

Our ref: DM# 7403252

6 August 2010

Inquiry into the State Underground Power Program Cost Benefit Study  
Economic Regulation Authority  
PO Box 8469  
Perth Business Centre  
197 St Georges Terrace  
Perth WA 6849

Dear Sir/Madam,

**Inquiry into the Costs and Benefits of the State Underground Power Program (SUPP)**

I refer to the Issues Paper released on 28 June 2010 regarding the above inquiry.

Please find attached Western Power's responses to the issues raised with comments on Issues Paper statements.

If you require further information or have any further questions please don't hesitate to contact Nicholas Bailey, Western Power's SUPP Program Manager on 92192011.

Yours sincerely

**Mark de Laeter**  
**General Manager Networks**

## Issues

### *1) Do the current methods used to evaluate and select underground power projects have an impact on the costs of undergrounding?*

Western Power's Response:

The current SUPP evaluation methods (as outlined in the Guidelines) do have an impact on the costs of undergrounding due to the key ranking criteria shown in Table 1:

<b>Project Feasibility Criteria</b>
<b>1. Nominated Area</b>
a. Number of residential lots
b. Project area average size of properties
c. Number of residences per lot average
d. Extent of industrial/commercial properties within project area
e. Ground suitability of drilling/trenching
<b>2. Project Budget</b>
a. Project cost per rateable property
b. Cost escalators

**Table 1: SUPP Selection Criteria from Round 5 Guidelines (cost driver criteria)**

These selection criteria target lowest cost.

However the current requirement to obtain property owner support through surveys does lead to delays in work continuity which can escalate project costs

### *2) Is the current method of calculating the costs of underground power appropriate?*

Western Power's Response:

The method of calculating costs for SUPP is appropriate. Project development and project delivery costs are fully identified in the partner budget (see Table 2) for the categories of project management, labour and materials.

Any extra costs for enhancements are excised from the budget and are fully funded by the accountable partner. For example Network feeder and voltage upgrades are fully funded by Western Power whereas decorative streetlights are fully funded by the Local Government.

Ratepayer affordability is a major driver for accurate budgeting and keeping costs low. Retrospectively seeking extra funds from property owners is not acceptable.

Successful measures have been implemented to control costs through contingency reduction (now 5%), use of aluminium cable (instead of copper) and renegotiation of lower contracting rates. All projects since 2003 have been delivered within partner budgets.

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<b>FINAL DETAILED BUDGET</b>	
	<b>Budget (\$)</b>
<b>Project Management Costs</b>	
Project Management	\$ 778,893
Design	\$ 130,260
DFIS	\$ 10,000
Project Close Out Fund	\$ 50,000
LGA In Kind Costs	\$ 102,310
Project Management Costs Contingency 5%	\$ 53,573
	<b>\$ 1,125,036</b>
<b>Materials</b>	
Street Services Materials	\$ 3,114,658
Street Light Materials	\$ 358,048
Miscellaneous Materials	\$ 11,640
Interface Materials	\$ 28,460
Materials Contingency 5%	\$ 175,640
	<b>\$ 3,688,447</b>
<b>Labour</b>	
Street Services Contract	\$ 3,462,549
Street Services Contract Scope Contingency	\$ 157,389
House Services Contract	\$ 1,427,764
House Services Contract Scope Contingency	\$ 86,253
Street Light Installation Contract	\$ 129,965
Street Light Installation Contract Scope Contingency	\$ 5,908
Demolition Contract	\$ 564,607
Demolition Contract Scope Contingency	\$ 25,664
Demolition Purchase of Salvage Material	-\$ 23,716
Interface Contract	\$ 150,811
Interface Contract Scope Contingency	\$ 6,855
	<b>\$ 5,994,047</b>
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<b>TOTAL BUDGET (EXC. CONTINGENCY)</b>	<b>\$ 10,296,249</b>
<b>Contingency</b>	<b>\$ 511,281</b>
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<b>TOTAL BUDGET (INC. CONTINGENCY)</b>	<b>\$ 10,807,530</b>
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<b>Direct Council Costs</b>	
Powder Coated Street Lights	<b>\$ 44,055</b>

**Table 2: Sample SUPP Partner Budget**

**3) Is the proposed approach to the cost benefit study appropriate?**

Western Power's Response:

The CBA approach will depend on how the benefits to each contributor are quantified and the effectiveness of the sensitivity testing.

