Single Electricity Market

DEMAND SIDE VISION FOR 2020

Decision Paper

27th May 2011

SEM/11/022

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EXECUTIVE SUMMARY

AIMS OF THIS DECISION PAPER

The respective governments of Ireland and Northern Ireland are pursuing a number of closely aligned energy policy goals. The common themes are (1) competitiveness; (2) security of supply; and (3) sustainability. In attaining the Island's electricity goals for 2020, the Regulatory Authorities (RAs) in the Republic of Ireland (RoI) and Northern Ireland recognise the potential which demand side management has to deliver significant economic and environmental benefits to the All-Island market. Realisation of this potential will require a high level of co-ordination between stakeholders and policymakers across a broad range of areas including energy efficiency, smart metering, large-scale demand side response, new forms of electric demand, aggregation of distributed generation and storage.

In 2010 the RAs commissioned a review of Demand Side Management to develop a Demand Side Vision for 2020. This Decision Paper follows a Consultation Paper (AIP/SEM/10/052) published on the 17th of August 2010. The Consultation Paper put forward an assessment of the merits of different DSM options, the associated development of a Demand Side Vision for 2020, and identified supporting policy measures and an implementation path to enable the 2020 Demand Side Vision to be delivered. A number of questions were raised in the consultation paper regarding the assessment, observations and provisional conclusions; seeking the views of all existing and potential stakeholders.

This Decision Paper provides (1) a précis of that Consultation Paper, (2) a summary of the comments received from industry stakeholders and (3) the final view of the 2020 Demand Side Vision and a prioritised list of measures to enable it to be delivered and (4) a list of decisions on the next steps to be taken by the SEM Committee and RAs. It is important to note that the SEM Committee or RAs separately do not have responsibility for all of the areas covered by this consultation and that some of the aspects highlighted are a matter for consideration by Government and other agencies.

THE NEED FOR GREATER DEMAND SIDE PARTICIPATION

In 2020 and beyond, the electricity system will be characterised by high levels of wind generation whose output profile will become a dominant driver of the electricity system. As a consequence, the key times (of peak 'effective demand') within each day will become far less predictable, at least more than one or two days ahead. It is expected that new forms of load such as electric vehicles or heat pumps, if not influenced by time-of-day pricing, will increase the magnitude of peak demand. In this context, demand side response could:

- contribute to avoided investment in peaking plant by delivering peak load reduction;
- avoid the curtailment of wind by increasing demand in the off-peak periods;

- provide flexibility to mitigate the uncertainty of wind output;
- contribute to providing frequency response and similar ancillary services at times when thermal generation does not run; and
- help mitigate transmission and distribution network constraints.

DEVELOPMENT OF THE PROPOSED 2020 DEMAND SIDE VISION

In both the Republic of Ireland and in Northern Ireland, a number of existing policies, initiatives, and market design features already assist and enable demand side actors to participate actively in electricity markets. The policies and measures currently in place will form the starting point for any set of new measures that need to be put in place to realise the Demand Side Vision for 2020. In developing a Demand Side Vision for the Island in 2020, a wide range of areas relevant to demand side response were considered. These were:

- energy efficiency;
- consumer behaviour change;
- smart meters;
- home and office automation;
- demand side bidding;
- new forms of electrical demand i.e.:
    - renewable heat; and
    - electric vehicles;
- aggregation of distributed generation; and
- storage.

Some of these measures, for example, electric vehicle penetration and smart meter roll-out, are the subject of well-defined policy goals. Others, such as home automation and storage, have received less attention from government and regulators. In all of the areas, there are further measures that could be taken in order to increase the volume of demand side response that may be expected to materialise by 2020 beyond the level that is expected under current market arrangements and with existing policies. These are demand side 'options', which may be technically feasible, economically cost-effective, but which would be expected to require further policy measures or regulatory changes to realise.

DESCRIPTION OF THE 2020 DEMAND SIDE VISION

The Consultation Paper described what the 2020 Demand Side Vision would look like. Specifically, it was proposed that the 2020 Demand Side Vision was for a world in which electricity consumers make informed choices about their use of electricity in the short term and their selection of appliances in the longer term. The prices they face would reflect the cost of supply at those times, and would provide appropriate rewards for

reductions in total consumption and changes in the profile of consumption. Consumers would face appropriate incentives to 'invest' (perhaps in terms of effort rather than financially) in methods which would allow them to better manage their consumption.

Demand would play an active part in the process of system balancing and market price formation through a combination of autonomous response to expected market prices, dynamic response to market prices over a range of timescales and the inclusion of some dispatchable demand (and distributed generation) in the centralised processes of price formation and dispatch. It was recognised that different types of consumption are flexible over different timescales and with varying degrees of notice; and the demand side mechanisms offered would reflect these different needs and the different degrees of value that such flexibility delivers.

The paper recognises that there may be certain requirements for demand management which cannot be dealt with through price alone, perhaps due to specific needs of the transmission or distribution system operators (e.g. within-hour dispatch or local network constraints), and appropriate arrangements would also need to be in place to allow demand side flexibility to be captured for these purposes where required.

Consumers would have a different attitude to their electricity consumption compared with today. They would recognise the consequences of their consumption and the level of consumer awareness would be high.

Towards 2020 and beyond, electrification of heat and transport would play a significant role in the decarbonisation of the entire energy system for the Island, facilitating high levels of production of electricity from renewable sources. Flexibility of demand would play a key part in balancing the output of the variable sources of generation, alongside interconnection, flexible thermal generation (including distributed generators) and perhaps bulk electricity storage. This would enable a move away from the present 'predict and provide' arrangements – in which generation is varied to meet demand – towards a world where demand is able to flex to match the output of variable sources of generation.

IDENTIFICATION OF POLICY OPTIONS AND PATHWAYS

In considering the potential policy options for delivering the proposed 2020 Demand Side Vision, all measures considered were presented in the Consultation Paper to ensure that a broad range of policy options were available for consideration as part of the consultation process. The approach to evaluating the different demand side implementation options was to perform a qualitative assessment of costs and benefits of the various options over and above that which is assumed to be implemented under a policy 'baseline' for 2020. On the basis of this assessment, the provisional categorisation of the value of the demand side measures defining the 2020 Demand Side Vision was as follows:

- **High value:** energy efficiency, smart metering with advanced in-home displays and dynamic time-of-use tariffs, and industrial and commercial demand side response.

- **Medium value:** home and office automation, electric vehicles with dynamic price responsive charging, and aggregation of distributed generation.
- **Low value:** behavioural change and storage.

On the basis of the above, the Consultation Paper summarised a number of policy recommendations, which would be required to support delivery of the 2020 Demand Side Vision, grouped by 'value' and implementation time frame. The consultation indicated that this provisional categorisation of policy recommendations could be used to define a number of potential policy pathways, which could be tailored to meet institutional responsibilities, capacity and government funding where required. As such it formed the basis of the initial recommendations in the Consultation Paper, on which we sought stakeholder feedback.

OVERVIEW OF STAKEHOLDER RESPONSES TO THE CONSULTATION PAPER

A total of 24 organisations responded to the 2020 Demand Side Vision Consultation Paper. While in agreement with the general thrust of the assessment and policy recommendations, respondents made a number of key points that are outlined below, together with our view:

- **Approach for policy recommendations:** A number of respondents indicated their view that this assessment was trying to pick winners and that enabling DSM should really be about removing over restrictive rules and other barriers to DSM.
    - Identifying barriers and making recommendations to remove them has very much been the focus of the process to define the 2020 Demand Side Vision. The aim of the 2020 Demand Side Vision is to create the right environment for entrepreneurs as a mean of delivering innovation and cost-effective demand side management.
- **Consumer centric analysis:** A large number of respondents noted that the consumer was not at the heart of the analysis while the merits of the demand side activity should really be assessed on the extent to which they result in lower bills for the end-consumer.
    - Whilst the customer was not explicitly at the centre of the Consultation Document, the aim of the assessment was to determine the value of demand side measures to the customer by identifying their value for the power system and their contribution to policy goals. For the avoidance of doubt that our ultimate aim under our 2020 Demand Side Vision is to deliver benefits to the end user; explicit mention of the value for the end-user as the target of this 2020 Demand Side Vision is now included.
- **Electric storage and heat storage:** Respondents highlighted that there heat storage and electric storage were assessed together whilst they have very different features and benefits.

- In the revised assessment, we have separated these two demand side measures.

- **Interaction between measures:** It was pointed out that understanding the interactions between the DSR measures was critical. Examples included energy efficiency limiting the amount of flexible demand or measures acting as enablers of others; conversely, electrification has been mentioned as a means of preventing wind shedding.

  - We agreed with this point which has been outlined in our final assessment.

- **Network Benefits:** Based on respondents' feedback, we have added 'Network Benefits' contribution of demand side measures in the high level assessment of options value.

In addition, respondents identified a number of points of detail and/or of refinement which if addressed they felt would improve the both the robustness of the 2020 Demand Side Vision and its delivery via proposed policy pathways.

FINAL VIEW OF DEMAND SIDE OPTIONS AND POLICY PRIORITIES

Feedback from the respondents has been taken into account to obtain the final view of the relative merits of different demand side options as set out in Section 3.3**.** Changes we have made from the original proposals put forward in the Consultation Paper (AIM/SEM/10/052) published 17th August 2010 are highlighted in red. The key changes to the assessment of the costs and benefits of different demand side options are:

- The addition of "Network Benefits" and "Operating and Tertiary Reserve" categories in the assessment matrix; which alters the overall ranking of home and office automation measures from 'Medium' to 'High' as they rank very high on the new Network benefits criterion. It also reflects how critical automation in facilitating behavioural change.

- The separation of heat storage from electricity storage. Our assessment concludes that it has a 'High' overall ranking with a high contribution against the electricity market metrics as well as a low cost since it is already in place in a lot of households.

- The Security of Supply ratings of industrial and commercial energy efficiency have been increased from 'Medium' to 'High' as the contribution of these two sectors to Security of Supply should be the same as domestic energy efficiency. This leads us to raise the overall ranking of commercial energy efficiency to increase from 'Medium' to 'High'.

- The Security of Supply ratings of static ToU tariffs have decreased as they can only mitigate the effect of a static peak in demand whereas dynamic ToU tariffs can mitigate the impact of periods of low wind and thus contribute more to

Security of Supply. The Security of Supply rating for advanced display has also decreased as while it enables behavioural change, it does not provide benefits of its own. The overall rating of static ToU tariffs has changed from 'Low' to 'Medium' on the basis that it has merit in the interim but may present local network issues as an enduring solution.

- Heat pumps rankings have been modified for some criteria; as their contribution to Green job creation as well as their benefits in terms of carbon emissions had been underestimated. Overall these changes translate into an overall ranking becoming 'Low' rather than of 'Limited' value.

	Competitiveness		Security of supply		Sustainability		Electricity market metrics					Cost of delivery	Overall ranking
	Competition & consumer choice	Green job creation	Generation capacity margin	Transmission capacity	Energy efficiency	Accelerated growth of RES	Generation costs / CO_2 emissions	Generation capacity costs	Network Benefits	Operating and tertiary reserve	Frequency response		
Energy efficiency - Industrial	Neutral	Medium	High	High	Medium	Medium	Medium	Medium	Medium	No	No	Medium	High
Energy efficiency - Commercial	Neutral	Medium	High	High	Medium	Medium	Medium	Low	Medium	No	No	Medium	High
Energy efficiency - Domestic	Neutral	Medium	High	High	Medium	Medium	High	High	Medium	No	No	Medium	High
Behavioural change - Education	Neutral	Medium	Medium	Medium	Medium	Medium	Medium	Low	Low	No	No	Low	Low
Smart meter system - Advanced displays	Medium	Medium	Low	Low	Medium	Low	High	High	Low	No	No	Low	Medium
Smart meter system - Static ToU tariff	Medium	Medium	Medium	Medium	Medium	Medium	High	High	Low	No	No	Low	Medium
Smart meter system - Dynamic ToU tariff	Medium	Medium	High	High	Medium	High	High	High	Medium	No	No	Medium	High
Home & office automation - Direct load control	Medium	Medium	High	High	Neutral	High	Medium	High	High	Yes	?	Medium	High
Home & office automation - Autonomous	Medium	Medium	High	High	Neutral	High	Medium	High	High	?	No	Low	High
Home & office automation - Frequency-responsive relays	Medium	Medium	Neutral	Neutral	Medium	Neutral	Low	Low	High	No	Yes	Medium	High
Industrial & Commercial DSR - Interruption contracts	Medium	Neutral	High	High	Neutral	High	Medium	High	High	Yes	No	Low	High
Industrial & Commercial DSR - Direct load control	Medium	Neutral	High	High	Neutral	High	Medium	High	High	Yes	?	High	High
Industrial & Commercial DSR - Demand-side bidding	Medium	Neutral	High	High	Neutral	High	Medium	High	High	Yes	No	High	High
Industrial & Commercial DSR - Autonomous	Medium	Neutral	High	High	Neutral	High	Medium	High	High	?	No	Medium	High
Heat pumps - Heat pumps are fitted with storage	Neutral	Medium	Medium	Medium	Neutral	High	High	Medium	Low	Yes	No	High	Low
Electric vehicles - Night charge	Neutral	Medium	Medium	Neutral	Neutral	Low	Low	Medium	Medium	?	No	Low	Neutral
Electric vehicles - Hybrid vehicles	Neutral	Medium	Medium	Medium	Neutral	Medium	Low	Medium	Low	?	No	Medium	Neutral
Electric vehicles - Intelligent (price-reponsive) charging	Neutral	Medium	Medium	Medium	Neutral	Medium	Low	Medium	Medium	?	No	Medium	Medium
Microgeneration - Controllable	Neutral	Neutral	Medium	Medium	Neutral	Low	Low	Medium	Medium	Yes	?	Low	Neutral
Aggregation of DG	Medium	Neutral	Medium	Medium	Neutral	Medium	Medium	High	High	Yes	?	Low	Medium
Storage - Electric	Neutral	Neutral	Medium	Neutral	Negative	Medium	Low	Medium	Medium	Yes	Yes	High	Low
Storage - Heat	Neutral	Neutral	Medium	Neutral	Negative	Medium	High	High	High	Yes	?	Low	High

Note: While value to consumer is not explicit in this table, the options are assessed against general policy goals which are important to the consumer (security of supply, sustainability, competitiveness). The options are also assessed on the benefits they provide to the electricity market; benefits which will translate into lower bills for the consumer. The 'Overall ranking' column threfore reflect the value of the option from the consumer perspective.

Note: the demand side options have been evaluated independently and therefore this assessment does not take into account conflicts between options. For instance, energy efficiency decreases the amount of demand that can be moved and is therefore detrimental to demand flexibility.

Table 1 – Final evaluation of the demand side options against assessment criteria.

On the basis of the refined view of the merits of different demand side options, we refined our thinking to deliver our final view of the relative value and priority of policy actions which we believe are necessary to help support the delivery of the 2020 Demand Side Vision. This is presented in Table 2. The key changes are the following:

- Based on respondents' feedback a recommendation of high value which is relevant to all demand side measured has been added. It proposes to review the pricing of ancillary services in the SEM. We believe this should be done immediately as this simple measure would enable the development of demand side activities.

- Industrial and commercial demand side response has been changed from a 'Medium' to a 'High' value based on feedback from respondents.

- Based on an assessment of heat storage and the respondents' feedback, the value of that heat storage is now 'High'. Therefore one of the recommendations is to review the Building Regulations to ensure that new housing stock is equipped with heating system the most beneficial for the electricity system.

- Based on the revised assessment of heat pumps in the light of respondents' feedback, the overall ranking of heat pumps was increased from 'Limited' value to 'Low' value.

