4 February 2002

Dr Thomas G Parry
Chairman
Independent Pricing and Regulatory Tribunal
PO Box Q290
QVB Post Office
NSW 1230

Attention Michael Seery, Program Manager Electricity

Dear Dr Parry

Undergrounding Electricity Cables in NSW

Thank you for the opportunity to provide a submission on undergrounding of electricity cables in NSW. Please find attached ENERGEX's submission.

ENERGEX recognises the significant benefits provided by undergrounding, and supports undergrounding provided a funding method can be devised that provides appropriate economic returns on the necessary new investment.

Yours sincerely

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Submission on Undergrounding

Introduction

To be successful, undergrounding initiatives must to be market-managed. Government-managed undergrounding initiatives risk undermining the current electricity reform agenda aimed at ensuring electricity prices are attuned to market signals. Therefore, the major challenge for governments in implementing undergrounding is to devise rules that encourage private and corporatised-entity investment in undergrounding in response to demand from users. Governments and regulators can achieve this aim by permitting utilities and others to recover their investment in undergrounding according to standard market concepts of willingness to pay, and by adjusting the regulatory framework to encourage greater flexibility in service offerings by utilities.

ENERGEX supports undergrounding of electricity cables in urban areas provided such investment is treated under market rules with adequate flexibility for utilities to offer a range of service options. This submission examines possible investment rules in the context of the spread of benefits among the community.

Government and community support for undergrounding

Support for undergrounding appears to be growing among State Governments. Local Governments now generally require new distribution cables to be undergrounded, and a number of States have launched initiatives to underground existing overhead lines (NSW Ministry of Energy and Utilities 2002). The Western Australian Government's program is the most extensive, with a policy target of undergrounding at least half of Perth's house supply by 2010. South Australia and Victoria have more limited undergrounding programs, while ENERGEX recently conducted a pilot program at Inala in Queensland and Ergon Energy is targeting cyclone-affected areas for undergrounding. Overall, there appears to be strong political support for undergrounding urban electricity cables if equitable and cost-effective mechanisms can be found to fund undergrounding programs.

Community support for undergrounding also appears to be growing. However, it is clear that, as with governments, community willingness to pay for undergrounding cannot be determined in isolation of the likely costs, funding options, and implementation processes. Asking households to pay high upfront costs in the thousands of dollars for undergrounding of local overhead powerlines is not the same as, for example, asking them to forego expected tariff reductions, or pay a small weekly surcharge on their power bills over a period of time. High upfront payments are likely to be inequitable in their impact because some members of the community will be unable to pay, and because costs are concentrated upfront while benefits flow gradually over a number of years.

A key element in the introduction of undergrounding projects would need to be willingness to pay surveys of the community and consultation among utilities, local councils and State Governments over funding and implementation mechanisms. This would ensure the community did not bear the costs of undergrounding projects in circumstances where there was not solid local support for undergrounding. This method of introduction of undergrounding would address the view expressed by the Victorian Office of Regulator-General (ORG) in its 2001-2005 Electricity Distribution Price Determination, that undergrounding does not have sufficient community backing for related investment to be included in distribution utilities' capital expenditure programs.

Benefits of Undergrounding

In its 1998 report, *Putting Cables Underground*, the Department of Communications, IT, and the Arts (DCITA) identified a range of potential benefits of undergrounding:

- improved urban amenity encompassing improvements in streetscapes and the visual amenity;
- reduced motor vehicle accidents caused by collision with poles;
- reduced interference with television and radio reception;
- reduced losses caused by electricity outages;
- reduced network maintenance costs;
- reduced tree pruning costs;
- increased property values;
- reduced transmission losses;
- reduced greenhouse gas emissions (due to reduced losses);
- reduced electrocutions; and
- reduced bushfire risks. (DCITA 1998, pp. 58, 77)

Another argued benefit of undergrounding is the perceived reduction in adverse health effects from reduced exposure to electromagnetic fields.

Beneficiaries of undergrounding

Beneficiaries of undergrounding encompass:

- the local community around an undergrounding project;
- the community at large; and
- electricity distribution utilities and telecommunications utilities.

