ETSA Utilities

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5 September 2011

Australian Energy Market Commission

PO Box A2449

SYDNEY SOUTH NSW 1235

Dear Sir/Madam,

Project EPR 0022 – Response to AEMC Issues Paper – *'Power of Choice'*

ETSA Utilities welcomes the opportunity to provide a submission to the AEMC Issues Paper – '*Power of Choice- giving consumers options in the way they use electricity*'.

Please find included with this covering letter our detail response, both of which have been submitted electronically.

Should you require any clarification or information about this submission please don't hesitate to contact Mr Grant Cox, Manager Regulatory Affairs, on telephone number 08 8404 5012 or via email cox.grant@etsa.com.au

Yours sincerely,

Doug Schmidt
General Manager Network Management

ETSA Utilities

We do everything in our power to deliver yours

ETSA Utilities submission to AEMC Issue Paper:

Power of choice – giving consumers options in the way they use electricity

Reference: EPR002

Contents

1 ETSA UTILITIES' SUBMISSION OVERVIEW

1.1 Objective of AEMC Review

ETSA Utilities understands that:

> *"…the objective of this review is to identify opportunities for consumers to make informed choices about the way they use electricity, and provide incentives for network operators, retailers and other parties to invest efficiently so that there is increased confidence that demand and supply side options are given equal weight in satisfying the community's demand for energy services."*

1.2 Focus of ETSA Utilities' Submission

The Issues Paper identifies two primary benefits of Demand Side Participation (DSP):

(i) Cost effective DSP has the potential to improve the efficiency of the electricity market, for example through more efficient utilisation of transmission and distribution networks and providing added competitive discipline on retailers. This should result in lower costs to consumers for an equal level of reliability of supply; and

(ii) Wider benefits may include improved environmental quality (i.e. lower greenhouse gas emissions).

As an electricity distribution company, ETSA Utilities' submission will focus on item (i) above, in particular the efficient operation and utilisation of distribution networks.

1.3 Customer Choice vs Distributors' Obligations

As outlined later in this submission, South Australia's peak demand is driven by the widespread use of domestic air-conditioners on hot days. It is ETSA Utilities' experience that after two or three hot days exceeding 35 to 40 degrees Celsius, most domestic customers will turn on, and leave on, their air-conditioners for the duration of a heatwave.

We acknowledge that, consistent with the AEMC Issues Paper, "*Consumer interest and willingness to take up DSP opportunities will depend on their view of the value, preferences and benefit provided to them.*"

As evidenced by ongoing high rates of take-up of domestic air conditioning, it is apparent that during extended heatwaves, customers place a very high value on maintaining personal comfort. Further, it is our conclusion that during an extended

heatwave customer interest and willingness to take up voluntary DSP opportunities will be very low indeed.

Therefore, to fulfil its regulated obligations to meet power quality and reliability standards, ETSA Utilities must either:

- continue to undertake timely investment in network infrastructure to increase capacity to meet peak customer demand on approximately 10 days each year; or
- have access to load control options that deliver '**firm**' load reductions during times of peak customer demand.

Noting customer behaviour during heatwaves ETSA Utilities cannot rely on good intentions or un-enforceable DSP agreements with customers as this is not likely to deliver '**firm**' load reductions during peak times.

Further, the distribution network only derives a DSP/DM benefit when it results in reduced infrastructure reinforcements at a location where future capacity constraints will occur. Consequently, any DM response needs to be focussed in a geographic area where that future constraint will occur. A DM response in other geographic areas where there is not a capacity constraint provides no benefit to distributors.

1.4 Domestic vs Commercial and Industrial Customers

ETSA Utilities has focused its Demand Management (DM) trials on domestic customers.

The reasons for this are:

a. Most larger commercial and industrial customers have an agreed maximum demand;
b. Electricity connections for commercial and industrial customers are carefully engineered to meet the maximum customer demand;
c. Commercial and industrial customers contribute towards their share of network capacity augmentation;
d. and
e. Regulated connection agreements with domestic customers, on the other hand, place no limitations on increases or decreases in their demand.

1.5 ETSA Utilities Experience

ETSA Utilities has been trialling DM initiatives, in conjunction with the SA jurisdictional regulator (The Essential Services Commission of South Australia - ESCoSA) since 1 July 2005. The initial DM Program comprised individual studies and trials classified under the following categories:

a. Power Factor Correction;
b. Standby Generation;
c. Direct Load Control;
d. Critical Peak Pricing;
e. Voluntary Load Control and Curtailable Load Control for Large Customers;

f. Interval Meters; and
g. Aggregation.

