SUBMISSION TO IPART

RESPONSE TO THE INTERIM REPORT ON THE INQUIRY INTO THE ROLE OF DEMAND SIDE MANAGEMENT AND OTHER OPTIONS IN THE PROVISION OF ENERGY SERVICES (REVIEW REPORT NO. 02-1)

12 JUNE 2002

EXECUTIVE SUMMARY

This response essentially focuses on addressing the proposed recommendations as set out in IPART's Interim Report on the Inquiry into the Role of Demand Side Management and Other Options in the Provision of Energy Services (Review Report No. 02-1). It also provides some comment on the additional barriers to demand management as set out in Appendix 2 of IPART's report.

It is recognised that many of the recommendations contained within IPART's Interim Report are really policy decisions for government. While Integral may have a view on many of these issues it will in the end be the NSW Government's decision as to whether any or all of the recommendations are implemented and in what form.

Integral however, sees great merit in heading towards a national approach to the issue of demand management particularly those aspects of demand management related to the environmentally driven and retail market driven initiatives and would encourage Governments, at all levels, and regulators to work towards this worthy objective.

Integral's responses to the recommendations contained within IPART's report are summarised in the following table.

Proposed Recommendation	Fully Support	Qualified Support	Don't Support	Comment
Environmentally-driven				
1. Strengthen Retail Licence.	v			Integral's preference is that any greenhouse benchmarks should be administered on a national level as retailers operate across the various states not just in NSW.
2. Establish Demand Management Fund.		v		Integral believes that more detail needs to be provided particularly with respect to the governance arrangements and allocation of monies from the fund before it could adequately comment on the proposal to establish a demand management fund. The concept itself has merit and would be supported by Integral Energy.
3. Allocate part of DM Fund for energy efficiency programs that target specific groups.		v		Integral believes that the allocation of funds from any demand management fund would be the responsibility of the fund administrators. The rules for allocation funds should be built into the administrative arrangements at the time the fund is established.
4. Review, strengthen and increase profile of energy efficiency programs and coordinate across Government Departments.	v			Integral would encourage the Government to adopt this recommendation but recognises that it is a Government decision on how best to implement any such recommendation.
5. Build DM into customer choice.	v			Integral supports IPART's recommendation with respect to building demand management into customer choice. Providing greater information to customers and encouraging the design and marketing of more efficient appliances and homes is fully supported by Integral.
Network-driven				
1. Review regulatory treatment of network capital expenditure.		v		It is important for the regulatory framework to provide sound commercial incentives for the distributors to encourage the most effective and efficient network for delivering electricity to customers. Integral would encourage IPART to develop the framework for

				assessing the prudency or otherwise of capital investments as a matter of some urgency.
2. Encourage trials of congestion pricing with DNSPs.		v		Integral would support the use of trials of locational and congestion pricing but has some serious concerns with the proposals contained in the interim report that the trials should ensure that the impact on customers is neutral, and that retailers absorb the price signals without passing them on to customers.
3. Clarify rules for treatment of avoided TUOS/DUOS and transaction costs to DGs.	v			The true avoided TUOS only occurs in situations where it can be demonstrated that proposed transmission capital expenditure is deferred either in the short term or indefinitely or in situations where the connection of a distributed generator results in the retirement or stranding of transmission assets.
4. Support DM Code of Practice.	v			Integral is very supportive of the Demand Management Code of Practice and has already taken actions to implement its requirements. Integral has publicly released its Network 2010 document which is our first Electricity Supply Development Review Report.
Retail market driven				
1. Review policy for rolling out meters to residential customers.		v		Integral's preferred view is that any roll out of smart meters should be undertaken on a national basis so that inequities are not built in to the process by having some States opt out. However, Integral recognises that any roll out even at a State level is a matter of Government policy and that several significant issues would need to be addressed before any agreement to a roll out was achieved.
2. Facilitate development of an active market or trading platform for the aggregation of DM.	v			Integral would support an assessment of the impact and effectiveness of aggregating loads and interruptibility of loads as tools for use by retailers. Any review should aim to put in place a framework that allows the development of an active market for the aggregation of demand as the market matures.
3. Develop a market framework for small-scale distributed generators.		v		The metering of distributed generation is an area that needs further investigation and the standards applied will more than likely vary with the size of the generation plant and where it connects in the distribution network. The use of net metering is of concern to Integral and Integral would recommend an import/export metering solution.
4. Enhance programs providing information on energy efficiency and strengthen Government's role as a 'model' energy consumer.	v			Integral would encourage the Government to adopt this recommendation but recognises that it is a Government decision on how best to implement any such recommendation
5. Develop an appropriate incentive framework for retailers to forego sales of electricity.	v			It is hoped that through the ICG a workable, robust and cost effective scheme will be implemented.

1. Introduction

As stated in Integral's original submission to this inquiry dated 31 August 2001, Integral strongly supports the development of a regulatory framework that provides the right balance between commercial and environmental incentives to encourage demand management initiatives in NSW.

Integral believes that IPART's Interim Report is an important step in developing such a framework and is pleased that IPART have recognised the quite separate and distinct drivers faced by retailers and network businesses. The separation of the recommendations into three distinct areas, environmentally-driven, network driven and retail market driven demand management indicates that IPART have clearly identified the different drivers faced by the different parts of the electricity industry.