	Demand-Side Measure	Immediate	Short to Mid Term	Long Term
High value	Energy efficiency		More ambitious roll-out of energy efficiency measures	
	Industrial / commercial demand side response	Create visible / firm day-ahead price and schedule for the SEM	Study on volume and nature of flexible demand available in the I&C sectors	
		Review of TSC & Grid Code to identify barriers to participation of I&C demand	Programme of engagement with I&C sectors to increase awareness of potential for demand-side participation	
	Smart meter systems	Smart meter specifications to allow for advanced displays & in future dynamic ToU tariffs	Education programme on benefits of smart meters	
			Interventions to accelerate adoption of ToU tariffs	
	Home & office automation	Smart meter specifications to allow for future needs of smart appliances	Smart meter trial with focus on home & office automation	Mandatory standards &/or subsidies to encourage adoption of smart appliances
			Labelling scheme for smart appliances	Review the impacts of demand-side management on distribution networks
				Assess value of dynamic demand based on GB trials
	Heat storage	Review the Building Regulations to ensure that new housing stock is equipped with the heating system the most beneficial for the system.		
	All	Review the pricing of ancillary services in the SEM		
Medium value	New demand – electric vehicles	Smart meter specifications to allow for interaction with EV charging systems	Review the impact of EVs for the electricity system	
				Review in detail the impacts of demand-side management on distribution networks
	Aggregation of distributed generation	Create visible / firm day-ahead price and schedule for the SEM	Develop standard contract structures and/or other measures to facilitate participation from DG	Detailed review of barriers facing distributed generators
		Review of TSC & Grid Code to identify barriers to participation of I&C demand	Review of network design standards or practices – identify barriers	
Low value	Behavioural change		Labelling scheme & education programme for smart appliances	
	Electric storage	Review payments to pumped storage through the SEM	Review support for R&D activities relating to distribution-level storage	
	New demand – heat pumps			Incentivise storage technologies for heat pumps
Limited value	Microgeneration	Smart meters required to interact with microgenerators		

Table 2 – Final Table of policy options by value and timescale.

NEXT STEPS

This review was intended to look at the role of Demand Side Management in a broad context, looking at the range of options for increasing the level of demand side participation on the island. The relative value and priority of policy actions necessary to help support deliver our 2020 Demand Side Vision have been identified. Having reviewed the revised recommendations, the SEM Committee is setting out the next steps with regard to the development of demand side participation on the island. It should be noted that there are already a number of areas where work is underway in bringing about a market environment that facilitates active demand side participation, both in terms of domestic and business customers. In that context the SEM committee / RAs (as appropriate) will implement the following decisions.

1. The SEM Committee and RA's will continue to liaise with the relevant bodies and government departments with regards to energy efficiency measures in both jurisdictions and will endeavour to promote a roll out of energy efficiency measures through the development and implementation of remedies outlined in the NEEAP in ROI and the NISEP in NI.

2. The SEM Committee will ensure that consideration is given in any modification to the trading and settlement code to introduce firm day ahead pricing in the SEM allowing the support of demand side participation. Demand side participation in the market will be integrated as a key driver into the project going forward.

3. The SEM Committee will write to the T&SC Modifications Committee Chair asking it to consider any barriers to DSM identified through current modifications and to consider the implications for demand side participation in relevant future modifications brought before the T&SC Modifications Committee. The T&SC Modifications Committee will be required to report back to the SEMC.

4. The SEM Committee will meet regularly with industry representative groups including the Irish Business and Employers Confederation (IBEC) and the Confederation of British Industry (CBI Northern Ireland) to consider what further actions can be taken to engage with the industrial and commercial sector to facilitate further work in this area.

5. CER will request that the TSOs consider if/how the current retail demand reduction schemes in ROI will fit within the harmonising and further review of Ancillary Services currently proposed by the TSOs. It is the SEM Committee's view that this review should also include an examination of the pricing of Ancillary Services with a view to promoting demand response.

6. Both RAs will monitor the introduction of Time of Use tariffs individually (where smart meters have been installed). With reference to the requirements of the Energy Services Directive, this may include the implementation of mandatory requirements for Time of Use tariffs.

7. In principle the RAs support the proposal for mandatory standards and/or subsidies to encourage adoption of smart appliances. The RAs will, via the publication and dissemination of this report, and through regular engagement with industry representative groups including IBEC and CBI Northern Ireland, bring these recommendations to the attention of manufacturers and relevant government.

8. The RAs will consider the impact of demand participation on distribution networks and the value of dynamic demand in line with the development of smart grids.

9. The SEM Committee will write to the T&SC Modifications Committee and Grid Code Committee Chairs asking them to consider any barriers facing distributed generators and/or other measures to facilitate participation from distributed generation. The T&SC Modifications Committee and Grid Code Committee will be required to report back to the SEM Committee.

10. The RAs will monitor the network needs for electric vehicles and will liaise with the DSO's to ensure that the distribution networks are capable of handling future volumes of EVs, both in the medium and longer term.

11. The SEM Committee will consult with industry on the development of standard contract structures between aggregators and capacity providers, which may facilitate participation from distributed generation (DG).

12. The SEM Committee supports the concept of a scheme for the labelling of smart appliances and will ensure that the benefits of such a scheme are communicated to relevant industry groups and government departments. If a labelling scheme for smart appliances was put in place the RAs will engage with the relevant actors to promote the scheme and ensure that consumers are fully informed.

13. The SEM Committee will request that the TSOs undertake a review covering payments for system wide storage and provide recommendations to the SEM Committee.

Much still needs to be done in order to remove the remaining barriers and engage customers. The RAs recognise the potential for demand side measures to deliver significant economic and environmental benefits to the All-Island market. To this end the RAs will conduct an annual review of progress with respect to the delivering the recommendations of the Demand Side Vision 2020 and publish its report. The SEM Committee is fully committed to the delivery of the Demand Side Vision and intends to review progress with respect to the delivery of the recommendations within this report on an annual basis.

1 INTRODUCTION

The Regulatory Authorities (RAs) in the Republic of Ireland (RoI) and Northern Ireland recognise the potential which demand side management has to deliver significant economic and environmental benefits to the All-Island market. Realisation of this potential will require a high level of co-ordination between stakeholders and policymakers across a broad range of areas including energy efficiency, smart metering, large-scale demand side response, new forms of electric demand, aggregation of distributed generation and storage.

In 2010 the RAs commissioned Pöyry[1] to do a review of Demand Side Management to develop a Demand Side Vision for 2020. This involved defining what is meant by demand side response, reviewing international experience, looking at the policy and market drivers for demand response on the island and finally the identification and assessment of supporting policy measures, with an implementation path, to enable the 2020 Demand Side Vision to be delivered. This decision paper, which follows a Consultation Paper published on the 17th of August 2010, presents the comments received from industry stakeholders on the assessment of the merits of different DSM options, the associated development of a Demand Side Vision for 2020, and the identification of supporting policy measures. These comments have been taken into account to formulate the 2020 Demand Side Vision and to elaborate a prioritised list of measures to enable the 2020 Demand Side Vision to be delivered.

It is important to note that the Irish RAs do not have responsibility for all of the areas covered by this consultation and that some of the aspects highlighted are a matter for consideration by Government and other agencies.

1.1 CONTEXT FOR DEFINING A 2020 VISION FOR DEMAND SIDE RESPONSE

Lack of participation by the demand side has long been identified as a weakness in electricity markets. It is well-established that demand side participation brings a number of benefits to electricity markets, including increased security of supply (or a reduced cost of delivering the same security of supply), greater efficiency in consumption and increased competition both in the wholesale and retail markets.

Historically, the high level of security of supply demanded by governments, regulators and customers has led to electricity companies focusing on having sufficient generation capacity to reduce the probability of loss of load to almost vanishing levels. The advantage of a generation-led strategy is essentially one of control: it has been easier to be certain of delivering power station capacity than controlling demand.

During the coming decade, this paradigm will be eroded from two directions; by changes in the characteristics of the wholesale market, and in demand side technology.

[1] Pöyry Management Consulting (UK) Ltd

The first is that generation will become inherently less controllable as the installed wind capacity increases on the Island. This will make it more technically difficult and costlier to vary generation levels in response to fluctuations in demand. The second is the emergence of new technologies, including smart metering, which will have the potential to lower the cost of demand side participation – a factor that has been a significant barrier in the past. Awareness of climate change and higher energy costs are likely to accelerate these trends, as consumers become more aware of the implications of their energy consumption.

WHY ARE POLICIES NEEDED TO SUPPORT DEMAND SIDE MANAGEMENT?

The intent of the work is primarily to identify those demand side measures which are economically advantageous and which may merit some form of policy intervention. Within the context of a competitive electricity market, the rationale for any form of policy intervention needs to be considered carefully. The default assumption should be that – except for the existence of a specific barrier – then to the extent that demand side management of any form is economically viable, it should also be financially viable and the market participants themselves should deliver it without policy support.

Therefore, in cases where some policy intervention is justified, we would generally expect that intervention should be to correct a barrier of some description. This might be one of the classic types of market failure from economic literature, or a refinement to the existing set of policy or regulatory arrangements. It should be made clear that the need for a policy intervention does not necessarily imply any direct or indirect financial support; this is an important issue given the current need for thrift from within the public budget. Generally, we would expect the types of demand side response which merit immediate policy intervention to be broadly self-financing for the key stakeholders, although, perhaps over relatively long timescales.

CONTRIBUTION TO COMPETITIVENESS

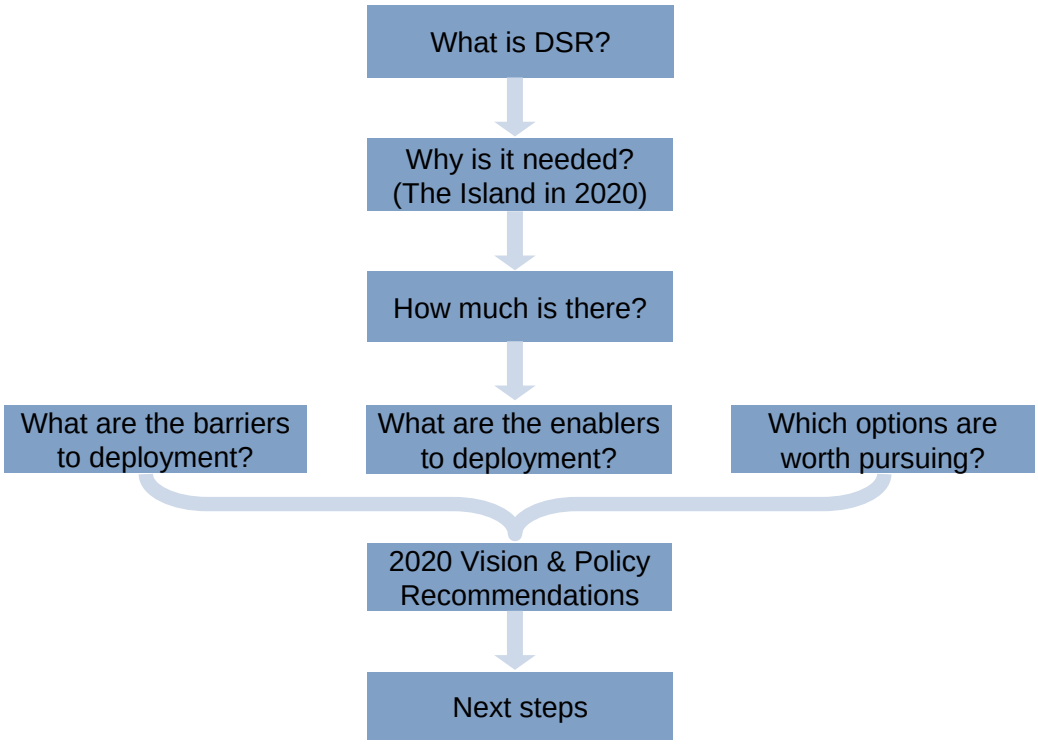
One potentially valid reason for providing a supportive policy framework for demand side management is to provide the All Island market with a competitive advantage in the world economy. Direct fiscal measures to reduce electricity prices to consumers (such as industrial customers in energy-intensive and internationally competitive industries) are not generally considered desirable and are likely to contravene European state aid provisions. However, there is scope for various forms of direct policy support for newly formed industries and to support energy efficiency, CO^2 emission reductions and renewables; as part of a drive to develop a green and smart technology based economy.

The All Island economy is relatively strong in the areas of finance, software and systems development and high-level design, but with no real competitive advantage in mass manufacturing. As a result, we see some value in supporting the development of intelligent systems for automation of demand response, but it is unlikely that this will

lead to significant employment in the mass manufacturing of smart appliances or electric vehicles.

1.2 ROADMAP FOR THE DEVELOPMENT OF A 2020 DEMAND SIDE VISION

The approach to the development of a Demand Side Vision for the Island in 2020 as adopted in the Consultation Paper issued on the 17th of August 2010 is illustrated below.



Firstly the paper defined what is meant by demand side response, its role and benefits, and discussed the generic lessons obtained from the experience of international deployment. Moving from the general to the specific, it examined the current policy drivers and the likely characteristics of the electricity market on the Island in 2020, and how this will affect the need for the services which demand side measures can deliver. Having established the requirements, we then attempted to evaluate the size of the potential demand side resource, identify the barriers and enablers to deployment and evaluate which of the different demand side options on the Island were worth pursuing.

This evaluation of demand side options in a 2020 context allowed us to propose a Demand Side Vision for the Island in 2020, as presented in t Consultation Paper of 17th August 2010, and suggest policy recommendations to realise it. The Consultation Paper concluded by outlining the proposed next steps towards defining a demand response programme for the All Island market.

1.3 BASIS FOR THE DECISION PAPER

This Decision Paper is the final step in defining the 2020 Demand Side Vision and it includes a high level implementation plan associated with delivery of the 2020 Demand Side Vision. Stakeholders have played an important part in this process through their participation in three workshops, in February 2010 in Dundalk prior to the Consultation Paper publication, in September 2010 in Belfast and Dublin after the Consultation Paper had been published, and finally through their responses to the Consultation Paper published on 17th August 2010.

This Section, 1, has set out the context of this Decision Paper.

Section 2 summarises both the approach taken to elaborate the 2020 Demand Side Vision and the proposed Vision itself as presented in the Consultation Paper published the 17th of August 2010.

Section 3 summarises the responses to the consultation we received from a range of industry stakeholders.

Section 4 presents the final refined version of the 2020 Demand Side Vision and its associated policy pathway; based on respondents' feedback and further consideration; which will be taken forward as appropriate[2].

Section 5 considers what the next steps should be to realise the 2020 Demand Side Vision, recognising what can be done within the regulatory vires and sets out the RAs next steps.

[2] This Decision Paper considers the 2020 Demand Side Vision from a holistic perspective. The vires of the Irish Regulatory Authorities allow us to seek to directly implement many, but not of all of the policy recommendations. As a consequence, a number of elements of the Vision and supporting policy pathways will be within the remit of Government and other policy bodies to consider and take forward.

2 SUMMARY OF OUR PRECEDING CONSULTATION PAPER

The Consultation Paper (AIP/SEM/10/052) which set the basis for this Decision Paper was published on the 17th of August 2010. The Consultation Paper put forward an assessment of the merits of different DSM options, the associated development of a Demand Side Vision for 2020, and the identification of supporting policy measures and their implementation path to seek to enable the 2020 Demand Side Vision to be delivered.

Throughout the Consultation Paper a number of questions were raised regarding the assessment, observations and provisional conclusions; seeking the views of all existing and potential stakeholders. Furthermore; to help capture and compare the views of all stakeholders and to understand the basis of their interest in the development of DSM in the All Island market, a Questionnaire Form was published alongside the Consultation Paper to facilitate stakeholders responses to the questions raised in the Consultation Paper.

2.1 ROLE AND BENEFITS OF DEMAND SIDE RESPONSE

Within the context of the Consultation Paper the term 'demand side response' (DSR) was defined to include changes in the characteristics and behaviour of a range of decentralised demand and (distributed) generation types. This included overall demand reductions, changes in the profile of demand (or distributed generation) to alleviate peaks, and the provision of flexibility to allow the system to adapt to unexpected events. The scope of the Consultation Paper encompassed energy efficiency, behavioural change, smart metering, home and office automation, industrial and commercial demand side response, new forms of electric demand, aggregation of distributed generation and micro-generation, and storage.

DSR confers a range of other potential benefits. These include reducing generators' market power, enhancing security of supply (or reducing the cost of delivering a given level of supply security) and facilitating retail competition.

