Inquiry into the Efficiency of Synergy's Costs and Electricity Tariffs

May 1st 2012

Citelum Australia • 12-16 Parker Street Williamstown, VIC, 3016 • www.citelum.com.au

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About Citelum

A specialist in Urban Electrical Equipment, Citelum is a global leader in Urban Lighting and Traffic Management services for local public authorities.

citelum	
city |ˈsitē| noun (pl. cities) 1 a large town: [as modifier] : the city center. • an incorporated municipal center. 2 [with modifier] informal a place or situation characterised by a specified attribute: city. 3 (the City)the financial and commercial district of London, England. ORIGIN Middle English: from Old French cite, from Latin civitas, from civis ‘citizen.’ Originally denoting a town, and often used as a Latin equivalent to Old English burh ‘borough,’ the term was later applied to foreign and ancient cities and to the more important English boroughs.	lumen [1] |ˈlo͞omən|(abbr.: lm) nounPhysics the SI unit of luminous flux, equal to the amount of light emitted per second in a unit solid angle of one steradian from a uniform source of one candela. ORIGIN late 19th cent.: from Latin, literally ‘light.’

The company manages street lighting, artistic lighting, and traffic signal systems, but also installs and operates innovative services, such as:

- recharging stations for electric vehicles,
- video protection networks
- traffic light enforcement radars

From its creation in 1993, Citelum has been committed to integrating a full range of services (from design to operation), which has enabled it to meet the energy-efficiency needs of local authorities. This strategy has made it possible for Citelum to play a key role over the last decade in many of the innovations in maintenance technologies, in remote management at the lighting point, and in the development of the use of electrical networks for connected urban equipment.

Citelum’s Comprehensive Management Contract, based as it is on specific performance commitments, offers guarantees that cities will achieve the level of service they expect. It is designed to meet major public policy challenges, including above all budgetary control, service quality, respect for urban planning goals, enhancing nighttime image, and meeting sustainable development objectives that balance economic, social, cultural and environmental concerns.

Citelum manages the Urban Electrical Equipment of small and medium-sized cities, regional capitals and global megacities with the same degree of attention and professionalism.

The company has a presence in many Capital Cities of Light around the world, including Mexico City, Madrid, Barcelona, Paris, Santiago, Prague, Venice, Naples, Shanghai, Vientiane, Beijing, Salvador, Bahia, and Ho Chi Minh City.

Motivated by the conviction that a sustainable city should also be a beautiful city, Citelum’s teams are dedicated more than ever to replacing the dehumanised, uniform, single-purpose, and energy-intensive lighting of the past with “a different light for the planet,” all over the world.

Citelum operates on 5 continents and places its know-how at the service of 17 Capital Cities of Light, always with the same goal to give each city its own nocturnal identity.

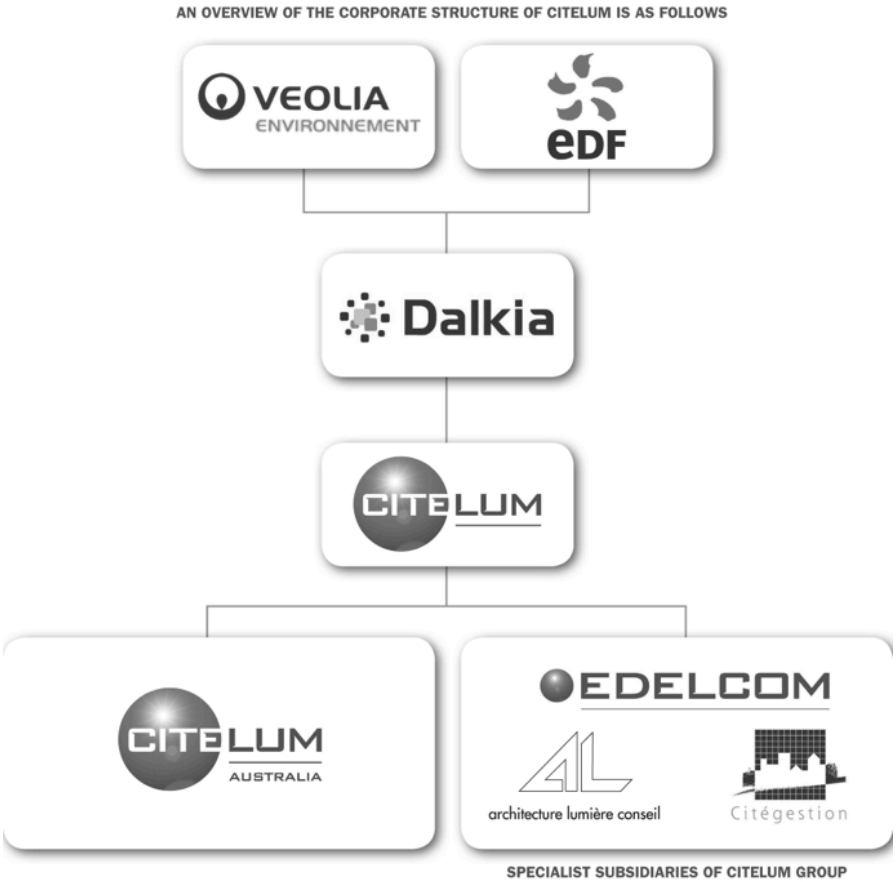
An overview of the contracts Citelum currently holds with key international cities are as follows:

- Barcelona – 45,500 lighting points
- Santiago – 34,500 lighting points
- Mexico City – 39,000 lighting points
- Madrid – 260,000 lighting points
- Salvador de Bahia – 35,000 lighting points
- Prague – 131,000 lighting points
- Kunming – 52,000 lighting points
- Ho Chi Minh – 12,000 lighting points
- Naples – 59,000 lighting points
- Palma Majorca – 37,000 lighting points
- Washington DC - 72,000 lighting points

Corporate Structure

The Citelum Group has three professional subsidiaries each dedicated with products and services that assist Citelum with innovative applications of specialist urban lighting management systems and services.

