiated to include those assets “gifted” by developers.
- The distributor would be able to seek a commercial return on those assets it owns. It would be necessary for these assets to be valued, audited, and checked on an agreed basis.
- Contestability in the provision of energy services is to be made available to the

end-user of the assets, consistent with the NSW programme and the national market metering rules. These rules are being reviewed to consider the effective arrangements for measuring electricity consumption at low volumes, which currently provides the main barrier to introducing contestability for street lighting use.

2.34 Responsibility for initiating and resolving these negotiations must fall with the councils and the distributors, and their respective industry bodies. There is no recommended outcome included in this report, as we believe that the appropriate outcomes should reflect historical practices and understandings and also the current and future objectives, skills and resources of each council and distributor.

3. CAPITAL CHARGES

3.1 The requirement to recover a capital charge is clearly covered under existing policy and legislation. Set out below is a brief summary of existing policies, how they relate to street lighting assets, the methodologies currently used by the distributors in recovering capital charges and our recommendations for appropriate future policies. The implementation of these capital recovery policies is based on the assumption that it is reasonable for the distributors to recover the capital costs of providing street lighting services from customers where these assets have not been funded by the customer.

Policy Review

Valuation and Recovery of Finance Charges

3.2 Section 15(1)(c) of the Independent Pricing and Regulatory Act 1992 (the Act) requires an appropriate rate of return on public assets be accommodated in making a determination or recommendation. Financial Appraisal Guidelines set out the basis proposed by the New South Wales Treasury (NSW Treasury) for calculating an "appropriate rate of return" using the Weighted Average Cost of Capital (WACC) methodology.

3.3 WACC provides a widely used approach to calculating target rates of return. However, it does require assumptions on a number of parameters such as the risk premium and the value of imputation credits, on which there is considerable scope for judgement.

3.4 NSW Treasury policy is to establish a consistent approach for the assessment of the WACC across all NSW Government business enterprises. NSW Treasury has an interest, as owner of the business, in maximising the target return on assets. However, Treasury needs to balance its ownership interests in setting a target WACC with its broader policy objective of encouraging more efficient resource allocation. IPART's legislation requires that it have regard to an appropriate return to the owner. As an independent regulator it will need to assess the competing claims of all stakeholders in the context of the objectives of efficient resource allocation and avoidance of monopoly rents. To the extent that IPART sets a lower return on capital than that claimed by the distributors the shortfall will be seen by the distributor as not being able to meet the owners WACC target. This therefore provides a level of transparency between the WACC requirements of the owners and the WACC return allowed for in the pricing determinations made by IPART.

3.5 The two costs associated with the use of capital are:

- return on opening or average capital for the period, and
- depreciation.

3.6 The capital charges noted above are reasonably recovered for assets paid for by the distributor (i.e. excluding contributed assets) in order to send the correct pricing signals to the customer, to amortise debt and recover funding of the asset to enable future replacement of the asset base, and to generate an appropriate return on equity for the shareholders.

3.7 The capital value of street lighting assets is the sum of the poles, supports, luminaires, lamps and controls multiplied by either their original cost, current replacement cost (RC), depreciated replacement cost (DRC) or optimised depreciated replacement cost (ODRC), depending on the policy adopted.

3.8 "Policy Guidelines for Valuation of Network Assets of Electricity Network Businesses", a technical paper from the NSW Treasury, promotes the valuation of assets on the basis of the modern equivalent asset using the ODRC approach.

3.9 The valuation of assets has been a controversial issue in regulation both in Australia and overseas. In the USA regulation is largely based on historic cost assets values and nominal rate of return. New Zealand have adopted an ODRC regime while in the UK regulators have used a hybrid approach with asset values falling between historic cost and replacement costs. IPART has not endorsed the use of DRC or ODRC in its previous determinations in electricity, gas or water.

3.10 IPART has expressed concern about the adoption of an ODRC approach due to:

- The problems of information asymmetry. IPART considers that adoption of the replacement cost approach increases the information asymmetry problems faced by the regulator. While the regulator may commission its own studies of replacement costs and asset lives IPART is concerned that there remain opportunities for increase in residual values due to inflated replacement costs.
- IPART believes that, in practice, the adoption of real returns on replacement costs results in excessive cash flows and significant increases in prices. This also appears to have been an important concern for the UK regulators. Underpinning the excessive cash flows there often appears to be a mismatch between the cost of renewal and replacement of existing assets and the depreciation charge based on replacement cost estimates of assets values.

3.11 IPART also notes that in principle the cash flow over the life of an asset will be the same whether prices are set on the basis of real returns on DRC or nominal return on historic cost accounting (HCA) (subject to the replacement cost of assets increasing in line with inflation). The profile of prices and revenues over the life of the asset would vary, however. Again in principle, HCA is easy to implement, reduces information asymmetry, (i.e. the distributors cannot game replacement cost values) and the opening asset values are based on actual expenditure.

3.12 In practice IPART has adopted an approach which generates a "hybrid" regulatory asset base. Rather than work from either a historic cost or replacement cost base, the Tribunal has examined future cash flow requirements against a range of benchmark and financial indicators.

3.13 While acknowledging IPART's position we are of the view that ODRC is the most appropriate valuation methodology as:

- Both HCA and DRC have theoretic strengths and weaknesses but DRC provides the correct incentives when properly implemented. If the regulator believes that they may be at an information disadvantage when evaluating distributor promoted replacement costs then this can be overcome by the regulator setting its own replacement costs. The New Zealand experience has shown that the historical cost valuations of distributors were less reliable than the revalued DRC valuations due to the inability of valuers to establish adequate audit trails for the historical values. The variances which existed in the ways in which historical values had been compiled were eliminated when DRC values were established on the basis of industry standards imposed by the regulator. Independent audits of the valuations ensure compliance and consistency.

- A major contributor to the perception of a mismatch in cash flows is inappropriate standard life assumptions compared to the true economic life - this is assumed asset lives are shorter than actual lives. This will give rise to accelerated recovery of depreciation over the assumed life. The total depreciation recovered over the life of the asset is the same amount using standard life or true economic life. However when lower standard lives are used the timing of the cash flows will be brought forward. This will be more than offset by lower returns on capital as assets are written down to zero while continuing to be used. This mismatch can be readily addressed by adopting realistic standard lives.

3.14 EnergyAustralia have put forward the argument that using a DRC or ODRC value for allocation of depreciation and return on capital will result in as many different tariffs as there are asset types, multiplied by each year of the age profile. While there may be a need to have a separate energy tariff for each type of lamp, the fixed charges for depreciation and cost of capital (while calculated on the basis of number of luminaire or pole) do not have to be allocated to each asset but can be charged to the customer as a

fixed charge or as an average charge. We do not support the concept of setting capital charges on the basis promoted by EnergyAustralia.

Capitalisation of Expenditure

3.15 The NSW Treasury Technical Report "Guidelines for Capitalisation of Expenditure in the NSW Public Sector", dated January 1994 under section 2.4 Asset Replacement states that if an expenditure relates to the replacement of a separately identifiable asset (including a segment within an asset) it should be capitalised, that is treated as a new asset. Acquisitions of insignificant replacement parts below the level of separately identified segments are an expense and should be treated as maintenance expenditure. The paper also refers to Treasury Circular G1991/36 which requires all physical non-current assets greater than $5,000 to be capitalised, those less than $500 to be expensed and individual agencies' discretion to be applied to amounts between $500 and $5,000.

3.16 The Policy Guidelines for Valuation of Network Assets of Electricity Network Businesses (NSW Treasury Technical Paper dated November 1995, paragraph 2.2.2 "Capitalisation Tests") states that network distribution system expenditure is of a capital nature, regardless of amount when:

- a new asset is purchased or constructed; or
- an existing asset has been replaced or increased in capacity or service quality; or
- expenditure has been incurred to significantly enhance the service potential of the Network in such a way that the improvement has restored the asset to more than its original condition and produces significant advantages to the Network including a significant extension of the useful life and/or significant safety advantages.

Application to Street Lighting Assets

3.17 Based on the above policies we are of the view that appropriate methodology for distributors to adopt in respect of street lighting assets is an ODRC regime in line with the valuation of the rest of each distributors network assets. However, applying a true ODRC approach is not possible currently, as there is not a "standard" available against which the asset base could be optimised. Furthermore, an appropriate "modern equivalent asset" to use as a benchmark for setting replacement costs is not included in the valuation guidelines. In the absence of industry guidelines for modern equivalent replacement costs, it is our recommendation that distributors adopt replacement costs based on their current asset replacement policies. Depreciation should be calculated using the standard asset life for street lighting assets included in the guidelines. The type of assets in use will influence the relative levels of capital costs and annual operating and maintenance costs.

This can be covered in the service contracts between distributors and councils and can be adequately reflected in the pricing structures set by the regulator.

3.18 Therefore, as an interim measure, we propose that distributors adopt a DRC regime using current asset configurations. (Section Eight includes a discussion of the distributors current asset valuations and capital charges in respect of street lighting assets.)

3.19 We note that further consideration of the appropriate modern equivalent asset values is required to achieve a consistent valuation approach across all distributors in respect of street lighting assets. The DRC approach excludes the optimisation aspect of the methodology where assets included in the asset base which are surplus to current requirements(after making appropriate allowance for growth projections) are to be excluded. However, it is our view, and one which is shared by the distributors, that surplus and redundant assets are typically not apparent in street lighting networks based on the lack of a "standard". Thus the optimisation component of the ODRC methodology can be assumed to be less relevant for street lighting networks than transmission and distribution networks, where it is typically applied.

3.20 In 1997 new street lighting design standards were issued (AS1158) which specify levels of illuminance at street level. These standards will primarily impact on future design and construction but are less relevant in valuing existing assets for DRC purposes. This new standard may present a basis on which technical optimisation can be undertaken but after discussions with distributors, it is unclear the extent to which existing assets comply to this new standard, either in over or under illuminance.

3.21 Under the DRC system, distributors record assets at their depreciated replacement value, with periodic revaluations to keep pace with current replacement costs. Replacement assets are added to the asset register and the assets replaced are deleted from the register. Depreciation is calculated on the basis of an agreed total asset life and a return on capital charged on the basis of the DRC. Any asset removed from the system which has a residual value will have the residual value written off in the year it is decommissioned.

3.22 Capital charges calculated from the DRC values need not be calculated on the basis of individual assets such as poles or luminaires but may be calculated from the total asset value, taking into account variations in remaining asset lives and depreciation rates. Charges may be presented as an annual fixed cost or divided by the total number of assets (e.g. luminaires) to give an average charge.

3.23 If the distributor is not replacing assets with its own funds (i.e. customers are funding replacements) then the asset base will eventually depreciate to zero and no further capital charges will be recoverable. If the distributor is replacing assets and expensing the cost of replacement, capital charges will reduce as existing assets are written down zero, while new assets will not attract capital charges as they were expensed in the year they were installed. If a distributor is replacing assets and capitalising the expense by adding it

to the asset base, capital charges will fluctuate reflecting changes in the total value of the asset base in each year and any changes to WACC, as agreed with NSW Treasury.

3.24 EnergyAustralia wishes to adopt a recovery regime based on recovering 10.5% of the RC. The 10.5% is the nominal return required (assuming 2% inflation) to recover both depreciation and capital on a "table loan" amortising basis. This approach is different from the preferred approach of the other distributors and appears to be outside the current policy guidelines issues by NSW Treasury. The difficulty is justifying why the charge should be based on the RC and not the DRC of non-contributed assets. EnergyAustralia have used RC for calculating their required return and have used a rate of 5%. Using RC and a 5% rate would generate the same result as using DRC and a 10% rate, if the average remaining life was half the standard life i.e. the asset base was half way through its useful life. We believe that the assumption that the assets will be maintained such that they are always half way through their life is unrealistic, therefore using RC to calculate the return on assets is not sustainable.

Tariff Constraints

3.25 The tariff constraints imposed by the price caps and associated side constraints introduce two issues for the future regulatory regime. Firstly when assets for which there has been no capital contribution require replacement, the distributor may be unable to pass on the full finance costs of the new asset. Secondly, if a contributed asset needs replacing and it is currently on a on-capital charge tariff, it may not be possible to move it to a capital charge tariff to adequately fund the replacement cost.

Ownership

3.26 Across the six distributors there are some who wish to retain ownership of street lighting assets and are prepared to invest their own funds on the construction of new and replacement assets on the proviso they can recover appropriate capital charges. Other distributors are comfortable with the customer funding the assets and believe all street lighting assets should be owned by the councils.

3.27 Likewise with the councils, there are some who wish to fund and own their street lighting assets while others have policies for new and replacement assets to be funded and owned by the distributor (refer Appendix D). Assets which the councils require private developers to construct as part of building or subdivision approvals are typically gifted to the councils. The ownership of the street lighting assets is typically assumed by the distributor on the basis that there is no capital charge for that asset, although this tends to be an ad hoc and informal process.

3.28 SLUOS charges should be able to be calculated for contributed (i.e. excluding capital charges) and non-contributed assets (including capital charges) without different ownership structures affecting the calculation of SLUOS charges. Ownership of assets is not considered part of this analysis other than in distinguishing between contributed and

non-contributed assets. For contributed assets, residual ownership obligations need to be considered e.g. public liability, maintenance of asset register, etc.

3.29 Where councils have paid into a "sinking fund" the proceeds of which have funded asset replacement, then these new assets should be treated as new contributed assets. The tariff for contributed assets should not include any allowance for either depreciation or return on assets. Where councils have paid into a sinking fund which has not been spent on assets replacement then that fund belongs to the councils.

Capitalisation of Expenditure

3.30 Earlier in this section we commented on the Treasury Guidelines for Capitalisation of Expenditure. Appendix C sets out the current asset replacement and renewal policies for each distributor and the likely future policy on capitalising expenditure. Typically distributors expense all asset replacement costs. However distributors have indicated that in the future they are expecting to capitalise more components of renewals costs, generally with the exception of lamps. This move to capitalise renewal expenditure appears to be in line with NSW Treasury policy, in particular the Policy Guidelines for Valuation of Network Assets of Electricity Network Businesses.

3.31 There have been concerns raised about the possibility that the distributors are "double dipping" on their capital cost recoveries. Double dipping is where assets are either expensed when they are constructed, or they are contributed assets, and the distributor makes a claim for depreciation and return on assets, therefore obtaining two deductions instead of one or a deduction on an assets which they are not entitled to. Each of the distributors (with the exception of Great Southern Energy) have stated that their records and accounting systems are sufficiently robust to ensure that assets are properly identified and there is no double dipping. Only an independent audit can verify the distributors claim.

3.32 Where a distributor through a change in policy is claiming capital charges on existing assets, but expenses renewal or replacement costs, the distributor is still only obtaining one deduction for the expense and while there may be a cash flow effect due to timing issues, this is not double dipping. Over the life of the asset there is no difference in cash flow between expensing or capitalising than depreciating, however, in changing from a policy of capitalising replacement assets to one of expensing replacement assets there will be an increase in cash flow requirements in the short term, which will decrease over time as the existing capitalised assets are depreciated to zero.

Summary of Recommendations

3.33 In summary, we recommend that the distributors be entitled to recover the full capital charges associated with the street lighting assets they have funded and capitalised but not be entitled to recover any capital charges for assets funded by capital contributions. Asset funding which was expensed should be excluded from the asset base. Capital charges should include two components, the return on capital and

depreciation charge. An appropriate valuation base would be a depreciated replacement cost valuation, reflecting assets valued on the basis of current replacement policies and depreciated over the standard life assumption for street lighting assets included in the NSW Treasury valuation guidelines. The return on capital should be calculated using an appropriate WACC.

4. CURRENT REGULATORY REGIME

Background

4.1 The existing price cap for street lighting charges is presented in Table 4.1 below.

Table 4.1 : Existing Street Lighting Price Cap (1996/97 $/MWh)

Distributor	NUOS	SLUOS	Energy	Total
Advance Energy	43	128	39	210
Australian Inland Energy	40	131	39	210
energyAustralia	59	112	39	210
Great Southern Energy	43	128	39	210
Integral Energy	39	162	39	240
NorthPower	44	157	39	240

4.2 The price caps resulting from the determination were set at two levels. This provided a degree of simplicity in the determination, by avoiding individual price caps, and minimised the potential revenue shock impact for NorthPower and Integral Energy, who were granted a higher price cap than the other distributors.

