# Attachment A

"Today, in much of the world we take energy for granted. Like many necessities we treat it as a right and we're careless in its use: consuming ever more energy-demanding gadgets, enjoying hot buildings in winter and freezing ones in summer, and driving gas guzzling cars in America and Australia.

Today the economics of energy use encourage this profligacy, for example a consumer may buy a television that uses more energy than a more efficient but also more expensive model. Over the medium term the greater running costs may still be less than the alternative greater upfront cost of the pricier model and this decision thus makes sense for the consumer. But for society as a whole it doesn't. In order to reliably meet that greater energy need, multiplied by millions of consumers who will often turn on their televisions at the same peak time, power distribution and transmission companies have to invest in additional capacity which is unused for much of the day."

Russell Caplan, Chairman, Shell Group of Companies Australia

We understand that the Environment and Resources Committee will consider four key issues, specifically

- The economic and environmental costs and benefits arising from energy efficiency improvements
- Potential barriers and impediments to improved energy efficiency
- Potential policy options for energy efficiency improvements with an emphasis on initiatives that are cost effective for individual producers and consumers
- The role of the Carbon Pollution Reduction Scheme and other Commonwealth Government initiatives in encouraging energy efficiency.

We have responded within the framework of these issues.

# The economic and environmental costs and benefits arising from energy efficiency improvements (in Queensland):

The economic benefits to electricity suppliers of more efficient use of energy are:

- On the presumption energy efficiency delivers maximum value at peak demand times, reduced need for network upgrading and extensions, resulting, in Ergon Energy's case, in reduced Community Service Obligation payments from the Queensland Government.
- Reduced network energy losses
- Customer electricity bills being lower than they would have otherwise been
- Enhancement of a societal culture of reducing resource use and waste
- Enhancement of the cost-efficiency of Queensland industry
- Flatter daily demand curve, potentially reducing the requirement for additional peak-period generation sources.

Customers energy efficiency, again presuming it has maximum value at peak times, also enhances the electricity supply efficiency of transmission networks, and even of the Queensland baseload electricity generators which benefit from a flatter daily demand curve.

Environmental benefits are:

- Reduced greenhouse gas emissions associated with electricity generation, both centralised and in Ergon Energy's isolated communities
- Reduced greenhouse gas emissions and local environmental impacts resulting from reduced need for network upgrading and extensions and subsequent vegetation clearing and easement and asset maintenance
- Reduced requirement for network construction inputs such as power poles, cables, transformers, etc.
- Reduced need for coal and gas extraction.

As electricity distribution network operators, while we strive for overall energy demand reduction for its financial, network efficiency, and emissions-reduction value, our focus is on peak demand reduction as a key element of maximising asset utilisation. It should be noted that some energy efficiency initiatives create perverse outcomes in regard to peak demand.

As customers' costs increase, alternative power supply solutions become more affordable, at both residential and business levels. Therefore, it is critical that peak demand issues are understood when developing energy efficiency programs.

An example is the phasing out of electric element hot water systems in Queensland. This is supported by ENERGEX and Ergon Energy for its emissions reduction value. However, if a significant proportion of electric heat pump systems and the electric boosters of new solar hot water systems are connected to the 24-hour retail tariff (T11) rather than controlled retail tariffs (T31 and T33), this would add to peak demand and increase costs to distributors, and ultimately customers, through required network upgrades. Accordingly, ENERGEX and Ergon Energy made submission to the Queensland Government's Solar Hot Water Program urging connection of the potential 200,000 systems to an offpeak tariff whenever feasible.

While more research and modelling is required to make clearer predictions, there are risks that the loss of electricity load control from the loss of electric hot water systems could have significant impacts on network management capacity.

Network energy losses, occurring from heat loss from conductors and other components, can be combated to some extent through the provision of local distributed generation where space permits and sufficient demand exists, however as losses are directly proportional to electricity delivered to customers, the greatest gains can be made through reducing demand through energy efficiency and other means.

However, reducing network energy losses, and the resulting emissions, is a focus for distributors and there are minimum efficiency standards for distribution transformers. A higher standard has been developed and as it takes effect and the transformers in the network are replaced, some reductions in losses will be seen. However, the continued increase in demand for electricity will see network energy losses increase in real terms due to inherent inefficiencies in distributing electricity from centralised generation.

These savings have resulted from the installation of a number of energy efficiency measures such as the retrofitting of old inefficient lighting systems, the replacement of old air conditioning chillers with current technology units and the installation of variable speed drives on primary chilled water pumps that have the ability to save significant amounts of energy. As a further example, the University of Queensland has reduced lighting costs in the Queensland Bio Science Precinct Building by 51% through the installation of a state-of-the-art lighting system.

Over the last two summers ENERGEX has conducted a trial of cycling air conditioner compressors in the Albany Creek and Arana Hills area of Brisbane.