The current program funding model was not established with a view of each partner having a return on their investment but as a result of Government policy to address network storm vulnerability, system reliability and local community amenity.

The community benefits are qualitative and not easily quantifiable in the CBA. This may result in this Benefit Cost Ratio (BCR) being negative and limited in valuing the intangible but major benefits that drive the program popularity.

These qualitative benefits include amenity and environmental improvement (removal of poles, wires and better street lighting with security benefits), improved public safety and leveraging of future options from broad band roll-out and smart grid installation.

As identified in the Issues Paper, the CBA is generic (and not project specific). It will be limited in value if it is based on a snapshot of data. Significant cost savings would be available for a future expanded underground program through economies of scale (the current SUPP program is limited in cost saving leverage).

The fragmented nature of SUPP has also restricted Network reliability improvements available compared to a larger, targeted and contiguous program. Furthermore technology change and methodology review will provide other opportunities to reduce cost. This is part of an Office of Energy Strategic Review into SUPP that reports in July 2011.

#### ***4) What are the alternatives to underground power?***

Western Power's Response:

##### 4.1 Undergrounding main feeders (typically 22kV).

- Delivers biggest reliability improvement
- Work bundling cost disadvantage with LV system not included
- Less amenity, streetlight, pole removal and/or tree pruning risk benefits

##### 4.2 Pole to Pillar - undergrounding of house services only

- Improves safety, reliability and localised amenity, property tree pruning
- Work bundling cost disadvantage with street services (HV, LV) not included
- Limited reliability improvement
- Limited amenity and/or tree pruning risk improvement

##### 4.3 Aerial bundled cable (ABC) – Insulating of overhead cables

- Improves reliability and cheaper than installing underground power
- Limited improvement in amenity
- No improvement in house service safety
- Some improvement in tree pruning risk

##### 4.4 Maintenance of overhead system

- Lowest priced alternative
- Some improvement in reliability, power quality, amenity, streetlight, pole removal or tree pruning risk benefits
- Higher operating expenditure

#### ***5) Have all the costs and benefits of underground power been identified?***

Western Power's Response:

Further benefits to Western Power are:

5.1 Reduction of the distribution network pole reinforcement and replacement program in the metropolitan area and regional centres

5.2 Reduction of the overhead customer services replacement program

**6) *What are the most important benefits of underground power?***

Western Power's Response:

The most important benefits to Western Power's network are:

- 6.1 Network safety enhancement (reduced programs of works to improve system safety see 5.1 and 5.2 above)
- 6.2 Network reliability (detailed analysis available)
  - 6.2.1 Reduction in costs associated with power interruptions and storms
- 6.3 Reduction in maintenance cost, pole and conductor capital costs
- 6.4 Reduction in power line vegetation pruning costs and risks

**7) *Are there any negative impacts resulting from underground power in the SWIS?***

Western Power's Response:

- 7.1 Cost may reduce funding for other work (growth and network performance) due to State affordability constraints
- 7.2 The potential network reliability and power quality benefits have been reduced by the non contiguous current SUPP program.
- 7.3 Greater difficulty in fault finding and repair and longer supply interruption times for effected customers – though this is offset by lower maintenance requirements
- 7.4 Greater hazard for installation of other utility services and excavations

**8) *What approach should be taken to undergrounding – the optimised or the like-for-like approach?***

Western Power's Response:

The 'like for like' approach was utilised until 2002 in SUPP. This was replaced by an optimised approach because:

- Did not allow 'future proofing' of the network for normal capacity expansion needs
- Higher cost (compared to overground) of modifying the underground installation capacity retrospectively to meet capacity expansion needs.
- Did not allow street light installation to Australian standards

Accordingly it is not practical or economically efficient to adopt a 'like for like' approach in retrospective undergrounding of modern power networks.