It is recognised that many of the recommendations contained within IPART's Interim Report are really policy decisions for government. While Integral may have a view on many of these issues it will in the end be the NSW Government's decision as to whether any or all of the recommendations are implemented and in what form.

Integral however, sees great merit in heading towards a national approach to the issue of demand management particularly those aspects of demand management related to the environmentally driven and retail market driven initiatives and would encourage Governments, at all levels, and regulators to work towards this worthy objective.

Demand management is not new to Integral. It has become an increasingly important part of how we operate our business and is a key factor in our decision-making processes in managing our business in an environmentally sustainable way.

Demand management programs have the capability of deferring capital expenditure on the network by influencing the way customers utilise electricity. Integral has been active in encouraging demand management initiatives to assist with the capacity of the network where constraints exist. These initiatives have been in accordance with the NSW Code of Practice – Demand Management that was originally adopted by the Ministry of Energy and Utilities (MEU) in 1999. These initiatives have been developed from a market-based approach and traditional network planning approach as provided for in that Code.

The MEU's 1999/2000 Network Management Report acknowledged Integral's leading role among NSW Distribution Network Service Providers (DNSPs) in achieving the greatest benefits from demand management by encouraging customers to use energy more efficiently, thereby reducing energy consumption and better managing peak consumption periods. Through these strategies Integral has been able to defer nearly $29 million of spending on additional network extensions during 1999/2000 – for only a cost $1.2 million. These initiatives have included the contracting of load reduction programs at times of network constraint with large customers, fuel substitution initiatives and the management of off-peak load. In addition trials have been undertaken to implement innovative control of air-conditioning units at times of network constraint.

In encouraging the development of cost effective alternatives to network options, Integral believes some fundamental principles need to be adopted by the regulator and the industry. These principles need to encompass a holistic approach to the

issue of demand management. Integral offers the following principles for wider consideration:

- Pricing signals should be recognised as a legitimate demand management strategy;
- Demand management initiatives should focus on the reduction in peak demand;
- The costs of network and non-network options, as identified by the distributor, should be used for evaluation purposes;
- The cost recovery of non-network options should be on a similar basis as network options;
- An effective demand management framework requires more customer education, as well as customer participation in reducing system load peaks in certain parts of the network. DNSPs have a leading role to play in this education process.

This response essentially focuses on addressing the proposed recommendations as set out in IPART's Interim Report and also provides some comment on the additional barriers to demand management as set out in Appendix 2 of IPART's report. Some of the responses in the network driven demand management section are a restatement of Integral's submission on IPART's distributed generation paper. As stated earlier however, it is recognised that many of the recommendations contained within IPART's Interim Report are really policy decisions for Government.

2. Environmentally-driven Demand Management

2.1 Strengthen Retail Licence Conditions

Integral's preference is that any greenhouse benchmarks should be administered on a national level as retailers operate across the various states not just in NSW. However, as one of the two retailers who have consistently met their NSW greenhouse benchmark, Integral is very supportive of this recommendation and is pleased to note that the NSW Government has already moved to implement this recommendation. On 8 May 2002, the NSW Government announced that it would implement an enforceable greenhouse benchmark scheme for electricity retailers from 1 January 2003. Although the high level details of the benchmarks scheme have been agreed, several more detailed design issues have yet to be finalised.

The Government also announced that an Industry Consultative Group (ICG) will be established to assist in the resolution of the detailed implementation issues. The purpose of the Group will be to provide advice on proposals developed by the interdepartmental Officers' Group, and to provide input on issues where industry is best placed to provide information on the likely effects of various policy options.

The Government has also established a Greenhouse Benchmarks Officers' Group, comprising representatives from various NSW Government agencies. The Officers' Group will be primarily responsible for managing implementation issues. The views of the ICG will be a vital input into the deliberations of the Officers' Group.

It is hoped that through the ICG a workable, robust and cost effective scheme will be implemented.

2.2 Establish Demand Management Fund

Integral believes that more detail needs to be provided particularly with respect to the governance arrangements and allocation of monies from the fund before it could adequately comment on the proposal to establish a demand management fund. The concept itself has merit and would be supported by Integral.

Integral believes that it would be more appropriate for individual retailers to be given the funds to invest in approved programs. This would then allow the capture of any electricity sales foregone into the greenhouse benchmarks. Also, the retailers have already developed relationships with their customers and would be best placed to develop and implement any approved programs.

The sourcing and level of funding is an aspect that needs careful consideration and would in the end be a Government policy decision. Integral agrees with IPART that relying on penalties imposed on retail licence holders for failure to meet greenhouse benchmarks is not an appropriate way to source funds for any demand management fund. Apart from the fact that the level of funding could vary significantly from year to year it also sends poor signals with respect to the expectations of IPART on the ability of licence holders to comply with their benchmark requirements.

Imposing a public benefits charge on say all network charges would again be a Government policy decision and as IPART rightly points out the Government would need to consider the effect of additional upward pressure on energy costs and the effects on equity of such a charge. It would not be difficult to implement such a charge as the former Electricity Distributors Levy (EDL) was exactly that ie an additional amount imposed on all network kWh charges. The distributors collected the levy and then paid it to the Government. The EDL is currently not charged as the charge per kWh has been set to zero. It would be a simple matter to reactivate the mechanism which still exists in the legislation

Integral believes that if such a charge were to be levied that it would need to be made explicit on all customer bills so that the intent of the charge was made clear to all customers. This would add costs over and above those incurred under the EDL as these charges were not made explicit on any bill.