Cost Drivers

4.3 The 1997 determination for street lighting services concluded that regulation should be by way of a price cap, even though a revenue cap was the preferred method of IPART. Perceived data problems precluded the use of a revenue cap in the 1997 determination. The 1997 determination states: "For equitable application to all distributors, coefficients for related cost drivers as well as associated factors such as growth and productivity for use in a revenue cap formula should be derived appropriately."

4.4 The retail business of each distributor is regulated under the RRGM formula which specifies customer numbers and sales volumes as the appropriate cost drivers for energy costs. The wires business of each distributor is regulated by way of the NRC which specifies customer numbers, sales volumes and circuit kilometres as the appropriate cost drivers for that business.

4.5 Although street lighting charges have traditionally been expressed on a "per pole" or "per lamp" basis, the price cap determination was expressed as $ per MWh due to difficulties in extracting appropriate data for the 1997 determination. Distributors were encouraged to continue charging on the basis of a per pole or lamp charge, but compliance with the determination is undertaken on a per MWh basis.

4.6 This has caused some confusion for both distributors and customers, in particular for the councils with only limited access to cost and asset data, in attempting to reconcile the charges incurred with the price cap. In addition, it is felt that the use of a per MWh

charge provides incorrect signals concerning the major drivers of costs for street lighting services.

Price Cap

4.7 The key components of street lighting costs are NUOS (recovered through the NRC), SLUOS (operating and maintenance, administration and finance charges), and Energy. In the following sections we discuss our recommendations for the current price regulation and the appropriate cost drivers for each component. We conclude that the appropriate form of a price cap for the 1998 determination should be a combination of a price per luminaire (encompassing SLUOS) and a price per MWh (encompassing NUOS and Energy).

4.8 Ideally, to meet with IPART's own objectives, these two drivers would be incorporated into a revenue cap, in a similar manner to the NRC. However, it is our recommendation, that as the data identification problems noted in the 1997 determination have not been fully resolved by the distributors in the interim period, it is not possible for a revenue cap formula to be derived.

4.9 In addition, as it is our recommendation that the street lighting price cap only be retained in the interim, until the electricity sector review is completed in 1999, there are benefits to limiting the changes to the existing price cap in view of the short time period that it is likely to apply.

4.10 In compiling our recommendations concerning the appropriate cost drivers, we have collected the following information from distributors in respect of energy sales volumes and luminaire numbers, applicable for the 1997/98 year. These values are used in the following sections in the analysis of appropriate cost price caps for 1998.

Table 4.2 : Number of Luminaires and Energy Sales Volumes

Distributor	Luminaires	Energy Sales Volume (MWh)
Advance Energy	26,897	12,322
Australian Inland Energy	3,089	2,269
energyAustralia	230,672	135,083
Great Southern Energy	30,853	19,309
Integral Energy	150,262	71,201
NorthPower	51,970	27,519

Level of Price Cap

4.11 Our recommendation as to the appropriate price cap for the 1998/99 year is to maintain the existing total price cap for the forthcoming year, although we do recommend the introduction of price balancing between the components of the charge for selected distributors. This conclusion reflects our inability to fully explain the variances in the

SLUOS components of the cost levels provided to us by each distributor. We have however determined appropriate price caps for the NUOS and Energy components of the charges, and the recommended methodology to be adopted when calculating these charges.

4.12 It is our belief that it is inappropriate to determine a SLUOS charge based on cost allocation criteria. The variances in the level of charges identified by both the distributors in NSW and those located outside NSW support this conclusion. Our recommendation is that SLUOS be regulated under the NRC and recovered through NUOS charges, to be supported by greater detail in the disclosure of the level of charges to customers. In this context, we are concerned that the application of a fully ring fenced accounting code may not result in the level of comparability desired because of the range of issues discussed in Sections Seven and Eight in respect of SLUOS charges.

4.13 In gathering benchmark data, it has become apparent that these issues are not unique to NSW and that the inclusion of street lighting within the recovery of other network use of system charges is a practical solution adopted elsewhere in the electricity distribution industry.

4.14 In the following sections we discuss our analysis and preferred approach for each component of the price cap. This discussion is summarised briefly below.

Energy Price Cap

4.15 The energy price cap can be derived from the combined unit vesting contract purchase rate and expected spot market purchase rate, after making allowances for distributor and retailer margins and transmission and distribution losses. The standard street lighting load profile is also applied when deriving the appropriate caps.

Table 4.3 - Recommended Energy Price Cap

	$/MWh
Advance Energy	37
Australian Inland Energy	38
energyAustralia	35
Great Southern Energy	36
Integral Energy	36
NorthPower	37

NUOS Price Cap

4.16 The NUOS Price Cap should be determined by applying the relevant network charges from the published list of charges for each distributor. The appropriate price caps derived on this basis, after making adjustments for the standard street lighting load profile are:

Table 4.4 - Recommended NUOS Price Cap

	$/MWh
Advance Energy	43
Australian Inland Energy	41
energyAustralia	44
Great Southern Energy	43
Integral Energy	32
NorthPower	54

SLUOS Price Cap

4.17 The SLUOS price cap, based on the recommendations outlined above, should be the difference between the NUOS and Energy caps as derived, and the previous determination. Thus our recommendation in respect of the SLUOS price cap is as follows:

Table 4.5 : SLUOS Price Cap

	$/MWh	Equivalent $/Luminaire
Advance Energy	130	60
Australian Inland Energy	131	96
energyAustralia	131	77
Great Southern Energy	131	82
Integral Energy	172	82
NorthPower	149	79

4.18 The relativity of the caps between the distributors varies for the $/MWh and $/luminaire values. This reflects the variance in the lamp characteristics reported by the distributors which result in a range of lamp wattages per luminaire.

5. ENERGY PRICE CAP

Energy Cost Drivers

5.1 For the energy component, the majority of the cost is the cost of electricity for which the most significant cost driver will be the volume purchased. The cost of administering those purchases, however, may have slightly different cost drivers, such as the number of customers and/or transactions. However, on examining the information provided by each of the distributors in respect of the costs of administering energy purchases, it appears as if these costs currently are viewed as either not significant, or not readily identifiable. For those distributors who provided cost estimates for administering the energy purchases for street lighting use, the costs ranged between $0.02/MWh and $3.17/MWh. The higher value is difficult to accept and in light of the variance in the data provided by some distributors, and the non-availability of the information from others we have not sought to examine these costs further. This reflects in part the lesser significance of the administration costs in relation to the purchase costs.

5.2 Thus, the appropriate cost driver for the energy component of street lighting costs in our view is energy volume. Using luminaires as a cost driver for energy costs is not appropriate as the energy use for each luminaire, for example, will depend upon the lamp type, number of lamps and lighting output, thus it is not possible to derive a simple coefficient per luminaire which will accurately reflect the different energy costs per luminaire.

5.3 Data provided by the distributors in respect of energy volumes and energy administration costs are included in Appendix G. Data provided by the distributors in respect of energy costs was typically sought by the street lighting manager from the retail arm of the business. In most cases, the information was provided to us with minimal explanation as to the assumptions made when preparing quoted prices. For this reason, and the resulting variations in prices and volumes offered, as summarised in Appendix G, we have used data sourced directly from market sources in the preparation of our recommendations, rather than that supplied by the distributors themselves.

Level of Energy Price Cap

5.4 We have undertaken detailed analysis of the energy prices available to retailers in supplying non-contestable load assuming a typical street light use load profile. These prices, together with relevant assumptions concerning losses, administration costs of the retailer and usage within the street light network have been used to derive a recommended price cap for the energy component of the charge. The detailed calculations which support this analysis are summarised in Appendix G.

Methodology

5.5 The energy sold in a street light (luminaire) is considered to be the sum of the lamp wattage and the energy used in the ballast and control equipment. This method has been applied by all distributors when calculating energy sales data.

5.6 The energy volume sold to the Councils is considered to be the same as the energy volume purchased from the retail supplier (refer comment on losses below). This is the manner in which a customer seeks a quote from a retail supplier. The retail supplier purchases the energy volume partly at vesting prices and partly at wholesale contract prices. These prices are quoted at the wholesale market's regional reference node. This is the common point for prices, and it is considered appropriate to quote the capped price at this point.

5.7 The retail supplier adjusts the purchase price upwards by an administrative charge to recover the contract negotiating and administration costs. The recovery of any billing cost is not included at this stage as this cost is included in the administration component of SLUOS. The resultant purchase price is the price quoted as the energy price cap.

5.8 The retailer adjusts the regional reference price upwards for the extra energy needed to supply the losses in the network. The adjusted price becomes the purchase price at the street light terminals.

5.9 The network operator is able to adjust the terminal purchase price upwards by a handling fee to recover costs associated with the administration of energy purchases which are not recovered under the street lighting operating and maintenance charges, including calculation of energy use profiles and managing the purchases with the retailer. The resultant price becomes the street light sales price at the street light terminals. This will result in a different price for each distributor due to the effect of the losses.

Calculations

5.10 Vesting prices for NSW distributors are summarised in Table 5.1 below.

Table 5.1: NSW Distributor - Vesting Prices

Period	Price ($/MWh)	Notes
Peak	71.30	0700 - 0900, 1700 - 2000 weekdays
Shoulder	61.80	0900 - 1700, 2000 - 2200 weekdays
Off-Peak	25.20	2200 - 0700 weekdays, all weekend
Total Average	44.50	based on overall franchise load profile
SL Average	35.25	based on street lighting load profile

5.11 Current vesting volumes make up approximately 80% of load. Thus we have assumed, 80% of street lighting energy is priced at the vesting rate. The remaining 20% is purchased from the market at spot prices which we have taken as $21.21/MWh being the NSW electricity sellers price forecast for a 10 MW flat load for the period (taken at

January 1998). This is considered a conservative price as there is no morning peak or day time shoulder consumption included in the street lighting load profile. Thus the weighted average purchase price for the street lighting profile is $32.45/MWh.

5.12 To this purchase price we have made an allowance for a retailer margin of 2% to cover retailer handling costs (excluding billing). This assumption is based on the research undertaken by London Economics summarised in their report "Retail Margins for the NSW Distribution Business" – October 1995 which concluded that retail margins in the UK typically fall close to the 1.5% average of the supply companies, and that New Zealand retailers typically reported higher margins with an average of 3%. IPART in the previous determination assumed 2% as an appropriate margin and we have also assumed 2% for this report. The resulting volume weighted street light price is $33.09/MWh when adjusted for the retailers margin. This price is considered to be a conservative price for the following reasons:

- there is no downward adjustment in the vesting prices or the spot market price for lack of morning peak or day time shoulder consumption in the street light profile;
- the spot market contract price is the seller's price and has not been adjusted downward for the buyer's lower projection of the future price;
- the price has not been adjusted for the impact of the Australian Electricity Futures projected price of $16.24/MWh; and
- the retailer margin of 2% is to cover for wholesale market contract negotiation and administration. Billing of street lighting customers and marketing of street lighting sales is not included as these costs are included in the SLUOS price cap.

5.13 As the energy purchase price cap is set at the regional reference node, this cap is adjusted to reflect the extent of each distributors losses from the regional reference node to the luminaire terminals. The loss data has been sourced from the information on network charges as published by each distributor on the IPART web site. Finally, the price is adjusted upwards by 1.0% to cover distributor handling costs associated with energy purchase functions. These costs are not recovered through SLUOS charges associated with operating and maintaining the street lighting network. The 1% is based on EnergyAustralia as a benchmark, where the charge amounts to approximately ½ a person per year to handle the energy component of the street lighting work.

5.14 The distributors were asked to provide information on the street light losses. These losses are the energy losses that occur in the street light wires and equipment. They are a third set of losses when considering the transmission and distribution losses. One distributor readily estimated these losses as 4%, whilst other distributors had difficulty in providing an estimate of these values. In assessing the information provided, it became clear that their was no standard methodology used across distributors to determine this value. The initial response by most distributors was that the distribution

loss was adequate to cover the street lighting losses. In the case of the distributor who estimated a 4% loss, the value was based on judgement rather than parameter driven methodology. As we have no method by which to separately determine these losses we have little confidence in the data provided. Accordingly, for this assessment we have assumed that the distribution losses extend to cover the street lighting assets. There are no separate losses to be allocated to the street lighting wires.

5.15 The final prices for energy sales for each distributor are summarised below:

Table 5.2 - Derivation of Energy Sales Price at Street Lights

Network Operator Handling Charge for Energy	Price at Regional Reference Node	Loss Factor (including transmission, distribution and street lighting losses)	Price at Lantern Terminal (after losses)	Network Handling Charge ($/MWh)	Energy Sale Price for Street Lighting at the Street Light Terminal
Advance Energy	33.09	1.113	36.83	0.3683	37.20
Australian Inland Energy	33.09	1.124	37.19	0.3719	37.57
energy Australia	33.09	1.059	35.04	0.3504	35.39
Great Southern Energy	33.09	1.091	36.10	0.3610	36.46
Integral Energy	33.09	1.082	35.80	0.3580	36.16
NorthPower	33.09	1.114	36.86	0.3686	37.23

5.16 The difference in price is driven by the difference in cumulated losses across the transmission, distribution and street lighting systems. Thus EnergyAustralia, with the lowest percentage losses, reports the lowest average energy purchase price for street lighting use.

5.17 We therefore recommend the following price caps for the energy component of the charge for 1998.

Table 5.3 : Recommended Energy Price Cap

	1998 Price Cap ($/MWh)	1997 Price Cap ($/MWh)	Difference ($/MWh)	Revenue Impact ($000)
Advance Energy	37	39	-2	(25)
Australian Inland Energy	38	39	-1	(2)
EnergyAustralia	35	39	-4	(540)
Great Southern Energy	36	39	-3	(58)
Integral Energy	36	39	-3	(214)
NorthPower	37	39	-2	(55)

The revenue impact has been calculated using 1997 actual or 1998 projected sales volumes, as provided by distributors.

5.18 The previous price cap for energy was applied equally to all distributors which provided a degree of simplicity in the total price cap formula. There are obvious advantages in maintaining the price cap unchanged from the 1997 energy cap, and therefore one possible outcome is that this position is retained for all distributors.

However, the analysis presented above suggests that the lower losses incurred by EnergyAustralia do result in lower energy costs than the other distributors. This is also demonstrated to a lesser degree by Integral Energy and Great Southern Energy. The customers of these distributors may reasonably expect to share in the benefits of the network characteristics.

5.19 It is therefore recommended that the 1998 price cap for the energy component of street lighting vary across the distributors in the manner shown in Table 5.3.

6. NUOS PRICE CAP

NUOS Cost Drivers

6.1 In our view, it is appropriate that the NUOS component of the price cap remain as a $/MWh charge. In previous analysis undertaken by the Tribunal for setting the NRC, from which the NUOS charges are derived, the appropriate cost drivers were identified as sales volumes, customer numbers and circuit kilometres.

6.2 Adopting the sales volume driver maintains the same assumption as that adopted in the 1997 street lighting determination. It is easily applied and interpreted as network charges are published in these units.

6.3 The number of customers is not an appropriate driver for street lighting customers as each customer has a number of connection points to the distribution network, a characteristic which differs from most other network customers. The circuit kilometre driver, which is most applicable for the distribution networks servicing remote villages, is not the primary driver for street lighting.

6.4 Demand is a key driver of distribution costs, although this is not represented in the NRC revenue cap formula. However, consumption is often used as a proxy for demand and, in fact, is a direct derivative of demand and thus we have recommended the $/MWh form of cap be retained. In addition, as network prices are expressed in units of consumption, transparency of pricing is encouraged by adopting consumption as the price cap.

NUOS Price Cap

6.5 In determining the appropriate level of price cap for NUOS we are recommending the use of the network prices that are published by each distributor and appear on the IPART web site. This method has arisen from our method of allocation of an appropriate recommended price cap for the NUOS component of the street lighting charge. To establish a fair and equitable benchmark methodology, we chose the published network tariffs of the distributors, without reference to the total NRC for each distributor. These prices are subject to the regulatory controls of the NRC regime, and by applying these prices to street lighting customers, ensures that they are treated in a consistent manner, in respect of distribution and transmission services, to all other customers connected to the distribution network.

6.6 Within the published price list, each distributor was requested to advise of the customer classification which would be applicable to street lighting. In the case of Australian Inland Energy, a street lighting classification was readily identifiable. For the other distributors, the classification varied between LV business tariff, general supply tariff and domestic tariff. Generally, the Time of Use (TOU) structure was chosen as being applicable to street lighting.

