



Final Guidelines of Good Practice on Regulatory Aspects of Smart Metering for Electricity and Gas

**Ref: E10-RMF-29-05
8 February 2011**

INFORMATION PAGE

Abstract

On 21st June 2010, ERGEG launched a public consultation on draft Guidelines of Good Practice (GGP) on Regulatory Aspects of Smart Metering for Electricity and Gas (E10-RMF-23-03). The draft GPP outlined a number of recommendations focusing on customer services, roll-out of smart meters, cost benefit analysis and data security and integrity. These final recommendations aim to provide guidance regarding the European Commission's 3rd Energy Package provisions on the installation of intelligent metering systems for electricity and gas.

This document (E10-RMF-29-05) presents our final GGP following a public consultation and stakeholder workshop. The GGP are accompanied by an Evaluation of Responses (E10-RMF-29-05a) to the public consultation.

Target Audience

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

If you have any queries relating to this paper please contact:

Mrs. Fay Geitona

Tel. +32 (0)2 788 73 32

Email: fay.geitona@ceer.eu

Related Documents

CEER/ERGEG documents

- “ERGEG Public Consultation Paper on Draft Guidelines of Good Practice on Regulatory Aspects of Smart Metering for Electricity and Gas – Evaluation of Responses”, February 2011. Ref. E10-RMF-29-05a, http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_CONSULT/CLOSED%20PUBLIC%20CONSULTATIONS/CUSTOMERS/Smart%20metering/CD/E10-RMF-29-05a_GGP_SM_EoC_8-Feb-2011.pdf
- “ERGEG Public Consultation Paper on Draft Guidelines of Good Practice on Regulatory Aspects of Smart Metering for Electricity and Gas”, June 2010. Ref.E10-RMF-23-03, <http://www.energy->

[regulators.eu/portal/page/portal/EER_HOME/EER_CONSULT/CLOSED%20PUBLIC%20CONSULTATIONS/CUSTOMERS/Smart%20metering/CD/E10-RMF-23-03_GGP-SmartMetering_PC_10-Jun-2010.pdf](http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_CONSULT/CLOSED%20PUBLIC%20CONSULTATIONS/CUSTOMERS/Smart%20metering/CD/E10-RMF-23-03_GGP-SmartMetering_PC_10-Jun-2010.pdf)

- “EREG Position Paper on Smart Grids. An EREG 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
- “EREG Position Paper on Smart Grids. An EREG Public Consultation Paper “, December 2009. Ref. E09-EQS-30-04, http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_CONSULT/CLOSED%20PUBLIC%20CONSULTATIONS/ELECTRICITY/Smart%20Grids/CD/E09-EQS-30-04_SmartGrids_10%20Dec%202009.pdf
- “European Energy Regulators’ 2010 Work Programme”, December 2009, Ref. C09-WPDC-18-03, http://www.energy-regulators.eu/portal/page/portal/EER_HOME/C09-WPDC-18-03_public-WP2010_10-Dec-09.pdf
- “EREG 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
- CEER 4th Benchmarking Report on Quality of Electricity Supply. Ref. C08-EQS-24-04, December 2008. http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_EREG_PAPERS/Electricity/2008/C08-EQS-24-04_4th%20Benchmarking%20Report%20EQS_10-Dec-2008_re.pdf
- “EREG Report on Smart Metering with a Focus on Electricity Regulation”, October 2007. Ref. E07-RMF-04-03, http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_EREG_PAPERS/Customers/2007/E07-RMF-04-03_SmartMetering_2007-10-31_0.pdf

External documents

- 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 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in gas and repealing Directive

2003/54/EC, <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0094:0136: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>
- 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
- 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://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:EN:PDF>
- The Treaty on the Functioning of the European Union, Article 16, European Union May 2008, <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:115:0047:0199: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 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on measuring instruments, <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32004L0022:EN:NOT>
- Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings, <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:001:0065:0071:EN:PDF>
- Standard EN 50160 - Voltage Characteristics in Public Distribution Systems
- Standard IEC 61000-4-30 - Testing and Measurement Techniques. Power quality measurement methods

Table of Contents

| | |
|----------------------------------------------------------------------------------|-----------|
| EXECUTIVE SUMMARY | 6 |
| Background..... | 9 |
| Objectives | 10 |
| ERGEG's approach..... | 10 |
| 1. HOW TO APPLY THE RECOMMENDATIONS..... | 11 |
| 2. RECOMMENDATIONS | 12 |
| 2.1. Data security and privacy - electricity and gas..... | 12 |
| 2.2. Customer services - electricity..... | 12 |
| 2.3. Cost benefit analysis - electricity | 18 |
| 2.4. Roll-out of smart meters - electricity | 22 |
| 2.5. Customer services - gas..... | 23 |
| 2.6. Cost benefit analysis - gas | 27 |
| 2.7. Roll-out of smart meters - gas | 30 |
| 3. CONCLUSIONS..... | 31 |
| ANNEX 1 – GLOSSARY OF TERMS | 32 |
| ANNEX 2 - CUSTOMER SERVICES FOR ELECTRICITY AND GAS RELATED TO M/441 | 35 |
| ANNEX 3 – CEER AND ERGEG..... | 37 |
| ANNEX 4 – LIST OF ABBREVIATIONS | 38 |

Tables

| | |
|--------------------------------------------------------------------------------------------------------------|----------|
| <i>Table 1: ERGEG's guidelines of good practice on regulatory aspects of smart metering</i> | <i>8</i> |
| Table 2: Correlation of Mandate M/441 additional functionalities and ERGEG Electricity recommendations | 35 |
| Table 3: Correlation of Mandate M/441 additional functionalities and ERGEG Gas recommendations | 36 |
| Table 4: List of Abbreviations..... | 38 |

EXECUTIVE SUMMARY

These guidelines of good practice (GGP) on regulatory aspects of smart metering for electricity and gas are directed at Member States, National Regulatory Authorities (NRAs) and industry. The document contains a set of services for retail market customers (as well as for those that both generate and consume electricity). Furthermore, a set of recommendations are directed towards the Member States regarding roll-outs, cost benefit analyses and data security and integrity.

The basis for these GGP stems from provisions in 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 Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas (hereinafter 3rd Package¹). The GGP will hopefully contribute to the effective implementation of the Directives as well as the continuous development of the European electricity and gas markets.

The 3rd Package contains provisions regarding intelligent metering systems, with the aim of better informing customers of their consumption and helping to increase awareness of energy consumption. The implementation of those metering systems may be subject to an economic assessment of all the long-term costs and benefits to the market and the individual consumer or of which form of intelligent metering is economically reasonable and cost-effective and which timeframe is feasible for their installation. According to the 3rd Package, Member States shall ensure implementation of intelligent metering systems, where roll-out of smart meters is assessed positively, the purpose being to ensure the active participation of customers in the electricity and gas supply market².

