26 April 2002

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

Dear Dr Parry

Undergrounding of Electricity Distribution Cables in NSW

Integral Energy would like to thank the Tribunal for the opportunity to participate in the public forum on the Undergrounding of Electricity Distribution Cables in NSW held on 19 April 2002.

Integral Energy welcomes IPART's Interim Report on Electricity Undergrounding as a serious attempt to quantify the costs and benefits, as well as outlining a reasonable approach to funding the undergrounding of electricity distribution cables in NSW. Integral Energy would also confirm its support, in principle, for the eventual undergrounding of the distribution assets in NSW subject to the appropriate financial arrangements being put in place. Integral Energy recognises the obvious benefits of undergrounding and has been pro-active, along with local councils and developers, in the undergrounding of electricity assets in new developments over the last three decades. In Integral's case this approach has resulted in a significant proportion of HV and LV mains being placed underground.

Integral believes 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. Integral would like to clearly indicate its desire to work closely with local Councils and other stakeholders in developing undergrounding projects that have the broad support of the local community.

Meritec Report

In relation to the report by Meritec, Integral has a number of concerns with the methodology described in the report. The use of an "optimally planned network" is of particular concern and Integral believes there are several shortcomings with this approach. IPART has recognised these shortcomings in their Interim Report when they state that the Tribunal "notes that this approach is untested and may be proved infeasible in the planning stages especially when environmental

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considerations are taken into account"[1]. In Integral's view some of the possible practical limitations of implementing the "optimally planned network" are:

- Locating distribution and zone substations in established areas is difficult and it would not always be feasible to locate them in the optimal location. The existing network is optimised within the constraints of geographical factors, load growth and the built environment. Geographic features include rivers, main roads and rail networks. As network load increase opportunities are taken to evaluate optimum zone substation locations and either relocate or rebuild.

- The model proposes using larger size transformers of 300 kVA capacity when Integral is already using 500 kVA padmount transformers due to the higher After Diversity Maximum Demands (ADMDs) primarily from air conditioning load.

- Acquiring easements for LV cables and substations would be difficult due to perceived concerns within the community.

- Single transformer zone substations may result in an unacceptably increased risk of failure and hence have a negative impact on customers' supply reliability. This is particularly so when the existing loads on Integral Energy's network are such that it would be extremely difficult to provide back up supply from adjacent substations via distribution feeders without a significantly increased redundancy, switching capability and cost.

Based on the above we believe that the cost reductions claimed for the "optimally planned" network have been considerably overstated in the report.

Integral Energy agrees with the customer numbers quoted for the low density areas ie 1000 customers per square kilometre. This is typical of the single dwelling per lot residential developments found in Integral's area. Of concern however, is the ADMD figure of 2.6 MVA per square kilometre used in the report. Integral Energy's experience indicates that for design purposes an ADMD of up to 7 kVA per customer or greater may be more appropriate. For larger areas and at the zone substation level the ADMD figure would be lower than 7 kVA but it would still be significantly higher than the 2.6 MVA per square kilometre used by Meritec. The use of the higher ADMD figure will impact on the costs derived from the "optimally planned network " model and cause significant increases in those costs.

Integral Energy believes there is some inconsistency in the cost numbers quoted in the Meritec report. For example, in Section 3.3 the costs for the low density areas imply a cost of approximately $4,200 per customer (excluding street lighting) and $4,700 when you add in the street lighting costs from section 3.8. On a like for like basis this equates to approximately $7,750 per customer using the 65% multiplying factor nominated by Meritec. Integral would be interested in further exploring this factor to understand how Meritec arrived at the 65%.

[1] IPART, Electricity Undergrounding in New South Wales, An Interim Report to the Minister for Energy, April 2002; page 5

Comparing these numbers with those in Section 3.5 we note that for low density areas the cost per customer is $3,534. This difference may be partly explained by footnote 1 which states that the customer numbers used were prospective customers over 15 years. The costs however, do not appear to have been adjusted to allow for the connection of the additional customers and their loads over the 15 years.

Meritec has also allowed for the replacement of the existing distribution assets as they reach the end of their serviceable life. In practice, the distribution assets in any one particular area are comprised of non homogeneous assets. That is, all the assets do not come to the end of their serviceable life at the same point in time. This means that some of these assets would be prematurely replaced which will require a significant write off of assets. The cost of such write offs needs to be factored into the overall costs of the undergrounding program.