A key insight from these trials was that the majority of DM techniques were not cost effective (ie had a negative Net Present Value, or NPV) where only the benefits derived from deferring network capital expenditure were considered. On the other hand we found, that Direct Load Control had the potential to provide a positive NPV when used to control residential and other air-conditioning.

Section 2 of this submission focuses on ETSA Utilities' DM trials, in particular, Direct Load Control, a '**firm'** load reduction approach, of domestic air-conditioners. ETSA Utilities is prepared to share its detailed experience and key learning's from the trials with the AEMC.

1.6 Aggregation of Benefits

ETSA Utilities considers that future regulatory arrangements must provide the initiator/investor of the DM initiatives with the majority of the benefits that are derived from that investment. This will maximise the future benefits for customers. Alternatively governments could mandate that distributors invest in specific DM activities which are funded by all customers. This subsequent reduction in peak demand in the long term should eventually flow through to customers via lower retail tariffs.

1.7 Summary

In summary, distributors have mandatory obligations to meet power quality and reliability standards.

With respect to DSP, one of the objectives of the AEMC Issues Paper is, "…*to identify opportunities for consumers to make informed choices about the way they use electricity*".

Given the South Australian context of long hot summers, it is ETSA Utilities' conclusion that during an extended heatwave, customer interest and willingness to take up voluntary DSP opportunities on those days will be very low. Therefore without measures to encourage '**firm'** load reductions during peak times, it is unlikely that deferred investment in network capacity can be realised.

Further, benefits from DSP for distribution networks only occur when DSP occurs in the same geographical location as forecast capacity constraints.

2 ETSA UTILITIES' DEMAND MANAGEMENT TRIALS

2.1 ETSA Utilities – The South Australian Electricity Distribution Business

ETSA Utilities is the South Australian electricity distribution business, supplying electricity to approximately 820,000 customers across the State. Its primary role is the safe and reliable delivery of electricity from high voltage transmission connection points to residential and business customers throughout the majority of populated areas of the State.

2.2 South Australian Context

Approximately 1.34 million of South Australia's total population of 1.65 million people, or 80% of the population, live within the greater metropolitan area of Adelaide.

Adelaide has the un-enviable record of the longest heatwave of any capital city in Australia; 15 days exceeding 35 degrees Celsius in March 2008. Heatwaves in Adelaide are not uncommon. More recently, Adelaide experienced six (6) days exceeding 40 degrees Celsius in January/February 2009 including five (5) days when the night time temperatures did not fall below 25.9 degrees Celsius.

As a summer peaking state, a main factor in South Australia's well-documented peak demand issue is the use of residential air conditioning. More than 90% of South Australian homes now have air conditioners.

ETSA Utilities' experience, as evidenced by recorded customer demand profiles, is that after two or three hot days exceeding 35 to 40 degrees Celsius, most domestic customers will turn on, and leave on, their air-conditioners for the duration of the heatwave.

Chart 1 below shows South Australia's peak recorded demand (on distribution system) on 31 January 201. This was the third consecutive day of temperatures of above 35 degrees Celsius with the last two days exceeding 42 degrees Celsius.