- Edelcom develop and pursue the technology of Citenergy® to enable state of the art public lighting technology
- Architecture Lumiere are specialist artistic lighting consultants producing superior quality visualisations of lighting plans
- Citegestion produce operational GIS Mapping services and operational management software especially for State of the Art Public Lighting Networks



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Date: 30th April 2012

Attention: Ms Helen Ensikat
Inquiry into the Efficiency of Synergy's Costs and Electricity Tariffs
Economic Regulation Authority
PO Box 8469, PERTH BC WA 6849
Level 4, Albert Facey House,
469 Wellington Street, Perth WA 6000

Email: publicsubmissions@erawa.com.au

SUBJECT: Inquiry into the Efficiency of Synergy's Costs and Electricity Tariffs

Dear Ms Ensikat,

Citelum welcomes to the opportunity to make comment regarding the Inquiry into the Efficiency of Synergy's Costs and Electricity Tariffs . It would be suggested that this submission be read in context with our Western Power Access Arrangement Submission as our focus relates primarily to Public Lighting Z Tariffs to be made on 2nd May 2012.

Citelum Australia is keenly interested in becoming a market participant in the Western Australia public lighting market, offering our services directly with all Local Government's Authorities (LGA) throughout Western Australia. Our proven model of delivery reduces costs and improves services to many local municipalities globally, from small towns to large mega cities, our services can be structured to the needs of each.

On the information we are able to obtain, it is our estimation that Local Government Councils in Western Australia are currently being impacted by the highest prices for public lighting services in the developed world. Significant savings of at least 20-30% and improved customer service delivery are achievable.

Could we suggest that ERAWA look on this submission as an opportunity to consider making further reforms under the Competition Policy Reform Act as Synergy is a significant State owned Corporation (SOC).

Citelum advocates that the regulated delivery model for public lighting could be better served if the service was classified as a negotiated service, regulation be removed and tax/rate payer funded public lighting assets transferred to Local Government Authorities.

We understand that this might alarm some LGA's but public lighting in the regulated model right throughout Australia is demonstrating escalating long term costs in the regulated model. Therefore we have proposed a transition framework that exists for Public Lighting Customers in NSW and Qld. Public Lighting is for the "public good" and could be managed and maintained by end users/ Councils.

Citelum detail in this submission some of the longer term issues associated with public lighting specifically and how the costs impact local government significantly and some of the alternative methods of public lighting delivery that reduce costs to the ratepayers and tax payers of Western Australia.

We understand that there is some cross-subsidisation occurring between the South Western Interconnected System and the rest of Western Australia, but we are interested in developing off-grid solutions for councils right throughout Western Australia. Citelum are undertaking this type of activity throughout Europe, Brazil and Chile.

We also note some inconsistency in tariffs between Synergy and Western Power and it appears there to be cross-subsidisation between these two State Owned Corporations.

We have highlighted specific comments made in the brief regarding the specific street lighting comments and made further suggestion that may assist in overcoming the barriers, improve competition and help reduce long term costs regarding public lighting.

If you require any further information regarding this submission, please do not hesitate to contact me. We would be only too happy assist.

Yours sincerely

Adam Carey
Managing Director Australia, NZ

Competition Reform

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http://www.treasury.wa.gov.au/cms/content.aspx?id=2173

"Western Australia is encouraging competition through access to the transmission and distribution systems, promotion of co-generation projects, and provision of privately generated power in regional areas as part of its commitment to microeconomic reform."

Western Australia is progressing significant reform to the electricity sector in order to meet its competition policy obligations, and to create a more competitive industry with lower prices to consumers:

1. Disaggregation legislation separating Western Power into four separate entities (generation, networks, retail and a regional power corporation) is currently in Parliament.
2. The Electricity Industry Act 2004 has provided for the creation of a wholesale electricity market, established new licensing and access regimes to be administered by the Economic Regulation Authority, and established an Energy Ombudsman to protect residential and small business consumers. The reforms are aimed at encouraging increased private sector participation in the electricity market and sustainable lower prices for Western Australian electricity consumers.

Citelum Comments:

Within information found on Western Power's website and other WA Govt sites we have found and detailed in this submission that Public Lighting is already technically contestable and that with the commitment made by the Western Australia government encouraging competition in the distribution systems encourages outside parties to enter the market.

This submission broadly advocates that there are better models by which to deliver public lighting to local government that aligns the needs of the local government customer with a service delivery that meets those needs.

Could we suggest that unbundling of the Z Tariffs of Public Lighting separating energy from distribution charges be a worth reform and allow companies like Citelum to enter the market?

Current Public Lighting Market Structure

Citelum identify that this is the current market structure as noted from a Public Lighting Seminar undertaken in 2008[1]. The model structure for public lighting within Western Australia creates a unique situation in that the corporation responsible for the day to day management, service reliability and infrastructure costs is insulated through an energy retailer.

The pricing structure bundles the service delivery and it would appear from the research we have undertaken that this structure creates confusion to public lighting customers (LGA's) in that under their own requirements under the Local Government Act.

The current framework and bundling of operation and energy charges makes it difficult to understand the market. An unbundling of energy tariffs from maintenance will enable customers to improve public lighting service delivery, reduce energy and maintenance costs and better manage publicly funded infrastructure.

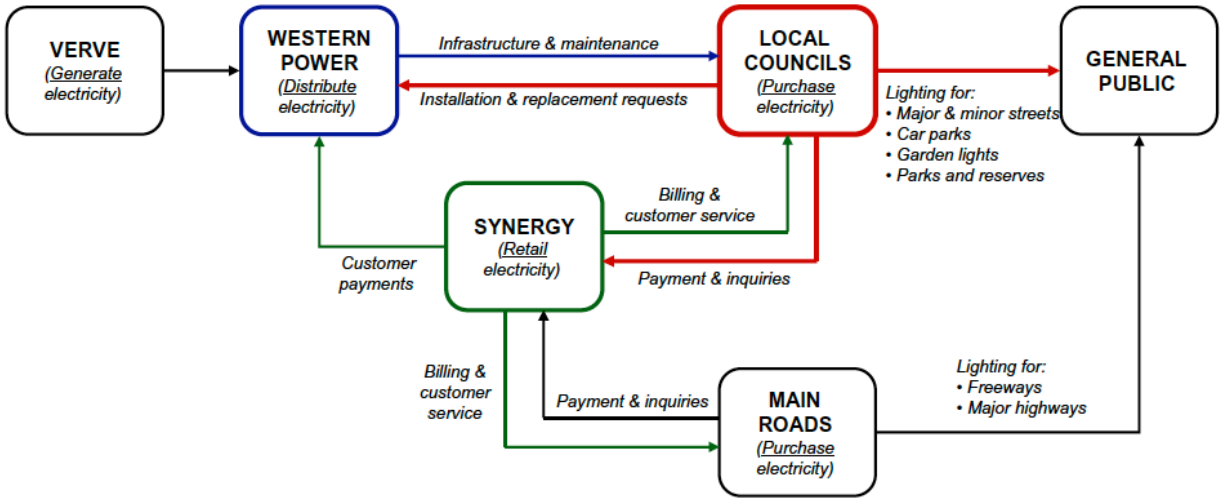


Figure 1: Roles and responsibilities of various stakeholders in public lighting management