6.7 In support of this approach we recommend that all distributors introduce a street lighting classification in their published list of network prices and that the appropriate classification provide a TOU structure for street lighting, rather than an average rate. An average rate refers to a weighted average of the peak, shoulder and off-peak prices.

6.8 It is common for a network price structure to include a supply availability (standing) component in the price. This component is generally determined as a dollar per customer per month although for Advance Energy, EnergyAustralia and Integral Energy it is applied on a per site basis, being either per pole or per luminaire.

6.9 The network tariff applicable for street lighting customers was identified by each distributor. In many instances these were presented to us as an average unit tariff. Equivalent TOU values have been extracted from the published list of network charges available on the IPART web site for the equivalent classification. The values from the published list are shown in Table 6.1 below.

Table 6.1 : TOU Network Tariffs Applicable for Street Lighting Customers

	Standing Charge ($/month)	**Peak ($/MWh)**	**Shoulder ($/MWh)**	**Off-Peak ($/MWh)**	**Average ($/MWh)**	**Classification**
Advance Energy	50.90	63.60	50.90	25.50		General supply TOU
AIE – North	140.00	n/a	n/a	n/a	39.00	street lighting
AIE – South	14.00	n/a	n/a	n/a	39.00	
EnergyAustralia	4.02	74.40	53.00	23.20		Domestic TOU
Great Southern Energy	0	45.20	45.20	45.20		Tariff not yet published
Integral Energy	4.00	54.60	44.90	16.00		General supply TOU
NorthPower	90.00	57.00	57.00	48.40		LV business TOU

6.10 The information provided by the distributors varied considerably across the above criteria. For Integral Energy, Australian Inland Energy and NorthPower it was a simple matter of applying the selected published tariff across the street light load profile, and applying the standing charge component to the appropriate customer or site definition to derive the appropriate cap for 1998. These calculations are summarised in Table 6.2 overleaf. A more detailed version of these calculations is included in Appendix F.

6.11 For Advance Energy we were unable to establish the correct application of the availability charge for street lighting customers, or in effect how that availability charge had been derived. Thus in applying the selected published tariff to street lighting customers we derived two average prices of $33/MWh (excluding the availability charge) and $49/MWh (including the availability charge). The 1997 price cap of $43/MWh falls within this band, and in the absence of further explanation we recommend that this is adopted for 1998.

6.12 Both Great Southern Energy and EnergyAustralia advised us that the published tariffs were not applicable for street lighting customers. Great Southern Energy advised that they were currently developing a new tariff structure ($45.20/MWh for peak, shoulder and off-peak load) which would apply to all network customers equally,

including street lighting customers. As we were unable to verify the basis for the proposed tariff, and as the tariff proposed is not currently in use, we recommend that the existing price cap of $43/MWh be retained.

6.13 EnergyAustralia does not currently apply a published tariff to its street lighting customers. The closest published tariff to that which is applied to street lighting is the domestic TOU tariff. This generates an average rate of $39/MWh once the appropriate load profile and availability parameters have been introduced. EnergyAustralia have calculated an average rate of $44/MWh reflecting the existing (non-published) tariff that they currently apply. Both calculations recognise that the price cap applied in 1997 of $59/MWh was too high. Consequently we recommend that the 1998 price cap be set at $44/MWh, and that EnergyAustralia publish this tariff along with the other published tariffs.

6.14 The published TOU charges presented in Table 6.1 are applied to the load profile of the street lights to determine a weekly average value. The weekly load profile is the average annual profile of 11.5 hours of lighting per day, on at 1815 hours and off at 0545 hours. The calculated values are presented in Table 6.2. The first column contains the standing charge components of each distributors tariff, as a $/annum figure and the second column the standing charge represented as a $/MWh figure. The third column presents the TOU component of the tariff as a unit charge. The final column presents the combined standing and TOU charges as the total charge, in $/MWh terms.

Table 6.2 : Derivation of NUOS Price Cap for Street Lighting Customers

	Standing Charge ($/annum)	**Standing Charge ($/MWh)**	**TOU Charge ($/MWh)**	**Total Charge – incl. TOU & Standing Charge ($/MWh)**
Advance Energy	199,042	16.15	32.80	48.95
AIE - North	5,040	3.17	39.00	42.17
AIE - South	504	0.74	39.00	39.74
energyAustralia	927,301	6.86	32.47	39.33
Great Southern Energy	-	-	45.20	45.20
Integral Energy	601,048	8.44	23.79	32.23
NorthPower	97,200	3.53	50.40	53.94

6.15 It is to be noted that the NSW Government levy, which was imposed on distributors in 1997 has not been included in the above analysis. This levy is considered to sit outside the framework of the NUOS price cap.

6.16 Therefore, based on the above analysis, we recommend the following price caps for the NUOS component of the street lighting charge for 1998. For Advance Energy and Great Southern Energy the price cap is to remain unaltered. For Australian Inland Energy, the price cap is to increase to $41/MWh which has been calculated as a weighted average of the North and South regions based on sales volumes. For NorthPower, the price cap is to rise to $54/MWh. For Integral Energy the price cap is to fall to $32/MWh. For EnergyAustralia the price cap is to fall to $44/MWh. These results are summarised in Table 6.3.

Table 6.3 : Recommended NUOS Price Cap

	1998 Price Cap ($/MWh)	1997 Price Cap ($/MWh)	Difference ($/MWh)	Revenue Impact ($000)
Advance Energy	43	43	-	-
Australian Inland Energy	41	40	1	2
energyAustralia	44	59	-15	(2,026)
Great Southern Energy	43	43	-	-
Integral Energy	32	39	-7	(498)
NorthPower	54	44	+10	275

The revenue impact has been calculated using 1997 actual or 1998 projected sales volumes, as provided by distributors.

6.17 It should be noted that the NUOS tariffs published by the distributors are not yet fully cost reflective. Thus the differences between the values presented above may reflect, in part, historical circumstances and existing price constraints. However, we do believe that by focusing on published tariffs and recommending that distributors publish street lighting network charges (supported by greater information disclosure), the customers needs are addressed and the regulatory mechanism is strengthened by the additional disclosure.

7. SLUOS PRICE CAP (Operating, Maintenance and Administration)

SLUOS Cost Drivers

7.1 The range of costs included under SLUOS are:

- operating and maintenance:
  - asset replacement and renewal
  - tree trimming
  - asset inspection
  - fault identification and repairs
  - asset design and project management
- administration
  - maintenance of asset records
  - bill preparation and revenue collection.
- capital charges
  - return on capital
  - depreciation

Capital charges are covered in Section 8 of this report.

Operating and Maintenance Cost Drivers

7.2 After analysing the information provided to us regarding the costs for each of these services for the distributors we are of the view that the majority of the operating and maintenance costs have a closer correlation with the assets employed for street lighting than the energy consumed by the assets. This confirms our understanding of the appropriate cost drivers for network related activities drawn from our past experience in the electricity distribution industry. The assets employed are made up of poles (with street lights attached), luminaires (or lanterns) and lamps (or bulbs). Control systems and connections to the distribution network also make up the street light network assets.

7.3 Appendix E summarises the types of assets recorded by each distributor, from which we are able to make several assumptions and draw a number of conclusions about the similarities and differences in the asset configurations of the distributors.

7.4 Firstly, it is apparent that all distributors make wide use of joint support structures (street lights supported by poles shared with the rest of the distribution network). The proportions range from 63% for Advance Energy to 99% for Australian Inland Energy. However, when non-pole supports are excluded for Advance Energy (walls, ceilings and suspension lighting) this percentage increases to 70%. This will impact on the way in which cost allocations are performed but not on the use of poles as a cost driver.

7.5 Secondly, in all instances, the number of luminaires is similar to the number of poles. No distributor reports a number of luminaires which is more than 2% higher than the number of poles. Thus luminaires and poles will provide similar results if selected as cost drivers. The luminaires without poles are typically suspended or attached to walls or ceilings.

7.6 And finally, with the exception of EnergyAustralia, single lamp luminaires comprise more than 75% of lamp configurations. For EnergyAustralia approximately half are single lamp luminaires and half are twin lamp luminaires. It would be expected, therefore, that with the exception of EnergyAustralia, lamp related tasks, such as lamp replacements, will be reasonably correlated with the number of poles or luminaires. In addition, it is our view that the additional costs in servicing the extra lamp, such as inspection, cleaning and tree trimming are not significant in terms of the total cost of the task. Thus lamps are not perceived to be as significant a cost driver as poles or luminaires.

7.7 Therefore, we believe, it is appropriate to adopt either poles or luminaires as the major driver, even in the case of EnergyAustralia. The marginal cost differences in servicing the twin lamps may therefore be reflected in the derivation of the appropriate coefficient for EnergyAustralia.

Administration Cost Drivers

7.8 The administration costs of asset management and record keeping are also likely to be significantly influenced by the number of poles, luminaires and/or lamps, these being the major components of street lighting assets.

7.9 The administrative costs associated with bill preparation and revenue collection will be influenced by the number of customers, together with the number of tariffs offered to each customer and the number of lamps (due to the energy calculations). The number of tariffs currently appears to be determined more by the range of assets in service than any other single factor. Applying a customer based cost driver to these costs may encourage rationalisation of tariffs where appropriate. However the bill related costs are relatively insignificant in the total cost of street lighting services. It may be appropriate, therefore, to align this cost driver to that of the more significant costs.

7.10 It is therefore suggested that the number of poles or luminaires is the more appropriate cost driver for street lighting services. This conclusion is supported by regression analysis which we have undertaken which produces a higher correlation between cost levels and poles and luminaires than between cost levels and lamps. In selecting one cost driver for use in the regulatory formula, we suggest the number of luminaires is the appropriate driver as this better reflects the servicing of all street light units, including suspension and wall or ceiling fitted lights. Thus we recommend that the number of luminaires be adopted as the driver for all operating, maintenance and administration SLUOS costs for simplicity.

Level of SLUOS Price Cap

7.11 The level of SLUOS costs identified by each distributor may differ for the following reasons:

- means of cost capture;
- cost allocation methods;
- accounting policy;
- asset configuration;
- levels of service provided;
- maintenance practices; and
- efficiency levels.

7.12 In order to understand the differences in reported SLUOS costs of the distributors in NSW and those benchmark partners located in Queensland, Victoria and New Zealand, we discuss each in turn in the following paragraphs. To assist with this discussion, a summary of the cost levels identified by the distributors are included in Tables 7.1 and 7.2, supported by data included in Appendix I. Table 7.1 includes only those costs which the distributors have identified as recovered through existing street lighting charges. Table 7.2 also includes the proportion of costs not currently recovered through street lighting charges, but which the distributors believe are reasonably associated with street lighting services. These are not recovered for a number of reasons, the two major ones being, firstly that the costs are currently not separated from the distribution network costs and secondly, in the view of the distributors they are not able to be recovered because of the price cap and side constraints which exist with the cap.

Table 7.1 : Actual OM Costs Recovered Through SLUOS ($/luminaire)

	Repairs & Replacements	Tree Trimming	Other Operating & Administration	Total
Advance Energy	46	0	0	46
Australian Inland Energy	39	0	16	55
EnergyAustralia	9	0	0	9
Great Southern Energy	39	0	0	39
Integral Energy	38	18	7	63
NorthPower	46	0	2	48
Victorian Distributor	15	0	1	16
Queensland Distributor	19	0	2	21
New Zealand Distributor	26	0	1	28

Note: Summation differences occur due to rounding

Table 7.2 : Estimated Full OM SLUOS Costs ($/luminaire)

	Repairs & Replacements	Tree Trimming	Other Operating & Administration	Total
Advance Energy	57	0	1	58
Australian Inland Energy	39	0	16	55
EnergyAustralia	23	2	4	29
Great Southern Energy	44	2	11	56
Integral Energy	38	18	8	64
NorthPower	46	0	3	49
Victorian Distributor	15	0	1	16
Queensland Distributor	19	0	2	21
New Zealand Distributor	23	0	1	24

Note: Summation differences occur due to rounding

7.13 Advance Energy, Great Southern Energy and EnergyAustralia have indicated that full cost recovery would result in SLUOS charges in excess of those currently recovered. Australian Inland Energy, Integral Energy and NorthPower however, report that SLUOS operating, maintenance and administration costs recovered are similar to the full costs identified as pertaining to street lighting services. The cost levels summarised in Table 7.2 above present obvious anomalies between distributors, particularly in the tree trimming costs of Integral Energy and the "other" costs of Australian Inland Energy and Great Southern Energy. We would expect data to be more robust for the repairs and replacement expenditure than the other components of cost which may be more difficult to separate from similar activities undertaken for the distribution network. In the following paragraphs we examine possible explanations for the cost variances. We also note that it has not been possible to establish full explanations, from the distributors themselves, for the variances in the costs identified.

7.14 We have, however, applied a number of analytical techniques to the data provided to attempt to explain the differences reported and to identify the key drivers supporting the cost levels presented. These techniques include regression analysis and non-parametric tests. Regression analysis is particularly useful in understanding correlations between variables in order to identify appropriate drivers, as noted in paragraph 7.10 above. Non-parametric tests are useful for analysing small data sets where the underlying

distribution profiles (ie: normality) in the data is difficult to ascertain. In this respect we have used the Wilcox Rank-Sum Test to assess statistical linkages between cost levels and maintenance practices.

Cost Capture

7.15 The practices relating to the identification of costs associated with street lighting services differs amongst the distributors. Overall the distributors report that they have difficulty in determining the costs associated with street light services. This has partly arisen because street lighting activities are not ring fenced in the same way that retail and distribution functions are under the Accounting Code of Practice, as previously discussed in Section Two. It also reflects the fact that some street lighting activities are typically undertaken in conjunction with similar activities for the distribution network, such as tree trimming and asset inspection. And finally, street lighting services form a relatively small proportion (less than 1% of revenues) of the activities undertaken by the distributors, and thus typically, less attention has been directed at capturing specific costs associated with street lighting than for other areas.

7.16 However, as demonstrated by the tables above, those entities who believe they have not fully captured the street lighting costs to date, have provided us with estimates of the unidentified costs, as shown in Table 7.2. Thus differences in the levels of cost capture are eliminated by focusing on the data in Table 7.2.

Cost Allocation

7.17 Currently there is some divergence in the allocation methods used by each distributor to identify the costs associated with the street lighting services provided. While there is some direct cost allocation based on costs captured under specific account codes, all distributors allocate some of their costs based on ad hoc estimates. The cost allocation methods used are outlined in Appendix J and are summarised in Table 7.3 overleaf.

7.18 As can be seen from Table 7.3, the distributors use a variety of allocation methods. "Direct" refers to costs which have been separately identified and accounted for as relating to street lighting charges. Typically this involves estimates of time spent on street lighting servicing as a proportion of total time worked by relevant staff. In many instances service costs are not broken down to this level of detail, and therefore separate allocation policies for each cost component are not readily identifiable. In particular, Australian Inland Energy was unable to separately identify tree trimming costs. EnergyAustralia, Great Southern Energy, and Integral Energy made informal estimates of tree trimming costs based on the best estimates of appropriate cost levels by staff associated with the activity. Where actual costs are not known, the number of poles is the most typical cost allocator (this is based on the relative number of dedicated street light, shared street light, and other poles), or informal estimates may be used.

Table 7.3 : Cost Allocation Methods

Service	Typical Allocation Method	Exceptions/Notes
Asset Replacement & Renewals	Direct Costs	NP use the number of poles. GSE use informal methods.
Tree Trimming	Informal Methods or Unknown	AE use direct costs. Often included with other services.
Asset Inspection	Informal Methods or Unknown	Typically included with other services.
Fault Identification & Repairs	Direct Costs or Number of Poles	AIE and GSE use informal methods.
Asset Design & Project Mgmt	Direct Costs or Unknown	IE and NP use asset depreciation.
Asset Mgmt & Records	Informal Methods	IE use direct costs. Often included with other services.
Revenue Collection	Unknown	Not readily identifiable.

7.19 The benchmark distributors also typically report that costs such as tree trimming, asset inspection, asset management and record keeping are unknown. Where estimates are made, the Victorian distributor tends to allocate costs to street lighting in proportion to either asset values or the number of poles, and the Queensland distributor in proportion to revenues. The New Zealand distributor uses both of these approaches, although where possible the New Zealand based distributor uses direct costs. Detailed information about the benchmark distributor allocation methods are included in Appendix J.

