14 February 2002

Dr Tom Parry,
Chairman
Independent Pricing and Regulatory Tribunal of NSW
PO Box Q290
QVB Post Office
Sydney NSW 1230

Dear Dr. Parry

IPART Review of the Costs, Benefits and Funding for Undergrounding Electricity Cables

Please accept this letter as Integral Energy's written submission to the above review. Integral Energy will also work closely with the Tribunal with respect to the provision of information and data that may assist the Tribunal in its review. It should be noted, however, that given the extremely short timeframe allowed for this review that it may not be possible to provide to the Tribunal all requested information.

Integral Energy supports, in principle, the proposed undergrounding of electricity distribution assets in urban areas of NSW. There are a number of matters that will need to be considered as part of the review so that the optimum outcomes are delivered both in terms of the expectations of customers and the expectations of other key stakeholders. These matters are expanded on below.

1. Principles and process for undergrounding

Integral Energy acknowledges that establishing the principles and process for undergrounding electricity cables are beyond the Terms of Reference that have been provided to IPART. We envisage that this critical area will have a high priority in the policy statement to be developed by the Ministry for Energy & Utilities (MEU). However, Integral Energy is of the view that any serious analysis of the costs, benefits and funding of undergrounding must be considered in the context of the principles and process that will be used to determine the priorities and timing of any future program. This is also essential to determining the prudency of expenditure related to undergrounding and, as the economic regulator, is therefore an area in which IPART must demonstrate leadership in order to provide confidence and certainty in the regulatory framework.

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For these reasons, Integral Energy strongly recommends that the development and implementation of a formal undergrounding program needs to be supported by a clearly defined set of principles and a transparent review process. In particular, this approach would need to recognise that different stakeholders will desire different outcomes that need to be balanced in the interests of an optimum outcome for the community and the performance of the electricity network.

While Distribution Network Service Providers (DNSPs) may prefer to focus on undergrounding projects that deliver improved reliability outcomes, other stakeholders may have a preference for other outcomes. For instance, Integral Energy recognises that residential customers may view the undergrounding of low voltage lines as a priority due to the aesthetic improvements and other perceived benefits. In order to balance these and other priorities, Integral Energy supports the development of a consultation process to establish a clear set of undergrounding principles that recognises the different interests of various stakeholders. This would also be an important step in setting parameters for any undergrounding program and in establishing increased alignment in the expectations of all stakeholders.

Integral Energy believes that the establishment of clear set of principles and a transparent review process is fundamental to the development of an effective undergrounding program that has the support of the broader community and the DNSP sector in NSW.

2. Intent of the program

In line with ensuring a transparent process, the intent of any undergrounding program needs to be clearly established so that any benefits can be readily identified and costs clearly understood. Among other outcomes, the intent of the program could cover such issues as:

1. Improving reliability
2. Improving visual amenity or aesthetics
3. Safety of the public and electricity workers.
4. Reducing ongoing costs

It may be that the intent of the program is to deliver on all of the above in some way and that the above will be the criteria used in establishing priorities for any undergrounding program. From a regulatory perspective, it will be necessary for some weighting of these criteria if they are to be used as part of the prioritisation process. Input from customers and other stakeholders will be an important part of the review process to rank these criteria.

In establishing these criteria it should be acknowledged that simply undergrounding a particular part of an overhead distribution system will not necessarily lead to an immediate improvement in the reliability of the supply for

customers. Reliability improvement will only occur over a number of years, as larger and larger sections of the distribution system are placed underground.

On the other hand undergrounding the distribution assets will provide an immediate improvement in the visual amenity of the area in which it occurs.

With regard to safety it is important to recognise that placing the distribution assets underground will not lead to the removal of all electrical assets from the street scape. For example, street lighting columns will still be required to provide the necessary level of illumination and distribution substations will still be required. The substations could be placed on the footpath if sufficient space is available and subject to local council approval or on private land covered by an easement. It may be necessary for Distribution Network Service Providers (DNSPs) to resume private land for substation sites if insufficient space is available on public land. Clearly, there will still be assets present in the streetscape and whilst prudent placement of these assets will mean vehicle collisions with these assets will be reduced they will not be entirely eliminated simply by the undergrounding of the overhead assets.

Integral Energy believes that defining the intent and priorities of an undergrounding program will be an important outcome of engaging with the community on this issue. The following section highlights a number of commercial, technical and customer issues associated with undergrounding electricity cables, including suggested approaches on some of these issues. The breadth of these issues serves to underline that any effective response will require a broader community and regulatory response, rather than a prescribed industry outcome.

3. Scope of the program

The scope of the program to place underground the existing overhead power lines in NSW is still unclear. Specifically, the type of electricity lines that fall within and outside the proposed program have not been clearly stated. Electricity supply networks are configured in a manner that is similar to road transport networks. Different types of electricity lines, both overhead and underground, perform different functions in the transport of electricity in much the same way as different types of roads perform different functions in the transport of vehicles.