In parallel, Mandate M/441 is an initiative of the European Commission's Directorate General (DG) Enterprise, based on an official Commission mandate of 12 March 2009 to CEN, CENELEC and ETSI for the development of an open architecture for utility meters involving communication protocols and functionalities enabling interoperability. The Mandate has the general objective to highlight or to harmonise European standards that will enable interoperability of utility meters (water, gas, electricity, heat), which can then improve the means by which customers' awareness of actual consumption can be raised in order to allow timely adaptation to their demands.

According to Mandate M/441, the implementation of this provision requires the definition of new functionalities for smart meters – in addition to those in the MID³, and as stated by the European Commission in the Mandate M/441.

ERGEG recognises that the benefits from services developed with the help of smart metering systems will apply to all customers, in particular vulnerable customers. All services developed within these GGP have been proposed taking into account vulnerable customers. With the help

¹ The 3rd Package proposals for the European Internal Market in Energy were adopted on 13 July 2009 and include five legislative acts, which can be viewed at: <http://eur-lex.europa.eu/JOHtml.do?uri=OJ:L:2009:211:SOM:EN:HTML>

² Directive 2009/72/EC and 2009/73/EC, Annex I, par. 2

³ Directive 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on measuring instruments

of these services, all customers will have the opportunity to regulate their consumption of energy so that the energy bill need no longer be an unpleasant surprise.

ERGEG believes that functionalities are crucial to the sound deployment of smart metering systems and to guaranteeing a minimum level of service to customers and those that both generate and consume electricity. This is also linked to the future development of smart grids in the electricity sector where the active participation of customers (and those that both generate and consume electricity) in the electricity market, with real time electricity pricing, is easily predictable.

ERGEG also expects that open standards and an interoperable architecture for smart meters will be delivered by the European Standardisation Organisations (ESOs) in due time in order to allow Member States to fulfil provisions in the 3rd Package.

The recommendations on services outlined in these GGP aim to be in line with the six additional functionalities outlined thus far by Mandate M/441.

- The focus of this report is on the customer and the regulatory perspective.

In preparing these GGP, ERGEG conducted a public consultation from June to September 2010 to which 54 stakeholders responded. These stakeholders represented 12 responses from industry associations, 10 from energy companies, 10 from DSOs and DSO associations, 5 consumer associations, 9 metering equipment and IT providers, 4 research and consultancy firms, and 4 public authorities at national level. ERGEG finds, from the answers received, that there is strong support for the provision of further guidance to the 3rd Package provisions. Out of the 54 stakeholders responding to the public consultation document, the vast majority were in favour of the draft recommendations but also presented very valuable comments to them. As a result, in these final GGP ERGEG has deleted three recommendations, added two and made modifications and clarifications to a majority of the others.

Table 1 provides a summary of the 28 recommendations for services that can be provided by smart metering, as set out in the present GGP. The identical electricity (E) and gas (G) recommendations have been given parallel numbers, e.g. E 2/G 2 (which accounts for the non-sequential numbering of the gas recommendations – which have different specificities given the nature of gas). ERGEG intends for the recommendations in the GGP to be a starting point rather than an exhaustive list, considering the ongoing developments in this area.

ERGEG recommends that Member States define at national level a list of services required from the industry: suppliers, DSOs, metering operators and other possible stakeholders. This list should include services regarded by ERGEG as core services, which are described in Chapters 2.2 and 2.5.

| ELECTRICITY AND GAS | |
|---------------------------|-------------------------------------------------------------------------------------------------------------|
| Data security & integrity | E/G 1. Customer control of metering data |
| ELECTRICITY | |
| Customer services | 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 |
| | Costs and benefits |
| Roll-out | E 15. All customers should benefit from smart metering |
| | E 16. No discrimination when rolling out smart meters |
| GAS | |
| Customer services | 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 |
| | Costs and benefits |
| Roll-out | G 15. All customers should benefit from smart metering |
| | G 16. No discrimination when rolling out smart meters |

Table 1: ERGEG's guidelines of good practice on regulatory aspects of smart metering

Background

The implementation of the 3rd Package has been one of ERGEG's seven priority areas during 2010. ERGEG's 2010 Work Programme⁴ notes that energy regulators – within the ambit of their responsibilities – can help influence the 'greening' of the energy sector, and one important step in that direction could be the implementation and use of smart metering (or 'intelligent metering') systems.

As ERGEG seeks to engage in a more proactive policy of customer empowerment, it has decided to develop Guidelines of Good Practice (GGP) on Regulatory Aspects of Smart Metering for Electricity and Gas. Smart metering systems can, from the customer point of view, enable better control over energy consumption, adjust behaviour and affect energy bills. Furthermore, the metering data provided to the customer could make supplier switching more efficient and easy, which would encourage increased customer participation in energy markets.

Customers should have confidence in the efficient operation of competitive electricity and gas markets. ERGEG therefore believes that customers themselves play a leading role in stimulating competition but that it is still regulators' and market participants' responsibility to bring the benefits of market opening to competition to customers by promoting choice, quality and value. This general objective has a special significance with the entry into force of the 3rd Package, which contains provisions with the aim to boost competition and create effective regulation in the interest of energy customers.

Intelligent metering systems are promoted for several reasons in the 3rd 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 its definition of "active participation", ERGEG has chosen to include the possibility for the customer to be also a producer of electricity, which is reflected in this document. Furthermore, this is in line with the aim of the 3rd Package to promote the development of smart grids, with one of the goals being an increase in the use of renewable energy sources and distributed generation.

Where this report refers to customers, they are to be understood as household customers and those SMEs that are deemed to be encompassed by Annex I of the 2009 Electricity and Gas Directives when implementing the 3rd Package.

Regarding electricity and the interaction between smart meters and smart grids, the ERGEG Position Paper on Smart Grids⁵ states that the terms smart grids and smart metering are often used together and are sometimes even mistaken to have a similar or even the same meaning. Even though smart metering enables some features and functionalities of smart grids, the scope of smart grids is much larger than smart metering. It is important to bear in mind that smart metering provides a smarter grid, although it is possible to have smarter distribution and transmission networks without smart metering. There are, however, potential synergies between smart metering and smart grids.