7.20 The most significant example of differences in cost allocation methods is the tree trimming charges identified in Table 7.2. Integral Energy have identified a tree trimming cost of $18/luminaire. No other distributor is currently recovering a separately identified tree trimming charge through the SLUOS charge. In addition, once fully estimated costs are considered, EnergyAustralia and Great Southern Energy have identified tree trimming costs of approximately $2/luminaire for street lights. It should be noted that NorthPower has direct council involvement in tree trimming and thus they do not directly recover charges from the local councils.

7.21 Integral Energy have based their allocation method on the proportion of trees under the wires which were planted by councils. This is about one third of the trees, and therefore Integral Energy deem that as the street light wire is the lowest wire, one third of all tree trimming costs are allocated to street lighting. It is not entirely obvious why the burden of tree trimming costs should fall on those responsible for planting the trees. In particular, this approach does not fully reflect the benefit to the distribution network of trimming the trees planted by the councils. Accordingly, we cannot support the level of cost recovery for tree trimming costs presented by Integral Energy.

7.22 Other distributors have taken a more avoided cost approach (ACA), and identified the marginal costs associated with tree trimming for street lighting as appropriate,

recovering the remaining charges under NUOS which more adequately reflect the benefits to the distribution system of the tree trimming activities. As noted previously, both full cost allocation and marginal cost allocation methods are defensible. However, it should also be noted, that if Integral Energy are currently recovering this level of tree trimming cost (as presented in Table 7.1) through SLUOS charges, there should be a corresponding lower NUOS charge. This is consistent with the recommended NUOS price cap included in Section 6 of this report derived from published network prices, which is notably lower for Integral Energy than the other distributors.

Accounting Policy

7.23 The relative proportion of operating versus capital costs will vary depending on the policy related to the expensing and capitalisation of asset replacement and renewal. Section Three discusses NSW Treasury policy guidelines in respect of asset replacement policy, and the following table summarises the current practice among the distributors. This information is presented in Appendix C.

Table 7.4 : Accounting Policy

Item	Accounting Policy
Lamps/bulbs	• Typically expensed except some distributors capitalise group replacement of lamps
Other assets	• Generally expensed (although all distributors except NorthPower have suggested they will capitalise in the future). • AE and eA plan to expense control boxes in the future.

7.24 Typical practice is for distributors to expense lower cost items (up to say $500) including bulb replacements, and capitalise higher cost items (over $5000). Items falling between these cost levels are typically subject to discretion, with varying policies adopted by the distributors. Bulk replacement of bulbs are often capitalised, while spot replacements are typically expensed. Both EnergyAustralia and Integral Energy state they would typically capitalise bulk lamp replacements rather than expensing them, although these items have a low unit cost so the total impact does not tend to be significant.

7.25 The effects of each of the significant elements in cost capture, allocation and accounting practices, relative to the majority of distributors for each element can be summarised as follows. The key elements are designated higher or lower for each distributor if it is believed that the distributor could be expected to report higher or lower SLUOS charges reflecting the policies adopted in respect of each element. Where no comment is entered, then the policies are believed to be neutral or indeterminate in influencing the level of SLUOS.

Table 7.5 : Impact of Cost Capture, Cost Allocation and Accounting Policies on Cost

	AE	AIE	eA	GSE	IE	NP	BM
Cost Capture	-	-	-	-	-	-	-
Cost Allocation	-	-	-	-	Higher	-	-
Accounting Policy	Lower	Lower	-	-	-	-	-

Asset Configuration

7.26 Appendix E describes, in detail, the number and type of assets for each distributor.

Supports/Poles

7.27 All distributors, and particularly Australian Inland Energy are characterised by predominantly joint pole construction, with the proportion of joint poles ranging from 70%-99%. Therefore Australian Inland Energy might be expected to have a slightly lower relative cost for pole replacements and renewals. The only distributor to identify wall ceiling fixtures and suspension lighting (Advance Energy), advises that these assets comprise just 10% of assets in total, while the others have indicated that these assets form only a small proportion of their respective asset bases. However, we do not believe that these differences in configuration should significantly contribute to variations in SLUOS costs between the distributors.

Luminaires

7.28 Distributors generally used single lamp luminaires, although EnergyAustralia reports about half are twin or multi-lamp luminaires. Based on luminaire types used, there is no material reason for differences in costs amongst distributors, except as relating to lamp replacement practices. The replacement of lamps in multi-lamp luminaires may provide some labour and transport cost savings on a per lamp basis, and therefore we would not expect twice the cost of lamp replacement for twin lamp luminaires. Analysis supports this, where the number of luminaires appears to correlate better with SLUOS costs than the number of lamps.

7.29 As EnergyAustralia has more multi-lamp luminaires, we would expect higher SLUOS costs per luminaire, although on a unit basis, these would not be twice as high due to the cost savings outlined above.

7.30 The benchmark distributors all report lower proportions of multi-lamp luminaires than the NSW distributors, resulting in lower lamp replacement costs per luminaire for the benchmark partners.

Lamps

7.31 Of the lamp data provided, 61% of lamps are fluorescent and 26% mercury vapour. The remaining lamps are predominantly sodium. As a general rule it is possible to extract twice the life and four times the lumen output from a sodium or mercury lamp that is approximately three times the cost of lower life ones. The high pressure sodium and mercury lamps offer longevity and output advantages whereas fluorescent and filament lamps offer a shorter life with a cheaper price and lower output. With lower output lamps like fluorescent, design distance between light poles would tend to be reduced to achieve the luminance required. As the lamp is typically only 10% of the initial construction cost, such schemes would tend to have higher up front costs and non-material maintenance costs. Reliability of the cheaper lamps is also lower than sodium or mercury lamps.

7.32 With the exception of EnergyAustralia, all distributors report the proportion of sodium and mercury lamps between 40% and 60%. EnergyAustralia has a significantly higher proportion of fluorescent lamps. Thus the lamp replacement costs for EnergyAustralia would be expected to be higher than the other distributors due to more frequent replacements. However the bulk lamp replacement costs that EnergyAustralia incurs will not be included in these cost levels as they are capitalised, and therefore this factor is not expected to be significant for EnergyAustralia's operating costs.

7.33 The benchmark distributors all report significantly higher proportions of sodium and mercury lamps than the NSW distributors. This would tend to support lower replacement costs for the benchmark entities.

7.34 The Wilcox Rank-Sum methodology was used to test whether there was a statistical relationship between the type of lamp used and the SLUOS charges of the distributors. On the basis of the information provided, no statistically defensible conclusions were able to be drawn.

7.35 The effects of the characteristics of each asset components on SLUOS can be summarised as follows.

Table 7.6 : Impact of Asset Configuration on Cost

	AE	AIE	eA	GSE	IE	NP	BM
Poles	-	Lower	-	-	-	-	-
Luminaires	-	-	Higher	-	-	-	Lower
Lamps	-	-	Higher	-	-	-	Lower

Service Practices

7.36 Appendix L lists the parties responsible for the provision of the key services in relation to street lighting. For the majority of services the responsibilities are similar across all distributors as summarised in the following table.

Table 7.7 : Service Provision

Service	Typically Provided By:	Exceptions/Notes
Maintenance Responsibility	Distributor	
Asset Monitoring and Inspections	Distributor & Public/Other	AE and IE rely on significant public involvement, eA makes some use of external contractors
Tree Trimming	Distributor, Council & External Contractor	Council involved for AE, eA and 100% for NP. eA and IE make extensive use of external contractors
Fault Identification	Distributor & Public/Other	AIE also rely on the local councils
Asset replacement/renewals, fault repairs, asset design and project management, management and records and revenue collection	Distributor	NP make minimal use of external contractors for asset design and project management

7.37 In most instances the distributor has the primary responsibility for the provision of all services relating to street lighting. EnergyAustralia, Integral Energy and to a limited extent, North Power have contracted external contractors to provide some of these services (most notably tree trimming and asset inspections) although they do maintain overall asset maintenance responsibility. It is generally accepted that the use of external contractors for certain tasks will result in reduced costs in the long term. The three users of contractors should have slightly better costs than average from this practice. Because capturing the benefits relies on supporting processes and performance measures for the effective use of contractors it is difficult to determine whether any of the distributors are indeed capturing gains.

7.38 Most distributors rely to some extent on public involvement for fault identification and asset monitoring. The level of involvement ranges significantly, from 90% for Great Southern Energy to 20% for Advance Energy in respect of fault identification. We would therefore expect the costs of providing these services to be less for those with a greater reliance on outside assistance.

7.39 Councils also undertake tree trimming for street lights. North Power has no cost associated with tree trimming as the council provides this service, while Advance Energy and EnergyAustralia also benefit from council tree trimming. Costs for these distributors would therefore be expected to reflect this arrangement.

7.40 The Australian benchmark partners make more extensive use of contractors which, if the results of industry best practice trends are demonstrated, should result in lower cost

levels. However, results from the Wilcox Rank-Sum test on the use of contractors and levels of cost were inconclusive in this respect.

7.41 The effects of each of the significant elements of service are summarised in Table 7.8. Those with outside assistance in undertaking certain tasks are designated as having a "Lower" influence on SLUOS. It should also be noted that some tasks, such as asset record keeping, are duplicated by customers suggesting inefficient use of resources.

Table 7.8 : Impact of Service Provision on Costs

	AE	AIE	EA	GSE	IE	NP	BM
Asset Inspection	Lower	-	-	-	Lower	-	Lower (V)
Tree Trimming	Lower	-	Lower	-	-	Lower	Lower
Fault Identification	-	-	Lower	Lower		Lower	Lower

Maintenance Practices

7.42 The different maintenance practices adopted by each of the distributors also assists in explaining the cost structures of each distributor. These practices are outlined in Appendix M. A summary version is included below:

Table 7.9 : Maintenance Practices

Maintenance Task	Practice	Adopted By:
Lamp Replacements	Bulk Corrective	eA, IE, NP (traffic routes only), GSE (some rural) Remainder
Luminaire Replacement	By Condition By Age	All Distributors Some assets for both AE and IE
Support Replacement	By Condition	All Distributors
Tree Trimming	Periodic By Condition Unknown	AE, GSE and IE AIE, GSE (predominantly), eA (set clearance parameters for contractor) NP unknown as council responsibility
Control Repairs	Corrective/ Condition	All Distributors
Street Light Network Repairs	Corrective/ Condition	All Distributors

7.43 The purpose of maintenance is to ensure effective lighting performance throughout the economic life of the equipment. Maintenance practices should deliver this outcome through appropriate implementation of recognised and proven methodologies applicable to the operation of the assets. It is commonly accepted that rural distributors may incur higher cost levels than urban distributors, for a number of reasons such as the additional costs of servicing remote locations. Based on the data provided by the distributors, we were unable to statistically support this assertion using the Wilcox Rank-Sum test methodology.

Lamp Replacement

7.44 Information from the distributors shows that EnergyAustralia, Integral Energy and North Power employ group replacement extensively. EnergyAustralia report that they plan to extend group replacement throughout their area.

7.45 Corrective (spot) replacement of lamps as an alternative is not the most cost effective method as it can involve significant labour and transport costs relative to the material cost of the lamp. The bulk replacement of lamps is likely to have a cost saving by minimising transport costs and improving effective labour utilisation in specific areas. The trade-off is that some lamps may be discarded before the end of their useful lives. This can occur particularly at the transition phase when a maintenance provider is increasing the use of group replacement, or where there has been significant spot or batch replacements between scheduled change dates. The other factor influencing potential savings is the uniformity of lamp types, as the interval for change depends upon lamp mortality and depreciation (lumen output) rate. These can be determined from manufacturers' data to establish a lamp change interval (the life is usually taken as 80% of the rate). More uniformity in lamp types will enable more efficient group replacement practices. Group replacement derived from this concept allows the prediction of costs for the replacement more accurately.

7.46 In addition to pure cost considerations, other particular conditions, such as the existence of prestigious areas, security arrangements, traffic hazard localities, or "rogue" failure in a group replacement may also drive appropriate use of group replacement. These replacements will usually be in addition to the normal group replacement routine and should not influence the frequency of the next replacement for the group.

7.47 The distributors which do not have significant group replacement policies would be expected to have higher costs, especially when combined with a high proportion of rural street lights. These distributors include Australian Inland Energy, Advance Energy and Great Southern Energy. This conclusion was supported by a Wilcox Rank-Sum test which concluded that (at a 99% confidence level) there was a positive statistical relationship between the practice of bulk lamp replacement and lower asset replacement and repair costs. This results was the only positive conclusion we were able to draw from the number of Rank-Sum statistical tests undertaken.

7.48 Amongst the benchmark distributors, replacement policies were mixed - the Victorian distributor adopts widespread bulk replacements and the others do not.

Luminaire Replacement

7.49 Most distributors change luminaires on the basis of condition. This is the most effective method as many factors relating to particular environments influence the performance. This requires an inspection which can be carried out at the time of the lamp replacement. Frequently the deterioration is overcome by cleaning and simple repairs, such as replacing seals. Additional costs may be involved for luminaires in polluted localities. From time to time an extra cost may occur to ensure compliance with the "in-service" luminance level specified in AS 1158.1.1. Both Advance Energy and Integral Energy replace some luminaires on the basis of age rather than condition and the Victorian distributor replaces the majority of luminaires on the basis of age. It is likely that the Victorian distributor may report higher costs than others in this respect although this is not conclusive as demonstrated by the Rank-Sum test undertaken which failed to link condition or periodic replacement practices with lower SLUOS costs.

Support Replacement

7.50 All distributors replace supports by condition following an inspection at predetermined intervals, usually carried out in conjunction with the inspection of other network assets. For joint use poles this operation can be undertaken in conjunction with the electricity distribution pole programme. At the same time as the pole inspection, the bracket supporting the luminaire can be inspected to minimise costs. Again, the practices are similar for all distributors including the benchmark partners.

Tree Trimming

7.51 Distributors use both periodic cutting and condition based tree trimming to control trees to ensure the effectiveness of the street lights. In some cases where the Council or a contractor is used, the distributor is unaware of which approach is used. There is no clear overwhelming advantage of either method. Periodic tree trimming may not be effective if the rate of growth is unpredictable and condition based trimming may result in unwarranted site visits without prior inspections. The most cost effective method for the distributor may be to put the responsibility on to the Council who, in most cases, would be the owner of the trees and the customer in terms of the lighting provided. Joint use poles would result in the allocation of cutting costs in proportion to the electricity distribution mains involved.

7.52 Other than North Power, where tree trimming is carried out by councils, Australian Inland Energy and Integral Energy could be expected to have slightly lower tree trimming costs than the remaining distributors as a result of the higher proportion of joint poles.

Control Repairs

7.53 These repairs are carried out using a combination of corrective and condition based approaches for NSW distributors. PE cells, time switches and ripple delays and control boxes will require repairs at a frequency relating to the quality of the product. Costs should be saved if, for instance, the PE cell had a life similar to the lamp and was replaced at the time of the lamp replacement (periodic). Other control units have a life generally in excess of the normal change interval for most lamps. Thus the unit may be changed every third lamp change but inspected/tested at each lamp change. The Victorian distributor undertakes control repairs on the basis of age rather than a corrective/condition approach which may result in higher cost levels although this is inconclusive.

Street Light Network Repairs

7.54 The street light network comprising the service connection and/or the 5th wire has a greater reliability than other street light components. Cost effective maintenance would therefore be based on a corrective method. A "by condition" approach requires prior inspection to verify the work needed and will tend to cost more unless it is tied in with other existing/inspection activities. Maintenance costs for underground and overhead assets tend to be similar in magnitude. While the cost per underground repair tends to be higher, there are generally fewer instances where repairs are required. Again, the maintenance practices associated with street light network repairs are not believed to be a contributing factor to cost differences.

7.55 The effects of each of the significant elements in maintenance practices, relative to the majority of distributors for each element can be summarised as follows.