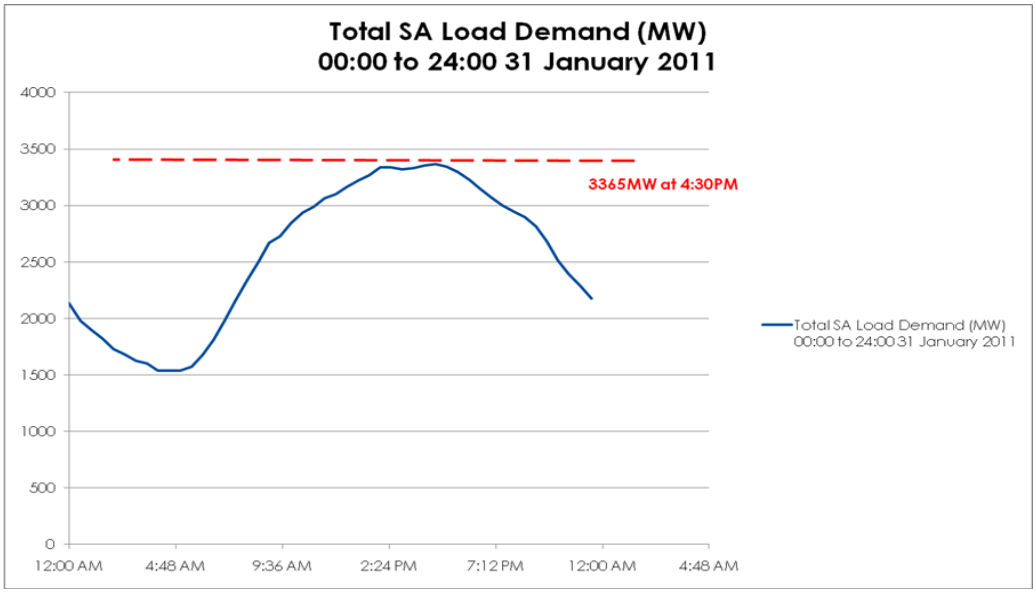

Chart 1: South Australian Load Profile 31 January 2011

South Australia has the most unfavourable Load Duration Curve of any state where the peak demand is about twice the average demand and three to four times the

minimum demand (See Chart 2 below). This is primarily driven by domestic air conditioning use.

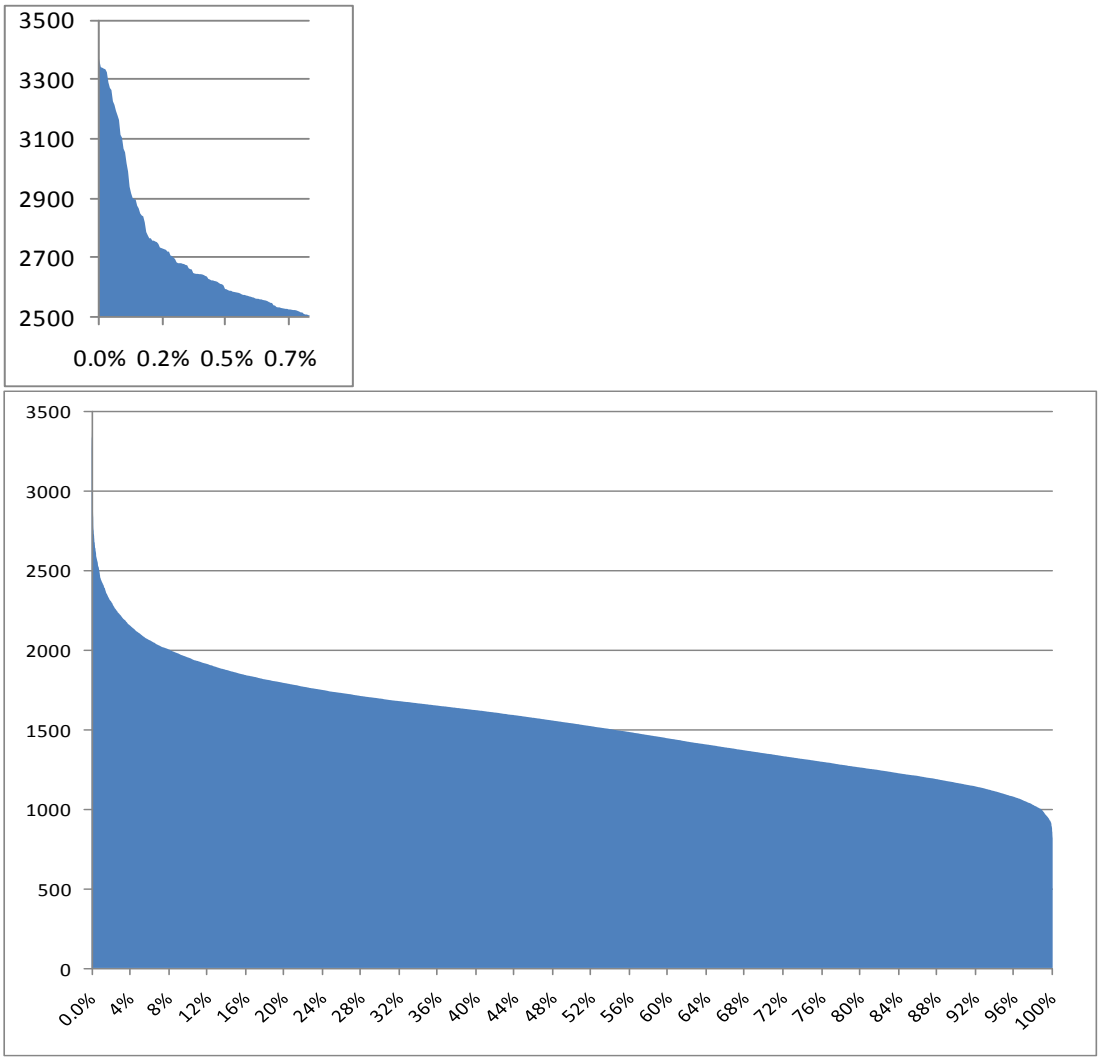

Chart 2: South Australian load duration curve, with a separate chart showing the peak demand days.

