CONCERTED ACTION
ENERGY EFFICIENCY
DIRECTIVE

Article 15 – Overview of measures undertaken and planned to enable and promote demand response

Executive Summary

WGR 3.2

Core theme 3
Working Group Report 2

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1.1 Article 15 - EED

Article 15 of the Energy Efficiency Directive (EED) has the subject 'Energy Transformation, Transmission and Distribution' and is interrelated to Annex XI and Annex XII. The main objective of the article and annexes is to maximise grid and infrastructure efficiency and to promote demand response.

When implementing Article 15 it is necessary to take into account different stakeholders, such as the competent national authorities including national energy regulatory authorities, energy producers, transmission system operators (TSOs), distribution system operators (DSOs), aggregators, energy suppliers and final energy consumers of all sizes and types (residential, commercial and industrial).

Additionally, it is very important to keep in mind that demand response is a tariff or programme established to motivate changes in the energy use of final customers, in response to changes in the price of energy over time, or as a result of incentive payments designed to induce lower energy use at times of high market prices, high renewable availability or when the grid security and/or reliability is compromised. **As such, demand response brings savings both to the consumers and more efficiency to the energy system.**

Taking into account the complementarity between the Energy Efficiency Directive and the Internal Energy Market Directives package, it is highly relevant to identify barriers and to discuss and share the best ways of implementing Article 15 in a context of demand response and considering the MS obligations.

1.2 Defining demand response

For a better understanding of the meaning of demand response a definition is described below. This definition was developed by the Smart Grid Coordination Group of CEN-CENELEC-ETSI. As demand response is often confused with demand side management the difference between these two is clearly defined by this group:[1]

Demand response (DR) implies a 'bottom-up' approach: the customer becomes active in managing his/her consumption in order to achieve efficiency gains and, by this means, monetary/economic benefits. Demand response can be defined as "the changes in electric usage by end-use customers from their normal consumption patterns in response to changes in the price of electricity over time. Further, DR can be also defined as the incentive payments designed to induce lower electricity use at times of high wholesale market prices or when system reliability is jeopardized. DR includes all intentional modifications to consumption patterns of electricity of end use customers that are intended to alter the timing, level of instantaneous demand, or the total electricity consumption". DR aims to reduce electricity consumption in times of high energy cost or network constraints by allowing customers to respond to price or quantity signals.

Demand side management (DSM) or load management has been used in the (mainly still vertically integrated, as opposed to unbundled) power industry over the last thirty years, "to reduce energy consumption and improve overall electricity usage efficiency through the implementation of policies and methods that control electricity demand. Demand side management (DSM) is usually a task for power companies/ utilities to reduce or remove peak load, hence defer the installations of new capacities and distribution facilities. The commonly used methods by utilities for demand side management are: combination of high efficiency generation units, peak-load shaving, load shifting, and operating practices facilitating efficient usage of electricity, etc." Demand side management is therefore characterized by a 'top-down' approach: the utility decides to implement measures on the demand side to increase its efficiency.

In any event, demand response is to be understood as voluntary changes made by end consumers to their usual electricity use patterns in response to market signals (such as time-variable electricity prices or incentive payments) or following the acceptance of a bid (on their own or through aggregation) to sell, in organised energy electricity markets, their will to change their demand for electricity at a given point in time. Accordingly, demand response should be neither involuntary nor unremunerated. In this context, reference can be made to the definition

[1] CEN-CENELEC-ETSI Smart Grid Coordination Group – Sustainable Processes report for DG Energy (Page 43, 2.1.1 Definitions)

by the International Energy Agency, which says that “demand response or demand side response are programmes and activities designed to encourage consumers to change their electricity usage patterns, including timing and level of electricity demand, covering all load shape and customer objectives. Demand response includes time-of-use and dynamic rates or pricing, reliability programs such as direct load control of devices and instantaneous interruptible load, and other market options for demand changes (like demand side bidding)” (‘Integration of Demand Side Management, distributed generation, renewable energy sources and energy storages. State of the art report’).

1.3 Why is demand response important?

Although there are risks associated with demand response, it offers a diversity of financial and operational benefits for final energy customers, households and businesses, energy suppliers, transmission and distribution system operators and energy producers.

Electric power systems have three inherent characteristics.

1. Electricity cannot be stored economically: the supply of and demand for electricity must be maintained in balance in real time.