Table 7.10 : Impact of Maintenance Practices on Cost

	AE	AIE	EA	GSE	IE	NP	BM
Lamp Replacement	-	-	Lower	-	Lower	Lower	Lower (V)
Luminaire Replacement	-	-	-	-	-	-	-
Support Repairs	-	-	-	-	-	-	-
Tree Trimming	-	Lower	-	-	Lower	-	-
Control Repairs	-	-	-	-	-	-	-
SL Network Repairs	-	-	-	-	-	-	-

Efficiency Levels

7.56 The following table summarises responses from the distributors as to construction costs of a small, typical street light extension, as an example of relative cost levels. Parameters were given for the project to ensure costs presented were determined for identical conditions. This information is included in more detail in Appendix N. Although this example is a construction tender, where the costs would be capitalised and not included in the SLUOS (O&M) charge, it does provide an illustration of the relative cost levels of each organisation and can be regarded as a proxy for efficiency.

Table 7.11 : Small Typical Street Light Extension Construction Costs

$/luminaire	AE	AIE	eA	GSE	IE	NP	V	Q	NZ
Materials	956	965	798	559	855	626	417	418	580
Labour	100	116	480	81	421	125	238	277	109
Oth. Direct Costs	98	87	25	108	0	36	90	257	17
Total before Overheads	**1154**	**1168**	**1303**	**748**	**1276**	**787**	**745**	**952**	**706**
Overheads	199	369	518	235	0	104	39	64	0
Total	**1353**	**1536**	**1821**	**983**	**1277**	**891**	**783**	**1016**	**705**

7.57 There is a consistency in the proportion of costs associated with materials, labour and other costs. Materials typically account for 60-70% of cost for the NSW distributors, although they are lower for the Victorian and Queensland Distributors and EnergyAustralia. EnergyAustralia and Integral Energy have labour costs much higher than the other distributors. This reflects the higher labour rates in the areas of operation of theses two distributors and also implies greater time taken per street light installation. In addition, although the EnergyAustralia figures indicate a higher level of recovery of overheads, the Integral Energy data has a zero level of overheads which suggests the labour costs may include other costs. EnergyAustralia's indirect costs form a higher proportion of total costs than the other NSW distributors. Integral Energy's response has a higher labour charge but no other non-material costs which suggests the labour costs include other costs in this instance. The overall tender is lowest for NorthPower, Great Southern Energy, and the Victorian and New Zealand Distributors. Factors which would contribute to this lower cost include:

- design criteria and accuracy;
- source of materials and purchasing strength;
- construction methods and supervision, and
- cost allocation.

7.58 We have also ranked the responses, lowest to highest, on the basis of total cost, material costs only and non-material costs only. These rankings are summarised below.

Table 7.12: Construction Cost Components ($/luminaire)

Rank	Total		Materials		Non-Material Costs	
(1 = low)		$		$		$
1	NZ	705	V	417	NZ	125
2	V	783	Q	418	NP	265
3	NP	891	GSE	559	V	366
4	GSE	983	NZ	580	AE	397
5	Q	1016	NP	626	IE	422
6	IE	1277	EA	797	GSE	424
7	AE	1353	IE	855	AIE	571
8	AIE	1536	AE	956	Q	598
9	EA	1821	AIE	965	EA	1024

7.59 By isolating the non materials components of cost we are able to more directly focus on distributor operating efficiency. These include allocated overheads due to the inconsistency in the data provided in separately identifying overhead allocations. The lowest cost levels are reported by the New Zealand and Victorian benchmark partners as well as NorthPower. The highest cost levels are those of EnergyAustralia, Australian Inland Energy and the Queensland distributor.

7.60 An independent estimate proposed by Worley Consultants, assuming typical industry standards (not necessarily industry best practice) is $1,209/luminaire (rank 5-6) for the total tender of which $547 (rank 6-7) is non material costs. Distributors reporting cost levels below these may be considered to be operating with acceptable industry standards, based on the information provided, and those at the lower end may be approaching industry best practice. However, the data presented in Table 7.2, which summarises estimated full SLUOS costs for each distributor, do not reflect the same relativities of cost levels shown in Table 7.12. Thus it is difficult to conclude that the assumed efficiency levels demonstrated above are reflective of overall levels of efficiency for each distributor.

Relative SLUOS Costs

7.61 Based on the analysis outlined above we have identified the following key explanatory variables for differences in SLUOS:

Table 7.13 : Explanatory Variables for SLUOS Replacement Costs

	AE	AIE	EA	GSE	IE	NP	BM
Cost Allocations	Higher	-	-	-	-	-	-
Accounting Policy	-	-	Lower	-	Lower	-	-
Asset Type	Lower	Lower	Higher	-	-	-	Lower
Maintenance Policy	-	-	Lower	-	Lower	Lower	Lower (V)
Efficiency	-	Higher	Higher	Lower	-	Lower	Lower (V & NZ)
Distributors Full Costs ($/Luminaire)	57	39	23	44	38	46	15-23

Table 7.14 : Explanatory Variables for SLUOS Tree Trimming Costs

	AE	AIE	EA	GSE	IE	NP	BM
Cost Allocations	None	None	-	-	Higher	-	None (V & Q)
Service Provision	-	-	Lower	-	-	None	-
Maintenance Policy	-	-	-	-	Lower	-	-
Distributors Full Costs ($/Luminaire)	0	0	2	2	18	0	0

Table 7.15 : Explanatory Variables for SLUOS "Other" Service Costs

	AE	AIE	EA	GSE	IE	NP	BM
Cost Allocations	-	Higher	-	-	-	-	-
Service Provision	Lower Asset Inspect'n	-	Lower Fault Identif'n	Lower Fault Identif'n	Lower Asset Inspect'n	Lower Fault Identif'n	Lower Asset Inspect'n (V)
Efficiency	-	Higher	Higher	Lower	-	Lower	Lower (V & NZ)
Distributors Full Costs ($/Luminaire)	1	16	4	11	8	3	1-2

7.62 Due to the uncertainty surrounding the costs provided by the distributors, and the variance in the data provided, we have not extended this analysis to examine the relative importance of each of the influencing elements listed above. As demonstrated by the preceding tables, the data provided does not always support expectations based on the relative policies adopted by each distributor, therefore, we believe there is little value in undertaking more detailed data analysis. In this respect, the analysis of the benchmark partner data has also been of a limited value. Based on asset configuration, service practices, maintenance practices and estimated efficiency levels, the benchmark partners could be expected to report lower operating and maintenance costs than the NSW distributors, as demonstrated by the data provided.

7.63 Our conclusions in respect of the appropriate level of SLUOS price cap are therefore inconclusive, as previously noted in Section Four of this report.

8. SLUOS PRICE CAP (Capital Charges)

Capital Cost Drivers

8.1 The two finance costs associated with SLUOS are:

- return on capital invested in the street lighting system, and
- depreciation of those assets.

8.2 These are valid for non-contributed assets only, as discussed earlier in Section Three. The capital charges reflect the number, type and age of assets employed. It is, therefore, more appropriate to include them with the other SLUOS charges associated with the luminaire based cost driver than the energy volume driver assumed for NUOS and the Energy component. Adopting this approach also contributes towards the simplicity of the recommended solution.

Level of SLUOS (Capital) Price Cap

8.3 Capital charges are, on the whole, not accurately reflected within the existing street lighting tariffs. Residual income under the current SLUOS cap is typically apportioned to capital charges, either depreciation and/or return on assets, and thus full capital charges are not recovered by distributors due to the constraints on charges imposed by the price cap and side constraints.

8.4 Table 8.1 below summarises the capital charges calculated by the distributors as currently recovered through street lighting charges. These include capital charges relating to non-contributed assets only. The depreciation and return on assets have been presented as a $/luminaire value using just those luminaires for which these charges are recoverable. Great Southern Energy were not able to provide a breakdown of contributed versus non-contributed assets so we have calculated their cost per luminaire on the basis of total luminaires in the absence of the necessary information. Table 8.2 shows the charges that the distributors believe they should recover, if charges were not constrained by the price cap and/or side constraints and the preferred valuation methodology of each distributor was used. These are also presented in Appendix I.

Table 8.1 : Capital Charges Currently Recovered Allocated to Non-Contributed Assets

$/luminaire (non-contributed)	Depreciation	Return on Assets	Total Capital Charges
Advance Energy	18	24	42
Australian Inland Energy	31	0	31
energyAustralia	41	6	47
Great Southern Energy	0	0	0
Integral Energy	62	40	102
NorthPower	24	22	46

Table 8.2 : Full Capital Charges Calculated by Distributors Allocated to Non-Contributed Assets

$/luminaire (non-contributed)	Depreciation	Return on Assets	Total Capital Charges
Advance Energy	26	34	60
Australian Inland Energy	31	26	57
energyAustralia	41	45	86
Great Southern Energy	46	43	89
Integral Energy	62	40	102
NorthPower	43	29	72

8.5 As demonstrated by the tables above, the level of capital charges per luminaire differ between distributors. One obvious anomaly is the high depreciation charge claimed by Integral Energy, which we have been unable to validate. We have examined possible explanatory factors in the following paragraphs to attempt to explain the differences. We have identified the following key factors which influence capital charges:

- the asset valuation method applied;
- the rate of return used;
- the age profile of the assets;
- the proportion of assets funded by the distributor;
- the accounting policies adopted for capitalising expenditure, and
- the types of assets in use.

8.6 For these reasons we would not expect the capital charges to be recovered under the SLUOS price cap to be the same for each distributor.

Valuation Methodologies Used By Distributors

8.7 The distributors use a number of valuation methodologies which we have listed in Appendix C. Three of the distributors have expressed a desire to adopt a different approach from that currently used. This wide variation in valuation methodologies and associated calculations of depreciation and return on assets makes any valid comparisons between the distributors difficult.

Table 8.3 : Valuation Methods Applied

	Valuation Methodology Used	Valuation Methodology Preferred
Advance Energy	Historic Cost	DRC
Australian Inland Energy	DRC	DRC
energyAustralia	RC	RC
Great Southern Energy	DRC	DRC
Integral Energy	WDV	DRC
NorthPower	WDV	DRC

8.8 Advance Energy have historically recovered capital related costs in an annuity over 20 years recovering the full capital amount together with a return at 8%. EnergyAustralia has used replacement costs, Great Southern Energy and Australian Inland Energy have used DRC and Integral Energy and NorthPower have used written down values (WDV) based on the SKM valuation. Sometimes referred to as the "RAT test" or “return on asset” test, a WDV assumes asset values are written down because of the existing side constraints on price increases. Distributors in NSW are restricted in their ability to make real price increases. It is the distributors view that this restriction on prices effectively locks them into an historic tariff structure and prevents the recovery of a market return on recommended ODRC or DRC values. We are unable to verify this view from the information available.

8.9 The use of WDV as a basis for existing capital charges should result in lower charges for Integral Energy and NorthPower. The charges calculated on the basis of historic cost by Advance Energy would also be expected to be lower. However, the charges presented in Table 8.2 have been calculated on the basis of DRC for all except EnergyAustralia. EnergyAustralia’s calculation based on RC should provide a similar result if an appropriate WACC and depreciation rate are used and the average remaining life was 50% of the recommended standard life. As discussed in Section Three, this assumption cannot be verified and is unlikely to be appropriate in the long term. Thus, the charges included in Table 8.2 have been prepared on a similar basis, with the possible exception of EnergyAustralia and therefore the valuation method applied is not a significant explanatory factor.

8.10 We have compared depreciation claimed by distributors with their renewal and replacement expenditure. Including the benchmark distributors three have a low ratio of depreciation to renewals and replacements, three have ratios between 83% and 104% while two have ratios well in excess of one. In other words three distributors spend substantially more on their renewal and replacements than they recover on depreciation and two spend considerably less on renewals and replacements than they recover on depreciation. We conclude that there is no obvious trend identified when looking at this relationship.

Rate of Return

8.11 Each of the distributors has provided their required rate of return (as specified in Appendix C) and summarised in the table below. We understand that these rates are the

approved corporate real pre-tax WACC's with the exception of EnergyAustralia who have used 5.5% on the RC value to calculate the return on assets component.

Table 8.4 : Distributor WACC's

	Rate of Return (%)
Advance Energy	8.0
Australian Inland Energy	9.6
energyAustralia	5.5
Great Southern Energy	11.25
Integral Energy	10.5
NorthPower	8.74

8.10 As discussed in Section Three, WACC's can vary due to a number of different variables or interpretation of those variables. IPART's view on an appropriate real pre-tax WACC covers a range of 7.5% to 9.5%. The WACC's, in Table 8.4, provided by the distributors show that Australian Inland Energy, Great Southern Energy and Integral Energy exceed this range.

8.11 Accordingly, in Table 8.5 below we have attempted to "equalise" the return on capital requirements of all distributors by using an arithmetic average WACC of 9.6% (excluding EnergyAustralia). The 9.6% is very close to the upper end of the IPART range. We have recalculated Table 8.2 using DRC as provided to us by the distributors (except for EnergyAustralia which we have left unaltered).

Table 8.5 : Capital Charges Calculated by Distributors by Average WACC, Allocated to Non-Contributed Assets

$/luminaire (non-contributed)	Depreciation	Return on Assets	Total Capital Charges
Advance Energy	26	50	76
Australian Inland Energy	31	26	57
energyAustralia	41	45	86
Great Southern Energy	46	37	83
Integral Energy	62	32	94
NorthPower	43	32	75

8.12 The resulting return on assets in Table 8.5 is less than the return claimed for those distributors which have a target WACC higher than the average while the return on assets has correspondingly been increased for Advance Energy and North Power.

8.13 Table 8.5 represents our best efforts to provide a required return for non-contributed assets on a per luminaire basis, using a constant valuation methodology and the same WACC. However, in arriving at this table we have doubts regarding the robustness of the outcome due to the unexplained inconsistencies in the original data provided. We also note that the effectiveness of the comparisons presented above is

limited by the unavailability of contributed/non-contributed data from Great Southern Energy and the unique valuation methodology presented by EnergyAustralia.

Asset Age

8.14 The average remaining life of street lighting assets are included in Appendix C, and summarised in Table 8.6 below. These were determined when the SKM asset valuations were prepared during the amalgamation process. Assets constructed since that time have been depreciated over a standard twenty year life, at 5% per annum. We understand these assumptions apply to both contributed and non-contributed values and we have not been able to determine whether the remaining lives would be different if contributed assets were excluded.

Table 8.6 : Asset Remaining Life (for assets valued on incorporation)

Distributor	Remaining Life (years)
Advance Energy	7.2
Australian Inland Energy	8
energyAustralia	2
Great Southern Energy	10
Integral Energy	6.3
NorthPower	11

8.15 Thus those distributors with lower remaining lives may be expected to have lower depreciation charges, if we assume that for all systems there may be a proportion of assets still in service which may be fully written off, i.e.: exceeded their assumed twenty year service life. The proportion is likely to be higher for those distributors with older assets.

8.16 Lower remaining lives however, should result in lower return on asset components of the capital charge.

8.17 The extremely low remaining life assigned to the assets of EnergyAustralia appears to be unrealistic as it suggests that the total street lighting system for EnergyAustralia will need to be replaced over the next two years. We understand from EnergyAustralia is not the case. Therefore, Energy Australia have elected to use the replacement cost of the assets as the basis for their capital charge calculations. They have assumed a 5% depreciation rate on replacement costs, equal to a twenty year age profile, to calculate the depreciation portion of their charge.

Proportion of Contributed Assets

8.18 Table 8.7 overleaf, summarises the proportion of assets funded by the distributor. These proportions are based on the data provided to us for depreciated replacement costs. The split between contributed and non-contributed assets has been estimated in some cases in the absence of more detailed information. Great Southern Energy have not been able to provide an answer to this question as they do not have the information to be able to identify contributed assets from non-contributed assets.

Table 8.7 : Proportion Assets Non-Contributed (based on DRC values)

Distributor	Proportion Non-Contributed Value
Advance Energy	50
Australian Inland Energy	35
energyAustralia	99
Great Southern Energy	N/A
Integral Energy	52
NorthPower	92

8.19 Thus those distributors with higher proportions of non-contributed assets would be expected to recover higher capital charges.

Accounting Policies

8.20 Appendix C sets out the current asset replacement and renewal policies for each distributor and the likely future policy on capitalising expenditure. Currently all distributors expense all asset replacement costs, with the exception of Advance Energy which capitalises the replacement costs of luminaires, brackets and poles. Thus we may expect Advance Energy to report a higher capital charge than other distributors based on this accounting policy.

8.21 However there is a general recognition by distributors that more renewal expenditure should be capitalised. Great Southern Energy and Integral Energy plan to adopt a policy of capitalising asset renewals except for lamps which will continue to be expensed. Advance Energy and EnergyAustralia plan to adopt a policy of capitalising renewal expenditure on luminaires, brackets and poles but continue to expense lamps and control boxes.