[1] Sustainable Public Lighting Workshop July 2008 SMRC Councils

Customer Comments

1237. The Authority notes the points raised by WALGA that the existing street lighting service model results in local governments being almost powerless to influence the level of service or cost and, as street lighting is a public good, the costs would be better shared between users and the public. The Authority acknowledges there are different, and potentially better, models for recovering the cost of street lighting. However, for the purposes of this review the Authority can only apply the requirements of the Access Code which provides for Western Power to recover its efficient costs through network charges and that tariffs comply with sections 7.3 and 7.4 of the Access Code.

Citelum Comment:

Could the ERAWA consider developing a framework that would allow customers choice in the delivery of the public lighting network and contestability of the public lighting network. Citelum is keenly interested to enter the Western Australian Public Lighting Market through Western Australia's participation in Competition Reform. Our proposed framework follows the same methodology as NSW and Qld.

1238. The Authority has reviewed the updated list of streetlight asset types included in the proposed revised Price List for 2012/13. The Authority notes that Western Power has added 10 new asset types to the list of streetlight assets. However, all of the new asset types have been included in Table 3 of the Price List which relates to obsolete asset types. No submissions were received in relation to the addition of new asset types. Given that the new types relate to obsolete light types, the Authority would be concerned if these proposed changes lead to increases in charges to users and requires Western Power to ensure that its proposed new asset listing does not result in assets moving to a higher charging band than is currently the case.

Citelum Comment:

Developing individual item tariffs in relation to public lighting creates confusion for public lighting customers. There appears to be 58 separate Z Public Lighting Tariffs. Synergy appears to have the largest number of public lighting tariffs in Australia. With future development of LED and other light sources, these number of tariffs could increase substantially and therefore bring greater confusion.

Could we suggest that ERAWA develop a simplification of the public lighting framework such as Queensland and NSW that recognises the capital investment by the customer and/or Western Power and separate the energy component from the asset component. The proposed structure could be:

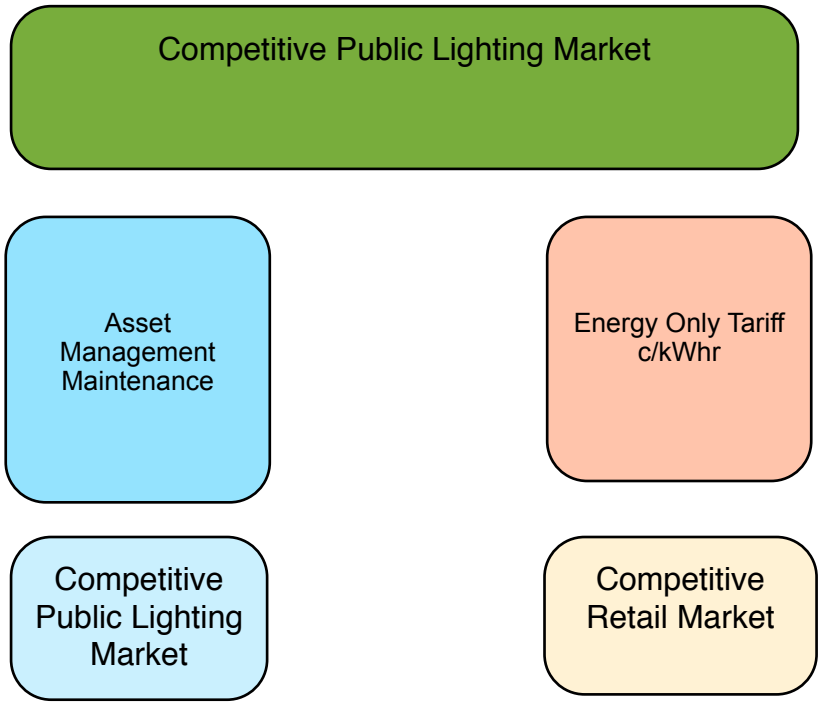
Rate 1 : Installed, Owned, Operated and Maintained by Western Power
Rate 2: Installed and Vested to Western Power
Rate 3: Installed, Owned, Operated and Maintained by Public Lighting Customer

Energy - cents per kilowatt hour

We would suggest a separation of energy away from asset management to ensure competitive provision of either service and only bundled under Rate 3 considerations where it is economically more competitive to do so.

Proposed Tariff Structure

Before transitioning to a negotiated public lighting outcome, Citelum understands that customers may want to explore contestability and service provision with also having the comfort of retaining a business as usual approach with Western Power as a public lighting provider. The following proposed tariff structure would recognise the appropriate funding provided by public lighting customers and Western Power. It would also allow customers choice in a 3rd Party.



Proposed Tariff Arrangements

Tariff	Description	Maintenance Pricing Structure	Energy Tariff	Pricing structure	Types of Streetlights
Asset Management			Energy Only Tariff		
Capital Funded by Western Power					
Rate 1	Funded Installed, Owned and Maintained by Western Power	Per LP Major Road Standard Maintenance	Unmetered based on Load Table Type 7	cents per kWhr	Standard Street Lights
		Per LP Minor Road Standard Maintenance			
Capital Funded by Public Lighting Customer					
Rate 2	Installed, Owned by Customer and Gifted and engaged Western Power for Maintenance	Per LP Major Road Standard Maintenance	Unmetered Load Table Type 7 Devices	cents per kWhr	Standard Street Lights
		Per LP Minor Road Standard Maintenance			
Rate 3	Installed, Owned and Maintained by Customer	Negotiated High Levels of Service	Unmetered Load Table Type 7 Devices	cents per kWhr	Standard Street Lighting Non - Standard Decorative Street Lights
			Metered	cents per kWhr	All street light types, Christmas Lights
			CMS Computerised Management Systems		

This structural framework recognises the appropriate level of capital funding and detail when Western Power has replaced assets and has expended capital in which it is entitled to replace.