2. Grid circumstances can change significantly from day to day, hour to hour, and even within moments. Demand levels can also change quite rapidly and unexpectedly, and resulting mismatches in supply and demand can threaten the integrity of the grid over very large areas within seconds.

3. Electrical infrastructure requires very high investments with financial return over several decades

These features of electric power systems require that power grids be designed, and their capacity projected for years in advance, to ensure that the system can operate reliably in real time; despite the many uncertainties surrounding future demands, fuel sources, the energy market, asset availability and grid conditions. The only truth is that electric power systems have to ensure that all the technical requirements needed to meet changing system demands at any time of day are met.

These challenges and uncertainties are what make demand response so valuable; it offers flexibility at relatively low cost. Energy producers, TSOs, DSOs and energy suppliers can use demand response to limit or shift loads, instead of (as has been the case traditionally), building more generation which leads to the production of unnecessary energy and compromises the efficiency of the energy system.

It is therefore important to discuss and plan the best way to take advantage of the implementation of Article 15 of the EED, to produce significant savings in close to real time and often at lower costs than supply-side resources.

Demand response is expected only to become successful if developments and interests in other parts of the energy value chain are taken into account. To discuss the potential of demand response is also to discuss developments in energy wholesale and retail markets, system and network developments, smart meter roll outs and even smart appliances at home and in industries.

The figure below visualizes the various relationships between demand response and other relevant developments, such as smart metering.[2] Besides these physical elements, it is equally important to consider the market model; whether aggregators have access to the market and whether tariffs and prices are conducive to demand response. This requires both the removal of existing barriers and the promotion of additional programmes to enable demand response.

[2] Source: Presentation by Jan Panek, Head of Unit B3 Internal Market III during the European Sustainable Energy week in Brussels, June 26. 2013. Title: Smart Metering in Europe: Are We on Track?

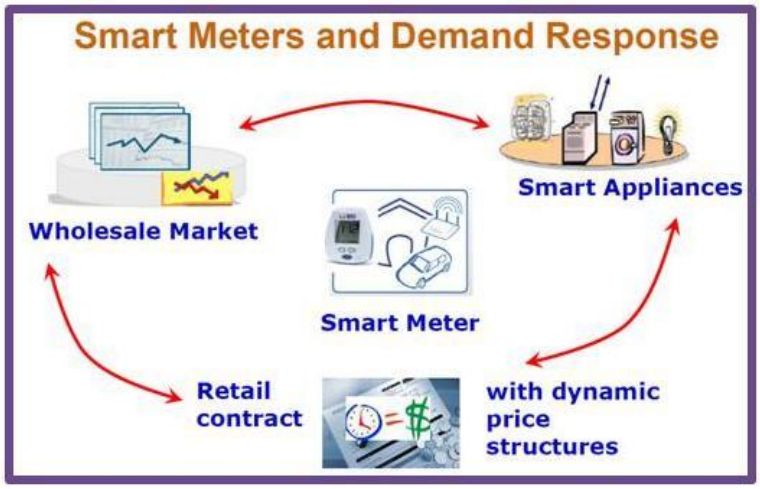

Fig 1 - Relationships between demand response and other relevant developments

1.4 Conclusion and recommendations

Through a questionnaire sent to all MS, it is possible to conclude that demand response is an important instrument for improving energy efficiency. Half of MS consider that demand response products are absolutely necessary to achieve energy efficiency effects among end users, and that it is very important to involve the customer as a part of the solution.

Demand response pilots show that tailor made DR-stimuli will result in consumers changing their behaviour and contributing to energy efficiency objectives. Demand response can only be successful if many new and existing market players are encouraged to contribute to implementing DR schemes. DR solutions and dynamic pricing contracts will allow end users to pay prices that reflect market prices.

The THINK report, published earlier this year, provided a sophisticated overview of contract types and consumer preferences (risks). We recommend MS use this overview to ensure that end users have choice regarding dynamic pricing and DR so they can fulfil their own needs with a customer friendly offering.

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The Concerted Action for the Energy Efficiency Directive (CA EED) was launched by Intelligent Energy Europe (IEE) in spring 2013 to provide a structured framework for the exchange of information between the 29 Member States during their implementation of the Energy Efficiency Directive (EED).

For further information please visit **www.eed-ca.eu** or contact the CA EED Coordinator Lucinda Maclagan at **lucinda.maclagan@agentschapnl.nl**

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