

# **CEER Draft Advice on the take-off of a demand response electricity market with smart meters**

## **A CEER Public Consultation Paper**

**Ref: C11-RMF-31-03  
04-May-2011**

## INFORMATION PAGE

### Abstract

On 10 May 2011, CEER launched a public consultation on CEER Draft Advice on the take-off of a demand response electricity market with smart meters (ref C11-RMF-31-03).

It outlines a number of questions to stakeholders, in order to provide CEER with input on recommendations that will enhance the implementation of demand response.

### Target Audience

Energy suppliers, traders, those that both generate and consume electricity, electricity customers, electricity industry, customer representative groups, network operators, Member States, academics and other interested parties.

### How to respond to this consultation

Deadline: **21 June 2011**

This public consultation is carried out through a **dedicated online questionnaire** on the European energy regulators website. To participate in the consultation please go to the following link:

[http://www.energy-regulators.eu/portal/page/portal/EER\\_HOME/EER\\_CONSULT/OPEN%20PUBLIC%20CONSULTATIONS/PC-62%20CEER%20Draft%20advice%20on%20the%20take-off%20of%20a%20demand%20response](http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_CONSULT/OPEN%20PUBLIC%20CONSULTATIONS/PC-62%20CEER%20Draft%20advice%20on%20the%20take-off%20of%20a%20demand%20response)

and fill in the login request form. You will be provided with a login and technical instructions for the questionnaire.

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All responses except confidential material will be published on the website [www.energy-regulators.eu](http://www.energy-regulators.eu).

## Treatment of Confidential Responses

In the interest of transparency, CEER

- i) will list the names of all respondents (whether confidential or not) or, alternatively, make public the number (but not the names) of confidential responses received;
- ii) requests that any respondents requiring confidentiality submit those confidential aspects of their response in a “confidential appendix”. CEER will publish all parts of responses that are not marked confidential.

For further information on CEER’s rules, see CEER Guidelines on Consultation Practices.

## Related Documents

CEER/EREG documents

- GGP on Regulatory Aspects of Smart Metering for Electricity and Gas, February 2011. Ref: E10-RMF-29-05, [http://www.energy-regulators.eu/portal/page/portal/EER\\_HOME/EER\\_PUBLICATIONS/CEER\\_EREG\\_PAPERS/Guidelines%20of%20Good%20Practice/Other/E10-RMF-29-05\\_GGP\\_SM\\_8-Feb-2011.pdf](http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_EREG_PAPERS/Guidelines%20of%20Good%20Practice/Other/E10-RMF-29-05_GGP_SM_8-Feb-2011.pdf)
- GGP on Indicators for Retail Market Monitoring for Electricity and Gas, October 2010, E10-RMF-27-03 , [http://www.energy-regulators.eu/portal/page/portal/EER\\_HOME/EER\\_PUBLICATIONS/CEER\\_EREG\\_PAPERS/Guidelines%20of%20Good%20Practice/Other/E10-RMF-27-03\\_final%20GGP%20IRMM\\_12-Oct-2010.pdf](http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_EREG_PAPERS/Guidelines%20of%20Good%20Practice/Other/E10-RMF-27-03_final%20GGP%20IRMM_12-Oct-2010.pdf)
- GGP on Customer Complaint Handling, Reporting and Classification, June 2010, E10-CEM-33-05, [http://www.energy-regulators.eu/portal/page/portal/EER\\_HOME/EER\\_PUBLICATIONS/CEER\\_EREG\\_PAPERS/Guidelines%20of%20Good%20Practice/Other/E10-CEM-33-05\\_GGP-ComplaintHandling\\_10-Jun-2010.pdf](http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_EREG_PAPERS/Guidelines%20of%20Good%20Practice/Other/E10-CEM-33-05_GGP-ComplaintHandling_10-Jun-2010.pdf)
- ERGEG Position Paper on Smart Grids. An ERGEG Conclusions Paper, June 2010. Ref: E10-EQS-38-05, [http://www.energy-regulators.eu/portal/page/portal/EER\\_HOME/EER\\_CONSULT/CLOSED%20PUBLIC%20CONSULTATIONS/ELECTRICITY/Smart%20Grids/CD/E10-EQS-38-05\\_SmartGrids\\_Conclusions\\_10-Jun-2010\\_Corrige.pdf](http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_CONSULT/CLOSED%20PUBLIC%20CONSULTATIONS/ELECTRICITY/Smart%20Grids/CD/E10-EQS-38-05_SmartGrids_Conclusions_10-Jun-2010_Corrige.pdf)
- European Energy Regulators’ 2011 Work Programme, December 2010, Ref. C10-WPDC-20-07, [http://www.energy-regulators.eu/portal/page/portal/EER\\_HOME/C10-WPDC-20-07\\_public%20WP2011\\_15-Dec-2010-Clean.pdf](http://www.energy-regulators.eu/portal/page/portal/EER_HOME/C10-WPDC-20-07_public%20WP2011_15-Dec-2010-Clean.pdf)
- ERGEG Status Review on Regulatory Aspects of Smart Metering (Electricity and Gas) as of May 2009, October 2009. Ref. E09-RMF-17-03, [http://www.energy-regulators.eu/portal/page/portal/EER\\_HOME/EER\\_PUBLICATIONS/CEER\\_EREG\\_PAPERS/Customers/Tab/E09-RMF-17-03\\_SmartMetering-SR\\_19-Oct-09.pdf](http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_EREG_PAPERS/Customers/Tab/E09-RMF-17-03_SmartMetering-SR_19-Oct-09.pdf)

## External documents

- The Treaty on the Functioning of the European Union, Article 16, European Union May 2008, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:115:0047:0199:EN:PDF>
- Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC, <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0055:0093:EN:PDF>
- Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:EN:PDF>
- Directive on energy end-use efficiency and energy services 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services, <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:114:0064:0064:EN:PDF>
- Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:001:0065:0071:EN:PDF>
- Mandate M/441: DG ENTERPRISE initiative, Standardisation mandate to CEN, CENELEC and ETSI in the field of measuring instruments for the development of an open architecture for utility meters involving communication protocols enabling interoperability, 12 March 2009, <http://www.cen.eu/cen/Sectors/Sectors/Measurement/Documents/M441.pdf>
- 2010 Assessment of Demand Response and Advanced Metering, Staff Report, Federal Energy Regulatory Commission, February 2011 (USA), <http://www.ferc.gov/legal/staff-reports/2010-dr-report.pdf>
- Interpretative note on Directive 2009/72/EC concerning common rules for the internal market in electricity and Directive 2009/73/EC concerning common rules for the internal market in natural gas - retail markets, 22 January 2010, [http://ec.europa.eu/energy/gas\\_electricity/interpretative\\_notes/doc/implementation\\_notes/2010\\_01\\_21\\_retail\\_markets.pdf](http://ec.europa.eu/energy/gas_electricity/interpretative_notes/doc/implementation_notes/2010_01_21_retail_markets.pdf)

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## EXECUTIVE SUMMARY

This public consultation on the Draft Advice on the take-off of a demand response electricity market with smart meters seeks stakeholder views in order to provide input on upcoming CEER recommendations that aim to enhance the implementation of demand response with household customers and small and medium sized businesses. CEER believes that through offers reflecting actual consumption patterns and a meter equipped with an open gateway - interface with the home - the customer will be able to participate in demand response. Home automation could be a means to accomplish this. To enable these services, there need to be clearly defined roles and responsibilities for the stakeholders in the electricity market.