Because of the extreme nature of South Australian heatwaves and customers' usage patterns, the South Australian Government has firmly expressed its opposition to introducing Time of Use (TOU) pricing in South Australia[1].

2.3 Electricity Distributor's Obligations

ETSA Utilities is required to meet the power quality and reliability standards established and enforced by the ESCoSA and the Australian Energy Regulator (AER).

Non-compliance with these regulated quality and reliability standards will expose ETSA Utilities to financial and non-financial penalties.

[1] South Australia's former Minister for Energy, Pat Conlon, on several occasions expressed views on smart meters and Time of Use pricing in particular. One comment made was: "If you want a policy outcome where we kill the elderly in droves during heatwaves, this is what you do" (ABC, The 7.30 Report, Smart meters: blessing or curse? 23 August 2007).

Therefore, to fulfil its regulated obligations to meet power quality and reliability standards, ETSA Utilities must either:

- continue to invest heavily in network infrastructure to meet peak customer demand on approximately 10 days each year; or
- have access to load control options that deliver **'firm'** load reductions during times of peak customer demand.

As outlined above, it is ETSA Utilities' experience that after two or three hot days exceeding 35 to 40 degrees Celsius, most domestic customers will turn on, and leave on, their air-conditioners for the duration of a heatwave.

As evidenced by ongoing high rates of take-up and increased capacity of domestic air conditioning, it is apparent that during extended heatwaves customers place a very high value on maintaining personal comfort.

Consistent with the Statement in the AEMC Issues Paper, "*consumer interest and willingness to take up DSP opportunities will depend on their view of the value, preferences and benefit provided to them*", it is our conclusion that during an extended heatwave, domestic customer interest and willingness to voluntarily take up DSP opportunities will be very limited.

Therefore if ETSA Utilities is to effectively defer future investment in network capacity while meeting demand on hot days, we must be able to rely on **'firm'** load reductions during peak times. Relying on good intentions or un-enforceable DSP agreements with customers is not sufficient.

Further, the distribution network only derives a DSP/DM benefit when it results in reduced infrastructure reinforcements at a location where future capacity constraints will occur. Consequently, any DM response needs to be focussed in a geographic area where that future constraint will occur. A DM response in other geographic areas where there is not a capacity constraint provides no benefit to distributors.

2.4 ETSA Utilities Demand Management Trials

In 2005, ESCOSA approved funding of $20.4 million for ETSA Utilities to conduct a range of DM trials between 2005 and 2010 (later extended to 2012). The objective of the trials is to explore the most effective DM strategies for South Australia. The initial scope of the program involved industrial, commercial and residential DM options and opportunities.

The program primarily investigated the use of available and emerging technologies, as well as taking note of regulatory and economic impacts.

The initial DM Program comprised individual studies and trials classified under the following categories:

- Power Factor Correction;
- Standby Generation;
- Direct Load Control;
- Critical Peak Pricing;
- Voluntary Load Control and Curtailable Load Control for Large Customers;
- Interval Meters; and
- Aggregation.

ETSA Utilities has concluded that the most appropriate mechanism to effectively reduce peak demand within the South Australian environment is residential DM using Direct Load Control (DLC). This has now become the key focus of our investigations and trials of peak DM strategies noting that South Australia's' peak electricity demand is primarily driven by domestic air-conditioning.

2.5 Direct Load Control (DLC) Trials

DLC technology allows electricity distributors to remotely control electric devices in a home (or a business) and thus to 'cycle' electrical appliances at peak times, that is, to turn on and off appliances such as air-conditioners and pool pumps, for short intervals.

In the DLC trials conducted by ETSA Utilities, the load control function is managed by ETSA Utilities and provides '**firm**' load reductions during times of peak customer demand. The DLC targets domestic air-conditioners by remotely switching off their compressors but not their fans (to ensure customer comfort levels are maintained).