The electricity network supplying NSW can be divided into the following types of lines:

- Main grid Transmission lines. These lines have an operating voltage of 132 kilovolts or higher, and are used for the bulk transport of electricity from remote generation sources to main grid exit points. These lines are analogous to main interstate highways. Main grid lines cover vast distances.

- Distributor operated transmission lines. These lines have an operating voltage between 132 kilovolts and 33 kilovolts inclusive, and are used for the wholesale transport of electricity from grid exit points to bulk distribution points. These lines are analogous to major ring roads, such as the M4 and M5 in Sydney. Distributor operated transmission lines cover significant distances, often through developed residential, commercial and industrial areas.

- Distributor operated distribution lines. These lines have an operating voltage of 22 kilovolts and below, and are used for the distribution of electricity to local areas. These lines are analogous to major arterial roads, such as highways. Distributor operated distribution lines cover short distances in urban areas, but can cover much longer distances in rural areas. They commonly appear in suburban streets.

- Low voltage lines. These lines have an operating voltage of 240 volts, and are used for the distribution of electricity to individual customers. These lines cover short distances, and are present in most suburban streets.

Distribution lines and low voltage lines are the most prevalent electricity lines. Targeting these lines would result in the greatest volume of existing overhead electricity lines being placed underground. The high voltage distribution lines contribute approximately 70% of Integral Energy's unplanned lost customer minutes. This suggests that any undergrounding program would achieve better outcomes by concentrating on those areas that result in a maximum number of urban high voltage distribution feeders being placed underground. The program would need to commence at the zone substation for maximum effect.

As the rural network is generally uneconomic as an overhead system, the benefits of undergrounding rural overhead lines or substations needs to be considered further.

Transmission lines and main grid lines are key strategic elements in the supply of electricity to Sydney. These lines are usually protected by easements that provide strategic corridors for maintenance and future development of the electricity network. The undergrounding of these lines needs to be carefully considered, given the potential costs and negative impacts on existing and future electricity supply reliability. One approach may be to only consider undergrounding these assets where the lines are in public streets and in conjunction with the undergrounding of the distribution and low voltage assets.

The fact that the majority of customers are not aware of the technical aspects of electricity networks, and the limitations that may be encountered in an undergrounding program, further highlights the importance of community consultation and education in the development of a feasible program.

4. Undergrounding individual house services

As part of any undergrounding program it will also be necessary to underground the individual service from the DNSP's mains into the residences and buildings on the customers land. In new estates this work is undertaken by electrical contractors and accredited service providers who charge the customer.

In any undergrounding program the costs of installing these service will need to be factored in. Integral Energy does not install these services and hence has little if any cost data to assist the Tribunal. In many cases the work will require substantial hand work and reinstatement costs and it is estimated that it would cost approximately $2,000 per allotment.

As these assets are clearly the responsibility of the individual land owners, this would suggest that each land owner fund the undergrounding of their own service line. The landowner would be able to seek quotes form various contractors and obtain the best price for the work. If this approach were adopted, for technical reasons it would need to become a mandatory requirement. If one or more of the landowners in a particular location refused to install such services the existing overhead mains would need to remain in service. Clearly, this is an issue that requires greater community consultation.

In preparation for any future undergrounding, Integral Energy would recommend that all new and upgraded service lines in urban areas be required to be installed underground at the landowner's expense. Such a requirement would also need to be made mandatory probably through the DNSP Service and Installation Rules.

5. Street Lighting

As mentioned earlier, as part of the undergrounding process, all existing street lighting installed on power poles will have to be replaced.

At present, generally the local councils are not charged for the pole, only for the interest, depreciation, maintenance and energy for the lantern and bracket.

In any undergrounding of existing overhead assets, supports for street lights would have to be installed. Under current arrangements, local government pays for the cost of street lighting. The installation of new street light poles would be an additional cost of any undergrounding program and would lead to an increase in street lighting costs.

A substantial part of the street lighting system has been provided by Integral Energy and paid for over the life of the street lighting asset by the local council. Undergrounding of these assets would result in a substantial write off of existing street light capital which would need to be funded.

6. IPART Terms of Reference

With respect to the terms of reference for the review Integral Energy would offer the following comments.

6.1 The feasibility of undergrounding electricity cables with other utility services

In the development of new residential estates there is an existing arrangement for joint use of the trenches to install electricity, gas and telecoms. This has generally been as a result of the developer wishing to keep trenching costs to a minimum as the developer pays for the trenching and hence they have actively encouraged the joint use of trenches. Integral Energy believes that this arrangement could be implemented when undergrounding existing overhead areas but in such instances a sharing of the trenching costs between the parties will have to be negotiated.

Integral Energy is also a party to the Streets Opening Conference which allocates footpath space to the various utilities. The parties to this arrangement would need to meet and consider arrangements for the joint use of trenching and the various allocations of the trench space.

Consideration should also be given to creating utility corridors, for example, allowing the use of major transport corridors such as freeways and railway easements for the installation of any transmission or sub transmission cables if it is decided that these types of assets should also be placed underground. This may, in some instances, simplify the undergrounding along other main traffic routes.