Furthermore, CEER has found that demand response has been in place for several years in many countries - without smart meters. For the countries that have rolled out smart meters, demand response schemes based on the use of those smart meters have not been introduced on a large scale as of yet. This is an unsatisfactory situation and is why CEER has seen the need to make recommendations to further the development of demand response.

In order to develop a demand response electricity market, the customer is the crucial player. Without customer awareness and participation, demand response will not come into practice. Thus, this public consultation has a customer focus, but also encompasses the following stakeholders: micro generators, DSOs, metering operators, suppliers, energy service companies (ESCOs) and regulators. The reason for choosing these actors is that we regard them as the key stakeholders to be able to launch demand response.

CEER has chosen seven stakeholders as the key enablers of demand response. Amongst these, there are differences in roles and responsibilities. To be able to fulfil the roles, we have listed factors which should be in place. It is important to define both roles and these factors and it is therefore of considerable value for CEER to receive stakeholder views on.

CEER defines demand response as the following:

*Changes in electric usage by end-use customers/micro generators from their current/normal consumption/injection patterns in response to changes in the price of electricity over time, or to incentive payments designed to adjust electricity usage at times of high wholesale market prices or when system reliability is jeopardized. This change in electric usage can impact the spot market prices directly as well as over time*

CEER recommends the following to enable a take-off of demand response:

- Creating Offers reflecting actual consumption patterns

When looking at the particular service of offers reflecting actual consumption and the stakeholder roles with regard to this, **the main point of contact for the customer is with the supplier, ESCO and the metering operator.**

- Interface with the home

Meters should be equipped with or connected to an open gateway. The customer and service provider/s (suppliers, energy service companies, etc.) chosen by the customer should have access to this gateway. This approach would not give the DSO a privileged position compared to other service providers. The gateway should have a standardised

interface which would enable energy management solutions, such as home automation, different schemes on demand response and facilitate delivery of data directly, etc. It also allows the customer to react to price signals and adapt consumption.

- National hub/database:

In this public consultation document, CEER discusses the need for a national point of contact, in the form of a database for example, where relevant metering data can be accessed by the relevant stakeholder. This information should be subject to customer consent. Looking at national, regional and a future European electricity market will present new challenges to meter value management. It is feasible to expect each national electricity market to establish a national point of contact, for example a database or a hub, to which the metering operator transmits relevant metering values, and to which the relevant stakeholder can then turn to in order to get metering data, after customer consent.



## 1. Introduction

One of the benefits of smart metering is the possibility to realise demand response schemes. When rolling out smart meters to customers, there need to be processes and clearly defined roles and responsibilities in place to be able to realise the full benefits of smart metering. This document seeks to describe the roles and responsibilities for the different stakeholders in order to implement demand response.

This public consultation on the Draft advice on the take-off of a demand response electricity market with smart meters builds from a previous report published by CEER: E10-RMF-23-03: Final Guidelines of Good Practice on Regulatory Aspects of Smart Metering for Electricity and Gas (here after GGP on smart metering). Those GGP present 28 recommendations<sup>1</sup>. This advice document further develops two of those, since they are closely linked to the demand response issue: offers reflecting actual consumption patterns and interface with the home.

This document is derived from the following CEER key areas of work (numbering according to the total list in the CEER 2011 work programme):

1. 3<sup>rd</sup> Package implementation
3. Affordability and Consumer issues
4. Climate change, renewable energy issues and energy efficiency

Further to this, CEER has identified demand response as an area that can deliver benefits both to customers and to electricity systems. Customers benefit by enhanced ability to engage with the electricity market, managing their consumption and consequently enabling them to manage their costs. In addition, demand response also enables more active participation in electricity markets by micro generators, creating appropriate incentives to adjust their consumption/injection patterns to suit market/system requirements. From a system management perspective, demand response has the potential to reduce consumption levels at times of peak demand and also at times when system reliability is jeopardised.

Demand response has the potential to change electric usage over time, reducing usage at peak times. As well as the short-term benefits listed above, this change in usage has the potential to reduce costs over the longer term. This is due to reduced requirements for investment in generation capacity and network infrastructure over the longer term as a result of reduced peak demand. However, building a distribution network system capable of dealing with fluctuation in usage resulting from increased demand response could entail additional investments in the network. CEER also recognises that due to the increased amount of production of renewable energy it might be necessary to increase investments in a robust local network.

In order to achieve demand response, the European Commission Directorate-General for Energy (DG ENER)<sup>2</sup> has outlined a number of key topics that are addressed in this document and with which CEER agrees. The key topics outlined are:

- *Customer awareness through information*  
Knowledge of the consumption path, Dissemination of good practices

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<sup>1</sup> See Annex 3

<sup>2</sup> Presentation made at ERGEG workshop on Demand response 11<sup>th</sup> February 2011 by Manuel Sánchez Jiménez, European Commission, DG ENER Policy Officer, Gas and Electricity

- *Reflection of wholesale prices*
- *ToU prices, Dynamic Prices and Critical Peak Prices*
  
- *Automation and innovation*  
Implementation of automatic demand response measures (e.g. intelligent agents, intelligent control systems, etc.)
  
- *Regulation*  
Regulatory framework to enhance energy efficiency, integration of DER<sup>3</sup> and create a win-win situation.

The aspects captured in this report are primarily information, prices and regulation.

## 1.1. Background

Intelligent metering systems are promoted for several reasons in the 3<sup>rd</sup> Package; firstly with the aim to promote energy efficiency and demand-side management measures; and secondly with the aim to ensure active participation of customers in the market. In the definition of “active participation”, CEER has chosen to include the possibility for the customer to be also a producer of electricity (micro generator), which is reflected in this document. Furthermore, this is in line with the aim of the 3<sup>rd</sup> Package to promote the development of smart grids, with one of the goals being an increase in the use of renewable energy sources.

The ERGEG Smart Grids Position Paper<sup>4</sup> lists a high number of functions that smart metering systems can perform, concluding that: “smart grids encompass a much wider area of technologies and solutions and are by no means restricted or strictly delimited by the introduction of smart metering”. One of the drivers for smart grids, from a technical perspective, identified in the ERGEG Smart Grids Position Paper is active participation of customers in the electricity market, with dynamic electricity pricing. It is evident that the absence of smart meters will not guarantee such an active participation that implies, as a minimum, a frequent<sup>5</sup> availability of metering data and a deep awareness of both consumption and injection behaviours that are not possible through electromechanical meters.