The benefits which different forms/types of demand side response provide may be defined in terms of one or more of the following three types of modification to the demand profile (or to the effective demand profile, via changes to the profile of distributed generation):

- **overall demand reduction,** which refers to measures which reduce energy consumption; typically the target of efficiency programmes;
- **static peak reduction,** which encompasses measures which enable changes to be made to the profile of demand to alleviate system peaks; obvious examples of this are static time-of-use tariffs and static peak load reduction contracts; and
- **flexible measures,** which allow demand, or load, to be shifted in response to system condition on the day, such as dynamic time-of-use tariffs and dynamic system operator interruption contracts.

Demand side measures can also provide a fourth type of benefit, namely, **ancillary services** –this issue has not been evaluated in detail, except briefly to discuss new technologies, currently being trialled which enable devices such as fridges and freezers to respond automatically to changes in system frequency.

Different demand side measures will deliver one or more of these benefits. Understanding the nature and materiality of the benefits delivered forms a critical part of assessing the relative merits of different demand side options and thus the development of a Demand Side Vision for 2020.

2.2 INTERNATIONAL EXPERIENCE OF THE BENEFITS OF DEMAND SIDE ACTIVITY

To support the development of a 2020 Demand Side Vision, a detailed analysis of international experience and best practice in demand side management schemes covering more than 200 schemes was undertaken. In the Consultation Paper, the findings were broken down into four main categories and are summarised below:

2.2.1 ENERGY EFFICIENCY

- significant economies of scale can be achieved by targeting a whole sector or industry;
- actual savings from efficiency schemes can be lower than estimated beforehand as they fail to take into account complex technical, economic and behavioural factors;
- small and medium-sized enterprises can be particularly difficult to engage;
- publicity is important for targeting households but the effect of advertising in itself is short-lived;

2.2.2 ENHANCED FEEDBACK

- increased awareness of energy use consistently leads to reductions;
- maintaining consumers' interest can be difficult, but in some cases the response persists (particularly where there is an interactive element to the feedback or a comparison with past performance or peer' performance);
- helping consumers to interpret data can enhance energy savings;

2.2.3 TIME OF USE TARIFFS

- critical peak pricing schemes which expose consumers to higher prices at times of system stress, usually with day-ahead notification to consumers can significantly reduce demand at peak;

- most of the demand reduction in peak periods is shifted rather than removed;
- financial savings need to be considerable for consumers to be interested in time of use pricing;

2.2.4 DEMAND SIDE FLEXIBILITY AND HOME AUTOMATION

- where customers can opt out from direct control, the effectiveness of the programmes tends to reduce as the length of time for which the response is required increases;
- changes to end-use technologies can reduce the potential for demand side flexibility as a consequence of compatibility issues with control technology; and
- even decentralised responses can be highly predictable – automated devices and human actions can also produce a reliable response at peak.

In general, the technical, or theoretical, potential for demand side resource tends to be significantly higher than can be realised. Therefore, of key interest to policy makers is what proportion of this response can be delivered to the market and how it can be maximised.

2.2.5 QUANTITATIVE BENEFITS REALISED

The main 'quantitative' insights include the following:

- measures that improve energy efficiency or rely on modifying electricity users' behaviour consistently reduce the relevant customers' total energy demand, with reported savings often in the range 5%-15% of those customer total demand;
- introducing automation in the home and in commercial and industrial settings significantly increases the potential for peak reduction compared to other measures i.e. by up to 80% compared to less than 20%; and
- distributed generation and microgeneration can offer significant flexibility as a percentage of their capacity (depending on their energy source) i.e. above 50%.

2.3 POLICY DRIVERS AND THE ALL-ISLAND ELECTRICITY MARKET IN 2020

The respective governments of Ireland and Northern Ireland are pursuing a number of energy policy goals which are closely aligned. The Republic of Ireland's Energy White Paper of 2007 sets out strategic goals under the three headings of Security of Supply, Sustainability of Energy and Competitiveness of Energy Supply. In its consultation on the Draft Strategic Energy Framework 2009, DETI used a similar structure to propose a policy framework for Northern Ireland. The table below summarises some of the main common policy themes.

Policy area	Policy goals
Competitiveness	Encouraging competition and consumer choice in energy markets
	Maximising innovation, enterprise and job creation in the energy sector
Security of Supply	Ensuring electricity supply consistently meets demand
	Increasing fuel diversity in electricity generation
	Maintaining and upgrading networks to ensure efficient and reliable gas and electricity delivery to consumers
Sustainability	Incentivising and accelerating the growth of renewable energy sources
	Maximising energy efficiency and energy savings opportunities

These policy goals and the measures used to deliver them – notably those relating to sustainability and concerns over security and diversity of energy supply – will cause significant changes to the electricity system in the All Island market over the coming decade. Coupled with the increases in fossil fuel prices over recent years these policy goals will also impact on prices and affordability, driving investment in energy efficiency and end use technologies.

In attaining the Island's electricity goals for 2020 and responding to changes in the electricity system relying only on generation to balance the system will not be necessary or desirable. The demand side can play a substantial and economically valuable role.

2.4 IRISH MARKET DRIVERS OF THE FUTURE REQUIREMENT FOR DEMAND SIDE ACTIVITY

In assessing the future need for – and value of – demand side response on the Island, a number of common themes arise and these are set out below.

In the day-to-day timescales over which demand response can be exercised, variation in the underlying level of demand is currently the most important determinant of electricity price and the cost of production. Such demand variation is (to a high degree) predictable, and the critical times in each day can generally be forecast significantly in advance.

In 2020 and beyond, the electricity system will be characterised by high levels of wind generation whose output profile will become a dominant driver of the electricity system. As a consequence, the key times (of peak 'effective demand') within each day will become far less predictable, at least more than one or two days ahead.

It is expected that new forms of load such as electric vehicles or heat pumps, if not influenced by time-of-day pricing, will increase the magnitude of peak demand.

Changes in the Irish electricity system will be dominated by the planned increase in wind generation to 2020 and beyond. This is a key driver of the need for and the value of demand side activity in the All Island market, for the following reasons:

- total installed generation capacity required to meet a given level of peak demand will increase and some build of dedicated peaking plant is expected; therefore, to the extent that demand side management can deliver reliable peak load reduction (at times of low wind output), the cost of this additional build can be avoided and the value of the demand measures will be high;
- there will increasingly be times at which not all of the wind on the Island can be accommodated, and the price of electricity at these (overnight) times is expected to fall, leading to a significant value in being able to increase demand in these off-peak periods (especially at times of high wind availability);
- there will be greater uncertainty over the timing of the 'effective peak' (meaning the peak of demand, net of wind, which determines the output of thermal generation) and therefore the value of flexibility (the ability to move load at relatively short notice in response to changing wind conditions), in order to avoid generator part-loading and unit starts, will increase;
- as thermal generation is squeezed from the merit order, the cost of provision of frequency response and similar ancillary services will increase, and the contribution of the demand side to these services will be increasingly valuable;
- the incidence of transmission constraints is expected to increase; therefore to the extent that demand side measures are able to mitigate transmission constraints, then the need for demand side management may differ by region; and

- distribution network issues may place a limit on the potential for demand side response at the lower voltage levels (or, alternatively, to the extent that the needs of the distribution networks are not considered in the roll-out of demand side response, some of the potential benefits of demand side response to substitute for distribution investment may be lost).

2.5 DEMAND SIDE POTENTIAL IN THE ALL ISLAND MARKET

In both the Republic of Ireland and in Northern Ireland, a number of existing policies, initiatives, and market design features already assist and enable demand side participants to participate actively in electricity markets. The policies and measures currently in place will form the starting point for any set of new measures that need to be put in place to realise the Demand Side Vision for 2020.

In the SEM, Demand Side Units (with a minimum size of 4MW) can offer demand reductions into the pool, receiving a capacity payment for availability and a payment for demand reductions actually delivered as a result of receiving a dispatch instruction.

There are a number of SO schemes already in existence to incentivise reward demand reduction at peak times, for example the EirGrid's STAR (interruptible load) scheme which has been operating for more than 20 years, and its Winter Peak Demand Reduction Scheme (WPDRS); and Electric Ireland's WDRI tariff scheme. The form of and need for these are currently under review by EirGrid and SONI.

A number of energy efficiency initiatives have also been put in place in the Republic of Ireland and in Northern Ireland. In the Republic of Ireland, these currently focus on a few key areas across the residential and business sectors. Building improvements span from building energy ratings (BERs), to mandatory standards for new housings and Greener Homes schemes. The Home Energy Savings Scheme (HES) provides financial support for home energy performance upgrades. The Power of One programme provides online tools for the residential sector and monitoring and benchmarking tools for the business sector. It has also developed energy labelling schemes, advertising campaigns and information guides have been produced in order to change consumer behaviour.

In Northern Ireland, NIE's SMART programme already encourages the use of demand side management and embedded generation as alternatives to conventional network reinforcement, and in the Republic of Ireland ESB Networks is also doing some work of relevance to smart grids, for example by increasing its use of SCADA technologies.

Looking forward to 2020, the analysis of Irish demand suggested a number of key messages.

2.5.1 KEY MESSAGES ARISING FROM ANALYSIS OF TOTAL DEMAND

Demand from new types of load is expected to be relatively small, compared to existing demand. Even if the Republic of Ireland's electric vehicles goal were to be met fully, the total demand from these would be an order of magnitude smaller than

demand from domestic water heating, for example. Projected demand from heat pumps is larger but still only around half of the existing electric domestic space heating load.

There is significant uncertainty and lack of information on the components of demand, particularly electricity end-use in the industrial and commercial sectors. This makes it difficult to draw insights into the nature of the flexibility which might be available and where within these sectors any additional measures should be targeted.

2.5.2 KEY MESSAGES ARISING FROM ANALYSIS OF THE FLEXIBLE DEMAND RESOURCE

The potential for flexibility from heat pumps and electric vehicles is relatively small in absolute terms. Unless there are compelling reasons to concentrate on deriving flexibility from new sources of demand, it may be more effective to concentrate on taking advantage of existing demand with potential for flexibility, such as space and water heating.

Among existing demand, space and water heating appear to offer the largest potential for flexible operation in the industrial, commercial and domestic sectors. The degree to which appliances and non-heating loads can be flexible in these sectors is unclear, but it appears to be considerably smaller than the potential flexibility of heating. There is considerable uncertainty over the scale of flexibility available from different industrial processes, suggesting the need for some form of sector by sector audit.

2.6 CURRENT POLICY BASELINE FOR DEMAND SIDE MANAGEMENT

In developing a Demand Side Vision for the Island in 2020, consideration was given to a wide range of areas relevant to demand side response. These were:

- energy efficiency;
- consumer behaviour change;
- smart meters;
- home and office automation;
- demand side bidding;
- new forms of electrical demand i.e.:
    - renewable heat; and
    - electric vehicles;
- aggregation of distributed generation; and
- storage.

Some of these measures, for example, electric vehicle penetration and smart meter roll-out, are the subject of well-defined policy goals. Others, such as home automation and storage, have received less attention from government and regulators.

In all of the areas, there are further measures that could be taken in order to increase the volume of demand side response that may be expected to materialise by 2020 beyond the level that is expected under current market arrangements and with existing policies. These are demand side 'options', which may be technically feasible, economically cost-effective, but which would be expected to require further policies measures or regulatory changes to realise.

2.7 IDENTIFICATION OF POSSIBLE POLICY OPTIONS FOR DELIVERING THE PROPOSED 2020 DEMAND SIDE VISION

The potential policy options identified in the Consultation Paper for delivering the proposed 2020 Demand Side Vision are summarised below. All measures considered were presented, including those which do not ultimately form part of the 2020 Demand Side Vision to ensure that a broad range of policy options were available for consideration as part of the consultation process.

Demand-Side Measure	Immediate	Short to Mid Term	Long Term
Energy efficiency		More ambitious roll-out of energy efficiency measures	
Behavioural change		Labelling scheme & education programme for smart appliances	
Smart meters	Smart meter specifications to allow for advanced displays & in future dynamic ToU tariffs	Education programme on benefits of smart meters	
		Interventions to accelerate adoption of ToU tariffs	
Home & office automation	Smart meter specifications to allow for future needs of smart appliances	Smart meter trial with focus on home & office automation	Mandatory standards &/or subsidies to encourage adoption of smart appliances
		Labelling scheme for smart appliances	Review the impacts of demand-side management on distribution networks
			Assess value of dynamic demand based on GB trials
Industrial / commercial demand side response	Create visible / firm day-ahead price and schedule for the SEM	Study on volume and nature of flexible demand available in the I&C sectors	
	Review of TSC & Grid Code to identify barriers to participation of I&C demand	Programme of engagement with I&C sectors to increase awareness of potential for demand-side participation	
New demand – heat pumps			Incentivise storage technologies for heat pumps
New demand – electric vehicles	Smart meter specifications to allow for interaction with EV charging systems	Review the impact of EVs for the electricity system	
			Review in detail the impacts of demand-side management on distribution networks
Microgeneration	Smart meters required to interact with microgenerators		
Aggregation of distributed generation	Create visible / firm day-ahead price and schedule for the SEM	Develop standard contract structures and/or other measures to facilitate participation from DG	Detailed review of barriers facing distributed generators
	Review of TSC & Grid Code to identify barriers to	Review of network design standards or practices – identify barriers	
Storage	Review payments to pumped storage through the SEM	Review support for R&D activities relating to distribution-level storage	

2.8 ASSESSMENT OF OPTIONS AND PRIORITIES

The approach to evaluating the different demand side implementation options was to perform a qualitative assessment of costs and benefits of the various options. Costs consist of high level estimates of the costs of implementing demand side options over and above that which is assumed to be implemented under a policy 'baseline' for 2020. The baseline reflected what would be the outcome of a 'business as usual' approach to demand side management on the Island i.e. no government, or regulatory intervention, over and above that which is envisaged in the current policy framework.

Benefits were broken down into two groups, namely, those which are associated with broader energy policy objectives; and those which reflect specific electricity market metrics, relating to investment and operational cost savings. Inevitably, there is a degree of overlap between the two. The assessment of benefits included some consideration of the scale of the option which might be expected given an appropriate policy environment.

2.8.1 COSTS - IMPLEMENTATION

In this category an indicative ranking of the costs associated with implementing each of the demand side options was proposed. This was based on a view of the activities and potential investments associated with the implementation of each measure.

2.8.2 BENEFITS - POLICY IMPACTS

In this category a qualitative assessment of the impact of demand side options on the broader energy policy goals of the Republic of Ireland and Northern Island was proposed. These energy policy goals address three main areas:

- Competitiveness:
    - This encompasses two distinct policy objectives. The first is to further competition (including by encouraging new entry) and consumer choice in energy markets. The second refers to maximising innovation, enterprise and job creation in the energy sector. In our assessment matrix, we use 'competition & consumer choice' to refer to the former and 'job creation and innovation' to the latter
- Security of supply:
    - There are a number of policy objectives related to ensuring electricity supply consistently meets demand; increasing fuel diversity in electricity generation; and maintaining and upgrading networks to ensure efficient and reliable gas and electricity delivery to customers. The assessment focuses on two of these objectives, namely, ensuring that electricity supply can meet demand (in the sense that there is adequate capacity margin) and maximising the maintenance and upgrade of networks.

- Sustainability:
    - Two main policy objectives fall under the heading of Sustainability. The first is the acceleration of growth of renewable energy resources and the second is to enhance the efficiency of electricity use and realise savings in electricity use.

2.8.3 BENEFITS - ELECTRICITY MARKET

In this category a qualitative assessment the impact of the demand side options on the All Island electricity system against four different metrics was proposed:

- effect on generation capacity costs i.e. requirements for investment in new generation capacity;
- impact on variable generation costs;
- effect on levels of CO2 emissions; and
- provision of frequency response.

2.9 ASSESSMENT OF DEMAND SIDE OPTIONS AND OUR PROPOSED 2020 DEMAND SIDE VISION

The results of the qualitative assessment and the proposed 2020 Demand Side Vision which was presented in the Consultation Paper are set out in the table below.