**9) *Is the existing funding arrangement, which is based on a 'beneficiary pays' approach, appropriate?***

Western Power's Response:

Western Australia has the largest ongoing retrospective residential underground power program in Australia. The key to this has been the shared funding arrangements with the Government, Western Power and the property owners.

For the 39 major residential projects surveyed to date, a majority of the property owners were prepared to contribute 50% of the costs.

Without these arrangements there would not be a major program as evidenced in all other distribution jurisdictions.

Property owners gain at least an equivalent financial advantage to their contribution through property revaluation from underground power. Around 393,000 property owners have paid for the advantage of underground power (through sub divisional purchase prices and SUPP).

The current funding process establishes the precedent for a 'beneficiary pays' approach for the remaining 380,000 overground supplied properties.

Post SUPP project surveys conducted by local governments, show that between 80 – 90% of property owners who respond, believe they achieved 'value for money' from the network undergrounding.

This indicates how the intangible benefits of amenity improvement are valued by the property owners.

***10) Who benefits from underground power?***

***11) What is the appropriate share of funding for underground power projects?***

Western Power's Response (Issues combined):

Qualitatively, the current partner 25/25/50% sharing arrangement is a reasonable approach to recognising the benefits to each. Dependant on modelling and Government recognition of property owner socio economic circumstances, contribution may vary by 5-10%.

For Local Government (50% usually passed on to property owner) underground power delivers significant benefits in terms of reduced tree pruning requirements and major local area amenity, safety and security improvement.

For the property owner. (50% dependant on local government contribution) key benefits of underground power are:

- A more reliable power supply
- Improved local area amenity
- Improved property values
- Improved local area safety through reduced motor vehicle collisions with network assets and reduced risk of human contact with exposed live conductors

For the State Government (25%) underground power delivers significant benefits in terms of a more efficient electricity network with improved community amenity and safety.

For Western Power (25%) key benefits of underground power (see also 6) are:

- Improved reliability performance at all levels of the distribution power system
- Reduced asset based maintenance costs
- Reduced emergency network repair costs in the event of storms

## **Other Comments on Issues Paper Statements**

### **Section 2: State Underground Power Program**

Round 4 Local Government applicant expressions of interest (EOI) were shortlisted before surveys were carried out (not during EOI stage as stated in Issues Paper)

Pole to pillar (PTP) connections are not included in the formal identification of percentage of the SWISS with underground power supply (Issues Paper indicated PTP were included).

#### **Section 2.1 How Does SUPP Work (Page 4)**

Horizon Power is not part of the State Underground Power Program and is excluded under the terms of reference of this inquiry.

#### **Section 4.3.2 Negative Impacts of Underground Power (Page 26)**

Potential negative effects:

“Environmental damage including soil erosion and disruptions of ecologically sensitive habitat”

Western Power Comment:

Most cable installation is by horizontal drilling and not trenching for SUPP

“Electricity network operator employee work risks during vault and manhole inspections”

Western Power Comment:

Vault and manholes are not part of the SUPP infrastructure

“Although interruptions may occur less frequently with underground power when interruptions do occur, they last longer and more customers are impacted per outage”

Western Power Comment:

Recent March 22, 2010 storm data does not verify this statement (Page 31 of Issues Paper).

#### **Section 4.4.1 Potential Economic Benefits for Western Power Operating and Maintenance Costs (Page 28)**

“...there are costs associated with operating and maintaining underground electricity systems as well, such as the work risks to employees during vault and manhole inspections.....’

Western Power Comment:

Vault and manholes are not part of the SUPP infrastructure

“Duct bank systems are often required in urban areas in the US, ore where subsurface conditions could damage direct buried lines’

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Western Power Comment:

Duct bank systems are not part of the SUPP infrastructure

“However, underground power may not necessarily improve reliability, as any outages on underground systems often last longer and impact a larger number of customers’

Western Power Comment:

Recent March 22, 2010 storm data does not verify this statement (Page 31 of Issues Paper).