IPART Interim Report

In relation to the Interim Report, Integral believes there are issues with the interpretation of the costing methodology used by the consultants, particularly in relation to the use of NPV dollars compared to today's dollars. Integral would like to work with IPART in resolving these issues prior to the release of the Final Report.

The financial treatment of the cashflows is unclear in the Interim Report as shown in the following scenario analysis. It should be noted that the costs used in the analysis exclude any costs for communication cables.

Based on the cashflows detailed in Table 2.2 of the interim IPART report the net present value of the investment is $2.858 Billion (assuming an inflation rate of 2.5%, and a nominal discount rate of 9.675%[2]). The total cash outflows over the 40-year period total $10.36 Billion. The NPV of $2.858 Billion falls within the range of $2.6 and $4.3 Billion as cited in the IPART report.

As an example of a possible scenario, assume a customer is expected to make payments between $125.60 - $209.35 at constant prices over a 40-year period. Applying a real interest rate of 7.0 per cent per annum and assuming that prices

[2] The interim IPART report quotes a 7% real interest rate. The real interest rate assumes there is no inflation. The rate of interest of 7% is the real interest rate, i*, and compensates the investor for foregoing current consumption in the absence of inflation. The relationship between the real interest rate, i*, and the nominal interest rate, i, may be derived as follows:

$i = (1 + p)(1+i^*)-1$ Where: $p = 2.5\%$, $i^* = 7.0\%$.
In this case, $i = (1+0.07)(1+.025)-1$
$i = 0.09675$
$i = 9.675\%$

It should be noted that the real interest rate is not simply the difference between the nominal rate and the inflation rate.

are not expected to increase (no inflation), the net present value of the investment is in the range $1,800 - $3,000. The corresponding range of total cash outflows or cost to the customer would be $5,149 to $8,583 over 40 years. [These calculations exclude any costs for communication cables].

The table below illustrates the scenario quoted above.

Real Interest Rate	Inflation	Nominal Interest Rate	Annual Cash Outflows in Constant Prices	Total Cash Outflows	NPV
7.00%	Nil	N/A	$125.60	$5,149	$1,800
7.00%	Nil	N/A	$209.35	$8,583	$3,000

It is important to note that if inflation factors were applied to the cash outflows and a nominal discount rate was applied, the expected total cash outflow over 40 years would be significantly higher than those quoted in the above table.

Integral is concerned that the IPART report has been misinterpreted to indicate that the cost to consumers for the undergrounding is in the range of $1,800 to $3,000 per customer. This is clearly not the case and significantly understates the actual amount that individual customers would be required to contribute in today's dollars. While Integral accepts that the costs in the report are broad estimates of the order of magnitude of undergrounding costs, we believe it is important that the costs stated in the Final Report are as realistic and transparent as possible. We note that IPART has indicated that "further work would be required to provide firmer estimates of these costs"[3]. Integral considers the provision of firmer estimates to be paramount to ensuring the community and other stakeholders are well informed of the likely costs of an undergrounding program.

Despite these concerns on the costing issue, the Interim Report clearly indicates that the costs associated with undergrounding outweigh the benefits. Integral Energy supports the "beneficiary pays" principle adopted by IPART in its report, as it is the most efficient and equitable means of allocating costs to members of the community who are deriving benefits (via improved amenity, reliability, and property values).

We understand the "beneficiary pays" principle would involve 80% of underground funding being collected via local Council rates or levies. Integral believes this approach is preferable to the use of electricity charges for this purpose. The use of electricity charges would considerably distort relative prices and create equity issues between customers. As the Interim Report indicates, the use of a levy on electricity consumers "divorces the funding mechanism (in this case a single source levy on electricity consumers) from the allocation of cost recovery in proportion to, or on the basis of, benefits received"[4].

[3] IPART, Electricity Undergrounding in New South Wales, An Interim Report to the Minister for Energy, April 2002; page i

[4] IPART, Electricity Undergrounding in New South Wales, An Interim Report to the Minister for Energy, April 2002; page 34

More specifically, Integral believes that the use of an across-the-board levy on electricity charges to fund undergrounding raises numerous equity issues. These issues include:

- It would require the vast majority of electricity customers to contribute now, to a program that will not realise benefits in their local area for another 20 – 40 years. This provides no link between cost and benefit and will considerably distort electricity prices over this timeframe.
- It would require those customers living in an area that do not place a high value on undergrounding to contribute to undergrounding programs for those customers living in area that do place a high value on undergrounding. This would effectively entrench a cross-subsidy between communities.
- It raises practical questions over the timing and priority given to undergrounding projects which could lead to division between communities ie. Which community will be undergrounded in year 1? Which community will be undergrounded in year 40?
- It would potentially require customers living in areas that are already undergrounded to contribute to undergrounding in other areas, via such a levy. This outcome overlooks the fact that these customers have already contributed to undergrounding in their area through development and property costs.