	Competitiveness		Security of supply		Sustainability		Electricity market metrics			Cost of delivery	Overall ranking
	Competition & consumer choice	Green job creation	Generation capacity margin	Transmission capacity	Energy efficiency	Accelerated growth of RES	Generation costs / CO_2 emissions	Generation capacity costs	Frequency response		
Energy efficiency - Industrial	Neutral	Medium	Medium	Medium	Medium	Medium	Medium	Medium	No	Medium	High
Energy efficiency - Commercial	Neutral	Medium	Medium	Medium	Medium	Medium	Medium	Low	No	Medium	Medium
Energy efficiency - Domestic	Neutral	Medium	High	High	Medium	Medium	High	High	No	Medium	High
Behavioural change - Education	Neutral	Medium	Medium	Medium	Medium	Medium	Medium	Low	No	Low	Low
Smart meters - Advanced displays	Medium	Medium	High	High	Medium	Low	High	High	No	Low	Medium
Smart meters - Static ToU tariff	Medium	Medium	High	High	Medium	Medium	High	High	No	Low	Low
Smart meters - Dynamic ToU tariff	Medium	Medium	High	High	Medium	High	High	High	No	Medium	High
Home & office automation - Direct load control	Medium	Medium	High	High	Neutral	High	Medium	High	?	Medium	Medium
Home & office automation - Autonomous	Medium	Medium	High	High	Neutral	High	Medium	High	No	Low	Medium
Home & office automation - Frequency-responsive relays	Medium	Medium	Neutral	Neutral	Medium	Neutral	Low	Low	Yes	Medium	Medium
Industrial & Commercial DSR - Interruption contracts	Medium	Neutral	High	High	Neutral	High	Medium	High	No	Low	High
Industrial & Commercial DSR - Direct load control	Medium	Neutral	High	High	Neutral	High	Medium	High	?	High	High
Industrial & Commercial DSR - Demand-side bidding	Medium	Neutral	High	High	Neutral	High	Medium	High	No	High	High
Industrial & Commercial DSR - Autonomous	Medium	Neutral	High	High	Neutral	High	Medium	High	No	Medium	High
Heat pumps - Heat pumps are fitted with storage	Neutral	Low	Medium	Medium	Neutral	High	Medium	Medium	No	High	Neutral
Electric vehicles - Night charge	Neutral	Medium	Medium	Neutral	Neutral	Low	Low	Medium	No	Low	Neutral
Electric vehicles - Hybrid vehicles	Neutral	Medium	Medium	Medium	Neutral	Medium	Low	Medium	No	Medium	Neutral
Electric vehicles - Intelligent (price-reponsive) charging	Neutral	Medium	Medium	Medium	Neutral	Medium	Low	Medium	No	Medium	Medium
Microgeneration - Microgeneration - controllable	Neutral	Neutral	Medium	Medium	Neutral	Low	Low	Medium	?	Low	Neutral
Aggregation of DG - Aggregation of DG	Low	Neutral	Medium	Medium	Neutral	Medium	Medium	High	?	Low	Medium
Storage - Storage	Neutral	Neutral	Medium	Neutral	Negative	Medium	Low	Medium	Yes	High	Low

On the basis of this assessment, the provisional categorisation of the value of the demand side measures defining the 2020 Demand Side Vision was as follows:

2.9.1 HIGH VALUE

- Energy efficiency: reach for more of the economically-viable energy efficiency potential, particularly in the domestic sector.
- Smart metering: advanced in-home displays and dynamic time-of-use tariffs.
- Industrial and commercial demand side response: more participation from loads in the industrial and commercial sectors.

2.9.2 MEDIUM VALUE

- Home and office automation: participation from domestic and small-commercial loads in response to price signals plus frequency relays.
- Electric vehicles: dynamic price-responsive charging of electric vehicles.
- Aggregation of Distributed Generation: more involvement from aggregations of Distributed Generation in the wholesale market.

2.9.3 LOW VALUE

- Behavioural change: education programmes to encourage more use of intelligent devices and smart meters, and more energy-efficient behaviour.
- Storage: growth in electricity storage on the Island.

2.10 DESCRIPTION OF THE 2020 DEMAND SIDE VISION

The Consultation Paper described what the 2020 Demand Side Vision would look like. Specifically, it proposed 2020 Demand Side Vision was for a world in which electricity consumers make informed choices about their use of electricity in the short term and their selection of appliances in the longer term. The prices they face would reflect the cost of supply at those times, and would provide appropriate rewards for reductions in total consumption and changes in the profile of consumption. Consumers would face appropriate incentives to 'invest' (perhaps in terms of effort rather than financially) in methods which would allow them to better manage their consumption.

In the proposed 2020 Demand Side Vision, demand would play an active part in the process of system balancing and market price formation through a combination of autonomous response to expected market prices, dynamic response to market prices over a range of timescales and the inclusion of some dispatchable demand (and distributed generation) in the centralised processes of price formation and dispatch. It was recognised that different types of consumption are flexible over different timescales and with varying degrees of notice; and the demand side mechanisms offered would

reflect these different needs and the different degrees of value that such flexibility delivers.

It also recognised that there may be certain requirements for demand management which cannot be dealt with through price alone, perhaps due to specific needs of the transmission or distribution system operators (e.g. within-hour dispatch or local network constraints), and appropriate arrangements would also need to be in place to allow demand side flexibility to be captured for these purposes where required.

Consumers would have a different attitude to their electricity consumption compared with today. They would recognise the consequences of their consumption and the level of consumer awareness would be high.

Towards 2020 and beyond, indication was given that it was expected that electrification of heat and transport would play a significant role in the decarbonisation of the entire energy system for the Island, facilitating high levels of production of electricity from renewable sources. Flexibility of demand would play a key role in balancing the output of the variable sources of generation, alongside interconnection, flexible thermal generation (including distributed generators) and perhaps bulk electricity storage.

2.11 PROPOSED POLICY PATHWAYS

The table, below summarises a number of policy recommendations which were presented in the Consultation Paper requirements to support delivery of the 2020 Demand Side Vision, grouped by ‘value’ and implementation time frame.

	Demand-Side Measure	Immediate	Short to Mid Term	Long Term
High value	Energy efficiency		More ambitious roll-out of energy efficiency measures	
	Smart meters	Smart meter specifications to allow for advanced displays & in future dynamic ToU tariffs	Education programme on benefits of smart meters	
			Interventions to accelerate adoption of ToU tariffs	
	Industrial / commercial demand side response	Create visible / firm day-ahead price and schedule for the SEM	Study on volume and natures of flexible demand available in the I&C sectors	
		Review of TSC & Grid Code to identify barriers to participation of I&C demand	Programme of engagement with I&C sectors to increase awareness of potential for demand-side participation	
Medium value	Home & office automation	Smart meter specifications to allow for future needs of smart appliances	Smart meter trial with focus on home & office automation	Mandatory standards &/or subsidies to encourage adoption of smart appliances
			Labelling scheme for smart appliances	Review the impacts of demand-side management on distribution networks
				Assess value of dynamic demand based on GB trials
	New demand – electric vehicles	Smart meter specifications to allow for interaction with EV charging systems	Review the impact of EVs for the electricity system	Review in detail the impacts of demand-side management on distribution networks
	Aggregation of distributed generation	Create visible / firm day-ahead price and schedule for the SEM	Develop standard contract structures and/or other measures to facilitate participation from DG	Detailed review of barriers facing distributed generators
		Review of TSC & Grid Code to identify barriers to participation of I&C demand	Review of network design standards or practices – identify barriers	
Low value	Behavioural change		Labelling scheme & education programme for smart appliances	
	Storage	Review payments to pumped storage through the SEM	Review support for R&D activities relating to distribution-level storage	
Limited value	New demand – heat pumps			Incentivise storage technologies for heat pumps
	Microgeneration	Smart meters required to control and interact with microgenerators		

This provisional categorisation of policy recommendations could be used to define a number of potential policy pathways, which can be tailored to meet institutional responsibilities, capacity and government funding where required. As such it formed the basis of the recommendations in the Consultation Paper, for which stakeholder feedback was sought in formulating the final views presented in this Decision Paper

3 OVERVIEW OF THE CONSULTATION RESPONSES

A total of 24 organisations responded to the 2020 Demand Side Vision Consultation Paper. This section summarises their responses. It is structured as follows:

- The consultation questions are reiterated in Section 3.1
- Respondents' comments by section of the Consultation Paper are detailed in Section 3.2
- Finally respondents' comments by demand side response measure are detailed in Section 3.3
- The full list of respondents to our Consultation Paper is provided in Annex A.

3.1 CONSULTATION QUESTIONS

The Consultation Paper we issued on 17th of August 2010 sought feedback from stakeholders on a number of specific questions; they are listed below by section of the Consultation Paper.

SECTION 2: ROLE AND BENEFITS OF DEMAND SIDE RESPONSE

QUESTION 1: Do you agree with our characterisation of the four types of benefits that demand side management can provide?

QUESTION 2: Are there other cost savings which you believe demand side management can deliver?

QUESTION 3: Are there additional studies and reports which you are aware of and believe we should review?

QUESTION 4: What other insights do you have from your experience of demand side management adopted internationally?

QUESTION 5: Are you aware of other quantitative findings from international experience which you believe are important for us to capture and consider?

QUESTION 6: Do you agree with our identified drivers of future value for demand side response/management? Are there any additional drivers we should consider?

SECTION 3: DEMAND SIDE POTENTIAL IN THE ALL ISLAND MARKET

QUESTION 7: Are there any other aspects of current demand side activity in the All Island market which should be captured?

QUESTION 8: Do you agree with our high level assessment of the potential for demand side management in the All Island market by 2020?

SECTION 4: SUPPORTING DEVELOPMENT OF DEMAND SIDE ACTIVITY IN THE ALL ISLAND MARKET

QUESTION 9: Do you agree with our definition of each individual demand side measure?

QUESTION 10: Is our description of the current policy baseline for each demand side measure accurate and complete. If there are omissions please point them out.

QUESTION 11: Do you agree with our categorisation of different types of "market issue" and typical remedies for each?

QUESTION 12: Do you agree with our identified barriers and enablers for each of the specific demand side measures we have identified?

QUESTION 13: Do you agree with our identified market issues for each specific demand side measure and our proposed remedies to address these?

QUESTION 14: What are your views on the likelihood and effectiveness of the identified policy options addressing the specified market issue and delivering the desired change?

QUESTION 15: Are there any unintended undesirable consequences that any of the options might create elsewhere?

SECTION 5: ASSESSMENT OF OPTIONS AND PRIORITIES

QUESTION 16: Do you agree with our identified specific demand side measures and our assessment of the different types of benefits each demand side measure provides?

QUESTION 17: Are there any additional demand side measures that we should individually identify and assess? If so, what type of benefit(s) is it felt they provide?

QUESTION 18: Have we identified all of the relevant criteria for assessing the individual and comparative merits of the demand side measures?

QUESTION 19: What are your views about our approach to high level assessment of different demand side options?

QUESTION 20: Do you agree with our assessment of each demand side measure against each of the identified factors?

QUESTION 21: Do you agree with our overall assessment of the relative merits of the different demand side options?

QUESTION 22: Do you have any comments on our high level assessment of the benefits of different demand side measures?

SECTION 6: THE 2020 DEMAND SIDE VISION FOR THE ISLAND AND ASSOCIATED POLICY RECOMMENDATIONS

QUESTION 23: Do you agree with our assessment of the relative priorities of different demand side options in developing a 2020 Demand Side Vision?

QUESTION 24: What alternative views do you have on relative (merits and) priorities?

QUESTION 25: Do you agree with our proposed high level 2020 Demand Side Vision as described above?

QUESTION 26: What alternative vision would you put forward?

QUESTION 27: Do you agree with our proposed policy pathways for implementation of the identified different policy options for realising our proposed 2020 Demand Side Vision?

QUESTION 28: What alternative policy pathways would you propose based on your previous comments and responses?

SECTION 7: NEXT STEPS

QUESTION 29: Do you have any additional view or comments you feel are important/useful for us in (a) establishing a Demand Side Vision for 2020; (b) identifying associated policy development and (c) determining policy pathways?

QUESTION 30: Are there any final comments industry stakeholders wish to make about this consultation and the proposed next steps in the consultation process?

3.2 SUMMARY OF CONSULTATION RESPONSES BY SECTION

3.2.1 SECTION 2: ROLE AND BENEFITS OF DEMAND SIDE RESPONSE

3.2.1.1 RESPONDENTS VIEWS

Respondents were broadly in agreement that the four types of demand side responses were captured but some respondents provided some specific examples of DSR they did not feel were captured.

However, some highlighted these were characteristics rather than benefits; and some suggested they focused on system benefits and that the emphasis should be on user benefits. Some said that there should be an explicit mention of the benefits to consumers.

A small number of respondents commented that while it was worth looking at international experience, the All Island market particular context made it difficult to evaluate to what extent results from foreign studies could be apply to Ireland.

A number of respondents provided specific examples of DSR activities they are familiar with in other markets. For instance:

- In Chile, energy storage is deployed to release low-cost generation while providing superior frequency response and reserves to an island grid.
- In New-Zealand, reactive and active power metering was deployed at consumer site to allow the calculation of power factor. Requiring consumers to be above certain thresholds of power factor allowed to reduce current drawn from the network hence making it possible to delay network investment
- In many Australian cities, a significant proportion of heating load is remotely controlled by 'ripple' control. This simple technology allows a significant reduction in the electrical load.
- In the PJM market, demand side response can participate in the Synchronized Reserve Market and compete with generators to provide ancillary services.
- In Japan large numbers of off-peak electric storage heaters were being installed, resulting in a large and unwelcome demand for generation at the start of the off-peak charging period. Glen Dimplex developed a system to delay starting the charging so that the home would nevertheless be warm and the heaters charged at the end of the cheap rate period. This made the heaters more affordable to run as the house was not overheated at night.

Respondents also mentioned specific examples of quantitative findings from international experience:

- Pacific Northwest National Laboratory's GridWise Demonstration Project paper, PNNL-17167, demonstrates how the exposure to real-time consumption and pricing data together can alone lead to energy savings of 5-15%.
- "Impacts of Responsive Load in PJM: Load Shifting and Real Time Pricing"[3] evaluates the costs savings for consumers resulting of the deployment of responsive load resources using a short term equilibrium market model and on the basis of estimated demand elasticity.

Two on-going studies were also indicated:

- The Energy Demand Research Project (EDRP) running in GB which "seeks to better understand how consumers react to improved information about their energy consumption over the long term"; final results are expected in spring 2011.

[3] "Impacts of Responsive Load in PJM: Load Shifting and Real Time Pricing" Carnegie Mellon Electricity Industry Center Working Paper CEIC-07-02, January 2007

- The Californian Open Automated Demand Response programme has indicated that automated demand response leads to an improved certainty and consistency of response and provides system operators with a dispatchable resource.

A vast majority of respondents agreed with the identified drivers of future value for demand side response.

3.2.1.2 RESPONSE TO RESPONDENTS' COMMENTS

In terms of the definition of the four types of demand side management, we believe that the categorisation whilst not perfect covers all types of demand side activities including those examples raised by some respondents.

While the Irish context is unique and is very different from many other markets; however there is still merit in reviewing international experience and taking into account, as appropriate, observations and findings in helping to define a suitable 2020 Demand Side Vision for the All Island market. For example:

- The Pacific Northwest National Laboratory study demonstrates the very significant effect of in-home displays which is relevant for Ireland.
- The study on the "Impacts of Responsive Load in PJM: Load Shifting and Real Time Pricing" study is probably less interesting as it uses a model rather than real data and is based on estimated demand elasticity which are very market and customer dependent.

Regarding the Energy Demand Research Project which is running in GB, it is expected that it will provide very valuable insights and the RAs are already liaising with Ofgem on their experiences. Given the proximity of the two markets and the similarity of home equipment and customer behaviour, the findings of the study will probably be applicable to the Irish market.

