IEA DSM REPORT - EXECUTIVE SUMMARY

TASK XI SUBTASK 5

DEMAND "AVAILABLE" AND "TURNDOWN" VALIDATION MECHANISMS FOR MARKET BIDDING OF SMALLER CUSTOMER DEMAND

Background

A large amount of work has been and is being carried out in many countries to enable customers to participate in energy markets by modifying demand in response to price and other motivators. The difficulty in measuring the Demand Response (DR) of customers is seen by many to be a barrier to demand side participation in Demand Side Bidding markets.

Demand Side Bidding (DSB) is the formalisation of DR where contracts are put in place between customers and System Operators/Suppliers so as to deliver more reliable DR, which can be used to meet capacity constraints or as alternatives to generation.

Mechanisms are required to validate both that demand is "available" as a Demand Side Bid and that the demand was "turned down" when requested, as defined in the contract.

Objectives

The objectives of Subtask 5 are to identify and develop mechanisms which can be used to validate that smaller customer demand is "available" for demand change and also following instruction that the demand has "turned down".

Approach

Demand Side Bidding as presently implemented requires defined blocks of demand or generation to be made "available" to System Operators and contracted for DR "turndown" or switch on during agreed time periods.

DR cannot be considered for DSB unless it can be validated as "available" and "turned down".

Smaller customer DR validation on an individual basis is particularly challenging because, in most situations, the demand will be inhibited rather than interrupted. In the case of many white goods, the process cannot be interrupted, once started, and with thermostat set points, there is a probability of the thermostat being on or off when the control signal is received.

Consequently, it will be difficult to relate together the switching instruction and demand change.

Approach (cont'd)

Models of load response, based on empirical information gained from pilots and/or trials, would therefore seem to be appropriate for determining the level of demand "available" for demand response initiatives involving either manual or remote control of customer energy end-uses. Measuring the load response of an aggregated group of customers would also be a possibility.

Results

There are several mechanisms by which DR suitable for DSB can be delivered. Some of these have differing technical and equipment requirements for their operation, as well as for validation of the DR produced.

It is evident from Chapters 2, 3 and 5 that validation requirements of DR, in order for it to be used as DSB, should not present fundamental barriers to the adoption of smaller customer DSB in generation markets. In principle DR validation can be done based on control group measurement, statistical modelling and Grid substation measurements of demand "turndown" in response to DR motivator signals on specific days and at specific times. These routes use different metering "Smartness" levels together with remote/automatic control and communication of price signals. However, there is a significant need to understand and develop customer behaviour change in response to TOU price signals and remote/automatic and manual switching.

Manual responses to DR motivators are considered unsuitable for DSB.

One way, broadcast communication would be sufficient for end use switching of demand for DSB.

Implications

There are many issues to be resolved in order to motivate customer participation in DSB and the provision of communication enabled end uses and infrastructure. There may be some scope for considering the use of customer, manually switched DR as an interim measure for delivering some DSB and obtaining experience. This option is not considered viable for the long term. This process would require estimates to be made of customer manual switching in response to dynamic, critical price messages.

It is to be recommended that studies and trials of customer response to TOU and critical price signals are performed, which include simple 2 rate meters, remote, meter rate switching and remotely switched white goods and thermostats. In particular, if the level of Demand Response delivered is closely related to the level predicted to be "available", a solid basis can be formed upon which trust in future DR schemes involving domestic customers can be established.

International Energy Agency Demand-Side Management Programme
Task XI: Time of Use Pricing and Energy Use for Demand Management Delivery

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