⁴ European Energy Regulators' 2010 Work Programme, 10 December 2009, Ref. C09-WPDC-18-03

⁵ Position Paper on Smart Grids, An ERGEG Public Consultation paper, E09-EQS-30-04

The ERGEG Smart Grids Position Paper 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 active participation, which implies, as a minimum, a frequent availability of metering data and a deep awareness of both consumption and injection behaviours that are not possible through electromechanical meters.

Objectives

As energy regulators, ERGEG wishes to contribute to the effective implementation of the EU Directives and the continuous development of the European electricity and gas markets.

The present GGP cover a set of services, followed by recommendations on aspects of parameters that should be taken into account when conducting a cost benefit analysis and a section on parameters to consider before conducting a roll-out of smart meters. Lastly, one section is dedicated to describing the regulators’ recommendations on data security and customer integrity.

The document is intended to serve as guidance for Member States, NRAs and industry in their consideration and deployment of smart metering systems.

ERGEG intends for the recommendations in the GGP to be a starting point rather than an exhaustive list, considering the ongoing developments in this area.

ERGEG’s approach

The focus of this report is on the customer and the regulatory perspective. When preparing the recommendations on smart metering, ERGEG considered the fact that current legislation and regulation in Member States is not always in line with the provisions in the 3rd Package. However, ERGEG considers its recommendations to be an important aim to be worked towards, and believes that these should be regarded as core services in the framework of smart metering systems. ERGEG recognises that smart metering may facilitate retail competition with innovation in tariffs and services. Basic services will be free of charge and others may be subject to an additional charge.

ERGEG launched the work on these guidelines with a public workshop in December 2009. The draft recommendations were then out for public consultation from June - September 2010. The outcome of the consultation has been processed according to ERGEG public consultation procedures. All respondents were invited to a hearing in October 2010 to further discuss the draft guidelines.

The following recommendations reflect the outcome of ERGEG's evaluation of the responses (Ref. E10-RMF-29-05a) received from the 54 stakeholders who commented on the public consultation.

1. How to apply the recommendations

These guidelines of good practice (GGP) are directed at Member States, National Regulatory Authorities (NRAs) and industry. The document contains a set of services for retail market customers (as well as for those that both generate and consume electricity). Furthermore, a set of recommendations are directed towards the Member States regarding roll-outs, cost benefit analyses and data security and integrity. ERGEG recommends that Member States define at national level a list of services required from the industry: suppliers, DSOs, metering operators and other possible stakeholders. This list should include services regarded by ERGEG as core services, which are described in Chapters 2.2 and 2.5.

ERGEG considers it important that the following is taken into account when interpreting the GGP:

- Implementing smart metering systems in a “future proof” manner is difficult. Therefore, the GGP are not too technical but rather focused on the services that the customer will be able to benefit from.
- ERGEG expects that open standards and an interoperable architecture for smart meters will be delivered by the European Standardisation Organisations (ESOs) in due time in order to allow Member States to fulfil the provisions in the 3rd Package.
- ERGEG intends for the recommendations in the GGP to be a starting point rather than an exhaustive list, considering the ongoing developments in this area.

Scope

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 and Gas Directives of the 3rd Package.

2. Recommendations

2.1. Data security and privacy - electricity and gas

In relation to the concept of smart metering systems, concerns might be raised regarding:

1. the security of the metering data that is stored, transmitted and retrieved; and
2. the privacy of the customer.

ERGEG does not intend to make detailed recommendations on security and integrity regarding meter value management. ERGEG supports the ongoing work within the Smart Grids Task Force⁶ launched by the European Commission. ERGEG would in particular like to emphasise the importance of the work being done by Expert Group 2 which deals with regulatory recommendations for data safety, data protection and data handling. The final recommendations are expected to be delivered by the expert group to the European Commission by June 2011.

For ERGEG it is of the utmost importance that the privacy of customers is protected. All reasonable endeavours have to be undertaken to address data security and privacy issues before implementing a smart meter roll-out. ERGEG suggests that national solutions are applied but stresses the importance of cooperation with national agencies dealing with privacy issues and data security, to make sure that the specificities relating to energy are taken into account.

Recommendation E/G 1. Customer control of metering data

It is always the customer that 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.

2.2. Customer services - electricity

By customer services for electricity, ERGEG means the outcome which the retail customer and those that both generate and consume electricity should be able to expect and benefit from through the functionalities of the smart metering system. ERGEG recognises that installation of smart meters will not in itself reduce consumption, provide lower bills or increase injected power. However, information on actual electricity consumption may trigger changes in customer behaviour and thus reduce e.g. the overall electricity consumption.

⁶ http://ec.europa.eu/energy/gas_electricity/smartgrids/taskforce_en.htm

When describing the services a customer should be able to expect from a smart metering system, ERGEG has sought to identify the functionalities that are needed to accomplish these services. These functionalities are the additional functionalities developed by Mandate M/441.

The European Commission's services "consider that receiving information on a monthly basis would be sufficient to allow a consumer to regulate his consumption".⁷ This information would not necessarily be presented through monthly billing. In ERGEG's view, this could be the minimum timeframe for information to customers. It should be noted that the granularity of metering is not the same as the granularity of informing customers.

ERGEG recognises that smart metering systems can enable many more customer services than those suggested here. ERGEG observes that the services described in this paper should be made available to customers independently of the national implementation of the metering architectures conceived and developed by mandate M/441. ERGEG also follows the work done by the Open Meter⁸ project.

When developing the services set out below, the key point for ERGEG was to define what level of service a customer should be able to expect from a smart metering system. Another key point was to lower the barriers regarding the customer's possibilities to act as a producer of energy. ERGEG recommends that Member States define at national level a list of services required from the industry: suppliers, DSOs, metering operators and other possible stakeholders. This list should include services regarded by ERGEG as core services, which are described in the present chapter.

Recommendation E 2. Information on actual consumption and costs, on a monthly basis, free of charge

This recommendation only covers information, not billing.

ERGEG believes that the customer (as well as those that both generate and consume electricity) should be properly informed - at least once a month - of actual electricity consumption and costs⁹. This information should be free of charge. This enables the customer to regulate electricity consumption. With *remote data reading* through smart meters, information should be easily available and should be transmitted monthly to the relevant market actor.

⁷ 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

⁸ "Open Meter Project" is supported by the European Commission's DG Research, and financed within the EU's Seventh Framework Programme. The main objective is to specify a comprehensive set of open and public standards for advanced metering infrastructure (AMI), supporting electricity, gas, water and heat metering, based on the agreement of all the relevant stakeholders in this area, and taking into account the real conditions of the utility networks so as to allow for full implementation.