To reach active participation, the customers must, in some way or other, be able to react and adjust their consumption or be able to choose from several types of energy sources (wind, water etc.), or be able to inject electricity. Demand response is the tool for adjusting consumption and injection, and therefore CEER has chosen to launch this public consultation, which will be followed by a final advice document.

CEER recognises that innovations in energy services and pricing can contribute to a reduction in consumption and more efficient use of energy across the system and at peak times. Increased knowledge by customers of their consumption (and possibly injection) will help them to adjust their use of electricity.

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<sup>3</sup> Distributed Energy Resource

<sup>4</sup> E10-EQS-38-05, June 2010, [http://www.energy-regulators.eu/portal/page/portal/EER\\_HOME/EER\\_CONSULT/CLOSED%20PUBLIC%20CONSULTATIONS/ELECTRICITY/Smart%20Grids/CD/E10-EQS-38-05\\_SmartGrids\\_Conclusions\\_10-Jun-2010\\_Corrige.pdf](http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_CONSULT/CLOSED%20PUBLIC%20CONSULTATIONS/ELECTRICITY/Smart%20Grids/CD/E10-EQS-38-05_SmartGrids_Conclusions_10-Jun-2010_Corrige.pdf)

<sup>5</sup> More frequent than monthly, preferably hourly, see E10- RMF-23-03

The following services identified in the GGP on smart metering are relevant as the basis for demand response (the letter E stands for Electricity, to separate these recommendations from the ones on gas):

- E 6. Offers reflecting actual consumption patterns
- E 12. Interface with the home

Demand response is nothing new. Different kinds of demand response schemes have existed for many years, but focusing on the system perspective, such as load shedding. Today, we have a liberalised electricity market, which affects the processes in a broader perspective (not only the system perspective) and gives the customers as well as other stakeholders new opportunities. As a customer, you have the possibility to save money, use energy in a flexible way and contribute to a more sustainable society.

This CEER public consultation takes the customer perspective and is based on the roll-out of smart meters applied in a liberalised electricity market.

### **CEER work process**

CEER held a public workshop on this issue on 11 February 2011 in Brussels. At this workshop, CEER presented its objective to prepare an advice on the take-off of demand response and sought stakeholder opinions and experiences in the area. This was very valuable for CEER when making the present public consultation document. CEER also intends to have a hearing with the respondents to the public consultation and invite the respondents to this event. CEER hopes to publish its final advice at the end of 2011.

### **1.1.1. National experiences on demand response**

CEER queried its members to see if there are any existing demand response experiences in place in the countries that have rolled out smart meters. Thirteen countries responded and out of these thirteen countries three – Italy, Finland and Sweden – have made a decision to roll out smart meters. Out of these three, no country has a demand response scheme based on smart metering. CEER also found that several countries have had demand response schemes in place for many years without the use of smart meters.

## **1.2. Questions for public consultation**

In this document, CEER has tried to define demand response. We have embedded our questions to interested stakeholders within the report itself. There is a total of **21 questions**. Among other things, we welcome views on the following questions: do you agree to the proposed definition? Do you believe that we have pinpointed the relevant stakeholders to enable the take-off of demand response? Have we chosen the most important factors that need to be addressed for the stakeholders – including the customers – to bring the full benefits of demand response?

Stakeholders are invited to submit their answers via our online consultation tool:

[http://www.energy-](http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_CONSULT/OPEN%20PUBLIC%20CONSUL)

[regulators.eu/portal/page/portal/EER\\_HOME/EER\\_CONSULT/OPEN%20PUBLIC%20CONSUL](http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_CONSULT/OPEN%20PUBLIC%20CONSUL)

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### 1.3. Objective and purpose of this paper

In this advice, the European energy regulators express their suggestions on issues concerning the take-off of demand response, with the customer as the main focus. This means that we start off from the customer, not the system perspective. Demand response is one of several other parts of demand side management. Demand response can in itself be divided into two parts, direct load control on the one hand, and innovative pricing on the other hand (see figure 1, page 17). This document describes roles connected to the innovative pricing part, since it is here where the customer has the active part.

The purpose of this Consultation Paper is to seek stakeholder views on what is needed to establish the take-off of a demand response electricity market with smart meters.

### 1.4. Scope

Within the greater framework of progress on smart metering, this CEER Advice will particularly focus on:

- the roles for DSOs versus competitive players regarding customer services offered through smart meters; and
- balancing and settlement arrangements that could incentivise suppliers to develop time of use offers to customers.

**Where this report refers to customers, they are to be understood as household customers and those customers that are deemed to be covered by Annex I of the 2009 Electricity Directive of the 3<sup>rd</sup> Package<sup>6</sup>.**

There are many different stakeholders, both old and new, that might take part in the future demand side energy world: DSOs, TSOs, metering operators, producers, traders, balancing responsible parties, suppliers, energy service companies (ESCOs), aggregators, electric power grid equipment vendors, ancillary service providers, information and communication technology (ICT) service providers, grid communications network providers, home appliance vendors, Building Energy Management Systems (BEMS), electric transportation/vehicle solutions providers and clearing and settlement agents. Other actors on the electricity market are customers, micro generators, regulators, standardisation bodies, EU, national legislation authorities and financial sector undertakings.

The role of the TSO is important when considering the system and unbundling perspectives. In this document, however, we have chosen not to focus separately on the TSOs since we have the customer perspective, not the system perspective, in mind.

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<sup>6</sup> Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity ( <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0055:0093:EN:PDF>)

For the purpose of this document, we have chosen to focus on the following stakeholders: customers, micro generators, DSOs, metering operators, suppliers, ESCO and NRAs. When describing the role of the metering operator, CEER recognises that in the majority of the European countries the DSO is responsible for this activity.

Since European countries differ in market design concerning the DSO and the metering operator, we have chosen to separate them. This will be reflected in the suggested recommendations below, where we describe the different roles for the two stakeholders. (In practice in most countries these two roles are to be found within one body, the DSO.)

The reason for this distinction is that we regard these as the key stakeholders to be able to launch demand response and they are closely linked to the customer and the micro generator.

**Question 1: Do you agree to the stakeholders chosen as the focus of CEER's advice?**

## 2. Definition of demand response

There are various terms and definitions meaning more or less the same things, when it comes to discussing demand response. CEER would like to emphasise that this document, and thus CEER's definition of demand response, is not focused on the network system perspective of demand response – demand side management.