The Open Automated Demand Response programme in California has involved Industry stakeholders to develop standards allowing the effective deployment of demand side response. Whilst delivering interesting general insights such as the need for automation to deliver consistent and reliable load reduction, the main achievement of the programme is the development of a software interoperability framework and a set of standards to enable innovation in automated demand response. Defining specifications is paramount to foster innovation and that is reflected in the recommendations on smart meter systems.

3.2.2 SECTION 3: DEMAND SIDE POTENTIAL IN THE ALL ISLAND MARKET

3.2.2.1 RESPONDENTS VIEWS

While most respondents indicated they thought the list was complete, some respondents highlighted some detailed activities that were not fully captured. In particular, the following were highlighted as not being mentioned in our Consultation Paper:

- Programmes such as the Community Energy Savings Programmes, the retrofit programme and the Fuel poverty schemes like Warm Homes Scheme in Northern Ireland, Warmer Homes in Republic of Ireland and the Northern Ireland Sustainable Energy Programme deliver energy efficiency benefits.
- Powersave, while mentioned in Section 5 of the Consultation Paper had been omitted in the list of demand side activities.
- Also, a respondent mentioned that automatic systems are being used to switch loads on or off depending on wholesale electricity prices.

There was broad agreement that the high level assessment appeared reasonable. A large number of respondents shared the view that very limited data was available on the electricity demand in Ireland and that a more thorough analysis would be beneficial to develop a better understanding of the potential for demand response.

An additional couple of points were raised:

- Energy efficiency could reduce the potential of demand response.
- Supplier competition and consumer cost savings would be an important factor in releasing that potential.

3.2.2.2 RESPONSE TO RESPONDENTS' COMMENTS

Changes have been made in order to align with respondents view that more work on the volume of flexible demand is necessary; this is captured in the recommendation proposing a study on the volume and natures of flexible demand available in the I&C sector. The analysis tries to estimate that potential but the limited availability of data made it very difficult.

As some respondents indicated, the potential of flexible demand will depend greatly on the value to the consumer of switching the demand. This and the above observation underpins the view that further more sophisticated demand side trials are necessary to understand customer behaviour and its influence of flexible demand available. It is recognised that the potential can also be adversely affected by other demand side measures and in particular energy efficiency or long term fuel switching. Thus a note has been included in the revision of Table 7 of the Consultation Paper highlighting that

some of the demand side measures could be conflicting. Clearly in setting policies for the demand side it will be important to consider the trade-offs between measures to improve demand side efficiency, for example, and demand side response.

3.2.3 SECTION 4: SUPPORTING DEVELOPMENT OF DEMAND SIDE ACTIVITY IN THE ALL ISLAND MARKET

3.2.3.1 RESPONDENTS VIEWS

The respondents were broadly in agreement with the definition of each individual demand side measure. However several respondents pointed out that 'energy storage' was too general a term and that thermal storage should be separated from electrical storage – as they were very different in nature, costs and benefits and thus had very different implications for our 2020 Demand Side Vision. Some suggested some further clarification of measures.

Respondents agreed that the current policy baseline description was broadly comprehensive. A few highlighted additional specific measures. It was also noted that the term 'smart meter' should be replaced by 'smart meter system' as this is a more accurate description.

Those who responded universally agreed to the categorisation of different types of "market issue" and typical remedies for each.

In terms of the identified barriers and enablers for the specific demand side measures identified, we received a number of detailed points from a range of parties:

- Ex-ante day-ahead pricing would be helpful as a price signal for demand side measures. However, this should be considered within a wider scope than just demand side response.
- Restrictions on the DSUs were highlighted. There was a split opinion amongst respondents on whether the 4MW limit or the zero-export criteria are really barriers.
- The absence of long term signal for the value of ancillary services was mentioned as a barrier to Industrial/commercial scale demand response.
- It was noted that education provided by suppliers was a key enabler of behavioural change and energy efficiency.
- General remarks were made regarding the need for transparency in the market and clarity/simplicity of price signal to enable demand side activities.

One respondent felt regulatory issues were the barrier and that resolving these would enable the market to deliver DSR – this seems to take a narrow view of the definition of 'market issues'.

This was echoed to some extent by another respondent who felt that the objective of intervention should be to create the appropriate market conditions and to let businesses develop cost-efficient demand side measures; rather than seek to overly prescribe the market solutions.

Respondents broadly agreed with the identified issues and remedies proposed. There were a number of detailed comments, some of which are listed below:

- It was indicated that Energy Efficiency market issues could also find remedies in establishment of a 'Green Fund' for capital loans, tax relief for green investments or economies of scale through co-ordinated roll-out of technologies
- It was noted that dynamic pricing trials could help identifying the demographic profiles of the most responsive customers and this way help targeting smart metering roll-out.
- A survey of the volume of flexible demand available in the SEM would be very useful in identifying where the most potential lies.

Most respondents felt the recommendations made were adapted remedies to the identified issues. Some detailed comments were made e.g. one respondent suggested that increased electrification will contribute to increase the potential for DSR. One respondent highlighted the fact that there were a number of recommendations and that therefore there was a great need to prioritise.

In terms of the unintended undesirable consequences that some of the options might create, two points were raised:

- Drive for energy efficiency might reduce the demand side response capability. The relative importance of one against the other needs to be assessed.
- There is a need to consider demand side response not as an isolated issue but in the context of the wider market framework and developments in the market e.g. smart metering rollout, market reform.

3.2.3.2 RESPONSE TO RESPONDENTS' COMMENTS

It is noted that energy storage should be split into thermal storage and electrical storage, to ensure that the different nature, cost and benefits of thermal storage are taken into account, as suggested by many of the respondents. Clearly, thermal storage is a proven technology that is already in place in a lot of households and which is therefore relatively cheap to exploit whereas electrical storage is very much an emerging technology – and it is thus appropriate to highlight such differences explicitly in the Demand Side vision.

In the Consultation Paper the reference to 'Smart meter', meant 'Smart meter system' and was referring to the whole system around the meter (including the meter) rather than just the meter itself. Thus for clarity, the term 'smart meter systems' will be used going forward.

Most of the detailed points raised by the respondents on the barriers and enablers for the demand side measures were very valid, including:

- Ex-ante day-ahead pricing would be helpful as a price signal for demand side measures. However, this should be considered within a wider scope than just demand side response. There is in fact already an on-going regulatory process considering that change to the structure of the SEM but it is recognised that it is important to ensure the demand side management aspect is taken into account within any future change and will be feeding in to that process.

- Restrictions on the DSUs (such as minimum size thresholds) need to be reviewed. This is reflected in the recommendations.

- Long term signals for the value of ancillary services would enable more industrial/commercial scale demand response. To reflect that, a high value consideration proposing to review the pricing of ancillary services in the SEM has been added.

- Suppliers are key enablers of behavioural change and energy efficiency and are key to achieving the 2020 Demand Side Vision.

- Transparency in the market and clarity/simplicity of price signals are key to enabling demand response. This has been the approach taken in the recommendations which are about removing barriers to demand side activities; and reflected in our comments above.

Removing barriers to demand side response is paramount to ensure the market delivers economic demand side measure. It is very much the approach taken in the process to define a 2020 Demand Side Vision. The intention is not to try and pick the winners but rather to create the right environment for entrepreneurs as a mean of delivering innovation and cost-effective demand side management.

The additional remedies listed for energy efficiency are relevant. In the recommendations, it is proposed that stakeholders and relevant public sector bodies should consider developing policies to realise the further economic opportunities for energy efficiency that exist beyond measures contained in current energy efficiency action plans. The two other points on developing an understanding of the amount of flexible demand and of the reaction of customers to dynamic pricing both highlight the current lack of data available. A better knowledge on the amount of flexible demand and how customers will react to demand side measures would be very valuable. That is why it has been recommended that the volume of flexible demand in the I&C sector should be studied and that smart meters in the presence of home and office automation tools should be trialled.

There is agreement with the comments on the need to prioritise the recommendations, this exercise of prioritisation has been done to some extent in the Consultation Paper and has been developed further in the form through the next steps.

The undesirable consequences mentioned by the respondents are considered very sensible. For example, as previously noted in section 3.2.2.2, it is important to carefully consider the trade-off and appropriate balance of energy efficiency versus demand side response; and a note on the revised version of Table 7 on the Consultation Paper to outline the possible interactions between demand side measures has been added. As for the need to consider demand side response in the wider context of other market developments, it is agreed that this is important as already noted and these have been addressed within the recommendations.

3.2.4 SECTION 5: ASSESSMENT OF OPTIONS AND PRIORITIES

3.2.4.1 RESPONDENTS VIEWS

Respondents broadly agreed to the identified specific demand side measures and the assessment of the different types of benefits each demand side measure provides.

Respondents raised the following points:

- Storage consists of thermal and electrical storage, these should be assessed;
- Network costs were not included in Table 7;
- The end-user value did not explicitly feature in Table 7; and
- A small number of very specific comments on the assessment of potential, value and priorities were noted.

3.2.4.2 RESPONSE TO RESPONDENTS' COMMENTS

In response to the comments made by the respondents on the assessment of options and priorities, the following changes have been made to the Table 7 of the Consultation Paper:

- Energy storage is split into electricity and thermal storage and considered separately.
- Network costs have been included as it is an important criterion to consider when assessing the merits of demand side measures.
- The customer did appear in the consultation behind the Competitiveness, Sustainability and Security of supply criteria, but it is agreed that it should be mentioned explicitly. For the avoidance of doubt that the ultimate aim under the 2020 Demand Side Vision is to deliver benefits to the end user; the paper now includes an explicit mention of the value for the end-user as the target of this 2020 Demand Side Vision.

- A small number of very specific comments on the assessment of potential, value and priorities have been taken into account when revising the original assessment.

3.2.5 SECTION 6: THE 2020 DEMAND SIDE VISION FOR THE ISLAND AND ASSOCIATED POLICY RECOMMENDATIONS

3.2.5.1 RESPONDENTS VIEWS

Respondents broadly agreed to the proposed Demand Side Vision and the associated policy pathway. The few points that were made by the respondents are listed below.

Overall approach: A number of respondents indicated their view that this assessment was trying to pick winners and that enabling DSM should really be about removing over restrictive rules and other barriers to DSM.

Omitted criteria: It was highlighted that the impact on network should be considered. It was noted that the value to customer should be the focus of the assessment. A number of respondents commented that the ability of the DS measures to provide other ancillary services should be considered.

Interaction between measures: It was pointed out that understanding the interactions between the DSR measures was critical. Examples included energy efficiency limiting the amount of flexible demand or measures acting as enablers of others; conversely, electrification has been mentioned as a means of preventing wind shedding.

I&C and Energy efficiency are of very high value: Respondents stressed the high value of energy efficiency. A large number of respondents agreed with the evaluation of I&C DSR as a high value measure. Some suggested even higher values than those indicated should be given on certain criteria.

Behavioural change: A number of respondents insisted that measures the benefits of ToU tariffs were very reliant on behavioural change and that change had to be enabled by advanced display or home and office automation. This meant that the value of smart meter might end-up being limited, and especially in the absence of key enabler like advanced display or home and office automation. A couple of respondents asked a higher priority for home office automation.

Dynamic ToU vs. Static ToU tariffs: Respondents indicated that whilst dynamic ToU tariffs is the best solution in a market with high penetration of wind, static ToU tariffs have a value in the interim. On the static ToU tariffs, it was noted that its contribution to security of supply should be lower than that of dynamic ToU tariffs.

Value of Distributed Generation underestimated: A limited number of respondents indicated that aggregation of DG should be of high value and that its contribution to security of supply benefits and competition was underestimated.

Additional points:

- A couple of respondents highlighted that efficiency measures should be expected to provide the same benefits and have the same costs across all sectors.
- A respondent commented that the value of heat pumps had been misrepresented notably with regard to the energy efficiency, job creation and costs criteria; and that it should be given an overall value of medium instead of neutral.
- A respondent noted that the costs seemed generally low.

3.2.5.2 RESPONSE TO RESPONDENTS' COMMENTS

The comments have been taken into account in the revision of Table 7 of the Consultation Paper made to provide a final version for this Decision Paper as detailed in Section 4.1.

Overall approach: Identifying barriers and making recommendations to remove them has very much been the focus of the process to define the 2020 Demand Side Vision. The aim of the 2020 Demand Side Vision is to create the right environment for entrepreneurs as a mean of delivering innovation and cost-effective demand side management.

Omitted criteria: The three points indicated by the respondents have been taken into account in the revision of Table 7 as presented in the Consultation Paper to derive the final version presented later in this Decision Paper. In terms of the relative absence of the customer in our assessment matrix, as explained earlier, the value of the demand side measures to the customer was considered when assessing each measure against the policy goals of Competitiveness, Sustainability and Security of Supply. However, it is noted that an explicit mention of the value to the end-customer is important and that is why a note has been included below the revised table.

Interaction between measures: The remarks on the interactions between demand side measures are noted and a note under the revised version of Table 7 in the Consultation Paper to outline that point has been added.

I&C and Energy efficiency are of very high value: The comments of the respondents have been noted and Table 7 of the Consultation Paper has been modified accordingly.

Behavioural change: It is agreed the benefits of ToU tariffs are reliant on behavioural change and that change had to be enabled by advanced display or home and office automation. The overall rankings of home and office automation and advanced displays already take this into account and implicitly highlight this reliance.

Dynamic ToU vs. Static ToU tariffs: Whilst dynamic ToU tariffs are the best solution in a market with high penetration of wind, static ToU tariffs have a value in the interim. However, Table 7 of the Consultation Paper has been amended to reflect that static ToU tariffs have a lower contribution to security of supply than dynamic ToU – indeed

there are examples in a market with high levels of intermittent generation where static ToU tariffs could undermine local security of supply.

Value of Distributed Generation underestimated: A number of respondents indicated that aggregation of DG should be of high value and that its contribution to security of supply benefits and competition was underestimated. Distributed Generation contributes in these areas but does not provide as high a value as some of the other options.

Additional points:

- It was noted that Energy Efficiency in the I&C sector is unlikely to provide less benefits and be most costly than their residential counterparts. This has been corrected.
- On the value of heat pumps, the assessment on some of the criteria has been revised.
- The fact that the costs seemed generally low was not the most shared view and therefore no change has been made. However the costs were designed as indications of costs and there is no pretence to having done a detailed assessment of costs of each measure.

3.2.6 SECTION 7: NEXT STEPS

3.2.6.1 RESPONDENTS VIEWS

Respondents outlined that the Vision should take into account the consumer perspective. Others highlighted that demand side activities payments should be supported by robust quantitative measurements.

The need for further quantification of the cost-benefits of prioritised demand side measures was highlighted. A large number of respondents insisted that this was to be a first step in the policy and that stakeholders will need to be consulted on the best way forward for implementation of these general recommendations. End consumers should be included in the reflection.

A number of additional points were made:

- Creating the right conditions and letting the market pick the best solution is the best way to achieve cost-effective demand response.
- It is paramount to assess the cost-benefits of demand side measures before making policy commitments.
- Transparency and openness are key to create the right market conditions.
- Recognising the value of flexibility in the Irish context is paramount.

- An industry working group should be set up to decide how the 2020 Demand Side Vision and associated policy pathways are implemented.
- This consultation is only the first step.
- It was necessary to clarify which recommendations the Irish RAs are going to take forward and which will feed into other agencies.

3.2.6.2 RESPONSE TO RESPONDENTS' COMMENTS

All of the above general comments raised are valid, and many are already taken into account in developing the 2020 Demand Side Vision, whereas others will form a part of implementing the 2020 Demand Side Vision and are initially captured in the next steps.

3.3 RESPONDENTS FEEDBACK ON ASSESSMENT OF POLICY OPTIONS

3.3.1 ENERGY EFFICIENCY

3.3.1.1 RESPONDENTS VIEWS

RECOMMENDATION 1: More ambitious roll-out of energy efficiency measures

Respondents agreed with the barriers and enablers identified as well as to the recommendation. Additional suggestions were made. In particular, the need to include customers in subsequent discussion was highlighted.

The use of Energy Performance Certificates (EPCs) or Building Energy Ratings (BERs) and a greater education of the public of these tools could help mitigating the issue of split incentives.