These trials were carried out with some 2,000 volunteers with the objective to reduce peak demand while having negligible impact on customer comfort. Whilst the last two summers have been relatively mild in South East Queensland, peak demand reductions in the order of 1 kilowatt (kW) per air conditioner was achieved which is almost 17% of the thermally induced component of peak demand.

Ergon Energy conducted a similar air conditioner load control trial in Townsville with indications that the potential load curtailment after diversity is 0.8 kW per air conditioner. This result will facilitate a broader implementation, creating greater load control for the distributor, potentially reducing network augmentation as well as reducing customers' electricity costs.

In regard to appliance and building standards, proactive energy efficiency initiatives are pivotal for early gains in managing peak demand. This is clear from the following California Energy Commission graph:



Also clear from the Californian experience is the critical importance of improving both building and appliance standards. These standards have focused primarily on enhancing the energy efficiency of appliances and building envelopes. Evidencing the close relationship between the disciplines of energy efficiency and demand management, however, is the fact that these enhanced standards have also provided a spin-off benefit of approximately 50 per cent greater reductions in peak demand.

Both nationally and in Queensland, ENERGEX and Ergon Energy are working proactively, both individually and jointly, with numerous government departments, agencies, standards bodies and industry groups to foster constructive change in energy efficiency standards and implementation. A number of examples follow:

#### **Building Standards**

- Building Codes Queensland
- Building Services Authority

#### **Appliance Standards**

- Department of Environment, Water, Heritage & the Arts
- Minimum Energy Performance Standards
- Office of Clean Energy

### Standards & Industry Groupings

- Standards Australia
- Australian Institute of Refrigeration, Air conditioning and Heating
- Air conditioning and Refrigeration Equipment Manufacturers Association
- Swimming Pool and Spa Association
- Electrical Contractors Association Queensland

## Potential barriers and impediments to improved energy efficiency

The single biggest impediment to the uptake of energy efficiency measures in Queensland, at both the residential and business levels, is the lack of knowledge of issues and options in the market place, largely resulting from a low level of emotional involvement in the electricity supply process. The lack of understanding as to appliance and equipment running costs over the long term, lack of willingness to invest in more efficient appliances and equipment, and lack of appreciation of the implications of peak demand are also barriers. This is particularly evident at the residential and small-to-medium-enterprise level.

This low level of emotional involvement is largely due to both a low relative cost of electricity and a consistent power supply. While ENERGEX and Ergon Energy are seeing increases in customer interest in energy efficiency in line with rising costs and awareness of climate change issues, there is currently no 'burning platform' which will drive behaviour changes as was demonstrated in the recent water crisis in South East Queensland.

In addition to these barriers, customers and the media are generally sceptical when utilities investigate new technologies that have the potential to reduce energy consumption or lower demand.

Recent market research undertaken by the CSIRO for ENERGEX indicates customers can be suspicious of the motivations of both the utility and government for introducing demand management and energy efficiency measures. Without clear and comprehensive information from the government and the energy sector, including research agencies, to the public on the true cost of their energy use and its impact on the network's efficiency, rising electricity costs, greenhouse gas emissions and other aspects, this is unlikely to change rapidly or significantly.

Another barrier in the market is that appliance and equipment retailers are not generally compelled to feature energy efficiency in their marketing and as a result customers subsequently aren't educated to choose more efficient appliances. There is also a lack of knowledge amongst customers as to the existing tariff structure.

Industry as a whole in Queensland spends approximately 4 -5% of its annual expenditure on energy and as a result the concept of a reduction of 10 -15% savings achieved through the introduction of energy efficiency measures is "small beer".<sup>4</sup> It is also our experience that most commercial and industrial (C&I) customers at the smaller end of the spectrum lack the in-house skills and capacity to explore and identify the value of energy efficiency initiatives.

In our experience, many maintenance engineers and property managers within C&I customers have unrealistic expectations of the desired internal rate of return. Boards and executive managers tend to be more receptive to holistic business cases going beyond pay-back periods. But for some organisations, the desired rate is too short and as a result, the implementation of energy efficient technology that is capable of delivering significant savings over a longer term is not prioritised.

<sup>&</sup>lt;sup>4</sup> Ernst and Young 2008

It has also been demonstrated that C&I customers are confused over the multiple state and federal government funding programs that are available for energy efficiency, and by the semi-regular changes to these programs, with the end result being a 'do nothing' approach.

Many of these customers are also grappling with the multiple reporting requirements regarding energy efficiency, greenhouse gas emissions and water consumption that multiple levels of government require.