This structure works in Queensland and NSW and also allows a clear choice for customers. It is expected due to the onset of contestable works on the Eastern Seaboard that the Australian Energy Regulator is considering classifying public lighting services as Negotiated Services and removing all regulatory oversight.

Transferring between Tariff Rates

As customer needs change, there should be some flexibility between the tariffs and public lighting customers should be able to transfer between different rates as the needs of the customer change. Marked on each street light is the date of manufacturer as required by ASNZS 1158.6 and this would serve to help customers determine the depreciated capital value. From a recent photo below taken in the City of Perth the date on the streetlight is 00 which indicates it was likely installed in the year 2000 however due to the condition of the streetlight, there should be little or no written down value.

We agree with WALGA that whether the asset was funded by the council or Western Power, ultimately the asset was funded by the taxpayer/ratepayer and the asset should be placed with the authority who can best understand the needs of the public.

Rate 1 to Rate 3

As Western Power has funded the capital, pay out of written down value according to the remaining asset life

Rate 2 to Rate 3

As customer has funded the capital, the Customer shall not pay a written down value but shall typically pay any costs associated with wiring alteration and testing to ensure compliance with the Wiring Rules.

Rate 3 to Rate 2

Customer does not want the assets on the asset register and prefers that Western Power Manage the network in relation to public lighting.

If assets are on Rate 2, and Western Power replaces the asset, the asset then reverts to Rate 1. Customers should also be informed quarterly if assets are replaced and which assets will transition to Rate 1 Tariffs whereby Western Power are considering upgrading assets that have exceeded their economic life.

Public Lighting Objectives

We note from Western Power's Price List Explanation, the cost of providing public lighting as standalone business. The value of $201.4m AUD would appear to be a modelled figure however as a proportion of their total business interest, it explains the disproportionate level of attention between energy distributors and public lighting customers.

Across Australia and globally, public lighting accounts for 2-3% of the Energy Distributor's overall business interest but 40-50% of a public lighting customers electricity expense.

Could we suggest the broad agreement by the Western Australian Government and the comments made by public lighting customers in relation to having little influence, that the opportunity exists to reform the public lighting framework in Western Australia?

Stand Alone	Tariff	Percentage of total business	Public Lighting Customer Interest
600.6	RT1	24%	
330.8	RT2	13%	
196.9	RT3	8%	
363.5	RT4	14%	
187.2	RT5	7%	
335.9	RT6	13%	
94.5	RT7	4%	
12.4	RT8	0%	
201.4	RT9	8%	40-50%
203.2	RT10	8%	
0	RT12	0%	
2526.4	Total	100%	

Unbundling Streetlighting Charges

Citelum have identified Western Power's explanation to its price list[2] in relation to street lighting costs and we have some queries in relation to this. For this submission we have attempted to unbundle the energy costs from maintenance costs and we identify we would require further information on some discrepancies as there appears to be cross subsidisation between Western Power and Synergy.

3.7 Reference Tariff 9 (RT9)[3]

Reference Tariff RT9 consists of:

(a) a fixed use of system charge (detailed in Table 1) which is payable each day;
(b) a variable use of system charge calculated by multiplying the energy price (detailed in Table 1) by the estimated quantity of electricity consumed at an exit point (expressed in kWh and is based on the lamp wattage and illumination period); and
(c) a fixed asset charge based on the type of streetlight asset supplied (detailed in Table 18).

5.4.11 - Streetlight Costs

Allocation of network costs to street lighting is in two components, namely the use of network costs and the costs associated with the street light asset itself.

Use of Network Costs
Street lighting does not contribute to system peak load, which occurs mid afternoon in summer. In winter, the lighting load coincides with the evening peak but because the various network elements have a higher rating in the colder conditions, street lighting effectively does not contribute to network costs but simply assists in improving the load factor.

On this basis, **no transmission** or distribution HV costs are allocated to street lighting. LV and transformer costs are allocated on a fixed and variable basis as for other customer groups.

Street Light Asset Costs
The allocation of the street light asset costs is based on the average cost per light, as derived in the asset valuation, applied over the total asset.

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[2] Western Power 2011-2012 Price List Information

[3] Western Power 2011-2012 Price List

Citelum Comment:
It would appear that street lighting provides a net benefit in that it simply assists in improving the load factor of the distribution network therefore could a proposed energy only tariff be detailed and be cost reflective of the net benefit that street lighting is to the network.

Transmission Cost of Energy - 1.584c/kWh
Distribution Cost of Energy - 3.743c/kWh
Bundle Tariff - 5.32c/kWh

We understand the following from the Western Power Price List and question why the Transmission Costs have been built into RT9 Tariff Class for Public Lighting if clause 5.4.11 clearly demonstrates that it does not have the cost of the transmission structured into costs.

Based on Synergy's website the following explanation is given in relation to the cost structure associated with electricity costs:

Generation Costs: 45%
Distribution Costs: 35%
Regulatory Requirements: 15%
Retail Costs: 5%

Current cost break up

Citelum comment:

Our other question in relation to public lighting charges, is there cross subsidisation occurring between Western Power and Synergy's Tariff Rate? In all other lamp wattages, there is a difference between the Western Power price and Synergy's advertised tariff.