Fuel poverty schemes could be used to promote energy efficiency. Schemes where no up-front investment is needed (such as The Pay as You Save run by the EST) could help engaging Able to Pay customers.

Considering the level of costs savings provided by energy efficiency measures, the market issues they face could be mitigated by direct or indirect subsidy.

A respondent indicated that the reluctance of suppliers to promote energy efficiency could be mitigated by a levy system moving towards an obligation.

3.3.1.1 RESPONSE TO RESPONDENTS' COMMENTS

There is agreement with the comments made and that is reflected in the recommendation proposing that stakeholders and relevant public sector bodies should consider developing policies to realise the further economic opportunities for energy efficiency that exist beyond measures contained in current energy efficiency action plans.

3.3.2 BEHAVIOURAL CHANGE – EDUCATION

3.3.2.1 RESPONDENTS VIEWS

RECOMMENDATION 1: Labelling scheme & education programme for smart appliances

Respondents agreed with the barriers and enablers identified as well as the recommendation made. A number of respondents noted that the role of Suppliers and Energy Services companies in education was not to be underestimated.

3.3.2.1 RESPONSE TO RESPONDENTS' COMMENTS

It is noted that Suppliers and Energy Services companies have contributed greatly to customer education and they are key enablers of behavioural change.

3.3.3 SMART METER SYSTEM

3.3.3.1 RESPONDENTS VIEWS

RECOMMENDATION 1: Education programme on benefits of smart meters

RECOMMENDATION 2: Smart meter specification to allow for advanced displays & in future dynamic ToU tariffs

RECOMMENDATION 3: Interventions to accelerate adoption of ToU tariffs

Respondents provided feedback on the use of smart meters, or certain types of smart meters, and a strong argument that technology is already outpacing smart meters as a technology have been made (ESBCS, ESB Networks). The use of the internet, via PCs and smart phones as envisaged by third party providers is seen as a viable and more progressive and flexible option, with less capital investment. There were a number of questions about smart meters in particular in terms of their cost benefits and any effect they may have on competition in the market. There were also fears expressed by some respondents of the potential creation of a monopoly market through smart meters, which was a development they felt it was important to be avoided.

Whilst these comments were made in response of this consultation, there are other work streams better placed to discuss issues relating to this area, specifically, the on-going CER Smart Meter project and Retail Harmonisation Working Group to look at, for example smart meter specifications.

A number of respondents have raised the need for trials of ToU tariffs as at this point there is little quantification of how responsive customers are and that it is not clear at this point that smart meters' benefits outweigh their cost. A respondent expressed the idea to target the roll out of smart meters should be targeted at customers with the most demand response potential.

The adoption of ToU tariffs can significantly increase the bills for those consumers which use electricity at peak hours for lighting and cooking and therefore cannot switch their usage.

Whilst ToU tariffs are a good interim solution, in a market with significant amount of intermittent generation where the net demand peak can occur at any time of the day, RTP or dynamic ToU tariffs are really the best solutions. Two respondents indicated that smart meters should therefore be able to accommodate these as well while another respondent indicated that this could unnecessarily complicate the specifications of smart meters when prices could reach the customers by other means.

A number of respondents indicated that dynamic ToU tariffs are unlikely to deliver significant demand response in the absence of home and office automation.

A respondent expressed concern on the current smart meter policy judging that it was putting too much power in the hands of ESB Networks. The respondent advocated a system where it is the HAN device which controls smart appliances with the smart meter doing interval metering.

The role of Suppliers in educating the public on the benefits of smart meters (similarly to education on energy efficiency) was highlighted by a number of respondents.

A respondent emitted doubts on the efficiency of any measure imposing the establishment of ToU tariffs. The respondent pointed out that the development of these tariffs should be left to the competitive market.

3.3.3.2 RESPONSE TO RESPONDENTS' COMMENTS

Most of the comments made are important points for consideration in setting a 2020 Demand Side Vision but are also important issues to consider within the on-going CER Smart Meter project and work of the Retail Harmonisation Working Group. To this extent, stakeholders are encouraged to ensure these points are directly made within these on-going regulatory/market initiatives. Addressing the points here:

- It is recognised that smart meter system's benefits rely on behavioural change and that measures such as advance displays and home and office automation are key enablers of that change.
- In terms of the questions around the cost benefits of smart meters, the CER Smart Meter project[4]has provided very valuable insights showing that the estimated total net present values (NPVs) for the 12 main national electricity smart metering rollout options analysed are generally positive and often substantially so. One of the key findings from the Customer Behaviour Trial showed that the deployment of a range of ToU tariffs in conjunction with DSM stimuli were found on average to reduce overall electricity usage by 2.5% and

[4] Smart Metering Information Paper 4 cer11080

peak usage by 8.8%; The positive results of the Smart Meter trial will inform a decisions on the rollout of Smart Meters In a market where there is very significant amount of wind, dynamic pricing is the best solution but this is true only if customers react to prices.

3.3.4 HOME AND OFFICE AUTOMATION

3.3.4.1 RESPONDENTS VIEWS

RECOMMENDATION 1: Smart meter specification to allow for future needs of smart appliances

RECOMMENDATION 2: Smart meter trial with focus and home & office automation

RECOMMENDATION 3: Labelling scheme for smart appliances

RECOMMENDATION 4: Mandatory standards &/or subsidies to encourage adaption of smart appliances

RECOMMENDATION 5: Review the impacts of demand side management on distribution networks

RECOMMENDATION 6: Assess value of dynamic demand based on GB trials

Generally, respondents agreed with the assessment and the recommendations made. A number of respondents indicated that home and office automation was critical to ensure dynamic ToU tariffs deliver load shifting. Some of these respondents concluded that home and office automation should therefore be given a high priority. Additional detailed comments have been noted.

A respondent highlighted that greater coordination between Northern Ireland and Ireland would lead to economies of scales.

Two respondents noted that that the need for dynamic trials should be determined after the result of the National Smart Meter Plan.

A respondent raised the absence of agreement on Home Area Networking standards as a possible barrier (ESBCS).

Another respondent highlighted that the move away from thermal storage to instantaneous water heaters limited the flexibility of residential demand and that therefore the Building Regulations should be revised to ensure that new housing stock are equipped with the heating system the most beneficial for the system.

3.3.4.1 RESPONSE TO RESPONDENTS' COMMENTS

Home and Office automation is critical to deliver switching especially under dynamic pricing. Considering the number of respondents who made that comment, the medium ranking of this measure has changed to high.

Addressing the other comments, it is noted that the results of the National Smart Meter Plan should be considered before deciding on the trial of dynamic pricing. For example, the absence of standards has been identified as a barrier, this is reflected in recommendation 1. A recommendation has been added to note that the move away from thermal storage to instantaneous water heaters limits the flexibility of residential demand. It states that the Building Regulation should be reviewed to ensure that new housing stock are equipped with the heating system the most beneficial for the system.

3.3.5 INDUSTRIAL/COMMERCIAL-SCALE DEMAND SIDE RESPONSE

3.3.5.1 RESPONDENTS VIEWS

RECOMMENDATION 1: Create visible/firm day-ahead price and schedule for the SEM

RECOMMENDATION 2: Review T&SC & Grid Code to identify barriers to participation of I&C demand

RECOMMENDATION 3: Study on volume and natures of flexible demand available in the I&C sectors

RECOMMENDATION 4: Programme of engagement with I&C sectors to increase awareness of potential for demand side participation

A very large number of respondents highlighted barriers to DSUs in the Trading and Settlement Code and Irish and Northern Irish Grid Codes but also in other industry rules and regulations. There was a split of opinion on whether certain points are genuinely barriers but there was a consensus on the fact that a review of barriers to DSUs and AGUs should be conducted immediately and would be of high value.

The absence of firm and transparent day-ahead pricing or the absence of long term signals for the value of DSR and the misrepresentation of the value of ancillary services are judged as being barriers to I&C demand side response take-up.

Respondents also noted that the establishment of visible / firm Day-ahead pricing would be a very radical change in the market design and should be considered in the context of the development of the market as a whole. It was further noted that this point was already being considered within a separate regulatory initiative as part of the SEM – BETTA market coupling.

3.3.5.1 RESPONSE TO RESPONDENTS' COMMENTS

All of the points raised by the respondents have been captured in the recommendations.

Some recommendations have to be considered in the context of the market as a whole and the establishment of visible / firm Day-ahead pricing is already being considered within a separate regulatory initiative. Nonetheless it is important to stress how the absence of such price signals are a barrier to demand side response and there is work ongoing to ensure that the 2020 Demand Side Vision feeds into that process.

3.3.6 AGGREGATION OF DISTRIBUTED GENERATION

3.3.6.1 RESPONDENTS VIEWS

RECOMMENDATION 1: Create visible/firm day-ahead price and schedule for the SEM

RECOMMENDATION 2: Review T&SC & Grid Code to identify barriers to participation of I&C demand

RECOMMENDATION 3: Develop standard contract structures and/or other measures to facilitate participation from DG

RECOMMENDATION 4: Review of network design standards or practices - identify barriers

RECOMMENDATION 5: Detailed review of barriers facing distributed generators

Respondents generally agreed with the assessment of barriers and enablers and the recommendations made. It has been noted that a number of comments made on the participation of I&C to demand side response also apply here.

A respondent pointed out that rather than developing standard contract structures, the focus should be in the clarification of the functions of aggregators.

3.3.6.1 RESPONSE TO RESPONDENTS' COMMENTS

It is noted that there is some overlap between what is said for this measure and the demand response in the I&C sector.

There is merit in facilitating aggregation by defining standard contract structures; as this reduces market entry burden to new aggregators and thus helps facilitate competition. However, it for the aggregators to decide where there is most value and in what role they can help extracting that value.

3.3.7 NEW ELECTRIC DEMAND – RENEWABLE SPACE HEATING (HEAT PUMPS)

3.3.7.1 RESPONDENTS VIEWS

RECOMMENDATION 1: Incentivise storage technologies for heat pumps

Respondents generally agreed with the assessment of barriers and enablers and the recommendations made.

A respondent pointed out that in the case of a push for the take up of renewable space heating then the need for more investment in gas network as stated in the NI Strategic Energy plan is questionable.

3.3.7.1 RESPONSE TO RESPONDENTS' COMMENTS

Respondents agreed with the assessment.

It has been noted that the anticipated deployment of demand side measures should feed into the evolution of the NI Strategic Energy Plan.

3.3.8 NEW DEMAND – ELECTRIC VEHICLES

3.3.8.1 RESPONDENTS VIEWS

RECOMMENDATION 1: Review the impact of EVs for the electricity system

RECOMMENDATION 2: Review the impacts of demand side management on distribution networks

RECOMMENDATION 3: Smart meter specifications to allow for interaction with EV charging systems

Respondents generally agreed with the assessment of barriers and enablers and the recommendations made.

Two respondents noted that there is not necessarily need for the interface with EVs to be through the meter.

A respondent noted that Vehicle-to-Grid (V2G) could be used for Spinning Reserve and that any solutions proposed should not exclude this possibility.

3.3.8.1 RESPONSE TO RESPONDENTS' COMMENTS

Rather than prescribing solutions, market barriers should be removed to ensure the market delivers the most cost-effective technologies and end-to-end solutions. Therefore, the recommendation is that specifications should be defined to ensure smart meters can interact with EV charging systems and thus to allow such a technical

solution as one possible end-to-end solution rather than eliminate its possibility by design.

3.3.9 MICROGENERATION

3.3.9.1 RESPONDENTS VIEWS

RECOMMENDATION 1: Smart meters required to control and interact with microgenerators

Respondents generally agreed with the assessment of barriers and enablers and the recommendations made. A few comments were noted.

A respondent pointed out that this recommendation could also apply to Heat Pumps. Another respondent pointed out the existence of a trade-off between microgeneration benefits and network investment costs.

3.3.9.1 RESPONSE TO RESPONDENTS' COMMENTS

Stakeholders agreed with the assessment.

It is noted that microgeneration has network benefits at the local level. This is reflected in the revised version of Table 7 of the Consultation Paper.

3.3.10 STORAGE

3.3.10.1 RESPONDENTS VIEWS

RECOMMENDATION 1: Review payments to pumped storage through the SEM

RECOMMENDATION 2: Review support for R&D activities relating to distribution-level storage

Respondents generally agreed with the assessment of barriers and enablers and the recommendations made.

A respondent indicated that market mechanisms should enable storage to compete on an equal footing with generation for the provision of frequency response and reserves. That same respondent noted that cost of storage was often cited as a barrier but that there was significant investment in research and development programmes which are expected to deliver rapid near-term cost reductions.

A respondent mentioned that whilst the Consultation Paper focuses on pumped storage and distribution-level storage, there were other forms of storage that were worth considering such as batteries connected to the transmission system which are already being proven to have value.

A respondent pointed out that the interaction of the 2020 Demand Side Vision and the review of capacity payment should take into account the on-going review and studies by Eirgrid.

3.3.10.1 RESPONSE TO RESPONDENTS' COMMENTS

It is noted that that market mechanisms should enable storage to compete on an equal footing with generation for the provision of frequency response and reserves. Consequently, a recommendation proposing to review the pricing of ancillary services in the SEM has been added.

Promising new types of electrical storage are being developed and that is important ensuring this these technology options are not written off. Nonetheless in terms of prioritising policy actions there has to be recognition of the comparative economics of electricity storage to other demand side measures to identify most cost effective short term actions to develop the demand side in Ireland.

There is an on-going review of the capacity payment and work is ongoing with relevant colleagues within the RAs to ensure the impact of the capacity payment on demand side activities is being considered.

It is also worth repeating the new recommendation relevant to heat storage. Based on respondents' feedback, it would be useful to review the Building Regulation to ensure that the new housing stock is equipped with the heating system the most beneficial for the system.

4 FINAL VIEW OF OPTIONS AND PRIORITIES

Based on the comments of the respondents and the responses as expressed in Section 3 the 2020 Demand Side Vision as proposed in the Consultation Paper published 17th of August 2010, and both the underlying assessment and consequential policy recommendations has been reviewed. In particular, Table 7 (assessment of benefits and costs) and Table 8 (value and priority of actions) from the August 2010 Consultation Paper (SEM/10/052) has been reviewed – which form the key basis of determining our 2020 Demand side Vision and associated policy actions which should be taken forward to achieve it.

In this section the finalised tables are presented which indicate the:

- assessment of benefits and costs of different demand side measures; and
- view of the consequent value and priority of policy actions required

These revised tables now form the basis for setting a high level Implementation Plan. For each, in Section 4.1 and Section 4.2 respectively, the changes we have made from our August 2010 Consultation Paper are identified and explained, in the light of respondents' feedback, and further consideration of the issues.

4.1 FINAL ASSESSMENT OF DSR MEASURE BENEFITS AND COSTS

As indicated in Section 3, respondents generally agreed with the 2020 Demand Side Vision as formulated in the Consultation Paper of 17th August 2010.

The key changes to the assessment of the costs and benefits of different demand side measure options that have been made based on respondents feedback and the responses as expressed in Section 3.2 and Section 3.3, are:

- The addition of "Network Benefits" in the assessment matrix;
- The separation of heat storage from electricity storage;
- A mention of the value to consumer in an explicative note at the bottom of the table;
- A mention of the potential interactions between demand side measures in an explicative note at the bottom of the table; and
- Specific minor changes to a few of the categories for a small number of demand side activities based on respondents' comments (changes are highlighted in red).

These and other changes that have been made to the assessment structure and conclusions are detailed below, the changes in the revised version of Table 7 of the Consultation Paper are highlighted in red:

- The demand side measures are ranked against the two new criteria ‘Network benefits’ and ‘Operating and tertiary reserve’. it is not thought that these two additional criteria affect the overall ranking of the demand side measures apart from home and office automation measures.

- Based on the comments received form Consultation Paper respondents, the Security of Supply ratings of industrial and commercial energy efficiency have increased from ‘Medium’ to ‘High’ as the contribution of these two sectors to Security of Supply should be the same as domestic energy efficiency. This lead to raising the overall ranking of commercial energy efficiency to increase from ‘Medium’ to ‘High’.