CEER does not intend to establish an exclusive definition, but for the relevance of this advice document, we have chosen the following:

*Changes in electric usage by end-use customers/micro generators from their current/normal consumption/injection patterns in response to changes in the price of electricity over time, or to incentive payments designed to adjust electricity usage at times of high wholesale market prices or when system reliability is jeopardized. This change in electric usage can impact the spot market prices directly as well as over time.*

**Question 2: Do you agree to CEER's definition for demand response?**

### Legal basis

The 3<sup>rd</sup> Package<sup>7</sup> states the following requirements with relevance for the above definition:

- Information on energy costs provided to consumers frequently enough will create incentives for energy savings because it will give customers direct feedback on the effects of investment in energy efficiency and change of behaviour (preamble, paragraph 50);

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<sup>7</sup> Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity

- Customers should be properly informed of actual electricity consumption and costs frequently enough to enable them to regulate their own electricity consumption. That information shall be given by using a sufficient time frame, which takes account of the capability of customer's metering equipment and the electricity product in question. Due account shall be taken of the cost-efficiency of such measures. No additional costs shall be charged to the consumer for that service (Annex 1, paragraph 1);
- Member States shall ensure the implementation of intelligent metering systems that shall assist the active participation of consumers in the electricity supply market (Annex 1, paragraph 2).

### 3. The demand response vision

CEER's vision of demand response is a world in which electricity customers/micro generators make informed choices about their usage of electricity in the short term and their selection of appliances in the longer term. The prices they face will reflect the wholesale price at real time, and will provide appropriate rewards for changes in the profile of usage. Below, CEER will try to elaborate on this vision.

Customers will face appropriate incentives to invest (perhaps in terms of effort rather than financially) in methods which will allow them to better manage their usage. In addition, these incentives combined with the widespread availability of smart appliances will allow customers to manage their usage by choosing appliances that are capable of automatically responding to price signals; curtailing consumption during times of high wholesale prices and consuming during period of low prices. Customers will also have the possibility of opting-in to direct load control programmes, where some household appliances can be controlled by a utility or network company.

Demand response has implications for the process of system balancing and market price formation through a combination of autonomous and dynamic response to wholesale market prices. It is recognised that different types of consumption are flexible over different timescales and with varying degrees of notice of price signals; and the demand response mechanisms offered will reflect these different needs and the different degrees of value that such flexibility delivers. If many customers are exposed to the spot price and have the ability of demand response, consumption will be lower during the high-price hour but is likely to be higher during the hour before and after the high-price hour. The spot market price is set the day before, so this would still be high; but additionally the balancing price will become high the hour before and the hour after. CEER therefore recognises that it is not enough just to move consumption for all customers when peak prices occur since there then is a risk of just moving the peak – the peak remains but occurs a few hours later. CEER however believes that this is a challenge for the designers of new innovative offers.

There may be certain requirements for demand response 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 will be in place to allow demand side flexibility to be captured for these purposes where required. Flexibility of demand will 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. This is relevant from a system management perspective, however this is not dealt within the scope of this report.

In future, customers and micro generators will have a different attitude to their electricity usage compared with today. They will recognise the consequences of their usage and the level of awareness, and engagement in the market will probably be high.

### **Prerequisites for demand response**

CEER recognises that there are some key points in market structures that need to be in place to facilitate the take-off of demand response, in addition to the recommendations in the GGP on smart metering:

- Customers understanding of information on the electricity market;
- Customers offered easy ways of becoming aware, through new contracts etc.;
- Customer trust in the market and thus wanting to participate;
- A non-conflicting grid tariff; and
- The absence of end-user price regulation.

Demand response can be done in many ways, with different roles for the metering equipment. Figure number 1 shows home automation where the meter is a part of the communication system. CEER recognises that demand response could be managed without the meter when applying home automation. This could be done through applications in the actual appliance communicating via internet. This might be an option for the customers that do not yet have a smart meter. Figure number 2 shows home automation where internet (the cloud) is a part of the communication system instead of the meter.

However, keeping in mind the 3rd Package provisions related to smart meters, CEER believes it is very timely to reflect on the take-off of demand response with smart meters.

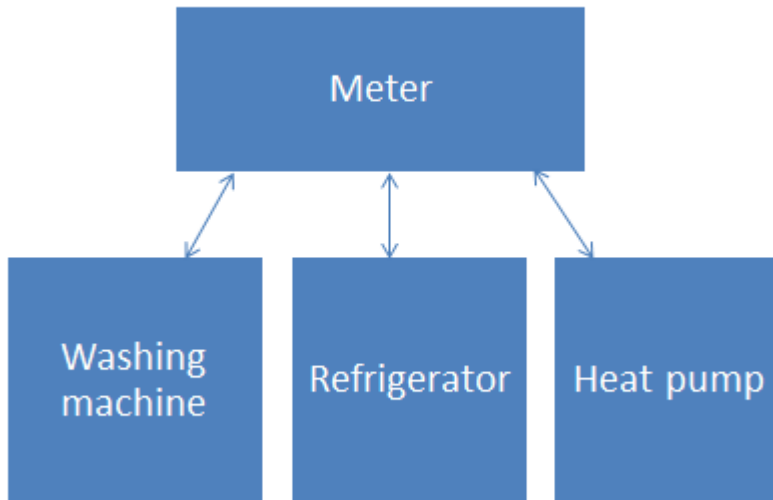


Figure 1: Demand response infrastructure – home appliances connected to the meter

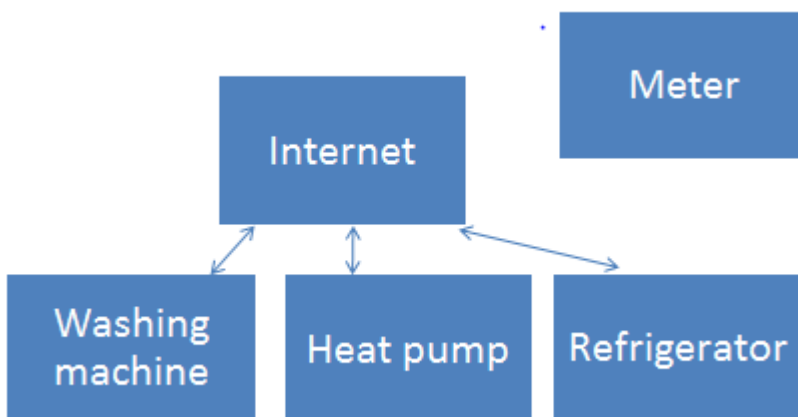


Figure 2: Demand response infrastructure in the home – appliances not connected to the meter

## 4. Customer protection

### 4.1. Customer trust in market functioning with smart metering and demand response

CEER recognises that in an increasingly complex market with more stakeholders to deal with than before and new offers to consider there is an increased need for the customer to feel



secure and to trust the market and its participants. This is particularly true for vulnerable customers.

CEER believes that it is important that customer protection from for example unfair selling methods, regret periods, etc. is considered when reviewing the regulatory framework in order to implement demand response nationally. The demand response environment, with varying amounts of possible offerings, might be experienced as a complicated one. One crucial factor is the way the customer is informed about the demand response world. It is important that the information about new offers is presented in a clear and correct manner. Also there should be a solid complaint handling system as well as redress schemes in place. An important stakeholder with regards to information will be the single point of contact for questions on electricity and gas, as stated in the 3<sup>rd</sup> package<sup>8</sup>.