6.2 The types of costs avoided

For DNSPs, the types of avoided costs associated with undergrounding are confined to vegetation management, pole inspection and repairs and maintenance expenditure. It is common to overstate the avoided costs principally because undergrounding will inevitably be undertaken for only part of the network and the fixed and common costs associated with vegetation management, pole inspection and maintenance will not be avoided. As with most network costs, they exhibit economies of scale, therefore undergrounding say, one-third of the network would reduce these costs by less than one-third.

The avoided costs associated with repairs and maintenance will depend on the types of undergrounding technique used (eg. ducting). Higher capital costs up-front may result in reduced operating costs in the future. For example, installing the cables in ducts will require a higher up front capital but should lead to reduced operating costs by reducing the number of dig ins and repair times. It is also important to note that while undergrounding will result in assets with longer lives and possibly requiring fewer inspections, the unit cost of repairs and inspections will increase significantly.

6.3 The distribution and timing of benefits

There are clearly both public and private benefits from undergrounding. The public benefits are generally associated with improved urban environments and increased public amenity. The public benefits are likely to be widely dispersed and non-exclusive it is therefore difficult to establish how much benefit

individuals or groups receive. The following table illustrates the distribution of benefits. It should be noted that the physical process of undergrounding would take a substantial amount of time, hence the benefits would be similarly delayed.

Beneficiary	**Type of benefit**
Customer	Reduced interruptions to supply
	Increased private amenity (likely to be capitalised into property values)
Community	Increased public amenity
	Reduced incidents involving contact with overhead powerlines
DNSP	Reduced maintenance expenses (vegetation, pole inspections)
	Reduced cost associated with responding to interruptions to supply
	Increased revenue associated with reduced interruptions to supply
Local councils	Reduced vegetation management
	Increase rates associated with increased land values
Electricity retailer	Reduced distribution losses
Insurance companies	Potential reduced costs associated with claims for motor vehicle accidents.

Over time the benefits attributed to DNSPs, electricity retailers and insurance companies are likely to flow on to customers. Regulation of DNSP costs in price controls will see any avoided cost passed on to customers in the form of reduced electricity charges. Electricity costs would also fall if loss factors were recalculated for retailers. Competition in insurance markets may see premiums fall as a result of observed reductions in accidents over time.

The revenue loss to DNSPs from supply interruptions is minimal.

Assessing and evaluating the customer benefits associated with increased reliability of supply is also problematic. Due to the network effects the private benefits are widely spread. Underground in a particular area may do little to increase reliability in that specific location but may improve levels elsewhere in the network. Even more problematic is placing a value on reliability. The value of a lost minute off supply to individuals and businesses will vary depending on the time of day and the duration and frequency of interruptions.

NSW Treasury, on behalf of DNSPs, is coordinating a study of willingness to pay for relevant quality attributes for consideration by IPART.

Amenity benefits will increase with the greater the density of traffic (both pedestrian and motor vehicle) in the vicinity of undergrounding. The benefits will be greater in heavy shopping districts and on major access roads, but they will be more widely spread when the undergrounding is in private residential streets where the benefits accrue to fewer people.

6.4 Options for funding undergrounding

Likely funding options include a) directing consolidated revenue from state or commonwealth taxes; b) a special purpose levy on electricity charges; c) higher council rates in areas where undergrounding takes place; or d) an increase in network electricity bills. Each option has a varying level of transparency and each spreads the cost of undergrounding to different members of the community.

Integral Energy would not support a situation where DNSPs were expected to contribute more than their avoided costs unless a corresponding increase in revenue was provided for by IPART. Such an arrangement leads to a reduction in shareholder value by distorting asset values. It would also encourage DNSPs to divert funds away from other necessary network expenditures reducing economic efficiency and distorting prices in input and output markets. It is Integral Energy's position that funding arrangements should be transparent and not utilise DNSPs in a wealth transfer or community support program.

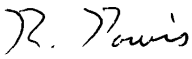
In this regard, using consolidated revenue would provide the least distorting funding for undergrounding. The extent of any inefficiency would depend on the type of tax instrument being used to raise revenue.

Site specific funding options like council rates or local levies may be best at capturing local amenity benefits and be more reflective of a user pays scheme. They will however have an impact on local land values as the present value of the taxation liability is internalised in the land costs (much like any land tax). The positive attributes of funding via local councils or levies is that the community would have greater influence on the extent of undergrounding in their area, offering a greater link to willingness to pay.

An alternative to this would be for the DNSPs to fund the undergrounding program. This would only be acceptable to Integral Energy if the investments were recognised as prudent and the assets included in the regulatory asset base. This would also mean a substantial increase in the capital expenditure of the DNSPs above the levels currently allowed in the IPART Determination. The recovery of this funding would be through increased network prices.

Integral Energy would welcome the opportunity to work with the Tribunal in the conduct of this review. If there are any questions arising from this submission or matters that need clarification please contact David Neville (02) 9853 6144 or Frank Nevill (02) 9853 6598 in our Regulatory and Pricing Group.

Yours sincerely



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