For the local community, the benefits of undergrounding include improvements in urban amenity, reduced TV and radio interference, reduced health concerns about electromagnetic fields, and improved property values.

For the community at large, benefits include greater reliability, reduced motor vehicle accidents with power poles, reduced losses caused by electricity outages, reduced greenhouse emissions (due to reduced losses), reduced electrocutions and improved safety, and reduced bushfire risks. The community at large also benefits from improved visual amenity, particularly where undergrounding projects are targeted at replacing overhead power lines along highways and near public buildings.

For electricity distribution utilities, the benefits are in the form of avoided costs and encompass reduced operation and maintenance costs (reduced tree trimming and line maintenance), and reduced energy losses. Telecommunications companies which

underground telephony and multimedia broadband cables at the same time as electricity cables share these benefits.

ENERGEX's Inala pilot project provided some data on the expected avoided costs for electricity distribution utilities from undergrounding. It estimated savings to ENERGEX resulting from reduced tree trimming, pole inspection, pole reinstatement, and energy losses at a net present value of around $460 per household. These savings represented around 8.4 percent of the actual costs of undergrounding during the pilot program, or perhaps 10.8 percent of anticipated average future project costs. The energy savings for the pilot project were estimated to be higher than normal due to the presence of a zone substation in the area. In view of this, utilities could probably expect to realise average cost savings of less than 10 percent of the costs of undergrounding.

One misconception is that the benefits of undergrounding are largely confined to the local community around an undergrounding project. In fact, the spread of benefits depends on the criteria for prioritising undergrounding projects. For example, under the criteria administered by the Power Line Environment Committee (PLEC) in South Australia, the major beneficiary is the community at large, since the criteria for funding are:

- will the project benefit the community at large? (eg major thoroughfares, major shopping streets, or tourist routes).
- is the area of significant heritage value?
- is this part of a staged project that has already begun? (PLEC 2001 Annual Report, p. 5)

Ergon's undergrounding program, which seeks to improve reliability by targeting cyclone-affected areas, also primarily benefits the community at large.

Costs of undergrounding

Undergrounding cost drivers include:

- soil type;
- road layout and width of pavements;
- housing density;
- size of land parcels and accessibility for machinery;
- current underground congestion; and
- potential for sharing undergrounding costs with other existing overhead services.

DCITA estimated undergrounding at $5,500 per household (1998 dollars) but found that with technical innovations and improved project management, costs might fall to $4,413 to $3,585 within five years (ie by 2003). In Western Australia, favourable soil conditions mean an average cost for Perth metropolitan lots has been around $4,000 (Ministry of Energy and Utilities 2002, p. 8).

The ENERGEX pilot program conducted at Inala cost $2,718,000 for 500 households or $5,480 per household. However, ENERGEX estimated future large scale projects

could have been undertaken for around $4,440 per household, with costs for some regions as low as $3,630.

Further technological innovations such as smart boring techniques may reduce the costs of undergrounding further in the future, thus affecting the optimal timing of investment in undergrounding.

Funding mechanisms

Funding for undergrounding could come from State Government general revenue, local government rates, and utility charges.

ENERGEX favours funding from identified beneficiaries. In practice this means funding from a combination of sources. Benefits accruing to local communities near undergrounding projects could appropriately be paid from local government rates or higher utility charges targeted to that area. Benefits accruing to the community at large could be paid from State Government revenue or higher utility charges.

ENERGEX would consider contributing a portion of the investment in undergrounding if it could earn a reasonable rate of return on the new investment under:

- alternative regulatory arrangements to the present cost-of-service regulatory arrangements; or

- unregulated arrangements relating to this specific investment.