2.3 Allocate part of DM Fund for energy efficiency programs that target specific groups

Integral believes that the allocation of funds from any demand management fund would be the responsibility of the fund administrators. The rules for allocation funds should be built into the administrative arrangements at the time the fund is established. The issues raised by IPART of ensuring the fund is seen to be equitable and providing incentives to invest in energy efficiency should form part of these arrangements.

2.4 Review, strengthen and increase profile of energy efficiency programs and coordinate across Government Departments

Integral would encourage the Government to adopt this recommendation but recognises that it is a Government decision on how best to implement any such recommendation.

2.5 Build DM into customer choice

Integral supports IPART's recommendation with respect to building demand management into customer choice. Providing greater information to customers and encouraging the design and marketing of more efficient appliances and homes is fully supported by Integral.

As IPART points out some of these matters should be addressed at a national level, for example, efficient appliance ratings etc but such aspect as efficient homes or building codes could be addressed at a State or Local Government level. It is important, however, that the information provided through such things as a star rating for buildings is correct and truly represents the energy efficiency of the building. To achieve this it is necessary for all stakeholders to have input into the development of any ratings scheme.

The Energy rating program for whitegoods is a good example of the type of information that customers value and should be extended to include other appliances particularly domestic air conditioners. Integral believes, however, that as well as providing information on energy consumption and energy efficiency that information on the power factor the appliance presents would also assist customers to make an informed choice. This would need to be combined with an education program on the benefits of choosing an appliance with a good power factor.

3. Network-driven Demand Management

3.1 Review regulatory treatment of network capital expenditure and DM/Distributed generation payments

It is important for the regulatory framework to provide sound commercial incentives for the distributors to encourage the most effective and efficient network for delivering electricity to customers. The distributor should be ambivalent as to the type of solution applied to a network constraint provided that the quality of supply and reliability of the network is not compromised in any way and provided the commercial incentives reflect this then the most appropriate decision should be made. This may mean that consideration be given to making distributed generation an excluded service to provide a separate income source to the distributor. It is important to ensure that any incentives put in place do not prevent a distributor from investing in and/or owning distributed generation of its own.

One aspect of the capital investment decision faced by distributors that is of concern is the treatment of investment in loss minimisation. As distributors do not bear the cost of higher losses there is little, if any incentive for distributors to invest in loss minimisation unless the regulatory framework actively encourages such an investment. There is also a risk if distributors invest in assets that minimise losses but then the optimisation process removes these assets from the regulatory asset base. Integral is pleased that IPART in their report "Pricing for Electricity Networks and Retail Supply" of June 1999 recommended that the value of loss reductions be taken into account in rolling the asset base forward and economic loss management should not be optimised out of the regulated base.

In the same report IPART also proposed to work with the distributors to develop a framework for assessing the economic prudence of loss management investment. This is just one aspect of the overall prudency of capital investment framework which is still not clear. Integral would encourage IPART to develop the framework for

assessing the prudency or otherwise of capital investments as a matter of some urgency. Integral is quite prepared to work with IPART to assist in the development of this framework.

Integral's planning process attempts to maximise utilisation of existing assets through consideration of DM alternatives. DM alternatives are diligently pursued where these are demonstrated to be the most cost effective option. Under this approach, the customer receives the benefit of having the most cost-effective option that overcomes the network constraint. This is reflected through reduced network charges. The major issue for regulators to address is how to make non-network options more cost effective by providing DNSPs with the same future revenues as network options.

In line with Integral's commitment to a policy of least cost planning, DM alternatives are evaluated in every case of network capacity constraint in accordance with the NSW Demand Management Code of Practice for Distributors. The costs and benefits of all options are determined with the most cost-effective option or combination of options being implemented. Application of this philosophy means that all options that have been developed, under the present regulatory climate, are the cost effective options, and hence an efficient balance has been obtained.

The suggestion that not enough DM is being undertaken is due mainly to the fact that particular DM options are not cost effective compared with the other options. If it appears that the balance between DM and supply side options is skewed, the allocation of costs and benefits need to be examined.

For more DM to be undertaken, it is our view that IPART has to address the issue of cost effectiveness in terms of future revenues of what is basically capital expenditure versus operating expenditure. If a DM project does not proceed through to implementation this means that the DM option was not cost effective – cheaper options were available.

The cost comparison of network and non-network options indicated in the IPART issue paper and detailed in the SEDA "DSM – Costs Market Potential in NSW" paper, dated 6 August 2001, contains many assumptions and averaged figures. The cost of the network option is determined by dividing two averaged figures and the non-network options are determined by estimating the how much support payments the distributor must make to encourage consumers to adopt the DSM measure. The assumption is that customers are willing to accept the majority of the cost. It is Integral's experience that generally consumers are not willing to invest in energy efficiency measures even those with short payback periods. For example, during a recent customer power factor improvement program at Wetherill Park, 31 customers were approached to undertake power factor correction with a payback period of two years. Out of the 31, two placed orders, five indicated they were not interested and 19 decided to further consider their options but ultimately did not proceed. Another omission is the calculations of the take-up rate of DSM measures and the requirement for a safety margin for demand reduction requirements. Therefore, actual cost comparison can only be determined and compared on a project basis and general estimates similar to that indicated in the issue paper can be misleading.