- The Security of Supply ratings of static ToU tariffs has decreased to show the difference with dynamic ToU tariffs which contribute most to Security of Supply as it can mitigate the impact of periods of low wind whereas static ToU tariffs can only mitigate the effect of a static peak in demand. The Security of Supply rating for advanced display has also decreased as while it enables behavioural change, it does not provide benefits of its own.

- The overall rating of static ToU tariffs has changed from ‘Low’ to ‘Medium’ on the basis that it has merit as an interim solution but may present local network issues as an enduring solution.

- Based on respondents’ feedback the rating of home and office automation has been increased from ‘Medium’ to ‘High’ as they rank very high on the new Network benefits criterion. This also reflects how critical automation is when it comes to overcoming the issue of behavioural change.

- Heat pumps rankings have been modified for some criteria. Based on feedback from respondents, previous rankings had underestimated their contribution to Green job creation as well as their benefits in terms of carbon emissions. Overall these changes translate into an overall ranking becoming ‘Low’ rather than of ‘Limited’ value.

- As for the additional heat storage demand side measure, the assessment concludes that it has a ‘High’ overall ranking with a high contribution against the Electricity market metrics as well as a low cost since it is already in place in a lot of households.

	Competitiveness		Security of supply		Sustainability		Electricity market metrics						
	Competition & consumer choice	Green job creation	Generation capacity margin	Transmission capacity	Energy efficiency	Accelerated growth of RES	Generation costs / CO_2 emissions	Generation capacity costs	Network Benefits	Operating and tertiary reserve	Frequency response	Cost of delivery	Overall ranking
Energy efficiency - Industrial	Neutral	Medium	High	High	Medium	Medium	Medium	Medium	Medium	No	No	Medium	High
Energy efficiency - Commercial	Neutral	Medium	High	High	Medium	Medium	Medium	Low	Medium	No	No	Medium	High
Energy efficiency - Domestic	Neutral	Medium	High	High	Medium	Medium	High	High	Medium	No	No	Medium	High
Behavioural change - Education	Neutral	Medium	Medium	Medium	Medium	Medium	Medium	Low	Low	No	No	Low	Low
Smart meter system - Advanced displays	Medium	Medium	Low	Low	Medium	Low	High	High	Low	No	No	Low	Medium
Smart meter system - Static ToU tariff	Medium	Medium	Medium	Medium	Medium	Medium	High	High	Low	No	No	Low	Medium
Smart meter system - Dynamic ToU tariff	Medium	Medium	High	High	Medium	High	High	High	Medium	No	No	Medium	High
Home & office automation - Direct load control	Medium	Medium	High	High	Neutral	High	Medium	High	High	Yes	?	Medium	High
Home & office automation - Autonomous	Medium	Medium	High	High	Neutral	High	Medium	High	High	?	No	Low	High
Home & office automation - Frequency-responsive relays	Medium	Medium	Neutral	Neutral	Medium	Neutral	Low	Low	High	No	Yes	Medium	High
Industrial & Commercial DSR - Interruption contracts	Medium	Neutral	High	High	Neutral	High	Medium	High	High	Yes	No	Low	High
Industrial & Commercial DSR - Direct load control	Medium	Neutral	High	High	Neutral	High	Medium	High	High	Yes	?	High	High
Industrial & Commercial DSR - Demand-side bidding	Medium	Neutral	High	High	Neutral	High	Medium	High	High	Yes	No	High	High
Industrial & Commercial DSR - Autonomous	Medium	Neutral	High	High	Neutral	High	Medium	High	High	?	No	Medium	High
Heat pumps - Heat pumps are fitted with storage	Neutral	Medium	Medium	Medium	Neutral	High	High	Medium	Low	Yes	No	High	Low
Electric vehicles - Night charge	Neutral	Medium	Medium	Neutral	Neutral	Low	Low	Medium	Medium	?	No	Low	Neutral
Electric vehicles - Hybrid vehicles	Neutral	Medium	Medium	Medium	Neutral	Medium	Low	Medium	Low	?	No	Medium	Neutral
Electric vehicles - Intelligent (price-reponsive) charging	Neutral	Medium	Medium	Medium	Neutral	Medium	Low	Medium	Medium	?	No	Medium	Medium
Microgeneration - Controllable	Neutral	Neutral	Medium	Medium	Neutral	Low	Low	Medium	Medium	Yes	?	Low	Neutral
Aggregation of DG	Medium	Neutral	Medium	Medium	Neutral	Medium	Medium	High	High	Yes	?	Low	Medium
Storage - Electric	Neutral	Neutral	Medium	Neutral	Negative	Medium	Low	Medium	Medium	Yes	Yes	High	Low
Storage - Heat	Neutral	Neutral	Medium	Neutral	Negative	Medium	High	High	High	Yes	?	Low	High

Note: While value to consumer is not explicit in this table, the options are assessed against general policy goals which are important to the consumer (security of supply, sustainability, competitiveness). The options are also assessed on the benefits they provide to the electricity market; benefits which will translate into lower bills for the consumer. The 'Overall ranking' column threfore reflect the value of the option from the consumer perspective.

Note: the demand side options have been evaluated independently and therefore this assessment does not take into account conflicts between options. For instance, energy efficiency decreases the amount of demand that can be moved and is therefore detrimental to demand flexibility.

Figure 1 – Updated evaluation of the demand side options against assessment criteria (This is an update of the Table 7 originally presented in the Consultation Paper, the original table is presented in Section2.9 of this Decision Paper)

4.2 FINAL ASSESSMENT OF DSR MEASURE VALUE AND POLICY PRIORITIES

Based on the revised assessment of the costs and benefits of different demand side measures as presented in Section 2 above, relevant feedback from consultation respondents and our views as expressed in Section 3 and Section 4, a finalised view has been reached of the value of different demand side measures and the priorities for different policy actions. The final view is presented below.

The key changes are the following:

- Based on respondents' feedback a recommendation of high value has been added which is relevant to all demand side measures. It proposes to review the pricing of ancillary services in the SEM.
- Industrial and commercial demand side response has been changed from a 'Medium' to a 'High' value based on the comments highlighted in Section 3.3.5
- Based on the assessment of heat storage and the respondents' feedback, heat storage is of 'High' value. As mentioned in Section 3.3.10, a review of the Building Regulations to ensure that new housing stock is equipped with the heating system the most beneficial for the system could be of great benefits as it would limit the deployment of heating systems detrimental to the electricity system.
- Based on the revised assessment of heat pumps detailed in Section **Error! Reference source not found.**, the overall ranking of heat pumps increased from 'Limited' value to 'Low' value.

	Demand-Side Measure	Immediate	Short to Mid Term	Long Term
High value	Energy efficiency		More ambitious roll-out of energy efficiency measures	
	Industrial / commercial demand side response	Create visible / firm day-ahead price and schedule for the SEM	Study on volume and nature of flexible demand available in the I&C sectors	
		Review of TSC & Grid Code to identify barriers to participation of I&C demand	Programme of engagement with I&C sectors to increase awareness of potential for demand-side participation	
	Smart meter systems	Smart meter specifications to allow for advanced displays & in future dynamic ToU tariffs	Education programme on benefits of smart meters	
			Interventions to accelerate adoption of ToU tariffs	
	Home & office automation	Smart meter specifications to allow for future needs of smart appliances	Smart meter trial with focus on home & office automation	Mandatory standards &/or subsidies to encourage adoption of smart appliances
			Labelling scheme for smart appliances	Review the impacts of demand-side management on distribution networks
				Assess value of dynamic demand based on GB trials
	Heat storage	Review the Building Regulations to ensure that new housing stock is equipped with the heating system the most beneficial for the system.		
	All	Review the pricing of ancillary services in the SEM		
Medium value	New demand – electric vehicles	Smart meter specifications to allow for interaction with EV charging systems	Review the impact of EVs for the electricity system	
				Review in detail the impacts of demand-side management on distribution networks
	Aggregation of distributed generation	Create visible / firm day-ahead price and schedule for the SEM	Develop standard contract structures and/or other measures to facilitate participation from DG	Detailed review of barriers facing distributed generators
		Review of TSC & Grid Code to identify barriers to participation of I&C demand	Review of network design standards or practices – identify barriers	
Low value	Behavioural change		Labelling scheme & education programme for smart appliances	
	Electric storage	Review payments to pumped storage through the SEM	Review support for R&D activities relating to distribution-level storage	
	New demand – heat pumps			Incentivise storage technologies for heat pumps
Limited value	Microgeneration	Smart meters required to interact with microgenerators		

Figure 2 – Updated Table of policy options by value and timescale (This is an update of the Table 10 originally presented in the Consultation Paper, the original table is presented in Section 2.11 of this Decision Paper)

5 NEXT STEPS

This review was intended to look at the role of Demand Side Management in a broad context, looking at the range of options for increasing the level of demand side participation on the island. The assessment of benefits and costs of different demand side measures has been finalised; and a view has been taken of the consequent value of the different demand side measures and priority of policy actions required to determine our 2020 Demand Side Vision and associated pathways. Therefore it is clearly important for the SEM Committee and the RAs to consider what the next steps should be to realise the 2020 Demand Side Vision, recognising what can be done within the regulatory vires and what would require Government and other agencies to take forward as they feel appropriate. The SEM Committee and RAs committed to engage with stakeholders wherever possible, and will work with the relevant bodies to progress the recommendations outlined above with the aim of achieving full participation from demand for the benefit of customers in the energy market.

The recommendations cover such a broad range of measures that initiatives will be developed at different paces given the different market, technology and cost requirements. The SEM Committee also notes the integrated nature of many of these initiatives where development in one area may support progress in another. This section looks at the recommendations in the report in terms of the value that various demand side options can deliver and outlines current work and next steps where appropriate.

5.1 HIGH VALUE DEMAND SIDE MEASURES

Focusing on the high value options, there were 6 keys areas identified where demand side participation could be delivered, in the short and medium term. Many of the key elements of the proposals have already been initiated.

5.1.1 ENERGY EFFICIENCY

Energy efficiency has significant value from a demand side perspective, but also from an economic and environmental outlook and this is reflected in the national[5] and European[6] targets for energy efficiency. There are already a number of work streams underway, involving the RAs and other agencies, examining ways to improve energy efficiency. The '*more ambitious roll out of energy efficiency targets',* recommended in the consultation document, will require ongoing liaison with and between the SEM Committee, RA's and the relevant departments north and south. The current work streams are described below for NI and ROI.

[5] ROI - National Energy Efficiency Action Plan & S.I. No. 542 of 2009 - EUROPEAN COMMUNITIES (ENERGY END-USE EFFICIENCY AND ENERGY SERVICES) REGULATIONS 2009
NI – insert text
[6] DIRECTIVE 2006/32/EC on energy end-use efficiency and energy services and repealing Council Directive 93

The Sustainable Energy Interdepartmental Working Group (SEIDWG), of which the Utility Regulator is part, is working to develop a unified communications plan to ensure a consistent message on energy efficiency and sustainable energy is delivered to the public throughout Northern Ireland. The conditions of the Northern Ireland Sustainable Energy Programme (NISEP)[7] include a provision that all measures must be carried out must be to the benefit of NI customers. NIESP is forecast to deliver 894 GWH of energy saving for the year 2011/12, however it should be noted that the energy savings will not all be electricity; saving other fuels such as oil and gas is also included in this figure. The UR recently undertook a review of the NISEP and it was decided to keep the changes introduced for at least three years. Now half way through this three year period, the UR is working with the Department for Enterprise Trade and Investment (DETI) to bring in a new model for energy efficiency delivery. The NIEES supply price control contains a target of 42.6 GWh of energy saving for the coming year (in addition to those delivered by NISEP). Again the savings are not all electricity, but can be other fuels. The Housing Executive is designated as the Home Energy Conservation Authority (HECA) for Northern Ireland. The Utility Regulator works closely with the Housing Executive in this regard, and is represented on the HECA panel which oversees the work of the HECA. The HECA has reported a 17% saving in energy consumption since 1996 in occupied housing stock across all tenures.

Similarly DCENR is working on RoI energy efficiency targets and is currently consulting on the 2011-12 National Energy Efficiency Action Plan (NEEAP2), which will be submitted to the EU in June of this year, further to the requirements of the Energy Services Directive[8].

5.1.2 INDUSTRIAL/COMMERCIAL DEMAND SIDE RESPONSE

One of the key high value areas to promote demand response is within the industrial and commercial sector. The two options identified for immediate implementation and as having high value were the introduction of a visible/firm day ahead price and schedule for the SEM and a review of the market codes to identify barriers. These are two areas where progress is already being made.

(i) Day ahead price and schedule for the SEM

The SEM Committee is aware of the benefits that a visible/firm day-ahead price and schedule for the SEM would bring both in terms of demand response and other areas of the market. To date the main drivers for this have been the need for a firm day ahead price for market coupling reasons and for compliance with the EC's emergent Framework Guidelines in this area. The SEM Committee will ensure that consideration is given to any modification to the trading and settlement code to

[7] NISEP in its current form (i.e. funded by NI PSO levy) is likely to remain for about another 2 years

[8] http://www.dcenr.gov.ie/Energy/Energy+Efficiency+and+Affordability+Division/NEEAP2+Consultation+Paper.htm

introduce firm day ahead pricing in the SEM allowing the support of demand side participation.

(ii) Review the Trading & Settlement and Grid Codes to identify barriers to I&C participation.

With regards to barriers to participation of I&C demand in the T&SC and Grid Code, there have been a number of developments in this area, and in particular there are currently two T&SC modifications underway that will address identified barriers in the codes. One modification addresses the removal of the connection between a supplier unit and a DSU[9] and the second modification is seeking the removal of the requirement that a demand site in a DSU shall not have an MEC[10].

The modifications process enables market participants to bring forward specific changes to the T&SC that they believe will improve the functioning of the market, including measures that will remove barriers or facilitate demand side participation. However participants have, via this consultation process and via the working groups relating to these specific modifications, emphasised that the existing Codes were developed with generator and supplier participation in the traditional sense in mind, and further review will be required to facilitate full demand side participation. The SEM Committee will write to the T&SC Modifications Committee Chair asking it to consider any barriers to DSM identified through current modifications and to consider the implications for demand side participation in relevant future modifications brought before the T&SC Modifications Committee. The T&SC Modifications Committee will be required to report back to the SEMC.

Two further measures which have been identified as having high value are the development of a programme of engagement with the I&C sector on the potential for demand side participation, supported by a further study on the volume and nature of flexible demand. The RA's will meet regularly with industry representative groups including the Irish Business and Employers Confederation (IBEC) and the Confederation of British Industry (CBI Northern Ireland) to consider what further actions can be taken to engage with the industrial and commercial sector to facilitate further work in this area.

To date the engagement with the I&C sector has been focussed around the retail demand side schemes in ROI. These schemes were initially developed in the context of ensuring security of supply but have delivered a steady contribution to demand response over the past 7 years. Eirgrid currently administers the Winter Peak Demand Reduction Scheme (WPDRS) and Powersave on behalf of the CER. While the premature removal of the schemes could have system implications in terms of demand reduction capability, the SEM Committee is conscious of the possibility that the actual existence of such schemes may hinder the development of dynamic, market led demand side participation. The SEM Committee will therefore request that the TSOs

[9] Mod_36_10 - Removal of connection between Supplier Units and DSUs
[10] Mod_04_11 - Removal of requirement that a demand site in a DSU shall not have an MEC

consider how the current retail demand reduction schemes in ROI will fit within the harmonising and further review of Ancillary Services currently proposed by the TSOs. It is the SEM Committee's view that this review should also include an examination of the pricing of Ancillary Services with a view to promoting demand response.

5.1.3 SMART METERING SYSTEMS AND TIME OF USE TARIFFS

The market remedies described above focus on solutions aimed at industry and large scale businesses. Smart metering is core to the recommendations in terms of the demand value it can potentially deliver directly from domestic and small business customers. Depending on the specification, the national rollout of smart meters facilitates a number of further initiatives as outlined in the recommendations. The rollout of smart metering will constitute a major national infrastructure project both north and south and as such both RAs are engaged in different stages of work programmes to establish the cost / benefit case for rollout.