ENERGEX notes that successful undergrounding programs to date in Australia have been funded from a combination of state government/utility sources and local government (Ministry of Energy and Utilities 2002, p. 15). The arrangements in South Australia appear to be the most suitable of the current models for funding undergrounding. Under these arrangements, ETSA Utilities pays two-third of the costs of undergrounding, the relevant local council pays one-third, and the undergrounding investment is rolled into ETSA Utilities' asset base (Electricity Pricing Order, clause 7.2 (f)).[1] These arrangements encourage new investment in undergrounding by ETSA Utilities and provide incentives for efficient cost management. At the same time residents are not hit with high upfront charges. As the criteria for funding the South Australia undergrounding project confer significant benefits on the community at large, payment of one-third of the costs by local governments is appropriate. PLEC notes in its most recent annual report that it is currently "inundated with [submissions for] future projects". (PLEC 2001 Annual Report, p. 5)

Regulatory barriers to new investment

There is significant government and community support for undergrounding to, among other factors, improve visual amenity, increase reliability, and reduce motor vehicle accidents. However, a funding solution must be found that is acceptable to all parties.

Funding investment in undergrounding through a combination of: (i) utility charges; and (ii) State and/or local government payments represents a feasible solution. However, the current cost-of-service regulatory arrangements in respect of electricity distribution services strongly discourage investment by distribution utilities in undergrounding. Under the current regulatory arrangements, distribution utilities are unwilling to invest

[1] In certain circumstances the Department of Transport makes a contribution.

significant amounts in undergrounding, even where there is demonstrated strong demand for undergrounding. This is for six reasons.

First, current regulated returns on new investment are unacceptably low.

Second, distribution utilities face unpredictable future returns on new investment at each regulatory reset. Undergrounded assets have a long life (around 50 years) and accordingly face more regulatory resets and therefore greater risk than existing investments.

Third, investment in undergrounding faces the risk of being reduced after the event on the basis that such investment is seen by regulators as exceeding prudent levels.

Fourth, and related to the above points, undergrounded cables face significantly higher technological risk than existing overhead cables. This risk emerges not just from the fact that the investment is new but also from the fact that that undergrounded cables have a longer physical lifespan than overhead cables. For example, evolution in fuel cell technology might render the high voltage network obsolete in perhaps 20 years. Prior to undertaking investment in undergrounded assets, utilities would need assurance that specific allowance has been made for these technological risks (eg through depreciation of undergrounded assets over a 20 year timeframe) and that treatment of that investment would not change over that period.

Fifth, the present arrangements effectively force regulators to make decisions on behalf of the community whether to permit the inclusion of undergrounding costs in utility tariffs without the benefit of normal market signals. In a normal market, demand for a service such as undergrounding would be signalled through payment of higher prices for undergrounded services and through the creation of differentiated service offerings for different consumers based on their individual preferences to pay for undergrounding. Regulators are understandably reluctant to permit expenditure where these market signals are absent.

Sixth, present regulatory arrangements hinder the creation of differentiated service offerings at a range of price levels. This means it is difficult, if not impossible, to look at possible solutions such as creating localised tariff zones in areas where undergrounding is supported which charge different tariffs to areas where undergrounding is not supported.

These problems were manifest in the ORG 2001-2005 Electricity Distribution Price Determination. The regulator declined to permit undergrounding expenditure as part of distribution utilities' capital budget because it was:

- uncertain about the strength of community support for undergrounding, despite strongly worded submissions supporting undergrounding from two local councils and VicRoads; and

- unable to devise a regulatory solution that permitted undergrounding in areas of high demand, instead seeing undergrounding as an all or nothing solution across each distributor network.

The regulator's decision left significant unmet community demand for undergrounding. Its proposed solution, requiring distribution utilities to be receptive to proposals for undergrounding, is an ad hoc and unsatisfactory solution. Moreover it overlooks the fact that resolving the funding basis for undergrounding is a key impediment to effective undergrounding programs. The regulator's approach demonstrates the inflexible of the current regulatory approach in addressing market issues.

Conclusion

ENERGEX believes that there is likely to be sufficient community support for undergrounding to proceed, at least in specific urban areas. However this needs to be confirmed through further surveys of community views. The key question then becomes how undergrounding is funded. The community may be opposed to high upfront payments for undergrounding, and such payments are likely to be inequitable.

ENERGEX believes funding should come from beneficiaries of undergrounding. If problems with the present regulatory arrangements were addressed, it may be feasible to collect some of this funding via utility charges. The community may be receptive to this method of payment.