Lamp Type	Western Power Price Lists Assets Table 18 *	Z Tariff	Retail Synergy Website**	ENERGY ***	DUOS ***	REGULATORY ***	RETAIL ***	TOTAL
				45%	35%	15%	5%	
42 watt CFL SE	**$ 88.54**	Z.18,Z. 87	**$ 88.54**	$ 39.84	$30.99	$ 13.28	$ 4.43	$ 88.54
42 watt CFL BE	**$ 94.10**		**$ 94.10**	$ 42.35	$32.94	$ 14.12	$ 4.71	$ 94.10
42 watt CFL KN	**$ 106.04**		**$ 106.04**	$ 47.72	$37.12	$ 15.91	$ 5.30	$ 106.04
50W MV	$ 55.06	Z.01	$ 139.17	$ 62.63	$48.71	$ 20.88	$ 6.96	$ 139.17
70W MH	$ 154.77	Z.20	$ 167.77	$ 75.50	$58.72	$ 25.17	$ 8.39	$ 167.77
70 HPS	**$ 76.12**	Z.19,Z. 62,Z. 70,Z. 77,Z. 85	**$ 76.12**	$ 34.25	$26.64	$ 11.42	$ 3.81	$ 76.12
80W MV	$ 74.11	Z.02	$ 167.77	$ 75.50	$58.72	$ 25.17	$ 8.39	$ 167.77
125W MV	$ 92.14	Z.03	$ 212.02	$ 95.41	$74.21	$ 31.80	$ 10.60	$ 212.02
150W MH	$ 178.82	Z.66,Z. 74,Z. 81	$ 217.02	$ 97.66	$75.96	$ 32.55	$ 10.85	$ 217.02
150W HPS	$ 100.13	Z.13	$ 217.02	$ 97.66	$75.96	$ 32.55	$ 10.85	$ 217.02
250W MH	$ 178.82	Z.67,Z. 75,Z. 82	$ 326.11	$ 146.75	$114.14	$ 48.92	$ 16.31	$ 326.11
250W HPS	$ 100.13	Z.15	$ 326.11	$ 146.75	$114.14	$ 48.92	$ 16.31	$ 326.11
250W MV	$ 120.19	Z.05	$ 284.01	$ 127.81	$99.41	$ 42.60	$ 14.20	$ 284.01
400W MV	$ 126.20	Z.06	$ 424.67	$ 191.10	$148.63	$ 63.70	$ 21.23	$ 424.67

Notes to table:

*** Table 18 Western Power Price List 2011-2012**

*** * http://www.synergy.net.au/for_business/large_business/street_lighting.xhtml**

***** http://www.synergy.net.au/energy_in_wa.xhtml**

Benchmark Pricing

In a competitive market whereby:

- Western Power supply only energy to the streetlight (DUOS)
- Metered or unmetered flat tariff at 8c/kWhr based on large industrial customer off-peak
- Energy is unbundled
- Maintenance is unbundled

Based on unmetered load table at 4300 hours per annum				Current Cost Break up			Unbundling		
Lamp Type	Western Power Price Lists Assets	Tariff	Retail Synergy Z Tariff	ENERGY	Distribution		Competitive ENERGY	DUOS RT9	Saving per LP
				45%	35%		8c/kWhr	3.743c/ kWhr	
42 watt CFL SE	$ 88.54	Z.18,Z.87	$ 88.54	$ 39.84	$ 30.99		$ 15.96	$ 7.47	$ 47.40
42 watt CFL BE	$ 94.10		$ 94.10	$ 42.35	$ 32.94		$ 15.96	$ 7.47	$ 51.86
42 watt CFL KN	$ 106.04		$ 106.04	$ 47.72	$ 37.12		$ 15.96	$ 7.47	$ 61.41
50W MV	$ 55.06	Z.01	$ 139.17	$ 62.63	$ 48.71		$ 21.22	$ 9.93	$ 80.19
70W MH	$ 154.77	Z.20	$ 167.77	$ 75.50	$ 58.72		$ 29.31	$ 13.71	$ 91.20
70 HPS	$ 76.12	Z.19,Z. 62,Z.70,Z. 77,Z.85	$ 76.12	$ 34.25	$ 26.64		$ 29.31	$ 13.71	$ 17.87
80W MV	$ 74.11	Z.02	$ 167.77	$ 75.50	$ 58.72		$ 32.54	$ 15.23	$ 86.45
125W MV	$ 92.14	Z.03	$ 212.02	$ 95.41	$ 74.21		$ 47.88	$ 22.40	$ 99.34
150W MH	$ 178.82	Z.66,Z. 74,Z.81	$ 217.02	$ 97.66	$ 75.96		$ 57.96	$ 27.12	$ 88.54
150W HPS	$ 100.13	Z.13	$ 217.02	$ 97.66	$ 75.96		$ 57.96	$ 27.12	$ 88.54
250W MH	$ 178.82	Z.67,Z. 75,Z.82	$ 326.11	$ 146.75	$ 114.14		$ 94.08	$ 44.02	$ 122.79
250W HPS	$ 100.13	Z.15	$ 326.11	$ 146.75	$ 114.14		$ 94.08	$ 44.02	$ 122.79
250W MV	$ 120.19	Z.05	$ 284.01	$ 127.81	$ 99.41		$ 94.08	$ 44.02	$ 89.12
400W MV	$ 126.20	Z.06	$ 424.67	$ 191.10	$ 148.63		$ 148.26	$ 69.37	$ 122.10

When analysing the tariffs above, there are some inconsistencies in relation to the 42 watt compacts (Z.18, Z.87) tariffs in how they relate to the maintenance prices for Western Power and this leads to assume that cross subsidisation is occurring between the two organisations.

Currently Western Power have 117,000 80 watt Mercury Vapour Streetlights. The net saving in relation to energy and distribution charges is approximately $10m AUD to Local Government per annum and represents a $200m AUD saving over the economic life of the asset for one lamp type by unbundling the charges and applying Western Australian commercial rates of energy production and applying the DUOS tariff as detailed by Western Power.

The retail margins and the regulatory margins have been excluded by under a competitive arrangement, the company undertaking the maintenance could also arrange the billing of the energy associated with energy supply.

Local Government Act 1995

2.7 . Role of council

(1) The council —

(a) governs the local government's affairs; and

(b) is responsible for the performance of the local government's functions.