Integral believes these issues are best mitigated through the mixed funding arrangement proposed by IPART which would involve the use of Council rates or local levies to raise most of the funds required for undergrounding projects. This approach is the most effective means of capturing local amenity benefits and reflecting a beneficiary pays scheme.

Support for Specific Proposals

Integral supports the following aspects of the Interim Report.

1. Integral strongly supports IPART's proposal that communities that place a relatively low value on the local benefits of undergrounding should be given the choice of opting out. While the issue of overhead electricity lines is a concern for many members of the community, there is likely to be significant differences in individuals' willingness to pay for undergrounding projects, both within a local government area and between local government areas. Integral believes the current work that is being undertaken on willingness to pay in relation to the next Network Determination, provides an important opportunity to understand – and value – customer preferences in relation to undergrounding and other projects designed to enhance current performance. The purpose of the willingness to pay work is to establish where the efficient level of electricity service quality might lie and determine how this can be integrated into the regulatory framework. As the benefits of undergrounding are more than just service-related – and the gap between benefits and costs is substantial – it will be important to establish that customers within local communities are prepared to pay the difference between the costs allocated to other stakeholder and the total costs.

2. Integral would support in principle, the 40 year timeframe proposed in the Interim Report. However, we believe this timeframe should be linked and tested against community expectations and willingness to pay. We also believe the implementation of an overall undergrounding program should aim to coincide with asset lives expiring so as to minimise the write off of assets.

3. The mixed funding approach recommended by IPART is supported by Integral as a practical scheme that comes closest to meeting the equity requirement. The predominant use of Council rates or local levies to raise funds is the most efficient means of capturing local amenity benefits and reflecting a user pays scheme. The positive attributes of the major funding coming via local councils is that the local community would have greater influence on the extent of undergrounding in their area, offering a greater link to willingness to pay.

4. Integral supports the utilisation of pilot undergrounding projects as an important means of testing the recommendations included in IPART's Report. Integral recommends that over the next 12 months the pilot projects should be used as an opportunity to engage with local government, understand how the customer negotiation process will work, as well as carefully assessing the actual costs and benefits and practical issues that arise from the implementation of these undergrounding projects. Integral believes that the use of pilot projects can assist in such things as:

    - Identifying technical and customer relationship issues that would need to be resolved in any large scale roll out eg the aquisition of suitable easements.

    - Trialling of different technologies eg different installation techniques.

    - Customer negotiations with respect to access to properties and the replacement of overhead services.

    It should be recognised that pilot projects will not give an absolute cost guide due to interface issues with the existing network which would not necessarily be present in a planned roll out. Some of these interface issues would include the number and siting of padmount distribution substations and underground to overhead terminations. It should also be noted that pilot projects will incur higher costs than any estimates for a large scale undergrounding program, due to the scale disadvantages of small projects and the interface issues noted above.

5. Integral agrees with IPART that the major benefits arising from any roll out of undergrounding are generally amenity benefits across the community and it would be difficult if not impossible to quantify these benefits in an absolute sense. As IPART has stated the only appropriate method for assessing the extent to which the community values the amenity aspects of undergrounding is by estimating customers' willingness to pay for the undergrounding.

    On this point, Integral agrees with IPART's observation that "without evidence on how members of local communities value the benefits of

undergrounding, it will be difficult to apply the principle that a community should receive the level of undergrounding that it is willing to pay for."[5] The willingness to pay study that is being developed presents an opportunity to gather the evidence required to support a large scale undergrounding program in NSW.

Integral Energy looks forward to the opportunity to participate further in developing an understanding of the costs and benefits of an undergrounding program. We are more than happy to assist IPART in examining the issues raised in this submission more fully and to understand the impact each of these will have on the costs and benefits.

Should you have any questions in relation to this submission, please contact Integral Energy's Regulatory and Pricing Group via David Neville on 02 9853 6144 or Frank Nevill on 02 9853 6598.

Yours Sincerely

Richard Powis
Chief Executive Officer

[5] IPART, Electricity Undergrounding in New South Wales, An Interim Report to the Minister for Energy, April 2002; page iv