⁹ Directive 2009/72/EC, Annex I, par. 1 i

When communicating with the customer, the service provider should offer a choice of different channels to provide this information for free (e.g. sms, internet, call centre). Service providers need to take into account other means of communication such as paper. This could be offered at a reasonable fee. Vulnerable customers will need to be especially taken into account. ERGEG does not state in this report which service provider should provide this information.

The information must be presented in a customer-friendly way, bearing in mind that customers' understanding of the electricity market is key for their confidence and active participation.

Recommendation E 3. Access to information on consumption and cost data on customer demand

On demand, the customer (as well as those that both generate and consume electricity) should be able to access information on his/her up to date consumption and injection data and costs.

When communicating with the customer, the service provider should offer a choice of different channels to provide this information for free (e.g. sms, internet, call centre). Service providers need to take into account other means of communication such as paper. This could be offered at a reasonable fee. Vulnerable customers will need to be especially taken into account. ERGEG does not state in this report which service provider should provide this information.

Concerning historical data, customers as well as those that both generate and consume electricity should have access to data at a frequency set nationally, free of charge.

Recommendation E 4. Easier to switch supplier, move or change contract

As a result of remote reading with smart meters, all service providers will have quick access to metering data. Through interval metering and registers, the metering data will be accurate. This facilitates supplier switching processes, moving or change of contract. Other processes also benefit from using remote reading, interval metering and registers; e.g. having access to historical data facilitates complaint handling.

Recommendation E 5. Bills based on actual consumption

As a result of *remote reading* of the meter values, customers should no longer have to accept estimated energy bills. Bills should reflect actual consumption. However, this recommendation does not preclude the possibility of offerings involving different payment schemes such as fixed monthly payments with a yearly reconciliation bill.

Recommendation E 6. 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.¹⁰ It is essential that the supplier be able to make offers to the

¹⁰ Directive 2009/72/EC, Chapter 2, Art. 3, par. 11, Annex I, par. 1 i

customer (and those that both generate and consume electricity) that better reflect actual consumption/injection divided into different time periods.

To enable this service, ERGEG recommends that smart metering systems should be capable of recording consumption on a configurable time basis. Considering a feasible electricity demand flexibility, this time basis should be set: at least **hourly**.

ERGEG 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 (time of use) registers. When ToU registers are applied, ERGEG 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.

ERGEG recognises that there is a risk of increased complexity in offers to customers (and those who both generate and consume electricity) due to these new metering capabilities. Therefore, ERGEG recommends 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.

Recommendation E 7. Remote power capacity reduction/increase

When a customer wishes to reduce or increase power capacity, he/she can contact the relevant market actor who will remotely perform this service, thus reducing the time to perform such operations (i.e. a remote action rather than sending personnel on site).

Remote management of power capacity allows the formulation of individually designed contract enhancements that would benefit the customer in meeting his/her specific needs.

This service can also be used to reduce power capacity to a minimum level instead of deactivating electricity supply in case of non-payment, leaving to the customer the possibility of using essential devices. This would in particular benefit vulnerable customers, who might better manage their energy consumption.

In cases where this is initiated by someone other than the customer, the regulatory framework should describe in detail the procedures and timeframes to be applied when undertaking power capacity reduction. In any event, customer protection and public service rights and obligations should be respected to ensure this service is used correctly.

Recommendation E 8. Remote activation and de-activation of supply

When a customer wishes to activate or de-activate the electricity supply, he/she can contact the relevant market actor who will remotely perform this service, thus reducing the time to perform such operations. The regulatory framework should describe under which safety conditions this can be performed.

In cases where this is initiated by someone other than the customer, the regulatory framework should describe in detail the procedures and timeframes to be applied. In any event, customer protection and public service rights and obligations should be respected to ensure this service is used correctly.

Recommendation E 9. All customers should be equipped with a metering device capable of measuring consumption and injection

ERGEG believes that in order to promote micro (or distributed) generation, the meter installed should be capable of measuring injected as well as consumed energy, thereby avoiding the need to change the meter in case a customer decides to become a producer. All customers should be equipped with a metering device capable of also measuring electricity injected into the network at the same point through which electricity is withdrawn.

Recommendation E 10. Alert in case of non-notified interruption

If a customer so chooses, he/she can receive immediate information on non-notified energy interruptions at his/her connection point (e.g. by sms), and thus act upon it. This will help minimise the extent of the damage resulting from an outage when the customer is away from the home. This information will also help the customer when claiming for reimbursement because of outages. This information could be subject to a reasonable fee.

Recommendation E 11. Alert in case of exceptional energy consumption

If a customer so chooses, he/she will be able to receive immediate information on exceptional energy consumption at his/her connection point and thus act upon it. With an alarm in the smart metering system, immediate information on a malfunction or a sudden exceptional change in consumption could be transferred to the relevant service provider. The service provider can then communicate this to the customer, through the channel of choice. This information could be subject to a reasonable fee.

The level of consumption that needs to be reached before the alarm is activated is up to the customer to decide. The relevance of this service depends on the national features of the metering system.

Recommendation E 12. 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.

Recommendation E 13. Software to be upgraded remotely

The customer should benefit from the future development of services related to smart metering systems without the relevant service provider having to come to make adjustments on site. Through the remote upgrading of software, costs will be reduced and the performance will be less time-consuming.

In order to have a future proof smart metering system, a smart metering system should allow for the programme software to be upgraded remotely. During upgrade operations, the metering system must hold the values stored and at the same time keep on reading and measuring the electricity withdrawn/injected.

2.3. Cost benefit analysis - electricity

The 3rd Package¹¹ stipulates that an assessment can be made by Member States before rolling out smart meters. This economic assessment should contain all long-term costs and benefits to the market and the individual customer. Separately from this purely economical assessment, the impact of data privacy should be considered. Part of this assessment could be a Cost Benefit Analysis (CBA) that takes into account the economic benefits to consumers as they, in the final instance, are called upon to bear the cost of smart meters. If assessed positively, a roll-out should be carried out. When conducting a CBA, it is important to consider if the “business as usual” scenario can be compared to the result of the CBA when considering the 20/20/20 targets for climate change and renewables¹².

Recommendation E 14. When making a cost benefit analysis, an extensive value chain should be used

Apart from the customer benefits achieved through the services described in the previous chapter, a CBA should also take into account an extensive value chain, covering DSOs, suppliers, metering operators, generators, etc. A CBA should also take into account the costs involved regarding metering data security. ERGEG would like to focus also on the benefits for network operators acting under a regulated regime. Considering these benefits, ERGEG would assume network operations could be carried out in a more efficient way. The CBA should be quantitative as far as possible depending on the national circumstances.