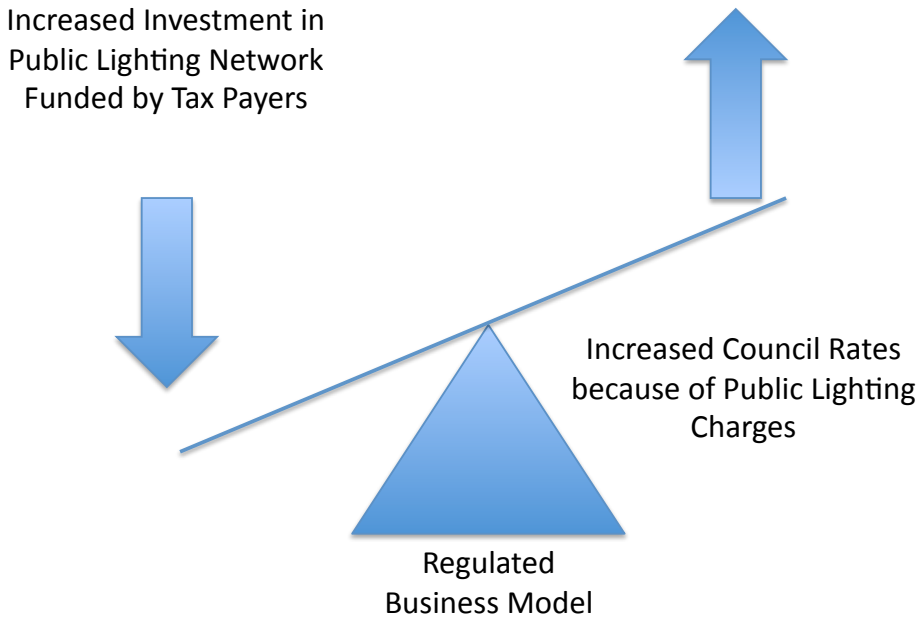
(2) Without limiting subsection (1), the council is to —

(a) oversee the allocation of the local government's finances and resources; and

(b) determine the local government's policies.

Citelum Comment

Unbundling the Public Lighting Tariffs from maintenance and energy component will in effect help local government assess its finances and resources more clearly. It will help avoid an issue whereby rate payers as tax payers are avoiding paying double in relation to increased rates due to large increases in streetlighting costs and assist local government in better managing public funds.



Models of Public Lighting Delivery

We note with interest the planned programmes such as WALGA undergrounding project and Smart Grid Trials. There are many stated benefits with these projects in ensuring an electricity network remains reliable however we believe that the prudent measure for government is to align the estimated benefits with contractually guaranteed outcomes. Some of the models that demonstrate energy saving benefits or state benefits should have those benefits underwritten by a contractually binding agreement ensuring minimum risk to the customer who makes the investment.

A popular method of public lighting delivery to improve energy efficiency is through the use of an Energy Performance Contract (EPC).

The key difference between an EPC and an energy efficient tariff is that there is a funding period for the contract rather than a perpetual tariff.

Energy Performance Contract

Energy Performance Partnership Contracts and the Public Energy Performance Contracts are contractual mechanisms that integrate “energy efficiency improvements with guaranteed results over the long-term.

The contact places an emphasis on several key points, including:
• curbing energy consumption;
• meeting contractual deadlines set for repair work;
• systematising preventive maintenance
• breakdown rates;
• identifying breakdowns in real time;
• photometric quality of lighting;
• controlling the environmental impact of services;
• thorough knowledge of all installations;
• transparency of information provided to the contracting authority;
• coordinating Citelum services with local authorities;
• relevant proposals for improvement.

Designed to generate energy savings, this model ensures that the necessary investments are made to meet the “contractually defined level of energy efficiency improvement.”

Ratios for each indicator allow for the use of a bonus/sanction scheme indexed to contractual objectives. This method provides strong incentives for the public lighting operator to meet its commitments.

This model of delivery ensures that the public lighting customers can improve the appearance and performance of the public lighting network with funding linked by the energy savings.

Cities such as Washington DC are using this method of delivery in partnership with Citelum. Other councils throughout Australia are realising the benefits of these programs especially when investing with public funds.

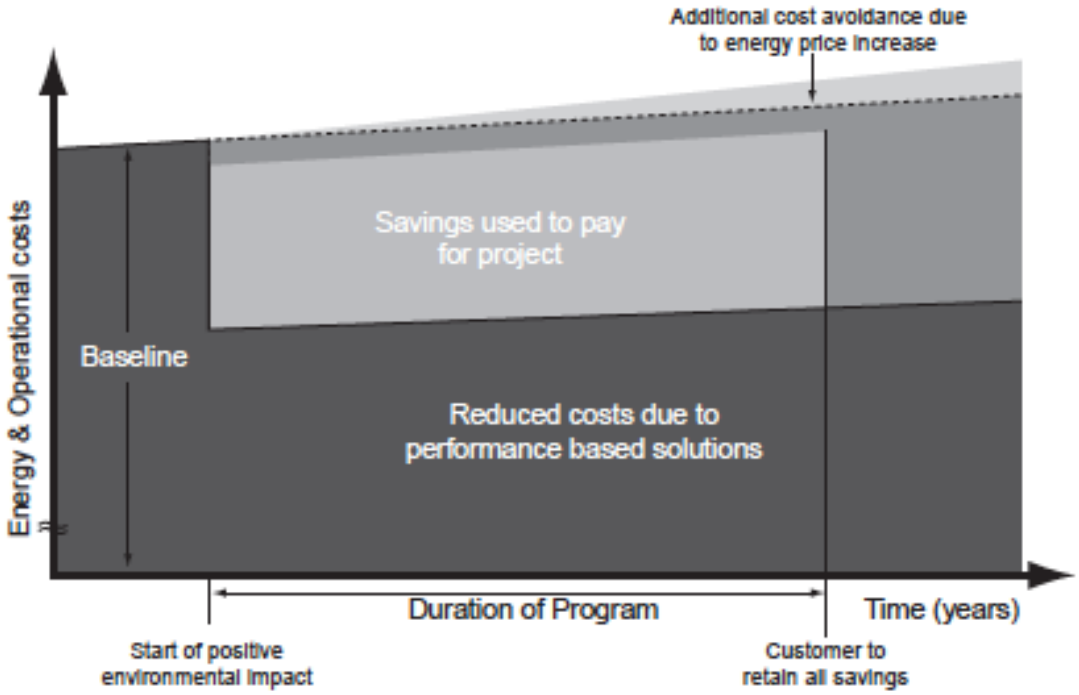
Under the regulated business models, energy efficiency is at odds with the regulatory rules in that the regulated tariff is designed to push prices upwards.

Under a negotiated outcome the public lighting customer can achieved significant improvements in the public lighting network and at the end of the investment period realise signficant savings to

From the graph below, under the Energy Performance Contract, the public lighting investment is offset by the energy savings and at the end of the contract period, the public lighting costs revert to maintenance only with an improved network with reduced energy costs.