The benefits from services developed with the help of smart metering systems will apply to all customers, in particular vulnerable customers. This is true in particular when customers are able to better manage their consumption with offers better corresponding to the consumption needs. With the help of the smart metering services, in particular the ones enabling demand response, all customers will have the opportunity to regulate their consumption of energy so that the energy bills need no longer be an unpleasant surprise.

One important factor for establishing customer trust in the market is transparency. Full transparency on existing customer data should be the general principle. For instance, when a service provider is in charge of information on the customer's voltage quality the customer should in this case be able to a) know that this data exists, and b) receive information on the explicit data. This information could be subject to a reasonable fee.

## 4.2. Market monitoring

ERGEG has previously issued advice on complaint handling<sup>9</sup> where ERGEG states, among other things, that whereas in some countries, customers' awareness of their rights is already high, in others much more has to be done regarding customer information on their rights (in these countries, information on the bill seems a prerequisite). This can depend on the maturity of the market and the level of competition. It should be carefully considered that in some countries, some customers, and particularly the vulnerable ones, may not have any access to the internet and/or are not fluent in writing a complaint.

Regarding customer information on complaint handling standards, a website is a very useful tool but cannot be considered sufficient to inform all customers, and in particular the most vulnerable ones. Therefore, it seems relevant to provide the document on complaint handling standards in printed form if a customer requests it.

In some aspects and depending on the moment, customer complaint monitoring could show evidence of market malfunctioning, for example as regards vulnerable customers, connection to the grid, direct selling, etc.

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<sup>8</sup> Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity

<sup>9</sup> GGP on Customer Complaint Handling, Reporting and Classification, June 2010, E10-CEM-33-05

ERGEG has previously published GGP on monitoring of retail markets<sup>10</sup>. When monitoring retail markets with demand response, this can mean that the focus of monitoring might be shifted towards an in-depth look at particular indicators. This indicator could be for example complaints. Looking at the type of complaint would give great insight into the nature of marketing, information, etc. This could lead to an audit of the relevant market actor or an increased focus on information or a need for new legislative measures.

**Question 3: Do you see a need for extra measures in this area?**

## 5. Recommendations

As previously mentioned, the GGP on smart metering present 28 recommendations<sup>11</sup>, covering electricity and gas. The present document further develops two of these (which are also to be regarded as services) since CEER regards these two as the key enablers for the take-off of demand response in the electricity market:

- Offers reflecting actual consumption patterns; and
- Interface with the home.

To enable the two services, CEER recommends that smart metering systems should be capable of recording consumption on a configurable time basis. Keeping in mind a feasible electricity demand flexibility, this time basis should be set at least hourly. CEER realises that a more frequent interval than hourly metering, as frequent as every ten or fifteen minutes, may be needed to develop energy efficiency services and offer peak load management services. Meter values should be stored with a capacity in line with the meter reading frequency. Another way to enable this service, but prevent the transmission of a significant amount of values, is the possible use of ToU registers.

When ToU registers are applied, CEER recommends the use of three registers at least, corresponding to time bands such as peak, middle level, and off-peak, during a period of 24 hours. CEER recognises that there is a risk of increased complexity in offers to customers (and micro generators) due to these new metering capabilities. Therefore, we recommend that NRAs adopt all needed and related measures before this service is made available. These measures could include a review of legislation on e.g. selling methods, contracts and information. A transition period is important to strengthen the customer's understanding of the new offers.

Furthermore, in addition to the functionalities above, ERGEG has stated previously that a smart metering system should be capable of remote power capacity reduction/increase; all customers should be equipped with a metering device capable of measuring consumption and injection; and software which can be upgraded remotely.

In the following recommendations, we define the roles for the chosen stakeholders with regard to demand response, and what needs to be fulfilled for being able to perform the roles. The recommendations are divided under the two services mentioned above.

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<sup>10</sup> GGP on Indicators for Retail Market Monitoring for Electricity and Gas, October 2010, E10-RMF-27-03

<sup>11</sup> Annex 3

## 5.1. Offers reflecting actual consumption patterns

Member States or, where a Member State has so provided, the NRA, shall strongly recommend that electricity undertakings optimise the use of electricity, developing innovative pricing formulas which reflect actual consumption. It is essential that the supplier be able to make offers to the customer (and those that both generate and consume electricity) that better reflect actual consumption/injection divided into different time periods. For example, offers could be in the form of dynamic pricing, time of use (ToU) tariffs and critical peak pricing. Our recommendations in this section outline the conditions that must be in place to allow each stakeholder to play its role fully in the use of demand response.

- **Customer**

Role:

The customer is the key stakeholder in order for the full potential of demand response to be realised. Ultimately, he/she must make use of the services provided drawing from available information and an understanding of his/her consumption.

CEER believes that the following is needed in order for the customer to take full advantage of offers reflecting actual consumption patterns:

- a) A reliable price comparison website to view the relevant offers;
- b) Information on consumption and cost at least monthly free of charge, in a clear and concise manner;
- c) Access to information on consumption and cost data on customer demand;
- d) Information should be provided through a choice of at least **two** communication channels, for example an in-home display, website, sms, via smartphones etc.; and
- e) Easy-to-launch complaint and solid redress schemes in place.

The level of detail and frequency of access to information will depend on the offer the customer has chosen.

### ***Question 4: Do you agree with the above?***

- **Micro generator**

Role:

The micro generator contributes to demand response by regulating consumption and injection to reflect wholesale prices.

To fulfil this role, the following needs to be in place:

- a) Possibility to sell electricity;
- b) A regulatory scheme on how to deal with payment/settlement for micro generation (feed in tariffs, net payment etc.)
- c) Micro generator to be provided information on consumption and injection data and costs, at least monthly free of charge, in a clear and concise manner;
- d) Access to information on price data, on demand; and
- e) Information should be provided through a choice of at least two communication channels, for example an in home display, website, sms, via smartphones, etc.

**Question 5: Do you agree with the above?**

- **Metering operator**

Role:

The metering operator offers services to provide, install and maintain metering equipment with functionalities that enable demand response. The metering operator is also responsible for carrying out the meter reading.

To fulfil this role, the following needs to be in place:

- a) A minimum set of functionalities (hourly metering or three registers, remote reading, remote power capacity reduction/increase, software to be upgraded remotely);
- b) Inter-operable communication standards; and
- c) A duty to deliver accurate metering data in a timely manner to relevant stakeholders, for example communicating with DSO's for balancing matters.

**Question 6: Do you agree with the above?**

- **DSO**

Role:

Increasing demand response places new challenges on balancing local grid networks. The DSO must manage these challenges while ensuring that the distribution network does not constrain the development of demand response.

To fulfil this role, the following needs to be in place:

- a) Information on metering values regarding consumption and injection;
- b) A distribution network system capable of dealing with fluctuation in usage resulting from increased demand response; and
- c) A regulatory scheme on how to deal with payment/settlement for micro generation.