This recommendation is not to be seen as a calculation model for a CBA, but outlines some of the possible benefits for different market actors on the smart metering system value chain:

*Potential **benefits for customers**, depending on the market model, can include:*

- A) Better customer information
By doing a better measurement (more frequent, more detailed, etc), customer information could be increased.
- B) Load shedding scheme¹³
Load shedding schemes driven by the meter could allow customers to fully and easily benefit from new tariffs.
- C) Reduction of peak load
Through customer information and settlement of incentive tariffs, peak load could be reduced.
- D) Reduction of cost and delay of interventions
By having most interventions automated, costs and delays could be reduced. Customers

¹¹ Directive 2009/72/EC, Annex I, par. 2

¹² Directive 2009/28/EC

¹³ Cutting of the electric current on certain connections when the demand becomes greater than the supply.

would not need to be physically present (i.e. requiring time away from other obligations) for each intervention by the operator.

E) Accurate consumption payments

By having bills which reflect real consumption, customers would no longer face imposed under/over payments which might require settling (and possibly unplanned for expenses) at a later date.

F) Damage/loss reduction

By receiving information on voltage deviations, certain customers could better plan their consumption and respond quickly to deviations which could damage/affect electrical devices, etc.

G) New services

The possibility to offer real-time pricing and innovative tariffs, as well as interfaces between the smart metering system and the home could result in new types of energy services being available to customers – to help manage their consumption (and costs) and to promote more energy efficient and 'green' energy networks.

Those that produce and consume electricity can keep precise track of their consumption/injections as well as prices and adapt their systems accordingly.

H) Easier switching

Automation and simplification of data exchange through smart metering systems should speed up the process for switching suppliers and simplify the 'action' required from the customer to make the switch.

*Potential **benefits for suppliers**, depending on the market model, can include:*

I) Better customer information

Better customer information will assist their participation in the electricity supply market and allow it to be more open.

J) Better frequency and quality of billing data

Better frequency and quality of billing data will reduce complaints from customers.

K) Improved load profiling and forecasting

*Potential **benefits for network owners/controllers**, depending on the market model, can include:*

L) Better operability of network

Better operability of network allows network owners/controllers to know if network operators do their job in the right way.

Potential **benefits for network operators**, depending on the market model, can include:

M) Reduction of peak load

Through customer information and settlement of incentive tariffs, network operators could reduce peak load situations.

N) Profiling and data aggregations

The availability of interval metering for withdrawn and injected active power in each delivery/injection point allows the aggregation of consumption and injection data according to wide-ranging criteria, which can be useful for many purposes: per type of customer and those that both generate and consume electricity, per MV/LV transformer substation, per geographical area, per supplier, and as a function in the calculation of network losses, etc.

O) Balancing

The support that smart metering systems can give to the balancing service is of importance. Thanks to the high capabilities of meters in recording and freezing consumption/injection data, balances can be tied to solar years and months, and shorter periods like weeks or even days.

P) System security

The availability of functionalities for remote disconnection/reconnection and for remote reduction/restoration of the available power, combined with an efficient communication system, can contribute to keeping the network more secure.

Q) Continuity of supply

Being able to measure interruptions through smart metering systems, improved information about incidents in the LV grid would be primarily beneficial for the DSO and as a consequence beneficial for the grid users; e.g. precise starting time and finish time for interruptions. However, possible costs of implementing this functionality should be considered. When referring to interruptions, relevant European and global standards should be referred to (IEC 61000-4-30), otherwise various smart metering systems will contain differing definitions of what an interruption is.

R) Faster fault location

Smart metering systems can help grid operators to locate more quickly faults which originate on low voltage networks, thereby reducing the time period between the time the fault occurs and the time the control centre of the grid operator receives this information, traditionally through telephone calls from customers.

S) Voltage quality

ERGEG's understanding is that smart meters and PQ (power quality) analysers are likely to be differentiated also in the future. Today's smart meters have not, to our understanding, been proven able to provide reliable measurements for voltage quality according to relevant European and global standards, including EN 50160 and IEC 61000-4-30.

PQ analysers must comply with relevant standards. Information on voltage quality is not considered necessary for all supply terminals. Still, today's meters can provide information about voltage deviations important for the DSO, and can offer preliminary information for further measurements, even if not done according to relevant standards. It is important to use the already available capability for today's smart meters to the extent and benefit possible.

T) Network losses

Grid operators can more easily make detailed calculations of network losses even for a small portion of network, notably at MV/LV substation level. Through interval metering, they can have this calculation differentiated by hour of the day, by day of the week and in general by defined periods in the year.

U) Reactive power

This benefit, available on each delivery point, can help the grid operator in discouraging bad practices in the use of the network and in locating customers that generate an amount of reactive power higher than that allowed, where such a limit exists.

V) Detection of fraud/theft

Smart metering systems make it easier to detect previously unmeasured consumption that resulted from bypassing the meter.

W) Process optimisation/savings of operational costs

Due to the fact that smart meters are included in the IT-infrastructure of the network operator, there exists a high potential for process optimisation and savings in operational costs. Using synergies could also lead to further benefits.

X) Improved investment and maintenance planning

*Potential **benefits for society as a whole**, depending on the market model, can include:*

Y) Reduction of greenhouse gas emissions and increases in energy efficiency

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 will help them to adjust their use of electricity.

2.4. Roll-out of smart meters - electricity

The 3rd Package states that “Member States or any competent authority they designate shall prepare a timetable with a target of up to 10 years for the implementation of intelligent metering systems. Where roll-out of smart meters is assessed positively, at least 80 % of consumers shall be equipped with intelligent metering systems by 2020.” ERGEG understands that the 3rd Package seems to address the potential inefficiencies introduced by Article 13 in the ESD Directive¹⁴.

Recommendation E 15. All customers should benefit from smart metering

If assessed positively and a roll-out is decided, all customers should be eligible to obtain a smart meter. It is important for all customers to be able to benefit from the services developed through smart metering systems in order to enable customers to become active on the energy market. ERGEG recognises that due to geographical or other special national circumstances it can be difficult to achieve a 100 percent roll-out.

Recommendation E 16. No discrimination when rolling out smart meters

Member States should avoid discriminatory behaviour by the party responsible for the roll-out. For example: discrimination based on distinguishing between customers served by suppliers other than the vertically-integrated supplier or distinguishing between customers served under regulated prices in relation to customers served on the free market. To avoid unnecessary costs for customers, the timing of the actual metering installation in different regions may have to be considered.