The Energy Performance Contract is used to fund:

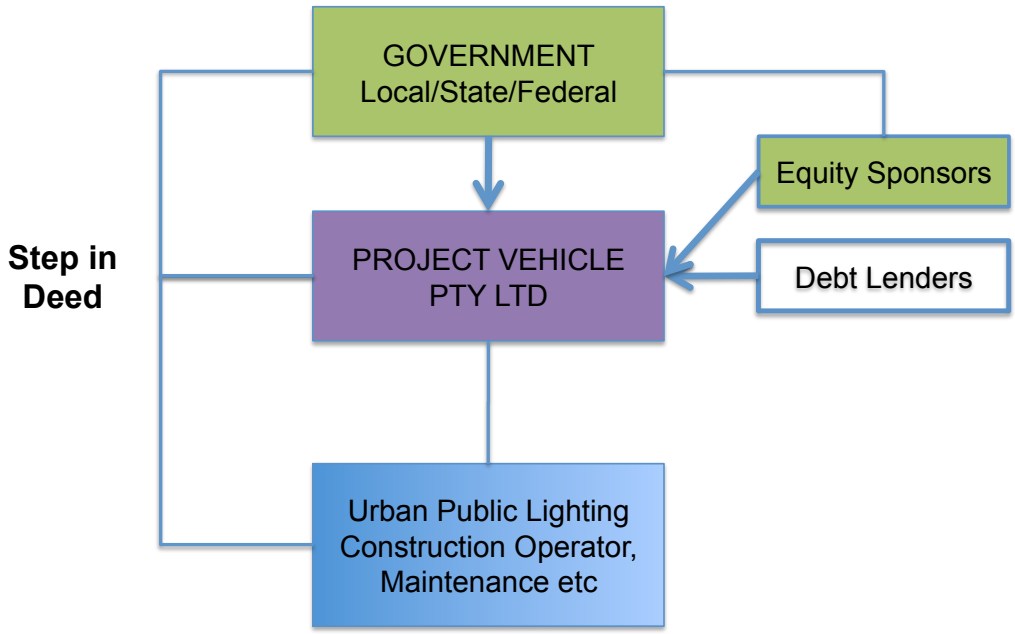
- Energy Efficient Street Lighting
- Computerised Management Systems (CMS) for Public Lighting
- Improved Management systems
- Public Lighting Audits

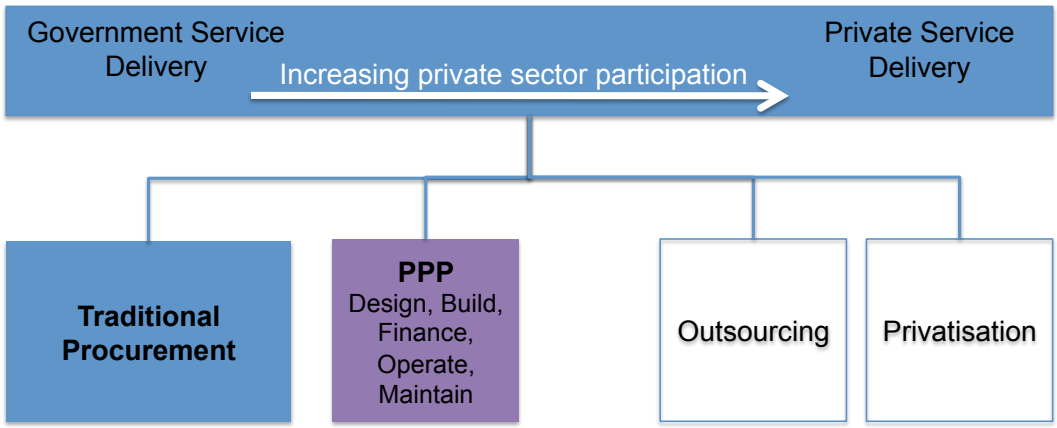


PPP - Public Private Partnership

Public Private Partnerships are used to incorporate the framework of the Energy Performance Contract but to include other added benefits to the community such as:

- Electric Vehicles Charging Stations
- Large Scale Solar Production
- Municipal WIFI
- Improved Traffic Management
- Smart Grid Applications





Examples on Energy Performance Contracts

Washington DC

On 10 February 2012, the District Department of Transportation of Washington D.C. awarded Citelum a comprehensive management contract for street lighting infrastructure and equipment. This five-year contract involves managing energy as well as the design, modernisation and construction work, and the operation and maintenance of the facilities. This has enabled Citelum to achieve a historic breakthrough in the American market by becoming manager of the country's capital city via its urban lighting comprehensive management model.

At the close of an international call for bids Citelum – agent for a grouping with the US company Lighting Maintenance Inc. – was selected to advise the local US authorities on the long term management of a lighting infrastructure of **71,000 lights**.

Upgraded facilities in smart grids

In particular the grouping will ensure the renovation of 35,000 LED lights. In addition, Washington's public lighting will use Citelum designed technological innovations.
The first of these innovations, Citenergy®, installed on 500 lights, enables the electric equipment available on the standard lighting network to be increased without disturbing operations or increasing negative impact on the environment.
It also enables time measurement of energy consumption. The second innovation, **PackWeb®**, facilitates daily maintenance operations (identifying failures, corrective on-site interventions, maintenance, etc.) and the dynamic inventory of the installations. Lastly, the mission will be carried out within the framework of an **Urban Lighting Master Plan.**

Solving the environmental performance /savings equation

- Energy savings of 40 %
- Current budget saving 15%
- Artistic Lighting Design
- LED on 35,000 lighting points
- Citenergy®

Venice - Smart City

City of Venice Citelum Italy Following an international call for tenders, the Commune of Venice awarded CITELUM the comprehensive management contract for street lighting, traffic signals and related equipment. The contract involves in particular managing 53,000 lights, 100 intersections with traffic lights for a duration of 9 years. High quality environmental targets; Citenergy®; LED lighting; infrastructure for charging electric vehicles; solar marine LED beacons; and Hotspot Wi- Fi are among the contract's unique features.

77% of the Capital invested by the project is being off-set by the energy savings.

Example of a PPP Contract

Sant Fost de Campsentelles - Barcelona

Sant Fost de Campsentelles is a model for cities around the world for its smart use of renewable energy to power its street lighting system. At Citelum, we worked hand-in-hand with the Spanish town to make this goal a reality.

Sant Fost de Campsentelles, a small city near Barcelona, has been attracting a steady stream of new residents since the early 1990s. To support this population growth, city planners have introduced a large-scale urban development program that includes upgrading all the street lighting. In addition to improving operations, the new equipment had to support the city's sustainable development policy. Our Spanish subsidiary teamed up with the city to secure public-private financing and carried out the renovation work under an **Energy Performance Contract**.