In the trial locations, customers have been provided with a small incentive, for example a gift voucher, to 'opt in' to the trial. Participation in the trials is purely voluntary.

All DLC trials investigate two key factors, technology and customer acceptance, and are also subjected to stringent cost benefit analysis.

The DLC trials operated by turning of air-conditioner compressors, for parts of hours over a number of hours at times of peak demand on hot summer days. Such hours are typically late afternoon and early evening.

2.6 DLC Trial Results

The results of the trials to date can be found in the following reports:

DM Program - Interim Report 1 (June 2007)

DM Program - Interim Report 2 (September 2008)

DM Program - Interim Report 3 (June 2010)

A copy of these reports is available via the following link
http://www.etsautilities.com.au/centric/our_network/demand_management.jsp

The initial DLC trial locations involved approximately 1000 volunteer households. The trial results to date indicate a 19 - 35% reduction in peak load where DLC DM is utilised.

The results of the trials confirmed that external DLC of air conditioners had taken place and that customers felt no perceptible reduction in comfort levels.

Cost benefit analysis carried out on the initial trials concluded that DLC alone did not deliver a positive societal NPV.

However, ETSA Utilities considers that DLC coupled with smart metering infrastructure may have a positive societal NPV and therefore should be trialled. (DLC functionality can be incorporate advanced meter infrastructure or DLC can be rolled-out independently of advanced meters.)

2.7 Independent Consultant's Report on Viability of DLC

In July 2007, a Smart Meter Working Group (SMWG) set up by the Council of Australian Government's (COAG's) Ministerial Council on Energy (MCE) appointed a team of consultants to undertake a cost benefit analysis to provide a basis for future decisions regarding a smart meter roll out in all Australian jurisdictions.

Contemporaneously with this study, ETSA Utilities separately engaged the consulting firm KEMA International (KEMA), which is internationally renowned for its work on smart metering and DLC, to develop a cost/benefit model specific to South Australia for DLC and to test the DLC alternative against smart metering.

The initial outcome of the modelling, at 2007 price points, determined that the alternatives of; (i) smart metering, (ii) DLC and smart metering and (iii) DLC alone all had negative NPVs so that a full scale roll out of any of the alternatives could not be justified.

However, our research with DSP at the time suggested a DLC solution in the form of a forerunner to the smart meter. This solution was termed the Peakbreaker+. Its NPV at 2007 price points was positive. However the positive quantum of the NPV was marginal if DLC was left to the consumer's discretion as to whether or not to take advantage of a DLC event. Importantly, the positive quantum of the NPV could be greatly enhanced if it was assumed that all new reverse cycle and ducted air conditioners were (mandated to be) pre-fitted with a device that provided for DLC functionality.

The overall conclusion of the KEMA report was that for DM to be cost effective and to maximise the benefits, it needs to be mandated by governments, including mandatory standards for certain electrical appliances to be pre-fitted with load control devices.

2.8 Large Scale DLC Trial

ETSA Utilities is currently rolling-out a large scale (5000 customer) defined area trial in the suburb of North Adelaide. The purpose of the trial is to assess, on a large scale over Summer 2011/12, the effectiveness of DLC combined with other smart grid technologies, including smart metering infrastructure.