Integral considers the barriers to DM to be more structural, than institutional. DNSPs will respond positively to a regulatory framework that provides greater certainty and clarity in the area of DM. Importantly, this framework needs to provide the correct balance between the commercial drivers that have been established in the industry over the last decade, and the environmental outcomes desired as an outcome of DM.

The current IPART determination allows for investment in demand management to be added to the Annual Aggregate Revenue Requirement (AARR) but to date no framework has been put in place to allow this to happen. Integral would recommend that IPART as a matter of some urgency, develop such a framework in consultation with stakeholders so that all parties are aware of the requirements to be met before any expenditure will be recognised as prudent and therefore to be included in the AARR. Failure to address this issue will mean that uncertainty of network expenditure and investment will continue into the future with a consequential reluctance on behalf of the networks businesses to invest in any form of demand management.

3.2 Encourage trials of congestion pricing with DNSPs

In our 31 August 2001 submission to IPART we stated that in order to encourage the development of cost effective alternatives to network options, Integral believes some fundamental principles need to be adopted by the regulator and the industry. These principles need to encompass a holistic approach to the issue of DM. One of these principles was that pricing signals should be recognised as a legitimate DM strategy.

Integral would support the use of trials of locational and congestion pricing but has some serious concerns with the proposals contained in the interim report that the trials should ensure that the impact on customers is neutral, and that retailers absorb the price signals without passing them on to customers.

Firstly, it is very hard to imagine any retailer agreeing to such a proposal given that their businesses are characterised by low margins. Expecting them to absorb the price signals would not make any commercial sense.

Secondly, by making the trials cost neutral to the customer there is then no way of assessing the impact of the trial on customer behaviour. If the customer does not see the network price signal they have no incentive to act to reduce demand and the whole basis of the trial would be negated.

Integral would recommend that IPART work with the industry and other stakeholders to develop a more equitable way of implementing trials that do not adversely impact the customers or retailers but still allows them to see and react to any price signals. The ultimate aim would be to reward those customers who change their behaviour with a positive result from a demand management point of view. To achieve this it may mean that those customers who do not change their behaviour will see higher costs.

It is essential that any trials track the long term customer behaviour to ensure that they do not revert back to their “old ways” once they become accustomed to or comfortable with the pricing signals.

Technology may also play a part in allowing customers or retailers to see the pricing signals on a more regular basis rather than just through an annual price reset. The technology would need to be able to indicate to customers the current pool price or even network price when they were making any decision to switch on particular appliances. One way in which this may be achieved and which Integral is currently investigating is the use of time of use prepayment meters. The proposal is only in its infancy and further understanding of the costs and benefits is needed before Integral would agree to undertake any trials of the proposal.

3.3 Clarify rules for treatment of avoided TUOS/DUOS and transaction costs to DGs

Integral would support this recommendation as this issue is a very vexing issue for all stakeholders. Essentially, the problem arises due to the fact that the large generators connected to the transmission system do not pay TUOS charges. Customers pay TUOS and hence the incentive is for payments to be made to distributed generators to the extent that they reduce the TUOS payments of the distributor to whose network they connect.

The main problem is that the TNSP is on a revenue cap form of regulation and hence any reduction in TUOS revenue due to the connection of distributed generators results in increased prices the following year to recover the lost revenue. TUOS is then not avoided except in the year the distributed generator connects.

The true avoided TUOS only occurs in situations where it can be demonstrated that proposed transmission capital expenditure is deferred either in the short term or indefinitely or in situations where the connection of a distributed generator results in the retirement or stranding of transmission assets.

The latest TUOS prices advised by TransGrid have also reduced the scope for payment for avoided TUOS as the new prices are essentially 75% fixed and only 25% variable. This is a significant change from the earlier 50:50 fixed and variable split. With only 25% of TUOS variable the amount of TUOS now avoidable has been substantially reduced.

The recent Code changes on payment of avoided TUOS have only added to the complexity of this issue as the requirements appear to apply to existing as well as future distributed generators. By not excluding existing generators there is the possibility that they could be compensated twice especially if the energy purchase price already includes an allowance for deferral of capital expenditure.

Avoided Distribution Network Costs

As mentioned in the IPART Discussion paper on Distributed Generation the payment for avoided distribution costs is complicated and not only by the mismatch between timing of the payments and the costs avoided. The application of any test in determining the benefits and costs avoided is complicated by the fact that the modelling must not only capture the costs and benefits at the time the generator connects but also model changes in those costs and benefits over time.

With regard to the proposal to consider a case by case approach or a possible rules based approach it is important to consider the relative merits and disadvantages of both.

The case by case approach has the merit that it allows the flexibility to deal with a range of situations and technologies. The disadvantage is that it would not be uniform in its application and the processes for dealing with distributed generation proposals would not be well defined or transparent. Some of these disadvantages could be overcome by having disclosure requirements etc as part of the information provision and reporting processes.

The rules based approach provides little scope for discrimination as all the processes can be well defined. The disadvantage of a rules based approach is that it can be too rigid and would not handle well the diverse ranges of technologies and situations.

It is Integral Energy's view that a rules based approach would be best applied in conjunction with a standard agreement for plant up to say 1 MW. Above this limit a case by case arrangement should be implemented.

3.4 Support DM Code of Practice and propose use of Standard Offers.

Integral is very supportive of the Demand Management Code of Practice and has already taken actions to implement its requirements. Integral has publicly released its Network 2010 document which is our first Electricity Supply Development Review Report.