**Question 7: Do you agree with the above?**

- **Supplier**

Role:

The supplier has the key role in developing innovating pricing formulas that reflect actual consumption, to enable the take-off of demand response.

To fulfil this role, the following needs to be in place:

- a) Timely and easy access to information on customers' metering values regarding consumption and injection;
- b) Timely and easy access to information on wholesale prices;
- c) An interface enabling communication on consumption and data between the customer and supplier;

- d) Capacity to analyse large volume of data quickly; and
- e) A regulatory scheme on how to deal with payment/settlement for micro generation.

**Question 8: Do you agree with the above?**

- **ESCOs**

Role:

ESCOs offer services and products that will ensure that customers and micro generators can benefit from offers reflecting actual consumption/injection patterns, such as home energy management systems, in home displays, smart appliances, software applications, energy storage devices etc.

To fulfil this role, the following needs to be in place:

- a) Timely and easy access to information on relevant data according to the offer between the customer/micro generator and the supplier;
- b) Access to relevant metering data; and
- c) Possibility to aggregate consumption from different customers in a demand response programme.

**Question 9: Do you agree with the above?**

- **NRA**

Role:

The NRA establishes a regulatory framework that enables demand response, as well as implementing appropriate monitoring measures. The NRA clearly defines stakeholder roles and responsibilities and develops appropriate incentives for relevant stakeholders, including grid tariffs that stimulate energy efficiency, to facilitate implementation of demand response and remove potential barriers.

**Question 10: Do you agree with the above?**

### **5.1.1. Conclusions - offers reflecting actual consumption**

When looking at the particular service of offers reflecting actual consumption and the stakeholder roles with regard to this, the main point of contact for the customer is with the supplier, ESCO and the metering operator. The interactions between the stakeholders are shown in figure 3 below.

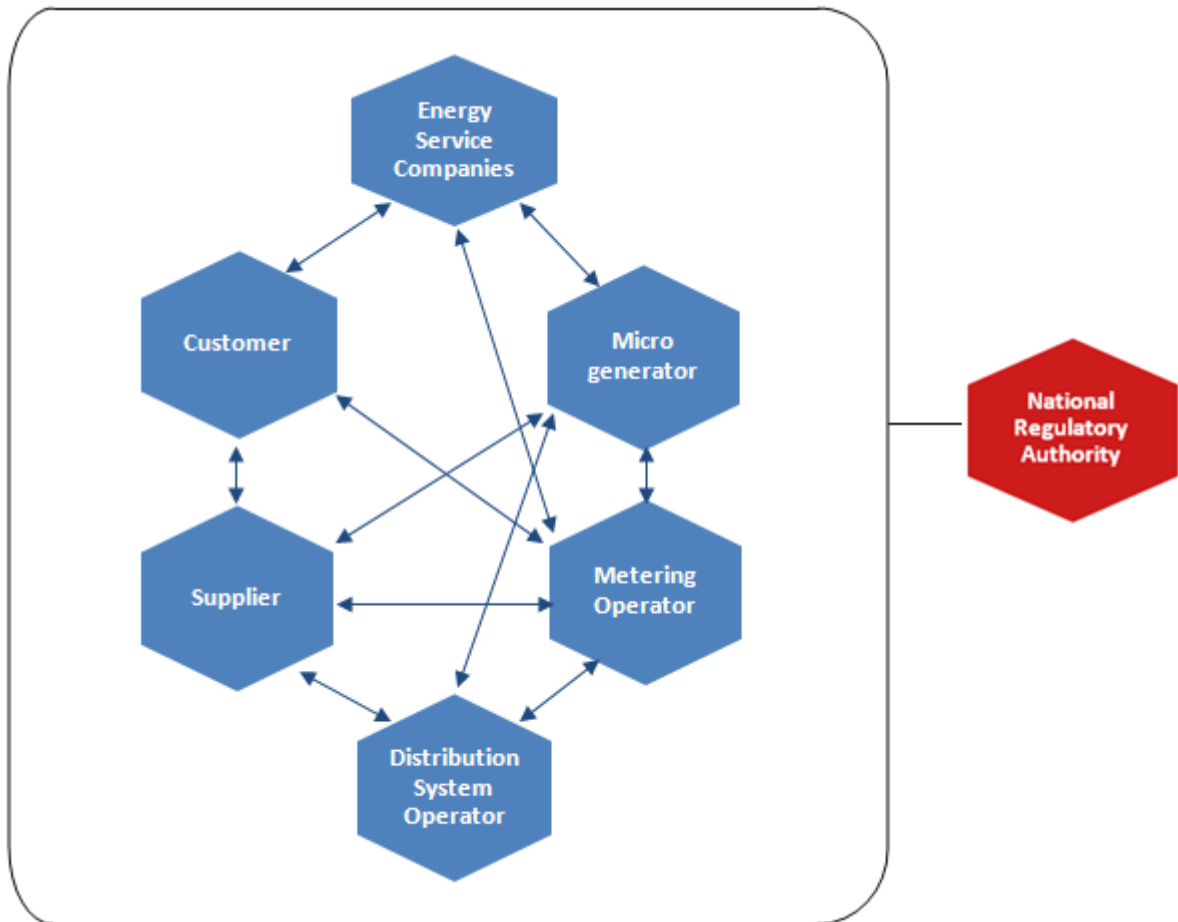


Figure 3: Interaction between stakeholders with regards to contracts that reflect actual consumption

## 5.2. Interface with the home

Meters should be equipped with or connected to an open gateway. The customer and service provider/s (suppliers, energy service companies, etc.) chosen by the customer should have access to this gateway. This approach would not give the DSO a privileged position compared to other service providers. The gateway should have a standardised interface which would enable energy management solutions, such as home automation, different schemes on demand response and facilitate delivery of data directly, etc. It also allows the customer to react to price signals and adapt consumption.

In this section, we list the conditions which must be in place to allow each stakeholder to play their part in the use of demand response.

- **Customer**

Role:

The customer can use the information available through the gateway to adjust consumption.

To fulfil this role, the following needs to be in place:

- a) A means to access to the metering values from the gateway

**Question 11: Do you agree with the above?**

- **Micro generator**

Role:

The micro generator can use the information available through the gateway to adjust injection.

To fulfil this role, the following needs to be in place:

- a) A means to access to the metering values from the gateway

**Question 12: Do you agree with the above?**

- **Metering operator**

Role:

The metering operator is responsible that the meter is equipped with or connected to an open gateway.

To fulfil this role, the following needs to be in place:

- a) Open standards for interfaces which enable interoperability two-way communications, so that any stakeholder wanting to connect to a device should not be hindered.

**Question 13: Do you agree with the above?**

- **DSO**

Role:

The DSO has no role in this matter unless the DSO is responsible for metering, in which case the role of the metering operator is applicable.

**Question 14: Do you agree with the above?**

- **Supplier**

Role:

The supplier develops innovating pricing formulas, enabled by means of easy access to metering values after customer consent.