Types of Assets

8.22 During this assignment it has been difficult to determine whether there are any significant factors in respect of asset type which would influence the asset valuations and therefore capital charges. We are aware that the lamp types differ considerable between distributors, but as these are typically expensed, these variations do not impact on the asset values.

8.23 All distributors make widespread use of distribution system poles for the street lighting network. Advance Energy, EnergyAustralia and Great Southern Energy have the highest proportion of dedicated street light poles, approximately 30% in each case. Australian Inland Energy has the lowest proportion, with just 1%. We would expect those with higher proportions of dedicated street light poles to report higher capital charges.

Relative Capital Charges

8.24 Based on the reasons spelt out in the previous paragraphs, we would expect the following conclusions to be drawn about the relative levels of capital charge between the distributors.

Table 8.8 : Factors Influencing the Level of Capital Charges

	AE	AIE	EA	GSE	IE	NP
Valuation Method	-	-	-	-	-	-
Rate of Return	Lower	-	-	Higher	Higher	Lower
Asset Age	Lower	-	-	Higher	Lower	Higher
Level of Contribution	-	Lower	Higher	-	-	Higher
Accounting Policy	Higher	-	-	-	-	-
Types of Assets	Higher	Lower	Higher	Higher	-	-
Overall	-	Lower	Higher	Higher	-	-
$/Luminaire	60	57	86	89	102	72

8.25 Without undertaking a detailed audit of the ways in which the capital charges have been calculated by each distributor, the conclusions shown in the table above, suggest that the capital charges calculated by the distributors fall in line with expectations about the relativity, with the notable exception of the depreciation charge for Integral Energy. We are unable to comment however, on the absolute level of the charges presented by each distributor.

Appendix A - Tariffs Offered

	Advance Energy	Notes	Australian Inland Energy	Notes	energyAustralia	Notes	Great Southern Energy	Notes	Integral Energy	Notes	NorthPower	Notes
Methods of Tariff Setting Used for Street Lighting Recovery												
Tariffs offered for the recovery of NUOS, SLUOS and energy:												
Fixed charge ($/lamp)									Y			
Fixed charge ($/pole)											Y	
Unit charge ($/MWh)							Y					
Combination of fixed and unit charge	Y		Y	AIE1								
Other					Y	EA1						
Tariffs to recover Capital Contributions												
Full contribution	Y		Y		Y	EA2	Y		Y	IE1	Y	
Partial contribution					Y	EA2			Y	IE2	Y	
Other							Y	GSE1			Y	NP1
Type of Charge for Street Lighting												
Street light tariffs are the same for all customers.	N		N		Y		Y		Y		N	
Reasons for variation in tariffs:	region		region								region	
Capital contributions the same for all customers.	Y		N		Y		Y		Y		N	
Reasons for variation in costs charged:			region								region	
Council Comments on Invoicing												
Average user friendliness rating: 1=difficult to use 5=easy to use	3		NA		NA		4		3.75		4	
Invoice separates fully contributed assets	yes		NA		NA		no		unsure		unsure	
Invoice separates partially contributed assets	yes		NA		NA		no		unsure		unsure	

AIE1 Annual lump sum charge for AIE North.

EA1 Calculates a specific price for each type of installation, based on the lamp wattage, lamp type, support type, supply methodology (overhead or underground) and capital cost (less contributions).

EA2 Full contribution with lower tariff for contributed assets. The majority of eA's lights have been fully financed by eA. Those that have had capital contributions applied have lower tariffs that reflect the fact that no capital recovery is required.

GSE1 With traffic route lighting the RTA and distributor subsidise the relevant council. The split of costs are equally 1/3 RTA,1/3 Dist,1/3 Council.

IE1 Schedule 2 charges apply.

IE2 Contribution of excess above Capital Provision. Schedule 1 charges apply.

NP1 Nil recovery.

Appendix B - Contractual Agreements

Council	Albury	Blacktown	Dubbo	Holroyd	Penrith	Rylstone	Tamworth	Tweed
Local Distributor	Great SE	Integral	Advance	Integral	Integral	Integral	NorthPower	NorthPower

Type of agreement		informal		informal	BL1	informal	DU1	informal		informal		no agreement		informal	TA1	informal	TW1
Contractual agreement covers:																	
Level of street lighting		-		-		no		-		-		-		no		yes	
Maximum outage levels		-		-		no		-		-		-		no		yes	
Asset replacement and renewal		-		-		no		-		-		-		no		yes	
Maintenance levels/practices		-		-		yes		-		-		-		no		yes	
Tree trimming		-		-		yes		-		-		-		yes		no	
Asset inspection		-		-		yes		-		-		-		no		yes	
Fault identification		-		-		yes		-		-		-		no		yes	
Fault repair		-		-		yes		-		-		-		yes		yes	
Asset design and proj management		-		-		no		-		-		-		no		yes	
Asset management and records		-		-		no		-		-		-		no		yes	
Revenue collection		-		-		no		-		-		-		no		yes	
New asset construction and ownership		-		-		yes		-		-		-		no		yes	
Not sure/not defined		yes		yes	BL2	no		yes		yes		yes		yes		no	TW2
Level of services																	
Hours of lighting 11.5hrs		100%		100%		100%		99%		100%		NA		100%		100%	
Maximum percentage lamps out	%	NA		NA		no		informal		NA		NA		NA		NA	
Maximum outage time	days	NA		NA		2		NA		NA		NA		NA		NA	
Information available from distributors																	
Other than tariffs and charges																	
Asset types and numbers?		yes		no		yes		yes		yes	PE1	yes		yes		yes	TW3
Asset age/condition?		no		no		no		yes		unknown		no		no		no	
Other information required		no		yes	BL3	no		no		no	PE2	no		no		no	TW4

BL1. Council request preparation of a scheme and costs involved. If appropriate funding is available, the council accepts the scheme and advises Integral to proceed with installation.
BL2. Council does not have a current agreement, but considers that an agreement should be formed including the above issues.
BL3. Would like: 1) A database indicating the locations of street lighting assets. 2) The number of street lights in the city area.
DU1. Meet regularly to co-ordinate road opening activities and programmed land development. Also meet to discuss maintenance policy.
PE1. Available on request.
PE2. Would like information on the types and numbers of lights in individual streets.
TA1. The current 'arrangement' is a historical one whereby the former County Council was responsible for the errection and maintenance of the streetlighting and TCC provided locations of new and additional lighting.
TW1. Good relationship with its previous supplier NRE, mainly based on local staff. Perception is that this has been lost with the transfer to NorthPower. Currently unaware of any contractual agreement. Historically been supplied by SEQEB (Queensland) and then NRE (New South Wales). Transfer details were arranged by government.
TW2. All the above functions (except tree trimming) were previously accepted as the responsibility of NRE.
TW3. Asset data other than type and number is not available.
TW4. Would like information on asset database details, maintenance policies, and operational criteria such as average life of fittings.

Appendix C - Asset Capitalisation Policies & Valuations

		Advance Energy		Australian Inland Energy		energyAustralia		Great Southern Energy		Integral Energy		NorthPower	
Asset Replacement & Renewal Policies													
Current Policy			Notes		Notes		Notes		Notes		Notes		Notes
Lamps/bulbs		expensed		expensed		expensed		expensed		expensed		expensed	
Luminaires, brackets, poles		capitalised		capitalised		expensed		expensed		expensed		expensed	
Control boxes		expensed		capitalised		expensed		expensed		expensed		expensed	
Expected Future Policy													
Lamps/bulbs		expensed		expensed		expensed		expensed		expensed		expensed	
Luminaires, brackets, poles		capitalised		capitalised		capitalised		capitalised		capitalised		expensed	
Control boxes		expensed		capitalised		expensed		capitalised		capitalised		expensed	
Replacement Costs													
(of Total Street Lighting Assets including Contributed Assets)													
Total	(000s)	$24,913		$480		$190,000	EA1	$28,073		$71,550		$41,949	
Asset Values													
Valued at Depreciated Replacement Value													
Total non contributed	(000s)	$12,535		$153		$22,450		$0		$29,766		$10,907	NP1
Total contributed	(000s)	$12,375		$280		$143		$0		$27,024		$921	NP1
Total asset value	(000s)	$24,910		$433		$22,593		$11,803	GSE1	$56,790		$11,828	
Average remaining life (SKM)													
Support	yrs	7.2						10				11	
Luminaire	yrs	7.2						10				11	
Lamps	yrs	7.2				0.75		1				11	
Control	yrs					1.5		10				11	
Connection	yrs	7.2				2		10				11	
Meters	yrs											11	
SKM Assets[1]	yrs			8		2	EA2			6.3	IE1		
New Assets[2]	yrs			18		19				19			
Parameters Used by Distributors to Calculate Capital Charges													
Valuation method[3]		HC		DRC		RC		DRC		WDV		WDV	
Asset value		$8,442		$282		$190,000		NA		$29,766		$41,950	
Rate of return for full recovery		8.0%		9.6%		10.5%		NA		10.50%		8.74%	

1. Assets valued on incorporation.
2. Assets added since incorporation.
3. HC=historical cost; RC=replacement cost; WDV=written down value; DRC=depreciated replacement cost.

AIE1. Council fund all replacement/renewal/construction costs.
EA1. Plus or minus 10%.
EA2. SKM assets depreciated at $12.5m pa.
GSE1. GSE have advised their database does not separate contributed and non contributed assets.
IE1. SKM assets depreciated at 12.5% pa.
NP1. 96/97 values proportioned over components using calculated installation costs. Value of control system not known. Value of contributed and non-contributed assets taken as a proportion of total assets using calculated installation costs.

Appendix D - Asset Funding

Council		Albury		Blacktown		Dubbo		Holroyd		Penrith		Rylstone		Tamworth		Tweed	
Local Distributor		Great SE		Integral		Advance		Integral		Integral		Integral		NorthPower		NorthPower	
Ownership of Street Lighting Assets																	
Streets/roadways			Notes		Notes		Notes		Notes		Notes		Notes		Notes		Notes
Distributor	%	80%		100%		100%		95%				NA		NA	TA1		
Council	%	20%						5%		100%		NA		NA	TA1	100%	
Underpasses																	
Distributor	%			100%		100%		99%				NA		NA	TA1	NA	
Council	%	100%								100%		NA		NA	TA1	NA	
Private	%							1%				NA		NA	TA1	NA	
Carparks																	
Distributor	%			100%		100%		NA				NA		NA	TA1		
Council	%	100%						NA		75%		NA		NA	TA1	100%	
Private	%							NA		25%		NA		NA	TA1		
Domains/parks																	
Distributor	%			100%		100%		95%				NA		NA	TA1		
Council	%	100%						5%		25%		NA		NA	TA1	100%	
Other																	
Distributor	%	NA		100%		100%		NA				NA		NA	TA1	100%	
Council	%	NA						NA		100%		NA		NA	TA1		
Ownership of New Assets		council	AL1	distributor		distributor		NA		council	PE1	council		NA	TA2	council	
Ownership depends on funder?		NA		no		no		NA		yes		NA		NA		no	
Design life of new assets		NA		20		20		NA		20		NA		NA		unknown	
Asset Information and Funding																	
Asset register																	
Council has asset register		no		no		no		yes		no		no		no		yes	
Otherwise - access to asset register		yes		yes		yes		NA		yes		no		no		NA	
Percentage assets captured in register	%	100%		95%		100%		100%		unknown		-		-		100%	
Is asset register accurate?		yes	AL2	no		no	DU1	yes		unknown		-		-		no	TW1
Does asset register record contributed and non contributed?		no		no		no		yes		yes		-		-		no	TW2
Capital costs of new assets																	
Policy exists for funding of new assets?		no	AL3	yes	BL1	yes	DU2	yes		yes		no		NA		yes	TW3
Policy covers council provision of upfront capital		yes	AL4	yes		yes		yes		yes		-		NA		yes	TW4
Policy covers distributor provision of upfront capital		yes		yes	BL2	no		yes		yes		-		NA		yes	
Policy covers SLUOS charges		NA	AL5	no		no		mostly		unknown		-		NA		yes	TW5

AL1. Asset ownership is unclear.
AL2. Street lighting assets are recorded by local energy authority.
AL3. Council normally requests street lighting new and upgrade work. Costs are usually amortised over the design life, therefore council pays an annual charge.
AL4. Total capital costs would be paid if work was subject to separate government funding.
AL5. Ownership of lighting varies from type of fixture (i.e. power pole or separate lighting pole).
BL1. Council pays for the capital contribution component as well as the annual charge.
BL2. Under schedule 2 rates.
DU1. Asset register does not indicate location of assets.
DU2. Council accepts the capital cost of all new streetlight installations it instigates. Council has a streetlighting improvement programme.
PE1. Asset ownership is unclear.
TA1. It is difficult to ascertain who is the asset owner. Historically, council has always paid a capital contribution as well as an annual charge (eg: Erect 1x50 W MBF/U on existing pole - capital contribution = $261.00, annual charge = $49.30). This seems to have always been the trend and file searches and interviews cannot confirm either way.
TA2. Asset ownership is unclear.
TW1. Street lights entered on GIS by location only, not type. Council GIS previously used by NRE/NorthPower. NRE advised they had no database by location.
TW2. Database contains only those lights connected to the street lighting system recognised by council.
TW3. Street lights, other than those provided by Developers, are funded from Councils' annual street lighting budget provision.
TW4. Council budget provides for both capotal and operating costs of new lights.
TW5. Council to date has been unable to obtain from NorthPower the basis used to calculate charges for capital/operating costs of new lights. They have provided some indications (eg: no capital contribution usually where a new light is erected on an existing pole that currently carries the necessary power lines).

Appendix E - Types of Assets

		Advance Energy		Australian Inland Energy		energyAustralia		Great Southern Energy		Integral Energy		NorthPower		Victorian Distributor		Queensland Distributor		New Zealand Distributor	
			Notes		Notes		Notes		Notes		Notes		Notes		Notes		Notes		Notes
Support	number	26,539		3,050		229,796		30,853		150,076		51,119		79,500		178,000	QD1	2,309	
Single	%	27%		1%		27%		30%		16%		10%		93%		79%		100%	
Joint	%	63%		99%		73%		70%		84%		88%		7%		20%		0%	
Wall/ceiling fixtures	%	7%		0%		0%		0%		0%		1%		0%		1%		0%	
Suspension	%	3%		0%		0%		0%		0%		1%		0%		0%		0%	
Luminaire	number	26,897		3,089		230,672		30,853		150,262		51,970		85,000		180,000	QD1	2,318	
1 lamp	%	87%		80%		51%		75%		85%		85%		100%		90%		100%	
2 lamp	%	13%		15%		48%		25%		15%		15%		0%		10%		0%	
More than 2	%	0%		5%		1%		0%		0%		0%		0%		0%		0%	
Lamps	number	30,612		3,089		343,850		38,566		173,379		60,493		85,000		230,000	QD1	2,318	
Sodium	%	37%		26%		7%		15%		16%		13%		18%		59%		35%	
Mercury vapour	%	19%		18%		23%		44%		27%		35%		82%		36%		64%	
Fluorescent	%	43%		56%		69%		40%		57%		51%		0%		5%		0%	
Incandescent/filament	%	1%		1%		0%		1%		0%		1%		0%		0%		1%	
Control																			
Time switch	%	13%		0%		0%		18%		10%		unknown		0%		0%		0%	
Photoelectric	%	32%		1%		100%		2%		15%		unknown		100%		95%		1%	
Ripple	%	55%		99%		low	EA1	80%		75%		unknown		0%		5%		99%	
Control box used?	y/n	NA		yes		yes		NA		yes		unknown		NA		yes		yes	
Connection																			
Direct to mains	%	9%		0%		high		2%		15%		unknown		100%		95%		1%	
Switch wire (5th core/wire)	%	91%		100%		low		98%		85%				0%		5%		99%	
Meters																			
Metered streetlighting?	%	0%		32%		0%		0%		0%		2%		0%		1%	QD2	0%	

EA1 Ripple controls are being phased out. Currently 5000 lights are controlled by ripple controls.

QD1 Estimates based on weighted averages calculated by Coopers & Lybrand using sales in MWh in the absence of distributor data.

QD2 Less than 1%.