5.1.3.1 BACKGROUND TO SMART METERING IN ROI AND NI

RoI's Smart Metering Programme

Phase 1 of the project began in 2008 and focused on undertaking a number of smart metering trials (technology and customer behaviour) and producing a cost-benefit analysis for a national RoI rollout. The outcome of these trials and the cost benefit analysis will inform decisions regarding a national smart metering rollout.

The electricity trials are now completed and the findings report for customer behaviour trials, the detailed technology trials findings report and the completed cost benefit analysis were published as part of the CER Information Paper on the Phase 1 findings[11]. This Information Paper also outlined the CER's next steps for the Smart Metering Project which includes publishing a consultation paper in August setting out the proposed high level design and timelines for a national smart metering system rollout in Ireland.

Following this consultation it is envisaged that a final rollout decision document will follow in October. The report CER/10/197 outlines the current assumptions for a national smart metering system high level design and rollout timelines (Project Phases 2-4) that were used as working assumptions to develop the cost benefit analysis. This assumed high level design caters for advanced displays and dynamic time of use tariffs.

NI - Smart Metering

[11] Smart Metering Information Paper 4 (CER11/080) Smart Metering Cost-Benefit Analysis and Trials Findings Reports

While the decision for mandating any roll out is ultimately a matter for the Northern Ireland Assembly, the UR will be providing decision makers with information as required to assist them in dealing with their deliberations around smart metering in NI.

In 2010 the UR undertook a metering review, which culminated in a report that gave a detailed picture on the composition of the NI utility metering state. Subsequent to this the UR has recently initiated a CBA for smart metering in NI. The outcome of this will be provided to the relevant Minister for use in decisions to be made on any smart metering roll out in NI and will take full account of the critical role of SMART metering in facilitating Demand Response and the recommendations in this SEM Decision Paper.

A point to note is the size of the prepay meter population in NI ~30% of utility meters, the bulk of which are electricity meters. Given the large proportion, these meters will have to be given special consideration in any potential roll out.

With regards to the proposal to make specific regulatory intervention to accelerate the adoption of ToU tariffs, both RAs will monitor the introduction of Time of Use tariffs individually (where smart meters have been installed). Both RAs will monitor this area individually, but also in the context of retail market harmonisation and will identify and progress any interventions necessary to encourage/accelerate take-up. With reference to the requirements of the Energy Services Directive, this may include the implementation of mandatory requirements for Time of Use tariffs.

5.1.4 HOME AND OFFICE AUTOMATION

As discussed above, smart metering is core to the recommendations in terms of the demand value it can potentially deliver directly from domestic and small business customers. Smart meters that incorporate the future needs of smart appliances is seen as an integral part of any national roll-out programme. In RoI, the details will be explored further during the design stage of a national rollout (i.e. Phase 2 of the project: “Planning, Requirement Definition, Procurement and Selection”). The current smart metering high level design assumes 2-way communications to the home i.e. a home area network (HAN) which would cater for smart appliance interface. It should be noted that the HAN is an area of smart metering system design which is still evolving and specific standards and requirements have yet to be fully defined and agreed. Similarly in NI, it is recognised that both the meter and any HAN should be developed as open source to allow for future devices as far as is possible. With regards to the longer term measures the RAs support the proposal for mandatory standards and/or subsidies to encourage adoption of smart appliances in principle. However, the RAs do not see this as being within the scope of the SMART metering projects. The RAs role in this regard is to provide the market structures, such as ToU tariffs, that will create economic incentives for the adoption of smart appliances and in this regard support for such standards will be provided. The RAs will, via the publication and dissemination of this report, and through regular engagement with industry representative groups including

IBEC and CBI Northern Ireland, bring these recommendations to the attention of manufacturers and relevant government bodies.

NETWORKS ISSUES

Significant demand response has the potential to impact on distribution networks and needs to be considered in the development of SMART grids. The RAs will consider the impact of demand participation on distribution networks and the value of dynamic demand

Administratively barriers can exist at network level as well as in the T&SC and Grid Codes. The SEM Committee will write to the T&SC Modifications Committee and Grid Code Committee Chairs asking them to consider any barriers facing distributed generators and/or other measures to facilitate participation from distributed generation. The T&SC Modifications Committee and Grid Code Committee will be required to report back to the SEM Committee.

In NI the Distribution Code Review Panel has established a sub group to investigate possible small scale generation issues. Generators are required to meet various codes and standards in order to ensure system security and stability. The sub group will explore possible changes to the Distribution Code and other standards which will allow small scale generators to connect without compromising system security and stability.

5.1.5 HEAT STORAGE

The final recommendations from the review states that there would be a high value in a review of the Building Regulations to ensure that new housing stock is equipped with heating systems that are optimised in terms of benefits for the system. While the SEM Committee notes that the proposal has merit, this initiative would fall outside the direct remit of the SEM Committee. In NI the building regulations are a matter for the Department of Finance and Personnel[12] and in RoI such matters fall under the jurisdiction of the Department of Environment Heritage and Local Planning[13].

5.2 MEDIUM VALUE DEMAND SIDE MEASURES

Having discussed the high value initiatives, the following proposals were deemed be of medium value in their capacity to deliver demand side participation; electric vehicles and aggregation of distributed generation.

[12] www.dfpni.gov.uk

[13] www.environ.ie

5.2.1 NEW DEMAND – ELECTRIC VEHICLES

The RAs recognises that EVs are one way to allow domestic and business customers to actively participate in demand side activities supported by a smart metering infrastructure and time of use tariffs – possibly varying with wind availability. In terms of the potential impact EVs may have on the wider electricity system, the scale of uptake in electric vehicles is the crucial issue and this is as yet uncertain. However, both the RAs and the respective DSOs are aware of the potential implications that a large expansion in the number of EVs connected to the grid may have. Therefore the –RAs will continue to monitor this area and liaise with the DSO's to ensure that the distribution networks are capable of handling future volumes of EVs, both in the medium and longer term.

Smart metering is core to the recommendations in terms of the demand value it can potentially deliver directly from domestic customers. Therefore any roll out of smart meters needs to consider the potential needs of EV charging systems. Both regulators are keeping a "watching brief" on this area and are cognisant that the smart metering design may have to cater for EVs, but the exact requirements have yet to become clear. The RAs will continue to monitor developments in order to give full consideration of the implications that EVs may have on any roll out of smart metering.

5.2.2 AGGREGATION OF DISTRIBUTED GENERATION

The participation of aggregators of distributed generation is facilitated within the SEM via authorisation by the relevant regulator and compliance with the relevant market codes. Since the launch of this facility in February 2010 a number of further barriers have been removed via modifications progressed through T&SC working groups. Furthermore, work is underway to create a visible/firm day-ahead price and schedule for the SEM to facilitate further participation by AGUs as well as aggregation of demand reduction.

In relation to contracts the SEM Committee will consult with industry on the development of standard contract structures between aggregators and capacity providers, which may facilitate participation from distributed generation (DG). The development of any such contracts would be undertaken through contact with aggregators and capacity providers in order to ensure that any standard contracts capture all the required elements. Therefore, if such contracts are viewed as being particularly useful to the industry in facilitating demand side participation, SEM Committee would welcome further feedback from industry participants.

The RAs are investigating the possibility of making aggregation of distributed generation and aggregation of demand reduction licensable activities. Potentially legislative changes would be required as well as a new licences. The RAs are continuing to explore the feasibility of creating the new licensable activity.

With regards to any barriers in the network design standards or practices, in RoI, the Distribution System Security and Planning Standards[14] (DSSPS) have been in place since 2003. At present this does not address distributed generation. However ESB Networks are currently updating the standards in order to account for distributed generation and will provide an updated document, for approval by the CER, in Q2 2011. The CER will consider barriers to DG when reviewing the updated DSSPS. In addition, the CER has already undertaken a substantial amount of work focused on ensuring that any barriers have been eliminated or minimised, including the Gate system and the Non-GPA process for non-wind renewables, the review of the connection process, the joint charging paper, the review of the contracts etc. The CER will continue to monitor this area over the mid to longer term and address any further barriers facing distributed generation that may be identified.

5.3 LOW VALUE DEMAND SIDE MEASURES

5.3.1 BEHAVIOURAL CHANGE

As set out above the SEM Committee sees education programmes as being integral to the roll out of smart meters and similarly there may need to be an education programme, as well as a labelling scheme for smart appliances. The SEM Committee supports the concept of a scheme for the labelling of smart appliances and will ensure that the benefits of such a scheme are communicated to relevant industry groups and government departments. If a labelling scheme for smart appliances was put in place the RAs will engage with the relevant actors to promote the scheme and ensure that consumers are fully informed.

5.3.2 SYSTEM LEVEL ELECTRIC STORAGE

With regards to the recommendation to review payments to pumped storage, there has been some progress in this area with a modification having been raised by ESB Power Generation on treatment of Uninstructed Imbalances (UI) in pumped storage units when pumping[15] plus a further modification 14_11. The first of these modifications seeks to exclude pumped storage units from the imposition of unrestricted imbalances when in pumping mode while the second allows pumped storage units to be granted under test status.

However other forms of storage such as compressed air storage are becoming available and the rewards for and value to the system of system level storage needs to be reviewed. To this end the SEM Committee will request that the TSOs undertake a review covering payments for system wide storage and provide recommendations to the SEM Committee.

[14] http://www.esb.ie/esbnetworks/en/downloads/220903_publication_distribution_system_security_and_planning.pdf

[15] MOD_46_09 - Treatment of UIs in Pumped Storage Units when Pumping

In terms of any support for R&D activities relating to distribution-level storage, there is limited scope from either RA. In NI the UR has access to limited R&D capacity in the form of its 'academic panel', which is a group of experienced academics who have skills and specialist knowledge in areas of mutual interest. There may be scope within this arena to explore this point and the UR will keep an open mind in this regard. In RoI the CER has limited capacity in an R&D context, but is willing to engage with any stakeholders wishing to undertake initiatives in this area. The SEM Committee's role in this respect is to ensure appropriate systems of reward and incentivisation in the market which should support R&D investment where market opportunities are identified.

5.3.3 NEW DEMAND – HEAT PUMPS

In NI work on incentivising storage technologies is driven primarily by DETI's Renewable Heat Strategy. The UR has met with DETI to discuss this matter and further consideration is being given as to how to develop this in the future.

The CER currently has no role regarding the regulation of heat, but will continue to monitor this area and where appropriate will contribute to work streams aimed at incentivising storage technologies for heat pumps.

5.4 LIMITED VALUE DEMAND SIDE MEASURES

5.4.1 MICROGENERATION

While the potential demand response value of microgeneration has been identified as being of limited value, smart metering is core to the delivery of that demand side contribution. It has been recommended that smart meters should be required to control and interact with microgenerators and this is something RAs will take account of in the context of a full rollout.

In RoI the Smart Metering Project is examining this from a system design perspective to ensure any requirements can be accommodated if needed and it is expected at this stage in the process that one of the core functionalities of smart meters would be the capability to record imported and exported electricity. An export register for the smart metering design will facilitate micro generators getting paid for export. Electric Ireland currently offers customers a microgeneration tariff for export from domestic microgeneration.

It has been noted that interest in microgeneration is growing in NI, and in particular small renewables due to the renewable incentive schemes offered by Government. The NI smart metering trial specification assumes an ability to interact with microgenerators. NIE Energy is also required to offer a microgeneration tariff that guarantees an outlet for surplus energy.

As in section 5.2.2, in NI the Distribution Code Review Panel has established a sub group to investigate possible small scale generation issues. Generators are required to meet various codes and standards in order to ensure system security and stability. The sub group will explore possible changes to the Distribution Code and other standards which will allow small scale generators to connect without compromising system security and stability.

5.5 NEXT STEPS – IMPLEMENTATION PLAN

As set out above, this review was intended to look at the role of Demand Side Management in a broad context, looking at the range of options for increasing the level of demand side participation on the island. As can be seen there are already a number of areas where work is underway in bringing about a market environment that facilitates active demand side participation, both in terms of domestic and business customers.

Much still needs to be done in order to remove the remaining barriers and engage customers. The SEM Committee recognises the potential for demand side measures to deliver significant economic and environmental benefits to the All-Island market. The SEM Committee is committed to working with all market participants and stakeholders to address barriers and work towards realising an All-island market where there is active and dynamic demand side participation. In that context the SEM committee / RAs (as appropriate) will implement the following decisions.

1. The SEM Committee and RA's will continue to liaise with the relevant bodies and government departments with regards to energy efficiency measures in both jurisdictions and will endeavour to promote the roll out of energy efficiency measures through the development and implementation of remedies outlined in the NEEAP in ROI and the NISEP in NI.

2. The SEM Committee will ensure that consideration is given in any modification to the trading and settlement code to introduce firm day ahead pricing in the SEM allowing the support of demand side participation. Demand side participation in the market will be integrated as a key driver into the project going forward.

3. The SEM Committee will write to the T&SC Modifications Committee Chair asking it to consider any barriers to DSM identified through current modifications and to consider the implications for demand side participation in relevant future modifications brought before the T&SC Modifications Committee. The T&SC Modifications Committee will be required to report back to the SEMC.

4. The SEM Committee will meet regularly with industry representative groups including the Irish Business and Employers Confederation (IBEC) and the Confederation of British Industry (CBI Northern Ireland) to consider what further actions can be taken to engage with the industrial and commercial sector to facilitate further work in this area.

5. CER will request that the TSOs consider if/how the current retail demand reduction schemes in ROI will fit within the harmonising and further review of Ancillary Services currently proposed by the TSOs. It is the SEM Committee's view that this review should also include an examination of the pricing of Ancillary Services with a view to promoting demand response.

6. Both RAs will monitor the introduction of Time of Use tariffs individually (where smart meters have been installed). With reference to the requirements of the Energy Services Directive, this may include the implementation of mandatory requirements for Time of Use tariffs.

7. In principle the RAs support the proposal for mandatory standards and/or subsidies to encourage adoption of smart appliances. The RAs will, via the publication and dissemination of this report, and through regular engagement with industry representative groups including IBEC and CBI Northern Ireland, bring these recommendations to the attention of manufacturers and relevant government.

8. The RAs will consider the impact of demand participation on distribution networks and the value of dynamic demand in line with the development of smart grids.

9. The SEM Committee will write to the T&SC Modifications Committee and Grid Code Committee Chairs asking them to consider any barriers facing distributed generators and/or other measures to facilitate participation from distributed generation. The T&SC Modifications Committee and Grid Code Committee will be required to report back to the SEM Committee.

10. The RAs will monitor the network needs for electric vehicles and will liaise with the DSO's to ensure that the distribution networks are capable of handling future volumes of EVs, both in the medium and longer term.

11. The SEM Committee will consult with industry on the development of standard contract structures between aggregators and capacity providers, which may facilitate participation from distributed generation (DG).

12. The SEM Committee supports the concept of a scheme for the labelling of smart appliances and will ensure that the benefits of such a scheme are communicated to relevant industry groups and government departments. If a labelling scheme for smart appliances was put in place the RAs will engage with the relevant actors to promote the scheme and ensure that consumers are fully informed.

13. The SEM Committee will request that the TSOs undertake a review covering payments for system wide storage and provide recommendations to the SEM Committee.

The SEM Committee is fully committed to the delivery of the Demand Side Vision 2020 and intends to conduct an annual review of progress with respect to the recommendations of the Demand Side Vision 2020 and publish its report.

ANNEX A LIST OF RESPONDENTS

A confidential respondent

Activation Energy

Airtricity

BG Energy

Chip eService

Dalkia

David Dunne

Eaga

Eirgrid

Electric Ireland (formerly ESB Customer Supply)

Energy Curtailment Specialists

EnerNOC

ESB Networks

Fingleton White & Co.

Irish Wind Energy Association

NIE Energy Power Procurement Business

NIE Energy Supply

Northern Ireland Energy

Northern Ireland Housing Executive

Sustainable Energy Authority of Ireland

Synergen

The Consumer Council

Viridian Power and Energy

Wirelite Sensors