To fulfil this role, the following needs to be in place:

- a) Interfaces which enable interoperability.

**Question 15: Do you agree with the above?**

- **ESCOs**

Role:

The ESCOs develop energy management services, by means of easy access to relevant metering values, after customer consent.

To fulfil this role, the following needs to be in place:

- a) Interfaces which enable interoperability.

**Question 16: Do you agree with the above?**

- **NRA**

Role:

The NRA monitors the electricity market with special regard to customer confidence, privacy and security.

To fulfil this role, the following needs to be in place:

- a) Clearly defined data protection rules applicable for electricity data communication.

**Question 17: Do you agree with the above?**

### **5.2.1. Conclusions – interface with the home**

The customer, supplier and the ESCO do not have to be in contact with the metering operator to use the open gateway. The interactions with regards to the interface with the home would be limited to the customer consent given to the supplier and/or ESCO.



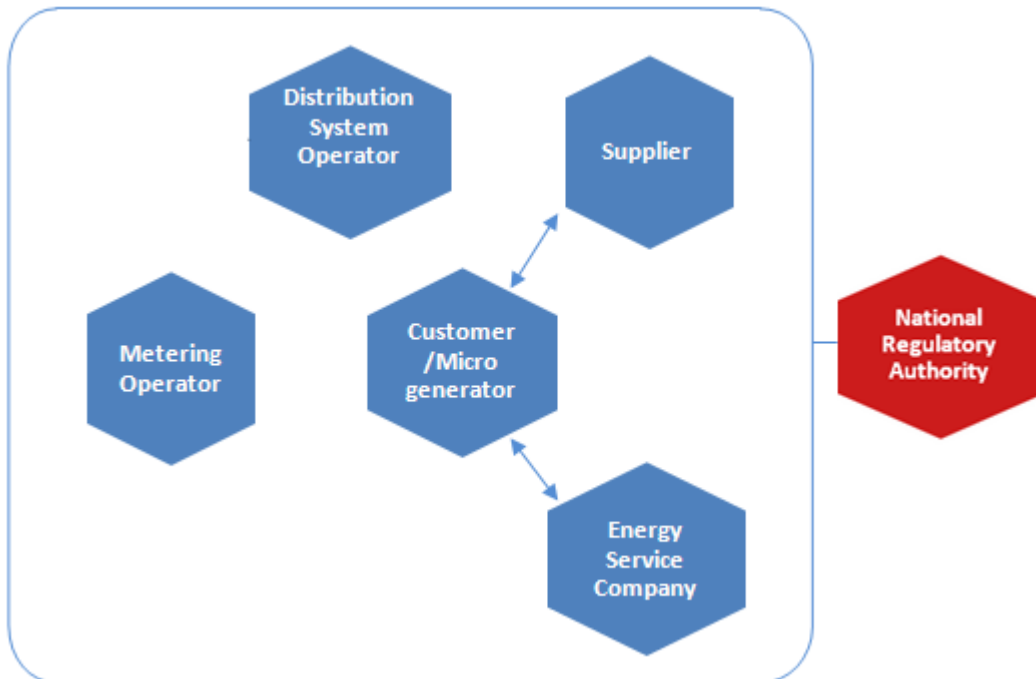


Figure 4: Interface with the home – interactions between stakeholders

### 5.3. National point of contact for information on metering data

Within the demand response process, there is a need to communicate a vast number of metering values to different stakeholders. This is particularly true when looking at figure 3, chapter 5.1.1. The metering operator is here more or less a hub, and this means in most cases the DSO.

Looking at national, regional and a future European electricity market will present new challenges to meter value management. It is feasible to expect each national electricity market to establish a national point of contact, for example a database or a hub, to which the metering operator transmits relevant metering values, and to which the relevant stakeholder can then turn to in order to get metering data, after customer consent. The role of this contact point would be **to receive metering data, store metering data and give access to metering data**. This contact point would not be responsible for the metering task itself, as defined under chapter 5.1 under the role of the metering operator.

This point of contact could be managed by the regulator, the TSO or a new stakeholder acting as a neutral market facilitator.

**Question 18: Is there a need for such a national point of contact?**

**Question 19: Which stakeholder should be responsible for this?**

### 5.3.1. Conclusion – national point of contact

Looking at national, regional and a future European electricity market will present new challenges to meter value management. It is feasible to expect each national electricity market to establish a national point of contact, for example a database or a hub, to which the metering operator transmits relevant metering values, and to which the relevant stakeholder then can turn to in order to get metering data, after customer consent.

## 6. Privacy and security

It should always be the customer who chooses in which way metering data shall be used and by whom, with the exception of metering data required to fulfil regulated duties and within the national market model. The principle should be that the party requesting information shall state what information is needed, with what frequency and will then obtain the customer's approval for this.

Full transparency on existing customer data should be the general principle. For instance, when a service provider is in charge of information on the customer's voltage quality the customer should in this case be able to a) know that this data exists, and b) receive information on the explicit data. This information could be subject to a reasonable fee.

In the case of an interface to the home via an open gateway in the meter, it is of great importance that these principles provide guidance in creating the necessary legal framework around demand response services.

Furthermore CEER supports the work made by Expert Group 2, under the Task Force Smart Grids, established by the Commission that works on a European level with questions on "Regulatory recommendations for data safety, data handling and data protection". The key deliverable is to identify the appropriate regulatory scenario and recommendations for data handling, safety and consumer protection. CEER recommends that the outcomes of this work will be implemented on a national level. Since the work of this group is not done by the publication of this public consultation document any specific comments or recommendations will not be made in reference to this work.

**Question 20: Do you see a conflict between issues of privacy and security of data with regards to demand response?**

## 7. Conclusions

Regulators have a proactive policy of empowering customers to actively participate in the market by enhancing access to information; removing the obstacles to supplier switching; promoting smart metering so as to stimulate an effective demand side response; and addressing customer protection issues (e.g. complaints and billing).

Enabling a demand response by customers makes retail and wholesale markets more efficient as well as helping to meet the EU's sustainability goals (e.g. by encouraging a shift in energy consumption away from peak times).

CEER has in this public consultation presented seven stakeholders to be regarded as the key actors for demand response: customers, micro generators, suppliers, metering operators, DSO's, ESCOs and NRAs. We have defined the stakeholders, their roles in relation to demand response and the factors needed to be fulfilled in order to manage each of these roles.

- When looking at the particular service of offers reflecting actual consumption and the stakeholder roles with regards to this, the main point of contact for the customer is with the supplier, ESCO and the metering operator.
- The customer, supplier and the ESCO do not have to be in contact with the metering operator to use the open gateway. The interactions with regards to the interface with the home would be limited to the customer consent given to the supplier and/or ESCO.
- Looking at national, regional and a future European electricity market it will present new challenges to meter value management. It is feasible to expect each national electricity market to establish a national point of contact, for example a database or a hub, to which the metering operator transmits relevant metering values, and to which the relevant stakeholder then can turn to in order to get metering data, after customer consent.