Appendix F - NUOS Costs

	Advance Energy	Australian Inland Energy	energyAustralia	Great Southern Energy	Integral Energy	NorthPower	Victorian Distributor	Queensland Distributor	New Zealand Distributor

NUOS Costs		Notes		Notes		Notes		Notes		Notes		Notes						
Current NUOS recovery	000s	$497		$92		$7,926		$873		$2,440		$1,100		$0	VDB1	$0	QD1	$73	
NUOS attributed to street lighting	000s	$584		$92		$6,285		$873		$2,440		$1,493		$0	VBD1	$0	QD1	$73	
Over/(Under) recovery	000s	($87)		$0		$1,641		$0		$0		($393)		$0		$0		$0	
Published network NUOS price	$/MWh	$47.40		$39.00			EA1	$45.20		$32.70		$0.00							
Classification basis		TOU	AE1	Street Lighting		TOU	EA2	Average LV	GSE1	TOU	IE1	TOU	NP1						

NUOS Price Cap Calculations

Published Time of Use (TOU) Network Tariffs

		Advance Energy	Australian Inland Energy North	Australian Inland Energy South	energyAustralia	Great Southern Energy	Integral Energy	NorthPower	
Standing charge	$/month	$50.90	$140.00	$14.00	$4.02	$100.00 GSE2	$4.00	$90.00	
Peak charge	$/MWh	$63.90	NA	NA	$74.40	$50.20	$54.60	$57.00	
Shoulder charge	$/MWh	$50.90	NA	NA	$53.00	$47.10	$44.90	$57.00	
Off peak charge	$/MWh	$25.50	NA	NA	$23.20	$18.40	$16.00	$48.40	
Average charge	$/MWh		$39.00	$39.00					

Street Lighting Weekly Load Profile

Level of lighting provided	hours/day	11.5
On time		18:15
Off time		5:45
Numbers of operating days	days/year	365

Published NUOS Prices Applied to the Street Lighting Profile

		Advance Energy	Australian Inland Energy North	Australian Inland Energy South	energyAustralia	Great Southern Energy	Integral Energy	NorthPower	
Standing availability charge	$/month	$16,586	$420	$42 AIE1	$77,275	$0	$50,087	$8,100	
Standing availability charge	$/annum	$199,032	$5,040	$504 AIE1	$927,301	$0	$601,048	$97,200	
Standing availability charge	$/MWh	$16.15	$3.17	$0.74 AIE1	$6.86	$0.00	$8.44	$3.53	
TOU charge	$/MWh	$32.80	$39.00	$39.00 AIE1	$32.47	$45.20	$23.79	$50.41	
Total charges	$/MWh	$48.95	$42.17	$39.74	$39.33	$45.20	$32.23	$53.94	

Differences Between Existing Price Cap and Recommended Price Cap

		Advance Energy	Australian Inland Energy North	Australian Inland Energy South	energyAustralia	Great Southern Energy	Integral Energy	NorthPower	
Recommended 1998/99 price cap	$/MWh	$43	$41	$0 AIE1	$44	$43	$32	$54	
1997/98 price cap	$/MWh	$43	$40	$0 AIE1	$59	$43	$39	$44	
Difference	$/MWh	$0	$1	$0 AIE1	($15)	$0	($7)	$10	
Difference (at 1997 sales volumes)	$	$0	$2,269	$0 AIE1	($2,026,245)	$0	($498,407)	$275,190	

AE1 General supply Time of Use (TOU).
AIE1 Charges and differences are included in those estimated for AIE North.
IE1 General supply TOU excluding supply availability tarrif.
EA1 $74.40 peak $53 shoulder $23.20 off peak.
EA2 Domestic TOU.
GSE1 Average LV tarrif.
GSE2 Estimate only.
NP1 LV business TOU.
VDB1 NUOS included in sales revenue estimate.
QD1 Not fully recovered because not readily identified.

Appendix G - Energy Prices

		Advance Energy		Australian Inland Energy		energyAustralia		Great Southern Energy		Integral Energy		NorthPower		Victorian Distributor		Queensland Distributor		New Zealand Distributor	
Energy Purchases for Street Lighting (MWh)			Notes		Notes		Notes		Notes		Notes		Notes		Notes		Notes		Notes
Peak	MWh/annum	1,072		283		8,547		2,201		8,145		1,981							
Shoulder	MWh/annum	1,454		291		19,800		4,630		8,886		3,770							
Off Peak	MWh/annum	10,043	1	1,969	1	114,098	1	14,118	GSE1	57,018	1	21,768	1	53,804	VDB1	98,405	QD1	1,546	
Total		12,569		2,543		142,445		20,949		74,049		27,519		53,804		98,405		1,546	
Energy Sales for Street Lighting (MWh)																			
Peak	MWh/annum	1,051		386		8,105		2,029		7,832		1,981	NP1						
Shoulder	MWh/annum	1,425		386		18,777		4,268		8,544		3,770							
Off Peak	MWh/annum	9,846		1,497		108,201		13,012		54,825		21,768		48,039		98,405		1,441	
Total		12,322		2,269		135,083		19,309		71,201		27,519		48,039		98,405		1,441	
Energy Purchases for Street Lighting ($000/annum)																			
Total		$608	$1	$101	$1	$0	EA1	$721	GSE1	$3,496	IE1	$1,070	$1	$0		$0		$60	
Energy Purchase Cost $/MWh																			
Weighted Average	$/MWh	$48.37		$39.72		$0.00	EA1	$34.42		$47.21		$38.87		$0.00		$0.00		$33.78	
Energy Sales Revenue for Street Lighting ($000/annum)																			
Total		$413		$111		$3,472		$972		$3,496		$1,123	NP2	$9,339		$19,492		$63	
Energy Sales Revenue for Street Lighting ($/MWh)																			
Peak	$/MWh	$69.96		$42.76		$73.50	EA1	$78.60		$96.92		$69.06							
Shoulder	$/MWh	$61.21		$45.36		$61.00	EA1	$70.63		$84.17		$67.24							
Off Peak	$/MWh	$24.79		$43.58		$16.00	EA1	$33.43		$34.35		$33.65		$173.57		$198.08		$35.25	
Weighted Average	$/MWh	$32.86		$43.74		$25.71	EA1	$46.40		$47.21		$40.80		$173.57		$198.08		$35.25	
Street Lighting Administration of Energy Purchases																			
Cost of administering purchases is fully recovered:	y/n	Y		N		N		N		Y		N	NP3	N		N	QD2	Y	
Cost of administering street lighting purchases:	($000s/annum)	$39		$1		$0		$25		$1	IE2	$0						$0	
Administration cost per MWh	$/MWh	$3.17		$0.44		$0.00		$1.29		$0.02		$0.00		$0.00		$0.00		$0.24	
Costs are not fully recovered because:																			
Not readily identified	y/n							Y						Y					
Not significant	y/n			Y		Y						Y		Y	VDB2				

Appendix G - Energy Prices

Vesting Prices			
Peak	$/MWh	$71.30	
Shoulder	$/MWh	$61.80	
Offpeak	$/MWh	$25.20	
Total average vesting price	$/MWh	$44.50	
Estimated street lighting average vesting price	$/MWh	$35.25	
Estimated volume purchased at vesting price	%	80.00%	
Spot Market Prices			
Spot market contract price	$/MWh	$21.21	For 1998/99 year
Estimated volume purchased at spot price	%	20.00%	
Weighted Average Purchase Price	$/MWh	$32.45	
Margin Adjustment			
Retail margin	%	2.00%	
Margin adjusted weighted average purchase price		$33.09	

		Advance Energy		Australian Inland Energy		energyAustralia		Great Southern Energy		Integral Energy		NorthPower	
Loss Adjustment													
Pool price	$/MWh	$33.09		$33.09		$33.09		$33.09		$33.09		$33.09	
Total LF losses	%	11.30%		12.40%		5.90%		9.10%		8.20%		11.40%	
Terminal purchase price	$/MWh	$36.83		$37.19		$35.04		$36.10		$35.80		$36.86	
Network handling charge	%	1.00%		1.00%		1.00%		1.00%		1.00%		1.00%	
Network handling charge	$/MWh	$0.37		$0.37		$0.35		$0.36		$0.36		$0.37	
Total sales price	$/MWh	$37.20		$37.57		$35.39		$36.46		$36.16		$37.23	
Estimated change from price cap	%	-4.6%		-3.7%		-9.2%		-6.5%		-7.3%		-4.5%	

[1] Note: All of the weekend period is counted as off peak.
[2] This should equate to the difference between the actual energy purchased (MWh) and the actual energy sold (MWh).
[EA1] Not available
[GSE1] Note: All of the weekend period is counted as shoulder.
[IE1] Not available
[IE2] Included in energy price from retailer
[NP1] Estimate of 97/98 Value. Includes ballast losses. 96/97 Value is 27508 MWh.
[NP2] Estimate of 97/98 Value. 96/97 Revenue was $2,298K.
[NP3] Assumed to be cost associated with S/L manager dealing with energy trading
[VDB1] Not entered on questionnaire. Assumed to be the same as implied purchases.
[VDB2] Covered by vesting contracts
[QD1] Not entered on questionnaire. Assumed to be the same as implied purchases.
[QD2] Not recovered because not considered significant and not readily identifiable.

Appendix H - Components of SLUOS - Annual Costs

	Advance Energy	Notes	Australian Inland Energy	Notes	energyAustralia	Notes	Great Southern Energy	Notes	Integral Energy	Notes	NorthPower	Notes	Victorian Distributor	Notes	Queensland Distributor	Notes	New Zealand Distributor	Notes
Actual Costs Recovered [1] ($000s)																		
Asset Replacement and Renewals	$0		$0		$1,470		$1,100		$4,260		$1,274		$1,000		$0		$35	
Tree Trimming	$0		$0		$0		$0		$2,638		$0		$0		$0		$1	
Asset Inspection	$0		$0		$0		$0		$0		$0		$0		$0		$0	
Fault Identification and Repairs	$1,249		$122		$568		$100		$1,440		$1,113		$270		$3,400		$26	
Asset Design & Project Management	$0		$0		$0		$0		$0		$6		$0		$0		$2	
Asset Management/Records	$0		$0		$0		$0		$200		$97		$50		$400		$1	
Revenue Collection	$0		$0		$0		$0		$0		$18		$5		$0		$0	
Other Services	$0		$48		$0		$0		$913		$0		$0		$0		$0	
Total	$1,249		$170		$2,038		$1,200		$9,451		$2,508		$1,325		$3,800		$64	
Capital Charge	$333		$0	AIE1	$1,354		$0		$3,125		$1,033		$0		$0		$15	
Depreciation	$254		$33		$9,500		$0		$4,737		$1,126		$2,640		$0		$23	
TOTAL SERVICE AREA COST	$1,836		$203		$12,892		$1,200		$17,313		$4,667		$3,965		$3,800		$103	
Estimated Full Costs [2] ($000s)																		
Asset Replacement and Renewals	$0		$0		$4,621		$1,250		$4,260		$1,274		$1,000		$0		$30	
Tree Trimming	$4		$0		$556		$55		$2,638		$0		$0		$0		$1	
Asset Inspection	$1		$0		$262		$152		$50		$0		$0		$0		$0	
Fault Identification and Repairs	$1,533		$122		$729		$100		$1,440		$1,113		$270		$3,400		$23	
Asset Design & Project Management	$15		$0		$400		$61		$0	IE1	$6		$0		$0		$2	
Asset Management/Records	$3		$0		$142		$42		$300		$97		$50		$400		$1	
Revenue Collection	$6		$0		$77		$83		$0		$18		$5		$0		$0	
Other Services	$0		$48		$0		$0		$913		$50		$0		$0		$0	
Total	$1,562		$170		$6,787		$1,743		$9,601		$2,558		$1,325		$3,800		$56	
Capital Charge	$454		$27		$10,450	EA1	$1,328		$3,125		$1,384		$0		$0		$15	
Depreciation	$347		$33		$9,500		$1,404		$4,737		$2,098		$2,640		$0		$23	
TOTAL SERVICE AREA COST	$2,363		$230		$26,737		$4,475		$17,463		$6,040		$3,965		$3,800		$95	
Estimated SLUOS Over/(Under) Recovery [3] ($000s)																		
Asset Replacement and Renewals	$0		$0		($3,151)		($150)		$0		$0		$0		$0		$5	
Tree Trimming	($4)		$0		($556)		($55)		$0		$0		$0		$0		$0	
Asset Inspection	($1)		$0		($262)		($152)		($50)		$0		$0		$0		$0	
Fault Identification and Repairs	($284)		$0		($161)		$0		$0		$0		$0		$0		$3	
Asset Design & Project Management	($15)		$0		($400)		($61)		$0		$0		$0		$0		$0	
Asset Management/Records	($3)		$0		($142)		($42)		($100)		$0		$0		$0		$0	
Revenue Collection	($6)		$0		($77)		($83)		$0		$0		$0		$0		$0	
Other Services	$0		$0		$0		$0		$0		($50)		$0		$0		$0	
Total	($313)		$0		($4,749)		($543)		($150)		($50)		$0		$0		$8	
Capital Charge	($121)		($27)		($9,096)		($1,328)		$0		($351)		$0		$0		$0	
Depreciation	($93)		$0		$0		($1,404)		$0		($972)		$0		$0		$0	
TOTAL SERVICE AREA COST	($527)		($27)		($13,845)		($3,275)		($150)		($1,373)		$0		$0		$8	

[1] Actual Costs are the costs entered by each distributor in the questionnaire.

[2] Estimated full costs are calculated based on the percentage recovery noted for each category in Appendix G. Where the recovery is less than 100%, the actual costs are increased to approximate the total cost.

[3] Estimated SLUOS over or under recovery is simply the difference between actual costs and estimated full cost.

AIE1 There is no capital charge as councils fund assets.

IE1 Included in Capital cost. Estimated as 12-15% of Capex (i.e. approximately $650k to $810k).

Appendix I - Energy, NUOS & SLUOS Charges

Table One - NUOS charges per MWh ($) per annum based on actual costs recovered

	Advance Energy	Notes	Australian Inland Energy	Notes	energyAustralia	Notes	Great Southern Energy	Notes	Integral Energy	Notes	NorthPower	Notes	Victorian Distributor	Notes	Queensland Distributor	Notes	New Zealand Distributor	Notes
NUOS Cost per MWh ($)	$40		$36		$56		$42		$33		$40		$0		$0		$47	
Energy Costs per MWh ($)																		
Purchase Cost per MWh	$49		$39		$0		$65		$47		$66		$0		$0		$0	
Purchase Administration Costs	$3.10		$0.39		$0.00		$1.19		$0.01		$0.00		$0.00		$0.00		$0.23	
Total Energy & NUOS Costs per MWh	$91		$75		$56		$107		$80		$106		$0		$0		$47	

Table Two - NUOS charges per MWh ($) per annum based on estimated full costs

	Advance Energy	Notes	Australian Inland Energy	Notes	energy Australia	Notes	Great Southern Energy	Notes	Integral Energy	Notes	North Power	Notes	Victorian Distributor	Notes	Queensland Distributor	Notes	New Zealand Distributor	Notes
NUOS Cost per MWh ($)	$46		$36		$44		$42		$33		$54		$0		$0		$47	
Energy Costs per MWh ($)																		
Purchase Cost per MWh	$49		$39		$0		$65		$47		$66		$0		$0		$0	
Purchase Administration Costs	$3.10		$0.39		$0.00		$1.19		$0.01		$0.00		$0.00		$0.00		$0.23	
Total Energy & NUOS Costs per MWh	$286		$166		$232		$321		$316		$340		$74		$39		$109	

[1] NUOS and energy costs included in this appendix are those provided by each distributor. The Coopers and Lybrand recommended costs are derived in appendicies F & G respectively.