¹⁴ Directive 2006/32/EC

2.5. Customer services - gas

By customer services for gas, ERGEG means the outcome which the customer can expect through the functions of the smart metering systems. ERGEG recognises that installation of smart meters will not in itself reduce consumption, or provide lower bills. However, information on actual gas consumption may trigger changes in customer behaviour and thus reduce e.g. the overall gas consumption. ERGEG recognises that there are significant differences between gas and electricity, e.g. in the case of gas volume measurement, need for batteries, safety regulation. This is reflected in the services below. ERGEG also wants to stress that all the services suggested here may not exist as of today, but should be seen with a forward-looking perspective. This is particularly true for the electro-valve which has not been fully tested in all countries.

When describing the services a customer should be able to expect from a gas smart metering system, ERGEG has sought to identify the functionalities that are needed to accomplish these services. These functionalities are the additional functionalities developed by Mandate M/441.

The European Commission's services "consider that receiving information on a monthly basis would be sufficient to allow a consumer to regulate his consumption".¹⁵ In ERGEG's view, this could be the minimum timeframe for information to customers. It should be noted that the granularity of metering is not the same as the granularity of informing customers.

ERGEG observes that the services described below should be made available to customers independently of the national implementations of the metering architectures conceived and developed by Mandate M/441 or by the Open Meter project¹⁶.

When developing the services set out below, the key point for ERGEG was to define what level of service a customer should be able to expect from smart metering systems.

ERGEG recommends that Member States define at national level a list of services required from the industry: suppliers, DSOs, metering operators and other possible stakeholders. This list should include services regarded by ERGEG as core services, which are described in this chapter.

¹⁵ Interpretative note on Directive 2009/73/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

¹⁶ See Footnote 8.

Recommendation G 2. Information on actual consumption and cost, on a monthly basis, free of charge

EREGEG would like to point out that this recommendation only covers information, not billing.

EREGEG believes that the customer should be properly informed - at least once a month - of actual gas consumption and costs¹⁷. This information should be free of charge. This enables the customer to regulate gas consumption. With *remote data reading*, information should be easily available and should be transmitted monthly to the relevant service provider.

When communicating with the customer, the service provider should offer a choice of different channels to provide this information for free (e.g. sms, internet, call centre). Service providers need to take into account other means of communication such as paper. This could be offered at a reasonable fee. Vulnerable customers will need to be especially taken into account. EREGEG does not state in this report which service provider should provide this information.

The information must be presented in a customer-friendly way, bearing in mind that customers' understanding of the gas market is key for their confidence and active participation.

Recommendation G 3. Access to information on consumption data on customer demand

On demand, the customer should be able to access information on his/her up to date gas consumption data and costs.

When communicating with the customer, the service provider should offer a choice of different channels to provide this information for free (e.g. sms, internet, call centre). Service providers need to take into account other means of communication such as paper. This could be offered at a reasonable fee. Vulnerable customers will need to be especially taken into account. EREGEG does not state in this report which service provider should provide this information.

Concerning historical data, customers should have access to data at a frequency set nationally, free of charge.

Recommendation G 4. Easier to switch supplier, move or change contract

As a result of remote reading, all service providers will have quick access to metering data. Through interval metering and registers the metering data will be accurate. This facilitates supplier switching processes, moving or change of contract. Other processes also benefit from using remote reading, interval metering and registers; e.g. having access to historical data facilitates complaint handling.

Recommendation G 5. Bills based on actual consumption

As a result of *remote reading* of the meter values, customers should no longer have to accept estimated energy bills. Bills should reflect actual consumption. However, this recommendation

¹⁷ Directive 2009/73/EC, Annex I, par. 1 i

does not preclude the possibility of offerings involving different payment schemes such as fixed monthly payments with a yearly reconciliation bill.

Recommendation G 6. Offers reflecting actual consumption patterns

Member States or, where a Member State has so provided, the NRA, shall strongly recommend that gas undertakings optimise the use of gas, developing innovative pricing formulas which reflect actual consumption.¹⁸ It is essential that the supplier be able to make offers to the customer that better reflect actual consumption divided into different time periods.

To enable this service, ERGEG recommends that gas smart metering systems should be capable of recording consumption on a configurable time basis. Considering gas demand flexibility, this time basis should be set: at least **daily**. 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, ERGEG recommends the use of **three registers** at least, corresponding to time bands such as **peak**, **middle level**, and **off-peak periods**. The time period during which these time bands could be applied could for example be spread over a yearly or seasonal basis.

ERGEG recognises that there is a risk of increased complexity in offers to customers due to these capabilities. Therefore, ERGEG recommends 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.

Recommendation G 8. Remote enabling of activation and remote de-activation of supply

When a customer wishes to activate or de-activate the gas supply, he/she can contact the relevant service provider who will remotely perform this service, thus reducing the time to perform such operations. The regulatory framework should describe under which safety conditions this can be performed.

While remote de-activation can be performed easily, for safety reasons, in most cases, it is necessary that gas activation is always performed manually by personnel on-site. Before the manual operation, primarily there has to be a remote enabling of activation by the party responsible, to prevent dangerous activation under unsafe conditions.

In cases where this is initiated by someone other than the customer, the regulatory framework should describe in detail the procedures and timeframes to be applied. In any event, customer protection and public service rights and obligations should be respected to ensure this service is used correctly.

¹⁸ Directive 2009/73/EC, Chapter 2, Art. 3, par. 11, Annex I, par. 1 i

Recommendation G 11. Alert in case of exceptional energy consumption

If the customer chooses, he/she will be able to receive up to date information on exceptional energy consumption at his/her connection point and thus act upon it. With an alarm in the smart metering system, immediate information on a malfunction or a sudden exceptional change in consumption could be transferred to the relevant service provider. The service provider can then communicate this to the customer, through the channel of choice. This information could be subject to a reasonable fee.

The level of consumption that needs to be reached before the alarm is activated is up to the customer to decide. The relevance of this service depends on the national feature of the metering system.

Recommendation G 12. Interface with the home

Meters should be equipped with or connected to an open gateway. The customer and the service provider/s chosen by the customer should have access to this gateway. The gateway should have a standardised interface which would enable energy management solutions, such as home automation and facilitate delivery of data directly.

ER GEG believes that the DSO need not necessarily be the party responsible for services related to the interface with the home. This recommendation suggests that the meter itself needs to be equipped with an open gateway enabling market actors to develop services which will use the full potential of this gateway. This approach would not give the DSO a privileged position compared to other service providers.

Recommendation G 13: Software to be upgraded remotely

The customer should benefit from the future development of services related to smart metering systems without the relevant service provider having to come to make adjustments on site. Through the remote upgrading of software, costs will be reduced and the performance will be less time consuming.