To reach demand response, the customer is the absolute key actor. As we see it, the customer shall also be encouraged to act as micro generator. To reach awareness and then action is not always easy. This puts a great responsibility on all other stakeholders to develop well-functioning markets with attractive offers where the customer realises that he or she has something to gain on demand response, and that participation is feasible both as far as information is concerned and as regards to economic issues. Demand response has to be understandable and easy to handle.

***Question 21: Do you think that there are any recommendations missing to be able to launch demand response? If so, please formulate and if possible according to the relevant stakeholders.***

## **Annex 1 – CEER**

In 2000, ten national energy regulatory authorities signed the "Memorandum of Understanding for the establishment of the Council of European Energy Regulators" (CEER). They had voluntarily formed the Council to facilitate cooperation in their common interests for the promotion of the internal electricity and gas market. In order to cope with a growing number of issues and to improve cooperation at operational level, the regulators decided in 2003 to formally establish themselves as a not-for-profit association under Belgian law and to set up a small secretariat in Brussels. The Statutes (English version, Statutes amendment) were published in the annex of the Belgian State Gazette on October 21st, 2003. The CEER now has 29 members - the energy regulators from the 27 EU-Member States plus Iceland and Norway.

The work of the CEER is structured according to a number of working groups, composed of staff members of the national energy regulatory authorities. These working groups deal with different topics, according to their members' fields of expertise.

This report was prepared by the Retail Market Functioning Task Force of the Retail Market and Customers Working Group.

## Annex 2 – List of abbreviations

Term	Definition
BEMS	Building Energy Management System
CBA	Cost Benefit Analysis
CEER	Council of European Energy Regulators
CEN	Comité Européen de Normalisation
CENELEC	Comité Européen de Normalisation Électrotechnique.
DG	Directorate General (of the European Commission)
DG ENER	Directorate General for Energy
DSO	Distribution System Operator
ERGEG	European Regulators Group for Electricity and Gas
ESD	Directive on energy end-use efficiency and energy
ESCO	Energy Service Company
ESO	European Standardisation Organisations
ETSI	European Telecommunications Standards
GGP	Guidelines of Good Practice
HV	High voltage
ICT	Information and communication technologies
IEC	International Electrotechnical Committee
LV	Low voltage
MID	Directive on Measuring Instruments
MV	Medium voltage; refers to voltage levels above 1 kV up to and including 35 kV, ref IEC
M/441	Mandate M/441
NRA	National Regulatory Authority
OTC	Over The Counter
PQ	Power Quality
RMF TF	Retail Market Functioning Task Force
SME	Small and medium-sized enterprise
TSO	Transmission System Operator
ToU	Time of Use

Table 1 – List of Abbreviations

## **Annex 3 – Recommendations from the GGP on Regulatory Aspects of Smart Metering for Electricity and Gas , E10-RMF-29-05, February 2011**

### Electricity and gas:

#### E/G 1. Customer control of metering data

#### Electricity

- E 2. Information on actual consumption and cost, on a monthly basis, free of charge
- E 3. Access to information on consumption and cost data on customer demand
- E 4. Easier to switch supplier, move or change contract
- E 5. Bills based on actual consumption
- E 6. Offers reflecting actual consumption patterns
- E 7. Remote power capacity reduction/increase
- E 8. Remote activation and de-activation of supply
- E 9. All customers should be equipped with a metering device capable of measuring consumption and injection
- E 10. Alert in case of non-notified interruption
- E 11. Alert in case of exceptional energy consumption
- E 12. Interface with the home
- E 13. Software to be upgraded remotely
- E 14. When making a cost benefit analysis, an extensive value chain should be used
- E 15. All customers should benefit from smart metering
- E 16. No discrimination when rolling out smart meters

#### Gas

- G 2. Information on actual consumption and cost, on a monthly basis, free of charge
- G 3. Access to information on consumption and cost data on customer demand
- G 4. Easier to switch supplier, move or change contract
- G 5. Bills based on actual consumption
- G 6. Offers reflecting actual consumption patterns
- G 8. Remote enabling of activation and remote de-activation of supply
- G 11. Alert in case of exceptional energy consumption
- G 12. Interface with the home
- G 13. Software to be upgraded remotely
- G 14. When making a cost benefit analysis, an extensive value chain should be used
- G 15. All customers should benefit from smart metering
- G 16. No discrimination when rolling out smart meters

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## Annex 4 - Stakeholder definitions

**Aggregator:** offers services to aggregate energy production from different sources (generators) and acts towards the grid as one entity, including local aggregation of demand (demand response management) and supply (generation management). In cases where the aggregator is not a supplier, it maintains a contract with the supplier.

**Ancillary Services providers:** providers of such services as those services necessary to support the transmission of electric power from seller to purchaser given the obligations of control areas and transmitting utilities within those control areas to maintain reliable operations of the interconnected transmission system<sup>12</sup>.

**Balance Responsible Party:** Ensures that the supply of electricity corresponds to the anticipated consumption of electricity during a given time period and financially regulates for any imbalance that arises.

**Building Energy Management Systems (BEMS) providers,** delivering the systems which facilitate management and control of building facilities, realising energy savings and increasing comfortability of users of buildings and making full use of the state-of-the-art Information Technology.<sup>13</sup>

**Clearing & Settlement agent:** Assumes liability for clearing and/or settlement of contracts and provides contractual counterparty within a power exchange and for Over the Counter (OTC) contracts.

**Electric Power Grid Equipment vendors:** stakeholder that sells electric equipment that supports the functioning of the power grid.

**Metering operator:** the entity which offers services to provide, install and maintain metering equipment related to a supply. In most EU Member States, the DSO is also metering operator. In case of a specific contractual basis, the contract is mostly with the network operator, or may be with the customer or the supplier. The meter may be rented to, or exceptionally owned by, the customer.

**Power Exchange:** Provides a market place for trading physical and financial (capacity/energy and derivatives) contracts for capacity allocation by implicit auctions within the defined country, region or cross border.

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<sup>12</sup> FERC 1995

<sup>13</sup> The already defined and broadly used building automation standards (like e.g. bacnet, LON and Konnex) shall be considered in relation to the interfaces between smart grids and smart metering.

**Regulator:** Independent body responsible for the definition of framework (market rules), for setting up system charges (tariffs), monitoring the functioning and performance of energy markets and undertaking any necessary measures to ensure effective and efficient market, non-discriminative treatment of all actors and transparency and involvement of all affected stakeholders.

**Standardisation bodies:** Responsible for standardisation of all relevant elements and components within the electricity supply chain, which in turn leads to harmonisation of relevant services, support towards removing barriers to trade, creating new market opportunities and reducing manufacturing costs.

**Supplier:** Has a contractual agreement with the end customer relating to the supply of electricity.

**Trader:** A person or entity that buys and sells energy goods and services in an organised electricity market (Power Exchange) or Over the Counter.