A win-win solution for the planet and the city's budget
The Sant Fost project proves that an urban development project can generate both cost savings and environmental benefits with initiatives like:

- A new solar power plant with 8,000 m2 of panels, 70 kWp of output, and the capacity to generate 900,000 kWh/year of power that will be sold to the local electric utility
- Reducing lighting energy consumption by 35% per year to substantially lower the city's electricity bill
- These savings helped finance the investments needed to rebuild the city's entire lighting system and increase the number of lights by 11% for greater capacity and performance.
- Exemplary environmental performance
- Sant Fost's upgrade is, of course, a good example of sustainable urban development. Concretely, the overhauled system will help:
- Cut CO2 emissions by 96 tons/year
- Eliminate light pollution
- Promote clean energy with features like an illuminated walking tour equipped with solar-powered lights
- Streamlined operations

These benefits were made possible not only by installing new materials and systems, but also by using our Luxicom® **remote lighting management** software. To ensure that the new lighting system was fully optimised, we:
Drew on our engineering skills to outline a **City Lighting Masterplan** early on in the project. Used our innovative PackWeb® software to improve day-to-day operations
Sant Fost de Campsentelles, Spain

- 7,900 inhabitants
- 1,811 lights
- Project type: comprehensive street lighting management under a public-private partnership
- Date: 2006
- Project length: 25 years

Technology - Computerised Management Systems

Computerised Management Systems can be funded through an Energy Performance Contract and benefits for the customer mean that they can reduce maintenance costs and energy costs by remotely controlling the network. Within our proposed rate structure we have suggested that a CMS tariff be introduced as the costs for metering are paid for by the customer and should be reflective of that capital and operational contribution the customer makes for the DUOS electricity rate.

Citelum have installed CMS into the following cities:

- Madrid - Spain
- Barcelona
- Paris - France
- Kunming - China
- Ho-Chi Minh - Vietnam
- Washington DC - USA
- OSLO - Norway

CMS enables data to be transferred across an electricity grid so that lighting power and voltage can be adjusted remotely. As a result, the grid operates more smoothly, equipment lasts longer, and the amount of electricity supplied can be matched to the amount needed—without affecting lighting quality.

Even an old-fashioned lamp post can be hooked up to a smart grid.

A small electronic unit is installed inside a lighting column to supply continuous power, which can be used for any type of urban electrical equipment. This smart city platform can leverage the street lighting grid to run additional electrical equipment—without affecting safety, continuity of service, quality, or environmental impact.

This smart system also has the advantage of not requiring any supplemental maintenance work or infrastructure investments.

Computersied Management Systems

Street lighting is one of the first items of expenditure in electricity for local authorities who want today to realise substantial energy savings.

The remote management system meets all the city’s requirements.

It allows:

•Significant energy savings by programming the power variation of each single light. The remote modules installed in the lantern receive their programming, ignition, extinction and variation orders through an efficient and open Power Line Carriage protocol.

•A real-time control of energy consumption through the single light module’s acquisition functions and the reporting functions of the monitoring software.

•An effective and reactive maintenance thanks to the feed-back of information from the field in real-time (failures, alarms, etc...) identified by the modules.

• A real-time control of street lighting through an open monitoring software allowing the remote control of equipment from many manufacturers.

•The transformation of the street lighting network in a data communication network, the first step to build a “Smart Grid City”, which may aggregate all kinds of uses and technologies: charging stations for electric vehicles, video cameras, wireless terminals, traffic and pollution sensors, billboards, etc.

Main Functions of a CMS

Single Light Energy Savings

The objective of the power variation is the adaptation of lighting while maintaining the continuity of service. The single light energy saving technique allows:

- The removal of start over-current and protection of the all appliance (lamp, ballast, ...)
- The maintaining through the time of a constant level of lighting
- The guarantee of the lamp operation through the self- adaptation of the parameter. In the context of characterising the energy performance, the measurement of electrical characteristics needs to be conducted.

That is the reason why CMS incorporates on every single lighting point remote modules, an acquisition card that measures and calculates the main electric single phase parameters of lighting point and its load (Voltage, Intensity, Active Power, Reactive Power, etc...).

This acquisition card supports the functions of stabilisation or regulation of the product, ensures the protection of the terminals, and also proceeds with the counting of the energy consumption on every single lighting point.

Maintenance Optimisation

The single light remote management plays a key role in managing numerous outdoor lighting. It is involved in the piloting of a facility, in the permanent control facilities, in the control and management of the lighting.

- Remote operations on a single lighting point: on / off / dimming
- Creation and modification of operating scenarios.
- Adaptation following the needs of the City, configuring each zone with switching ON / OFF hours and the relevant light levels. The feed-back of the network status

Lighting failure
The lamp no longer works(lamp,ballast or ignitor are Out of Service)

Facility Failure
The concerned module is no longer communicating (fuse out of service or faulty module)

Local control failure
The local control (clock, cell, ...) did not switch ON or OFF on time. The module returns the information and automatically controls the ignition or extinction.

Predictive Failure
Symptoms of irregular operation, to be treated before they become a real lighting failure (eg: deteriorated lamp, old lamp, still functioning but with less reduction and less saving: it will die soon).

Over-temperature
Module overheating (over 85 o C). It switches into security mode, switch off the lamp and return the information in order to plan an intervention before the all appliance or the module deteriorates and become a Light failure.

Management Improvements

Remote operations and the rise of network conditions favour a move optimisation and improved service quality and working conditions:

A predictive maintenance policy adapted to outdated lamps

•The elimination night rounds: the operator is alerted directly of the lamp failures

•Increasing the life-span of the lamps through the precise control of the power supply.

Harmonisation of the street lighting level
Following the power, the type and the age of the lamps. The user can get a uniform light level by programming each lighting points at the dimming rate that suits him the best for the overall vision: -

Comfort optimisation with the proper lighting level at the right time
Light adjustment following the life cycle of the fauna and flora The monitoring of the services and traceability as well as providing information on the intranet allows the contracting authority and its operator to measure the quality of services provided by the teams on the ground and avoid unnecessary travel.

The provision of a historical single database can provide answers to questions from residents during their interrogation of the public lighting functioning