In order to have a future proof smart metering system, a smart metering system should allow for the programme software to be upgraded remotely. During upgrade operations, the metering system must hold the values stored and at the same time keep on reading and measuring the gas withdrawn.

2.6. Cost benefit analysis - gas

The 3rd Package¹⁹ stipulates that an assessment could be made by Member States before rolling out smart meters. This economic assessment should contain all long-term costs and benefits to the market and the individual customer. Separately from this purely economical assessment, the impact of data privacy should be considered.

Part of this assessment could be a Cost Benefit Analysis (CBA) that takes into account the economic benefits to consumers as they, in the final instance, are called upon to bear the cost of smart meters. If assessed positively, a roll-out should be carried out. When conducting a CBA, it is important to consider if the “business as usual” scenario can be compared to the result of the CBA when considering the 20/20/20 targets for climate change and renewables²⁰.

Recommendation G 14. When making a cost benefit analysis, an extensive value chain should be used

Apart from the customer benefits described in the previous chapter, a CBA should also take into account an extensive value chain, covering DSOs, suppliers, metering operators, etc. A CBA should also take into account the costs involved regarding metering data security. ERGEG would like to focus in particular on the benefits for network operators acting under a regulated regime. Considering these benefits ERGEG, would assume network operations could be carried out in a more efficient way. **This recommendation is not to be seen as a calculation model for a CBA, but outlines some of the possible benefits for different market parties on the smart metering system value chain:**

*Potential **benefits for customers**, depending on the market model, can include:*

- A) Better customer information
By doing a better measurement (more frequent, more detailed, etc), customer information could be increased.
- B) Reduction of cost and delay of interventions
By having most interventions automated, costs and delays could be reduced. Customers would not need to be physically present (i.e. requiring time away from other obligations) for each intervention by the operator.
- C) Accurate consumption payments
By having bills which reflect real consumption, customers would no longer face imposed under/over payments which might require settling (and possibly unplanned for expenses) at a later date.

¹⁹ Directive 2009/73/EC, Annex I, par. 2

²⁰ Directive 2009/28/EC

D) New services

The possibility to offer dynamic pricing and innovative tariffs, as well as interfaces between the smart metering system and the home could result in new types of energy services being available to customers – to help manage their consumption (and costs) and to promote more energy efficient and ‘green’ energy networks.

E) Easier switching

Automation and simplification of data exchange through smart metering systems should speed up the process for switching suppliers and simplify the ‘action’ required from the customer to make the switch.

*Potential **benefits for suppliers**, depending on the market model, can include:*

F) Better customer information

Better customer information will assist their participation in the gas supply market and allow it to be more open.

G) Better frequency and quality of billing data

Better frequency and quality of billing data will reduce complaints from customers.

H) Improved load profiling and forecasting

*Potential **benefits for network owners/controllers**, depending on the market model, can include:*

I) Better operability of network

Better operability of network allows network owners/controllers to know if network operators do their job in the right way.

*Potential **benefits for network operators**, depending on the market model can include:*

J) Reduction of load

By customer information and settlement of incentive tariffs, network operators could reduce load situations.

K) Profiling and data aggregations

The availability of interval metering for withdrawn gas in each point allows the aggregation of consumption data according to wide-ranging criteria, useful for many purposes: per type of customer, per geographical area, per supplier, and as a function in the calculation of network losses, etc.

L) Balancing

The support that smart metering systems can give to the balancing service is of paramount importance. Smart metering systems will allow more accurate forecasts and synthetic load profiles, and thus decrease the need for balancing.

M) System security

The availability of the functionalities for remote disconnection combined with an efficient communication system can contribute to keeping the network more secure.

N) Network losses

System operators can more easily detect and make detailed calculations of network losses even for a small portion of network. Through interval metering, they can have this calculation differentiated by hour of the day, by day of the week and in general by defined periods in the year.

O) Improved investment and maintenance planning

*Potential **benefits for society as a whole**, depending on the market model, can include:*

P) Reduction of greenhouse gas emissions and increases in energy efficiency

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 will help them to adjust their use of gas.

2.7. Roll-out of smart meters - gas

ERGEG recognises that although there is no specific target date in the 3rd Package for the implementation of gas smart metering systems, a time table should be prepared and the roll-out should be achieved within a reasonable period of time.²¹ The 2009 Gas Directive (2009/73/EC) does not state how many gas customers shall be equipped with smart metering systems.

Recommendation G 15. All customers should benefit from smart metering

If assessed positively and a roll-out is decided, all customers should be eligible to obtain a smart meter. It is important for all customers to be able to benefit from the services developed through smart metering systems in order to enable customers to become active on the energy market. ERGEG recognises that due to geographical or other special circumstances it can be difficult to achieve 100 percent roll-out. A special circumstance could for example be smart metering for customers using gas only for cooking.

Recommendation G 16. No discrimination when rolling out smart meters

Member States should avoid discriminatory behaviour by the party responsible for the roll-out. For example: discrimination based on distinguishing between customers served by suppliers other than the vertically-integrated supplier or distinguishing between customers served under regulated prices in relation to customers served on the free market. To avoid unnecessary costs for customers, the timing of the actual metering installation in different regions may have to be considered.

²¹ 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

3. Conclusions

This document presents to all interested parties the ERGEG Guidelines of Good Practice on smart metering systems for electricity and gas. The customer is the focus of these GGP, and the customers are to be understood as household customers and those customers that are deemed to be covered by Annex I of the 2009 Electricity and Gas Directives of the 3rd Package.

ERGEG believes that an electricity customer should be able to benefit from 12 different services that would enable the electricity customer to take advantage fully of the benefits of the energy market. ERGEG believes that a gas customer should be able to benefit from 9 services that would enable the gas customer to take advantage fully of the benefits of the energy market. ERGEG recommends that Member States define at national level a list of services required from the industry: suppliers, DSOs, metering operators and other possible stakeholders. This list should include services regarded by ERGEG as core services, which are described in Chapters 2.2 and 2.4.

ERGEG intends for the recommendations to be a starting point and not an exhaustive list, considering the ongoing developments in this area. Furthermore, ERGEG is aware of the fact that the implementation of these recommendations will mean a lot of work for all stakeholders. ERGEG intends to work further on the issue of smart metering within its 2011 work programme. The future work will be “CEER Advice on the take-off of a demand response electricity market with smart meters.” Within the greater framework of progress on smart metering, this CEER Advice will particularly focus on the roles for DSOs vs. competitive players regarding customer services offered through smart meters as well as balancing and settlement arrangements that could incentivise suppliers to develop time of use offers to customers.