Appendix I - Energy, NUOS & SLUOS Charges

Table One - SLUOS charges per Luminaire ($) per annum based on actual costs recovered

	Advance Energy	Notes	Australian Inland Energy	Notes	energy Australia	Notes	Great Southern Energy	Notes	Integral Energy	Notes	North Power	Notes	Victorian Distributor	Notes	Queensland Distributor	Notes	New Zealand Distributor	Notes
SLUOS Cost of Service per Luminaire ($)																		
Asset Replacement and Renewals	$0		$0		$6		$36		$28		$25		$12		$0		$15	
Fault Identification and Repairs	$46		$39		$2		$3		$10		$21		$3		$19		$11	
Total Repairs & Replacements	$46		$39		$9		$39		$38		$46		$15		$19		$26	
Tree Trimming	$0		$0		$0		$0		$18		$0		$0		$0		$0	
Asset Inspection	$0		$0		$0		$0		$0		$0		$0		$0		$0	
Asset Design & Project Management	$0		$0		$0		$0		$0		$0		$0		$0		$1	
Asset Management/Records	$0		$0		$0		$0		$1		$2		$1		$2		$0	
Revenue Collection	$0		$0		$0		$0		$0		$0		$0		$0		$0	
Other Services	$0		$16		$0		$0		$6		$0		$0		$0		$0	
Total Other Operating and Administration Costs	$0		$16		$0		$0		$7		$2		$1		$2		$1	
Total Service Charges per Luminaire	$46		$55		$9		$39		$63		$48		$16		$21		$28	

SLUOS Capital Charges per Luminaire																
Capital Charge	$12		$0		$6		$0		$21		$20		$0		$0		$6	
Depreciation	$9		$11		$41		$0		$32		$22		$31		$0		$10	
Total Capital Charges per Luminaire	$22		$11		$47		$0		$52		$42		$31		$0		$17	
Total SLUOS Costs	$68		$66		$56		$39		$115		$90		$47		$21		$44	

SLUOS Capital Charges per Luminaire (non-contributed)																
Capital Charge	$24		$0		$6		$0		$40		$22					
Depreciation	$18		$31		$41		$0		$62		$24					
Total Capital Charges per Luminaire (non-contributed)	$42		$31		$47		$0		$102		$46					

Table Two - SLUOS charges per Luminaire ($) per annum based on estimated full costs

	Advance Energy		Australian Inland Energy		energy Australia		Great Southern Energy		Integral Energy		North Power		Victorian Distributor		Queensland Distributor		New Zealand Distributor	
SLUOS Cost of Service per Luminaire ($)		Notes		Notes		Notes		Notes		Notes		Notes		Notes		Notes		Notes
Asset Replacement and Renewals	$0		$0		$20		$41		$28		$25		$12		$0		$13	
Fault Identification and Repairs	$57		$39		$3		$3		$10		$21		$3		$19		$10	
Total Repairs & Replacements	$57		$39		$23		$44		$38		$46		$15		$19		$23	
Tree Trimming	$0		$0		$2		$2		$18		$0		$0		$0		$0	
Asset Inspection	$0		$0		$1		$5		$0		$0		$0		$0		$0	
Asset Design & Project Management	$1		$0		$2		$2		$0		$0		$0		$0		$1	
Asset Management/Records	$0		$0		$1		$1		$2		$2		$1		$2		$0	
Revenue Collection	$0		$0		$0		$3		$0		$0		$0		$0		$0	
Other Services	$0		$16		$0		$0		$6		$1		$0		$0		$0	
Total Other Operating and Administration Costs	$1		$16		$4		$11		$8		$3		$1		$2		$1	
Total Service Charges per Luminaire	$58		$55		$29		$56		$64		$49		$16		$21		$24	
SLUOS Capital Charges per Luminaire																		
Capital Charge	$17		$9		$45		$43		$21		$27		$0		$0		$6	
Depreciation	$13		$11		$41		$46		$32		$40		$31		$0		$10	
Total Capital Charges per Luminaire	$30		$19		$86		$89		$52		$67		$31		$0		$17	
Total SLUOS Costs	$88		$74		$116		$145		$116		$116		$47		$21		$41	

SLUOS Capital Charges per Luminaire (non-contributed)																
Capital Charge	$34		$26		$45		$43		$40		$29					
Depreciation	$26		$31		$41		$46		$62		$43					
Total Capital Charges per Luminaire (non-contributed)	$60		$57		$86		$89		$102		$72					

Appendix J - Cost Allocation Methods

Allocation Methods For:	Advance Energy	Notes	Australian Inland Energy	Notes	energyAustralia	Notes	Great Southern Energy	Notes	Integral Energy	Notes	NorthPower	Notes	Victorian Distributor	Notes	Queensland Distributor	Notes	New Zealand Distributor	Notes
Asset Replacement and Renewals	direct		not identified	AIE1	direct		informal	1	direct		# poles		% asset val		% revenue		direct	
Tree Trimming	direct	AE1	not identified	AIE2	informal	1	informal	1	informal	1, IE1	council	NP1	not identified	VDB1	not identified	QD1	direct	
Asset Inspection	0%		not identified	AIE2	informal	1	informal	1	not identified		unknown		not identified	VDB2	not identified	QD2	not identified	NZ1
Fault Identification and Repairs	# poles		informal	1, AIE2	direct		informal	1	direct		# poles		% asset val		% revenue		# poles	
Asset Design & Project Management	0%		not identified	AIE2	informal	1	informal	1	asset deprec	IE2	asset deprec		not identified	VDB3	% revenue	QD3	not identified	NZ2
Asset Management/Records	0%		not identified	AIE2	informal	1	informal	1	direct		other	NP2	# poles	VDB4	not identified	QD4	not identified	NZ3
Revenue Collection	0%		not identified	AIE2	not identified		not identified		not identified		other	NP2	# poles	VDB4	% revenue		% revenue	

[1] Informal means the distributor makes an estimate of how costs should be allocated based on judgement.

[AE1] Recovered through NUOS.

[AIE1] Councils fund all asset replacement and renewal.

[AIE2] This is included in a fixed charge of $300,000 to Broken Hill Council.

[IE1] Based on estimate of council planted trees as a proportion of trees, assuming full costs due to street wire being the lowest wire.

[IE2] Allocation based on depreciation of assets.

[IE3] Uses both direct allocation and allocations based on asset values.

[NP1] Tree trimming is the responsibility of the council.

[NP2] Carried out by the Street Lighting manager, and is funded from general street lighting revenue.

[VDB1] Street lights are placed on distribution assets which are subject to tree trimming as part of network codes.

[VDB2] Inspection not undertaken specifically for public lighting.

[VDB3] 20 year design life. Costs recovered as a direct charge to customer.

[VDB4] Included as flat charge in lamp tariff.

[QD1] Trees are trimmed clear of overhead mains, not street lights. Costs not recovered.

[QD2] Costs not recoverd because they are not readily identified and are outside the agreed service provision.

[QD3] Any excess cost above that provided by revenue is recoverable. Design life 25 years.

[QD4] Costs not readily identified.

[NZ1] Costs not recoverd because they are not readily identified and are outside the agreed service provision.

[NZ2] Design life 25 years.

[NZ3] Not readily identified.

Appendix K - Percentage Cost Recovery

Percentage of Costs Recovered For:	Advance Energy	Notes	Australian Inland Energy	Notes	energyAustralia	Notes	Great Southern Energy	Notes	Integral Energy	Notes	NorthPower	Notes	Victorian Distributor	Notes	Queensland Distributor	Notes	New Zealand Distributor	Notes
Asset Replacement and Renewals	73%		100%		21%		88%		100%		100%		100%		100%		100%	
Tree Trimming	partial	1	100%		partial	1	0%		100%		0%	NP1	0%	VDB1	0%	QD1	100%	
Asset Inspection	0%		100%		partial	1	0%		partial	1	partial	1	0%		0%	QD2	0%	
Fault Identification and Repairs	81%		100%		78%		0%		100%		100%		100%		100%		100%	
Asset Design & Project Management	0%		100%		0%		0%		100%		100%		100%	VDB2	100%		0%	
Asset Management/Records	0%		100%		0%		0%		67%		100%		100%		0%	QD3	partial	NZ1
Revenue Collection	0%		100%		0%		0%		0%	IE1	partial	1	100%		100%		20%	NZ2

[1] Costs are partially recovered but the percentage recovery has not been specified.

[IE1] Not believed to be significant.

[NP1] Costs are met directly by the council, so are not recovered.

[VDB1] Recovered as part of NUOS.

[VDB2] Recovered as direct charge to customer.

[QD1] Not readily identified, not significant, and outside agreed service provision.

[QD2] Not readily identified, and outside agreed service provision.

[QD3] Not readily identified.

[NZ1] Outside agreed service provision.

[NZ2] Not readily identified.

Appendix L - Distributor Provision of Services

		Advance Energy		Australian Inland Energy		energyAustralia		Great Southern Energy		Integral Energy		NorthPower		Victorian Distributor		Queensland Distributor		New Zealand Distributor	
Revenue collection			Notes		Notes		Notes		Notes		Notes		Notes		Notes		Notes		Notes
Distributor	%	100%		100%		100%		100%		100%		100%		100%		100%		100%	
Asset management and records																			
Distributor	%	100%		100%		100%		100%		100%		100%		100%		100%		100%	
Asset replacement and renewal																			
Distributor	%	100%		100%		100%		100%		100%		100%		35%		100%		100%	
Contractor to Distributor	%	0%		0%		0%		0%		0%		0%		65%		0%		0%	
Asset design and project management																			
Distributor	%	100%		100%		100%		100%		100%		98%		50%		90%		100%	
Contractor to distributor	%	0%		0%		0%		0%		0%		2%		0%		0%		0%	
Customer	%	0%		0%		0%		0%		0%		0%		50%		10%		0%	
Maintenance responsibility																			
Distributor	%	100%		100%		100%		100%		100%		100%		100%		100%		95%	
Customer	%	0%		0%		0%		0%		0%		0%		0%		0%		5%	
Monitoring/inspections																			
Distributor	%	80%		100%		100%	EA1	100%		50%		100%		10%		0%		98%	
Contractor to distributor	%	0%		0%		100%	EA2	0%		0%		0%		0%		100%		0%	
Ad hoc/public/other	%	20%		0%		0%		0%		50%		0%		90%		0%		2%	
Tree trimming																			
Distributor	%	50%		100%		5%		100%		0%		0%		10%		0%		100%	
Council	%	50%		0%		30%		0%		0%		100%		0%		0%		0%	
Contractor to distributor	%	0%		0%		65%		0%		100%		0%		90%		100%		0%	
Fault identification																			
Distributor	%	80%		66%		Low %		8%		50%		20%		10%		0%		50%	
Council	%	0%		8%		0%		2%		0%		0%		0%		0%		0%	
Public/other	%	20%		26%		High %		90%		50%		80%		10%		50%		50%	
Contractor to Distributor	%	0%		0%		0%		0%		0%		0%		60%		50%		0%	
Fault repairs																			
Distributor	%	100%		100%		100%		100%		100%		100%		35%		0%		100%	
Contractor to Distributor	%	0%		0%		0%		0%		0%		0%		65%		100%		0%	

[EA1] Responsibility for night patrol only.

[EA2] Responsibility for pole inspections only.

Appendix L - Council Provision of Services

Council		Albury		Blacktown		Dubbo		Holroyd		Penrith		Rylstone		Tamworth		Tweed	
Local Distributor		Great SE		Integral		Advance		Integral		Integral		Integral		NorthPower		NorthPower	
Asset management and records																	
Distributor	%	100%		100%		95%		100%		100%			RY1	100%		98%	
Council	%					5%		100%					RY1			2%	
Asset replacement and renewal																	
Distributor	%	100%		100%		100%		99%		100%		NA		100%		100%	
Contractor to council	%							1%				NA					
Asset design and project management																	
Distributor	%	100%		100%		90%		100%		100%				100%		100%	
Council	%					10%											
Maintenance responsibility			Notes		Notes		Notes		Notes		Notes		Notes		Notes		Notes
Distributor	%	100%		100%		90%		99%		100%		NA		100%		100%	
Council	%					10%		1%				NA					
Monitoring/inspections																	
Distributor	%	95%		100%		100%		100%		100%		NA				100%	
Council	%											NA		50%			
Ad hoc/public/other	%	5%										NA		50%			
Tree trimming																	
Distributor	%			100%		50%		100%		100%		NA		50%			
Council	%	100%				50%						NA		50%		100%	
Fault identification																	
Distributor	%	75%		100%		90%		50%		20%		NA				90%	
Council	%					5%		50%				NA		50%			
Ad hoc/public/other	%	25%				5%				80%		NA		50%		10%	
Fault repairs																	
Distributor	%	100%		100%		100%		99%		100%		NA		100%		100%	
Contractor to council	%							1%				NA					

Appendix M - Maintenance Practices

		Advance Energy		Australian Inland Energy		energyAustralia		Great Southern Energy		Integral Energy		NorthPower		Victorian Distributor		Queensland Distributor		New Zealand Distributor	
Lamp replacement																			
% group replacements			Notes		Notes		Notes		Notes		Notes		Notes		Notes		Notes		Notes
Urban areas	%	0%		0%		86%		0%		100%		100%	NP1	100%		0%		0%	
Rural areas	%	0%		0%		86%		15%		100%		0%		100%		0%		0%	
Luminaire replacement																			
% replacements based on:																			
Age	%	50%		0%		0%		0%		33%		0%		80%		0%		0%	
Condition/Performance	%	50%		100%		100%		100%		67%		100%		20%		100%		100%	
Supports																			
% replacements/repairs based on:																			
Condition	%	100%		100%		100%		100%		100%		100%		100%		100%		100%	
Tree trimming																			
% area based on:																			
Periodic	%	100%		0%		unknown	EA1	10%		100%		0%	NP1	90%		100%		0%	
Condition	%	0%		100%		unknown	EA1	90%		0%		0%	NP1	10%		0%		100%	
Controls																			
% repairs based on:																			
Corrective/Condition	%	100%		100%		100%		100%		100%		100%	NP2	0%		100%		100%	
Periodic	%	0%		0%		0%		0%		0%		0%		100%		0%		0%	
Street lighting network																			
% repairs based on:																			
Corrective/Condition	%	100%		100%		High %		100%		100%		100%		100%		100%		100%	

EA1 Unknown contractor information
NP1 Unknown council activity
NP2 Relates to traffic route lighting only.

Appendix N - Construction Costs

	Advance Energy		Australian Inland Energy		energyAustralia		Great Southern Energy		Integral Energy		NorthPower		Victorian Distributor		Queensland Distributor		New Zealand Distributor	
Tender Price ($)																		
Materials		%		%		%		%		%		%		%		%		%
Total materials cost	$11,470	71%	$11,574	63%	$9,565	44%	$6,702	57%	$10,265	67%	$7,509	70%	$5,000	53%	$5,012	41%	$6,955	82%
Labour																		
Total labour costs	$1,200	7%	$1,387	8%	$5,761	26%	$975	8%	$5,056	33%	$1,505	14%	$2,850	30%	$3,322	27%	$1,305	15%
Other Costs																		
Total direct costs	$1,170	7%	$1,040	6%	$300	1%	$1,300	11%	$0	0%	$427	4%	$1,080	11%	$3,089	25%	$198	2%
Total indirect costs	$2,390	15%	$4,430	24%	$6,222	28%	$2,823	24%	$0	0%	$1,248	12%	$470	5%	$764	6%	$0	0%
Total Tender Cost	$16,230	100%	$18,431	100%	$21,848	100%	$11,800	100%	$15,321	100%	$10,689	100%	$9,400	100%	$12,187	100%	$8,458	100%
Tender Price ($/Luminaire) [1]																		
Materials																		
Total materials cost	$956		$965		$797		$559		$855		$626		$417		$418		$580	
Labour																		
Total labour costs	$100		$116		$480		$81		$421		$125		$238		$277		$109	
Other Costs																		
Total direct costs	$98		$87		$25		$108		$0		$36		$90		$257		$17	
Total indirect costs	$199		$369		$519		$235		$0		$104		$39		$64		$0	
Total Tender Cost	$1,353		$1,536		$1,821		$983		$1,277		$891		$783		$1,016		$705	

[1] Assumes 12 luminaires are used.

Details of Construction Costs

Distributors prepared the costs asociated with a defined street lighting project.

Parameters

Quotations were calculated using normal chargeout rates.

Project Definition

The tenders relate to the supply and installation of street lighting facilities for a new residential subdivision.

The subdivision is 50km from the distributors depot.
The reticulation is by underground cable.
The road network comprises 200m of road at right angles to an existing road and 300m of road at right angles forming a "T" junction on the subdivision. Houses are to be situated on both sides of the roads.

The street lighting project has the following specifications:
Carriageway design width - 20m
Lamp spacing - 50m alternate sides
Column type - spun concrete, 8m overall length, 6.5m mounting height
Luminaire - Goughlite 500 or similar
Lamp - 50W high pressure sodium
Control - photoelectric sensor on each lamp.