The Network 2010 document places all information regarding network capacity constraints into the public domain. This document foreshadows emerging constraints in the short, medium and long term. The document also provides the opportunity for any interested party to register to obtain any publicly released information regarding any of the constraint areas detailed in the document. The constraint areas listed in the Network 2010 document have not necessarily been through the reasonableness test, consequently, it is unknown if a Request for Proposal (RFP) will be issued. However, by registering, all interested parties will be updated on the progress of all tests and decisions that have been made regarding each constraint area.

In addition to the Network 2010 document, there is the opportunity for any interested party to register on the Integral Energy web site to obtain information regarding specific constraint areas. These constraint areas have been tested and it has been decided that an RFP will be issued. Any interested party that has registered under the Network 2010 document or through the Integral Energy web site will be notified when the RFP has been issued. The RFP document itself will contain all details of how respondents are to complete the appropriate forms and submit their proposals for non-network options. Contact details are included if assistance is required in completing the forms.

The intention in providing this information publicly and with sufficient lead time is to allow alternative demand management options to be developed. This also encourages energy service providers to respond more effectively with appropriate demand management options. This will then allow consideration of the most cost effective solution to any network constraints. The publication of the network constraint information will be done on an annual basis so that over time more accurate and relevant constraint data can be provided.

It is noted that the Demand Management Code of Practice is due for review some time in 2003 and the experience gained from the publication of the network constraint data and responses to it will be a valuable inputs to the review.

Streamline Connection Agreements

Integral would support the development of national standards and guidelines for connection of "small" distributed generation. The definition of "small" may vary between stakeholders but Integral is of the view that streamlined connection agreements should be developed for generators with an installed capacity of up to say 1 MW. Care needs to be taken when developing these streamlined

arrangements for small generators to ensure that they are not biased against any one particular technology.

Integral firmly believes that for generators with installed capacity above 1 MW there should be individual negotiations and connection agreements. This is to reflect the fact that connecting generators above 1 MW can have significant impacts on the distribution network which are generally site specific and hence would need to be addressed on a case by case basis. For this reason it is appropriate that generators above 1 MW negotiate their individual connection arrangements and agreements.

Standard Offers

Integral would support the development of standard offers for generators covered by a standard connection agreement. This would be conditional on all the parameters identified in the IPART discussion paper on Distributed Generation being adequately addressed in any arrangement for a standard offer.

Integral would be prepared to work with IPART in the development of standard offers and the possible incorporation of standard offers into the Demand Management Code. One possible area of difficulty will be in the situation where a distributed generator fails to meet the required peak demand reduction expected under any standard offer.

4. Retail market driven Demand Management

4.1 Review policy for rolling out meters to residential customers.

Integral's preferred view is that any roll out of smart meters should be undertaken on a national basis so that inequities are not built in to the process by having some States opt out. However, Integral recognises that any roll out even at a State level is a matter of Government policy and that several significant issues would need to be addressed before any agreement to a roll out was achieved. These issues would include stranded metering asset costs, the roll out costs and its recovery and ownership of the metering assets.

Integral would be reluctant to commit to a full roll out of interval metering if this investment was to be made redundant by loss of responsibility for metering post 2004 when the current derogation expires. Integral would encourage IPART to consider this issue as part of their review under Clause 7.13(f) of the National Electricity Code and to give consideration to a possible extension of the derogation.

Integral has undertaken a review of some of the issues associated with interval metering for the mass market, identifying the benefits of interval metering, the barriers to implementing interval metering, and some options available to facilitate the reduction of these barriers. A brief summary of the review follows.

Benefits of Interval Metering

The primary benefit of Interval Metering is to allow price signals to be passed to customers in order to increase efficiency of energy use. The implications of this are discussed in more detail below. Note however that "real world" barriers, which are discussed further on in this submission, temper some of these benefits.

- Response to Energy Price Spikes

  Assuming perfect information (ie customers and/or retailers have access to pricing and consumption information in real time) customers/retailers could implement strategies to reduce costs through curtailing load during price spikes. This would lead to efficiencies in the Energy Market.

- Shifting of Load

  Passing on price signals to customers in the high energy usage/high energy cost times of day (Peak) would eventually lead to customers shifting load away from these times to some extent. The use of "Off-Peak" hot water is an example of successful application of such price signals.

- Reduction of Peak Demand (increasing Network Utilisation)

  Assuming similar pricing in Network rates the reduction of peak demand of the Network would operate in a similar manner to shifting of load above.

- Increasing Power Factor (and hence Network Utilisation)

  A potential benefit of interval metering could be the ability to pass on price signals to encourage power factor improvement. Power Factor is typically significantly lower than unity and the cost of correction can be quite low relative to the efficiency gains possible. Creating price signals to improve power factor could lead to significant long term gains as awareness of this issue encourages customers to purchase more efficient appliances and fixtures.

  It is important however to note that the interval metering technologies typically used on domestic premises at present do not measure power factor. Implementation of this would require some development by the meter manufacturers.

- Estimate of short run benefits

  Typically a residential sector customer is likely to respond to price signals in the short run by shifting usage (eg running appliances in the off peak times).

  Assuming average consumption in domestic premises of 7,000 kWh pa, 4,000kWh pa consumed during peak hours and 3,000 kWh pa consumed during off-peak hours. It is estimated that in the order of 20% of the peak consumption may be shifted to off peak hours. Based on the current difference between peak and off peak residential tariffs, customers can save in the order of $45 per annum ie around 8% of the current total billed amount. However, given that this effectively reduces the price to the customer there will be a price elasticity or "rebound" effect on the demand in the order of 200kWh.