Meeting demand growth is a significant component of ENERGEX's and Ergon Energy's capital works program which must ensure the electricity supply is delivered to consumers while maintaining network security. As a result, around 10% of our network infrastructure is used for less than 1% of the time, during periods of summer peak demand. While this level of capacity is used for only a short period of time, the full cost of these network assets is borne by customers over the long life of the assets concerned. Due to the structure of retail tariffs, both regulated and some market based, price signals do not reach those customers who require this additional network capacity. As a result, an inequitable sharing of costs occurs. Due to the averaging of costs, those who consume relatively more in off peak times pay the same as those who consume relatively more in peak times.

# Potential policy options for energy efficiency improvements with an emphasis on initiatives that are cost-effective for individual producers and consumers

There are a number of potential policy options that could improve the penetration of energy efficiency in Queensland:

- Set specific energy efficiency targets, potentially at state, regional, city and household levels, similar to the 140L per person target established for water for Brisbane residents.
- Develop an independent and authoritative centre of excellence to advise Queensland businesses and residents in the areas of energy efficiency and demand management.
- Mandate all government facilities to undertake energy efficiency programs via the Queensland Government's Energy Management System program.
- Develop a respected, independent, accurate and reliable education program for customers about the implications of not undertaking energy efficiency, including potential mandating of energy consumption and cost comparisons at point of sale.
- Initiate or further increase minimum energy star ratings for appliances, including air conditioners.
- Encourage additional supplies of natural gas to be made available for fuel substitution applications, specifically tri generation in commercial and industrial applications in South East Queensland.
- Encourage greater diversity of energy supply with gas options in greenfield developments.
- Enhance funding/support for electricity utilities to undertake network upgrades using smart network technology. Presently, networks are not designed to integrate renewable energy generation as seamlessly as centralised fossil fuel-based generation.

In terms of how governments, potentially in partnership with electricity utilities, can make information on energy efficiency improvements more accessible, we offer these concepts and ideas:

- Energy efficiency communications should be targeted at influencers in the community. The influencers become advocates for energy efficiency and are more trusted than utility or government advertising and other communications. Influencers could include appliance retailers, electricians, architects, builders and a sizeable proportion of the general public with increasing levels of emotional involvement in their electricity supply.
- The basic concept of peak demand is comprehensible to most people. Our experience is that once educated about the issue and their impact on it, the customers level of emotional involvement increases along with their likelihood to change their energy use behaviour.
- In the commercial and industrial sector, promotion of commercial delivery models such as energy performance contracts will assist companies to understand the value of energy efficiency interventions and share the risks of implementation.

## The role of the Federal Government's Carbon Pollution Reduction Scheme and other Commonwealth Government initiatives in encouraging energy efficiency

As electricity suppliers, ENERGEX and Ergon Energy believe the Carbon Pollution Reduction Scheme (CPRS) will create a significant stimulus for energy efficiency through placing a cost on greenhouse gas emissions. The CPRS, and climate change more broadly, has stimulated our initiatives in reducing our own greenhouse gas emissions and in assisting our customers to respond to rising electricity prices and the greenhouse impact of the their electricity use.

Already, some businesses are factoring future costs of carbon into their investment and production decisions and the rate of this will increase exponentially. Smart business managers will increasingly seek ways to reduce their costs and energy efficiency represents a very cost-effective investment with often short rates of return, or payback periods.

We support the Australian Government's commitment to provide assistance to exposed businesses and vulnerable households in the transition process, however, there is no doubt that costs will flow through the economy and stimulate energy efficiency.

Historically, ENERGEX and Ergon Energy have overtly supported the Energy Rating labelling program for appliances, and as an electricity retailer, Ergon Energy continues to through its website, advice and other channels. While awareness among consumers as to how to interpret the labels is slowly growing, we strongly support enhanced retailer engagement and integrated point-of-sale education initiatives to increase the value of the program. We also support the extension of the labelling to televisions and other appliances as a critical means of differentiating more efficient appliances and clarifying pay-back periods.

The Energy Efficient Homes program, subsidising both insulation and lower-emissions hot water systems, represents a significant financial commitment to reducing energy use in homes. Ergon Energy especially is leveraging these rebates in advising customers on how to reduce their electricity bills and associated emissions.

The Energy Efficiency Opportunities Act 2006 (EEO Act) targets significant energy users, i.e. users of energy greater than 0.5 petajoules. We presume this Act and its obligations have had a notable impact on the energy efficiency of these large users' facilities, however, we are not in a position to comment on or quantify its effectiveness.

The Minimum Energy Performance Standards and the Equipment Energy Efficiency program more broadly, Energy Star, and Top Energy Saver Awards are other Commonwealth Government programs we presume to be having impact but cannot comment on their level of effectiveness. We applaud the establishment of the National Partnership Agreement on Energy Efficiency to deliver a nationally consistent and cooperative approach to energy efficiency and look forward to leveraging the opportunities this may create for electricity distribution network operators.

#### References

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