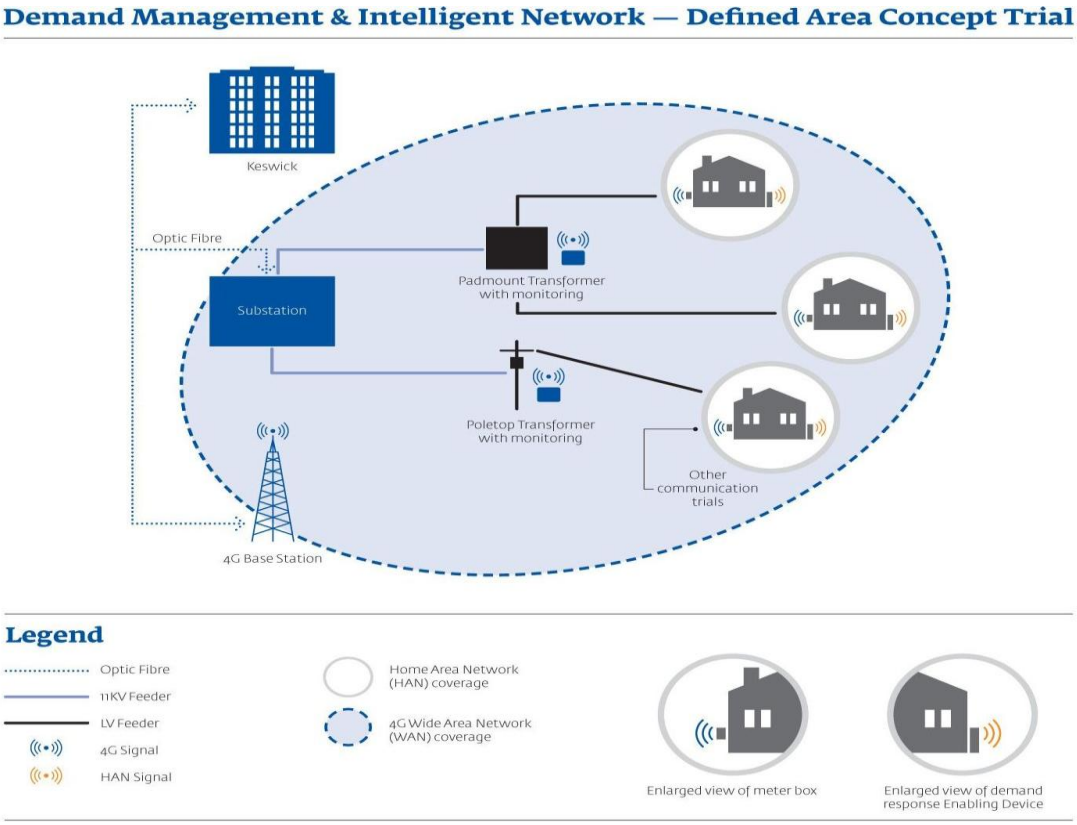

Diagram 1: Large Scale DLC Trial – North Adelaide

ETSA Utilities will be reporting on the results of the large scale DLC trial after Summer 2011/12.

2.9 Experience with Photo-Voltaic (PV) Cells in SA.

ETSA Utilities has experienced a significant take up of PV cells in SA due to favourable State feed-in tariffs and federal government incentives. This has enabled us to monitor the electricity demand of housing where PV cells have been installed. We have found that PV installations have marginally reduced the overall system's peak demand, the time at peak and delayed but not reduced the residential peak demand (which follows some hours after system peak demand). Consequently, the network infrastructure capacity requirements in residential areas have not decreased due to the installation of PV cells (as had been expected by some advocates).

Further, the installation of PV cells can cause voltage issues (ie high voltage levels) at a distribution transformer level where high concentrations of PV installations exist. This will result in either the energy output from the PV cells being constrained (ie inverter turns off PV cell) or will require further infrastructure reinforcement, thereby increasing distribution costs.

2.10 Energy Efficiency and Impacts on Distribution Costs Per Unit

ETSA Utilities recognises societal drivers to promote energy efficiency to reduce greenhouse gases and to help reduce customers' electricity bills. However, as average consumption falls in line with energy efficiency schemes and policies with

only marginal reductions in peak demand, the fixed infrastructure costs associated with network and generators will have to be recovered from less consumption. This will increase the per unit infrastructure cost and may offset the envisaged reduction in customers' electricity bills. That is, there is an equal imperative to address peak demand, in addition to energy efficiency.

Consequently, we consider that any energy efficiency measures must also include objectives related to peak demand reduction as well as consumption reduction. This should enhance benefits derived from energy efficiency measures.

This need is further highlighted by the South Australian experience with land developments that have mandated the construction of so-called energy efficient housing. Our experience is that while the overall energy consumption of these houses is lower than comparable housing the peak demand (ie during heatwaves) of theses houses can be the same or higher than comparable housing stock.

2.11 Aggregation of DSP Benefits

ETSA Utilities considers that the majority of benefits of any DM initiatives need to be captured by the party which funds the initiatives. However, it is difficult within the current regulatory arrangements (disaggregated industry roles, encompassing both monopoly and competitive regimes) for a single party to receive all the benefits from DM or for regulators to ensure customers ultimately receive the majority of the benefits through lower prices.

ETSA Utilities considers that future regulatory arrangements must provide the initiator/investor of the DM initiatives with the majority of the benefits that are derived from that investment. This will maximise the future benefits for customers.

Alternatively governments could mandate certain DM activities and allow industry participants to deliver the benefits to customers.