On the above assumptions an average residential customer will consume 4000-800+200= 3400kWh per annum during peak hours and the level of consumption during off peak hours will remain unchanged to 3800kWh per annum.

The net effect therefore is a 15% reduction in peak energy use.

The ability to shift load of a non-residential customer is likely to be far less significant than that of residential customers.

- Estimate of long run benefits

  For purposes of illustration of the benefits to the Network businesses, an order of magnitude calculation is as follows. Assuming $1,000 /kVA Network augmentation costs, an average 2.25kVA Diversified Maximum Demand (averaged over all customers), -0.2 price elasticity and a 50% Network price increase over the peak period (leading to a 25% total price increase). The benefit of introducing the price signal would be a reduction of $112 in capital expenditure if it is assumed the peak would reduce in proportion to the total energy use (although it is acknowledged that this is unlikely to be the case). This would typically cover the cost of the incremental purchase cost of metering, however this calculation is sensitive to the highly subjective elasticity figure and the level of reduction of the system peak compared to average peak time energy use.

  Note also that these benefits are averaged, and the true benefits will only be realisable for assets that require augmentation. The benefits will be to the economy as a whole (particularly where the benefit is long term), whereas the costs will fall upon the distributor (where they are not included in the capital projections of the regulatory period).

  For this reason interval metering should only be funded where the regulator has agreed to recognise the costs.

- Ancillary Benefits

  In addition to the primary benefits listed above there are a number of flow-on benefits arising from the data and/or the technology:

  - Human meter reading error removed.
  - Possibility of using gaps in interval data to identify theft.
  - Possibility of Market settlement by aggregation of load rather than differencing, removing some of the risk for the local retailer.
  - Transferring between Retailers could be accomplished at any time rather than requiring a physical read as the meter reading for every day is recorded in the meter.
  - Allows more innovative Retail products.

  If this were implemented with remote communication technologies (such as some of the power line carrier or radio solutions that are made possible with a mass roll out) there would be additional advantages such as:

- Reduction of no-access issues.
- Removal of need for a field visit for account finalisation.
- Unauthorised reconnections or “move-ins” can be remotely identified.
- Outage alarms and power quality monitoring is made possible.
- Reduction of meter reading costs.

Barriers to Interval Metering

A number of barriers to implementing interval metering exist as do a number of barriers to the effectiveness of interval metering. These are discussed in more detail below.

Barriers to implementing Interval Metering

- Purchase Price and Cost Recovery

The purchase price of interval metering is significantly greater than that of basic metering. Typical cost differences range from approximately $40 for a single phase customer with off peak or $50 without off peak, to around $150 for a three phase customer (approximately $70 on average). Note that this equates to approximately $500m over the National Market.

It is unclear how this increased cost may be recovered. At present there is no established government policy of rolling out interval meters, and so the prudency and hence the regulated recovery of such costs are uncertain.

IPART has recommended that the policy of customer choice of metering type should be reviewed to consider the merits of a more rapid roll out of interval meters. Further, that a targeted roll out to large users or “peaky” loads, or regions where there is network congestion may be appropriate.

In Victoria the ESC is currently undertaking a cost-benefit analysis of meter roll out for all customers.

- Asset Lifecycle Costs

In addition to the higher purchase costs of interval metering there are whole of life costs above those of basic meters. The most significant is the shorter life span of electronic devices, which may be as low as half the life of electromechanical meters.

- Cost of early redundancy of existing metering

To roll out meters in a timely fashion the majority of existing meters would be prematurely made redundant. This would present a significant opportunity cost to the industry.

- Data Collection and Processing

Given the high cost of installing communications systems, data collection devices need to be implemented to read the interval meters for small customers manually. In NSW and Victoria Networks would have installed such systems for FRC, however the capacity of these systems to

handle such high volumes would need to be assessed. In any event the data collection, storage and processing costs will be higher than those of basic meters.

On the assumption of the time to download a meter being 30 seconds (as required by the metrology procedure) and 500 meters per route, the additional time to undertake a meter reading route would be 4 hours. This implies that the meter reading costs would be increased by approximately 50%.

Data storage would also increase by approximately 4,000 times (storing 48 intervals per day), significantly increasing data management and storage costs.

- Disconnection will de-energise metering

Current switchboard designs often result in meter de-energisation when customer's premises are disconnected. This may cause problems with battery lives for premises remaining vacant for substantial periods of time. Any requirement to replace batteries would be a significant cost.

A related difficulty is the impossibility of reading metering while the site is de-energised.

- LNSP Loss of Responsibility for Metering

In 2004 the derogation to the National Electricity Code that places responsibility for metering small customers with the LNSP will expire. LNSPs will be reluctant to invest in interval metering which may be removed two years after installation.

Barriers to the effectiveness of Interval Metering

There are a number of barriers to the effectiveness of Interval Metering. These are discussed below.

- Regulated Tariffs/customer choice

Any regulatory framework that restricts restructuring of the customer's tariffs is a significant barrier to the effectiveness of interval metering. If customers may choose tariffs that are not demand/time dependent then any price signals are eliminated. This is particularly true of customers who are disadvantaged by interval metering.