Annex 1 – Glossary of Terms

The descriptions of terms listed here serve to provide a common understanding of the different subjects and apply in the first instance to the issues addressed in this document. Beyond that, for any other issue of general importance or of common understanding, the definitions in the existing legal framework, including the 3rd Package and Regulation (EC) 1228/2003, apply.

Some differences with definitions already in use in other situations and/or specifications are possible.

General terms

| | |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Customer | Where this report refers to customers they are to be understood as household customers and those customers that are deemed to be encompassed by Annex I of the 2009 Electricity and Gas Directives when implementing the 3 rd Package. |
| Interoperability | The ability of a system or a product to work well with other systems or products. |
| Metering values through web portal/gateway | Transformation of metering data into web format can be presented through different channels. Capability of the metering system to inform on total usage, injection and other metrological and non-metrological data for external visual display. |
| Remote reading | Metering value read remotely and stored, with provision to relevant service providers. The meter values are registered through a standard interface at a predefined time schedule or upon request. This includes export metering (i.e provision of consumption and injection data and exported net flows). |
| Standards | Voluntary technical specifications and common technical rules for products or systems to be placed on the market. |
| Time of Use registers | Capability of a meter to record consumption and injection into separate totalizer registers, additional to the single incremental totalizer register, according to time bands (e.g: 3 separate totalizer registers are needed if there are 3 time bands: peak, off-peak, mid-level; 2 separate totalizer registers are needed if there are 2 time bands: day, night). This capability allows time of use pricing but is not suitable for handling real-time pricing and critical peak pricing. |
| Two-way communication | The meter has the capability of two-way communication between the metering system and the relevant service providers. The metering system has the capability to retrieve data at a distance on |

e.g. usage, network and supply quality, events, network or meter status and non-metrological data and to make this data available to the relevant service providers. It gives the ability to the relevant service providers to configure the metering system at a distance, and to carry out firmware/software upgrades. It is also possible for the metering system to receive information – for example information sent from the supplier (and/or via relevant third parties e.g. DSO or metering operator) to the customers' smart meter.

Explanation of functionalities - electricity

Interval metering

Capability of meter to record consumption and injection at short intervals (e.g. 10 or 15 minutes, 1 hour and so on) and store them for a minimum period (e.g.: 1 month) inside the meter before being read by the data collector. These capabilities require the transmission to the data collector of a significant amount of values (e.g. for active energy consumed: 2,880 values for 1 month of 30 days if the interval is 15 minutes). It allows time of use pricing and is suitable for handling real-time pricing and critical peak pricing.

Meter reading of injected and consumed energy

Meter capable of registering both injected and consumed energy.

Remote management

Remote management means enablement and disablement (control and configuration) of total supply and flow/power limitation through configurable parameters set at the meter. This is managed by the relevant service provider. Where applicable, it also means the possibility of direct control of submeters in the home. Remote management offers the capability of the metering system to securely exchange data with home and building or energy management systems.

Explanation of functionalities - gas

Interval metering

Capability of meters to record consumption at short intervals (e.g. 1 hour, 1 day, 1 week and so on) and store them for a minimum period (e.g.: 1 month) inside the meter before being read by the data collector. These capabilities may require the transmission to the data collector of a significant amount of values (e.g. for active energy consumed: 720 values for 1 month of 30 days if the interval is 1 hour). It allows time of use pricing and is suitable for handling real-time pricing and critical peak pricing.

Remote management

Remote management means enablement and disablement (control and configuration) of total supply and flow/power limitation (subject to sufficient power source availability in the case of gas) through

configurable parameters set at the meter. This is managed by the relevant service provider. The remote management offers the capability of the metering system to securely exchange data with home and building or energy management systems.

Annex 2 - Customer services for electricity and gas related to M/441

In the tables below, ERGEG relates the customer services to the functionalities necessary for their operation. The functionalities listed in the right-hand column (F1-F6) stem from the additional functionalities for smart meters that have been developed by Mandate M/441. Regarding the interface with the home (F5) and information through web portal/gateway (F6), ERGEG recognises that the two functionalities may not need to be applied simultaneously in order to achieve a service but rather a choice needs to be made as to which one to use.

| ELECTRICITY | Additional functionalities according to Mandate M/441 | | | | | |
|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------|----------------------------------|-----------------------|----------------------------------------------|--------------------------------------------|
| | Remote reading, meter reading of injected and consumed energy, F1 | Two-way communication, F2 | Interval metering/ registers, F3 | Remote management, F4 | Interface with the home/ home automation, F5 | Information through webportal/ gateway, F6 |
| E 2. Information on actual consumption, on a monthly basis, free of charge | | | | | | |
| E 3. Access to information on consumption 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 | | | | | | |

Table 2: Correlation of Mandate M/441 additional functionalities and ERGEG Electricity recommendations

| GAS | Additional functionalities according to Mandate M/441 | | | | | |
|----------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------|----------------------------------|-----------------------|----------------------------------------------|--------------------------------------------|
| | Remote reading, meter reading of injected and consumed energy, F1 | Two-way communication, F2 | Interval metering/ registers, F3 | Remote management, F4 | Interface with the home/ home automation, F5 | Information through webportal/ gateway, F6 |
| G 2. Information on actual consumption, on a monthly basis, free of charge | | | | | | |
| G 3. Access to information on consumption 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 | | | | | | |

Table 3: Correlation of Mandate M/441 additional functionalities and ERGEG Gas recommendations

Annex 3 – CEER and ERGEG

The Council of European Energy Regulators (CEER) is a not-for-profit association in which Europe's independent national regulators of electricity and gas voluntarily cooperate to protect customers' interests and to facilitate the creation of a single, competitive, efficient and sustainable internal market for gas and electricity in Europe. CEER acts as a preparatory body for the European Regulators' Group for Electricity and Gas (ERGEG).

ERGEG is the European Commission's formal advisory group of energy regulators. ERGEG was established by the European Commission, in November 2003, to assist the Commission in creating a single EU market for electricity and gas. ERGEG's members are the heads of the national energy regulatory authorities in the 27 EU Member States.

The work of CEER and ERGEG 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 Customer Working Group.

Annex 4 – List of abbreviations

| Term | Definition |
|---------|---------------------------------------------------------------------------------------------|
| 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) |
| DSO | Distribution System Operator |
| ERGEG | European Regulators Group for Electricity and Gas |
| ESD | Directive on energy end-use efficiency and energy |
| 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 |
| PQ | Power Quality |
| ROI | The ratio of money gained or lost on an investment relative to the amount of money invested |
| SME | Small and medium-sized enterprise |
| ToU | Time of Use |
| TSO | Transmission System Operator |

Table 4: List of Abbreviations