- Timeframe to roll out metering

Any roll out of interval metering would require the replacement of millions of meters and could not be undertaken in a short timeframe. It is an ethical dilemma as to whether the cost signals should be implemented prior to full roll-out as this would treat similar customers in dissimilar ways resulting in cross subsidisation.

- Inefficiency of information availability (ie timeliness)

It is unlikely that there will be an effective communication of market price to the end use customer, nor are they likely to be subject to price signals reflecting market price. The majority of the price risk therefore lies with the Retailer rather than the customer and may therefore be difficult to manage.

- Limited price elasticity

Price elasticity measures the response of customers to changes in prices. The NEMMCO 2001 Statement of Opportunities quotes a long run own price elasticity of –0.25 for Residential, -0.35 for Commercial, and –0.38 for Industrial customer, however it also states that these figures relate to consumption per year, not for each instantaneous half hour.

It is expected that the short run elasticity of total energy usage is likely to be lower than this, although the ability to shift load (particularly for residential customers) may be available.

In general, given the low price of electricity compared to the convenience offered it is expected that the responsiveness of customers to price change is relatively low.

- Power Factor information not available

Domestic electronic metering does not presently provide power factor information. This would prevent the benefits described in the section on increasing power factor above from being realised. It may however be possible to overcome this barrier through negotiation with metering manufacturers.

A further barrier is the lack of a requirement to collect this information even where it is available (for example three phase metering). Where the Retailer is responsible for metering the data may not be collected even where it is available in the meter's memory.

- Averaging of Demand Pricing

The effectiveness of pricing on Network capacity is somewhat less efficient than the effect on energy costs as the nature of the Network cost drivers are driven by the peak load on a small number of days per year.

Given that pricing is typically structured either via peak/shoulder/off peak pricing, or, (more efficiently) via a peak demand pricing there is an averaging effect which reduces the benefit of these price signals. A good example would be heating or air conditioner loads where the customer can reduce their total bill by reducing peak usage during mild months but still contribute to the system constraints by operating air conditioning on the extreme temperature days.

This may be rectified through load dependent or weather dependent (as a proxy for system load) price signals, however the complexity of such an approach is significant. In order for such price signals to be visible to customers there may be a need for technological development or media involvement.

Roll-Out options

Various options for rolling out interval metering are available, ranging from an evolutionary approach driven by market forces to a more dramatic forced roll out. These different approaches are discussed in more detail below.

- Market Driven Solution

Under this option market forces would drive the roll out of interval metering. Network businesses would analyse the benefit of installing interval metering in terms of savings of capital investment and subsidise the purchase cost of interval metering by this amount.

Retailers/customers could decide the value of such meters to themselves and if this is greater than the residual incremental cost of the interval meter then market forces would drive them to install interval metering.

As more desirable loads are peeled off the Net System Load Profile the incentive to install interval metering increases and more customers will have metering installed.

- Targeted Roll-Out

This option targets some segments for which it is particularly desirable to provide price signals (eg peaky loads). These segments would be identified and interval metering mandated. Although in principle this operates in the opposite manner to the market driven solution (in that those customers that would least wish to be placed on interval metering are forced to accept these meters) it may still be used in conjunction with the market driven solution.

- New and Replacement

Under this option an active decision to roll out meters for all customers is made and a managed roll out is implemented over time for all new and replacement meters irrespective of market forces. Some of the cost impact is negated however as there are no costs associated with premature removal of existing assets.

- Full Metering Roll Out

This option is a managed roll out of all metering over a relatively short period of time. This option realises the most benefits, however it also carries the greatest cost.

Whilst this option may carry the costs of premature removal of exiting assets it does have some economies of scale benefits, including efficiencies in meter installation and the potential reduction of asset purchase costs.

The viability of some remote communication technologies such as power line carrier and radio solutions significantly increases with metering

density. Some of these options may be viable under a mass roll out, bringing with them the ancillary benefits described earlier.

As stated earlier it is Integral's preferred view that any roll out of smart meters should be undertaken on a national basis so that inequities are not built in to the process by having some States opt out. Any national or even state based roll out will need to address the issues identified above in order to capture the benefits also identified above.

4.2 Facilitate development of an active market or trading platform for the aggregation of DM.

Integral would support an assessment of the impact and effectiveness of aggregating loads and interruptibility of loads as tools for use by retailers. However, the following comments on Integral's experience in these aspects of load management are offered as background and input to this process. As can be seen from these comments, at this stage of the markets development there appears to be little scope for the use of such tools by retailers. Any review should aim to put in place a framework that allows the development of an active market for the aggregation of demand as the market matures.

Interruptible Business Customers' Load

Opportunities for interrupting the supply to business premises during the hours of high pool prices are generally limited. Business customers rarely have the technical capacity to switch off large load quickly in order to respond to a pool price spike. Most business customers are constrained by manufacturing processes that require many hours of notice without incurring significant loss of output. Secondly, for the large majority of business customers, electricity constitutes a relatively low proportion of their total production costs. Customers generally focus on core activities and are not highly interested in saving money from the electricity supply interruptions to their business and manufacturing processes. The savings would have to be at least sufficient to meet the cost of lost production.

Most of the businesses are not willing to allow the retailers to control the supply of electricity to all or parts of their installation. Those businesses that do agree to having some of their load interrupted prefer to limit the control to a specific number of interruptions per year at times that would suit their requirements eg planned maintenance or shut down periods. Thus, there is a clear mismatch between customers' level of interest and the retailers need to manage risk in high pool price events by offering suitable incentives to end use customers.

This is in contrast to the contracts for network load shedding. Network load shedding can be planned within a 24 hour period which generally provides sufficient time to notify customers. Finding customers with a process which can be interrupted and provide sufficient load shedding capability is difficult particularly if the business is labour intensive and hence has to stand their workforce down when any load shedding takes place. However, Integral does have some load shedding arrangements in place with a limited umber of customers.

Lack of access to real time whole sale price movements is an issue. However, it is not a huge barrier to further signing of retail interruptible contracts with end use customers. It is Integral's view that customer's lack of interest and incentives to

participate are far bigger barriers to formulation of further interruptible contracts with business customers.

Load Reduction

There is scope for many business customers to significantly reduce their overall load and energy expense. However, many are unwilling to invest the necessary capital to improve their energy efficiencies. Again for many business customers, electricity constitutes a relatively low proportion of their total production costs and so the return on capital invested is too low. Many customers have achieved very good price reductions in their energy contracts merely by changing retailer, which involves no capital outlay. However, as wholesale and retail prices trend higher then capital investment in energy efficient technical solutions will become more attractive to end use customers.

Price Structure

Research indicates that customers of all segments prefer price structures that are simple. Many business customers not only prefer flat prices for peak, shoulder and off peaks but look for flat prices to be maintained over multiple years of a contract. Many residential customers value comfort and lifestyle more than reduced energy bills through reduced consumption. Time of Use tariffs have not been very popular with end use residential customers to date but it is not clear as to whether the cost of the metering for such tariffs is the disincentive or the price structure or a combination of both. It would appear that for time of use price structures to provide incentives to reduce consumption in peak periods there needs to be a substantial differential between the peak and off peak prices to be effective.

Controllable Load

More than fifty percent of residential customers in New South Wales have off peak hot water systems, which can be interrupted in times of high pool prices. Certainly off peak controlled load represents some opportunity for demand management. However, the issue is how to do it without impacting on customers level of supply service and satisfaction with the end product. Customers do not like to take the risk of having cold showers. Trials of varying switching times conducted by Integral in the past have always brought some increase in the level of no hot water complaints from customers. Each customer's hot water use is different and with a master control switching a large number of hot water systems on or off it is very hard to differentiate the particular usage patterns of the individual customers.

4.3 Develop a market framework for small scale distributed generations.

The metering of distributed generation is an area that needs further investigation and the standards applied will more than likely vary with the size of the generation plant and where it connects in the distribution network. The determination of the appropriate standards will also need to consider the costs of the metering and whether it imposes any barriers to distributed generation.

The use of net metering is of concern to Integral as it would not be possible to reflect actual network usage with a net metering solution. Integral would recommend an import/export metering solution so that the customer pays the correct network charges when acting as a load and receives the correct payment for the energy supplied when acting as a generator.

4.4 Enhance programs providing information on energy efficiency and strengthen Government's role as a 'model' energy consumer.

This recommendation would appear to be the same as Recommendation 4 in the Environmentally-driven demand management section. As stated above Integral would encourage the Government to adopt this recommendation but recognises that it is a Government decision on how best to implement any such recommendation.

4.5 Develop an appropriate incentive framework for retailers to forego sales of electricity.

Integral agrees with IPART that as part of the strengthening of retail licences (see Recommendation 1 of the Environmentally-driven demand management section) a more robust methodology for assessing reductions of greenhouse gas emissions resulting from electricity sales foregone needs to be developed.

Retailers need incentives such as a broadening of the allowance for them to use these foregone sales to meet existing regulatory compliance requirements in order to encourage load reduction as a demand side initiative as it will effectively reduce their revenue. Competition alone will not force retailers to actively promote this type of service.

As discussed under Recommendation 1 of the Environmentally-driven demand management it is hoped that through the ICG a workable, robust and cost effective scheme will be implemented.

5. Additional Barriers to Demand Management

Many of the barriers identified in Appendix 2 of IPART's Interim Report have already been commented upon in the preceding sections. For example the lack of penalties in NSW retail licences and capital expenditure/payment uncertainty for network businesses.

The issue of uncertainty in emissions trading and especially the timing and allocation of permits is something that Integral believes requires urgent action. The suggested response of working with other states and the Commonwealth to develop a clear statement of policy regarding emissions trading and permit allocation is fully supported by Integral. A guarantee of "no disadvantage" for early action may serve to provide retailers and others with an incentive to be innovative in their actions on the issue of emissions trading.

The matter of energy labelling by retailers is something that has already been addressed to some extent with Integral proposing to provide information on greenhouse gas emissions on electricity accounts in the very near future. As stated earlier Integral would support the expansion of compulsory star rating of equipment and also believes that information on the power factor of appliance should also be provided to customers. The expansion of the star rating scheme should be accompanied by an extensive education programme to inform customers on what the stars actually mean.

An area of possible concern for Integral is the suggested response for protection costs for embedded generators. Integral would support IPART's suggested response of developing uniform codes and standards but does not support the proposition that networks be required to provide a protection design and installation service. There

exists already a market for protection design by any number of consulting engineers and many electrical contracting firms are more than capable of installing protection schemes. It should be a decision of the individual network businesses to participate in this type of work or not it should not be a mandatory requirement. As a market exists for this type of work IPART should not impose fixed prices or cost caps.