



An EREGG Public Consultation Paper on Draft Guidelines of Good Practice on Regulatory Aspects of Smart Metering for Electricity and Gas

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INFORMATION PAGE

Abstract

On 22 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). This document outlines a number of draft recommendations as well as questions to stakeholders, in order to further the discussion for the development of the final GGP on smart metering.

Target Audience

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

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How to respond to this consultation

Deadline: **3 September 2010**

Comments should be sent by e-mail to smart_metering@ergereg.org

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All responses except confidential material will be published on the website www.energy-regulators.eu.

Treatment of Confidential Responses

In the interest of transparency, ERGEG

- 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 respondent requesting confidentiality submit those confidential aspects

of their response in a “confidential appendix”. ERGEG will publish all parts of responses that are not marked confidential.

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

Related Documents

CEER/ERGEG documents

- “ERGEG Position Paper on Smart Grids. An ERGEG 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
- “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_ERGEG_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_ERGEG_PAPERS/Electricity/2008/C08-EQS-24-04_4th%20Benchmarking%20Report%20EQS_10-Dec-2008_co.pdf
- “ERGEG 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_ERGEG_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

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EXECUTIVE SUMMARY

This public consultation document presents draft guidelines of good practice (GGP) on regulatory aspects of smart metering for electricity and gas which are directed at Member States, National Regulatory Authorities (NRAs) and industry. These draft GGP contain a set of minimum customer services for retail market customers (as well as for those that both generate and consume electricity) and a set of optional services. 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 Package). 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. According to the 3rd Package, Member States shall ensure implementation of smart 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 market¹.

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 441, the implementation of this provision requires the definition of new functionalities for smart meters – in addition to those in the MID², and as stated by the European Commission in the Mandate M/441.

ERGEG believes that functionalities are crucial to the sound deployment of smart metering systems and to guaranteeing a minimum level of service to consumers 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 consumers (and those that both generate and consume electricity) in the electricity market, with real time electricity pricing, is easily predictable.

¹ Directive 2009/72/EC and 2009/73/EC, Annex I, par. 2

² Directive 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on measuring instruments

ERGEG also expects that open standards and the interoperable architecture 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 draft 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. The following questions formed the basis for ERGEG's draft GGP:

- Which level of customer service is required so that smart metering will assist the active participation of retail customers in the electricity and gas markets in a safe and secure manner?; and
- What should be considered from a regulatory perspective before conducting a roll-out of smart meters?

Conclusions

For retail market customers, it is essential that smart metering provides services in an obvious and easy way that benefits the customer. ERGEG regards some of these as minimum services which *should* be offered to every customer, while other services are optional and *could* be offered to a customer. ERGEG recommends that Member States stipulate that the minimum services are a requirement for the industry (metering operator, DSO, supplier). In addition, the Member States could impose other services, as described herein under optional services. Table 1 below provides a summary of the (29) recommendations contained in these GGP, for both electricity and gas smart metering systems. For the most part, the recommendations for electricity and gas are identical, differing only where the specificities of each energy so require.

The 3rd Package states that the decision for a roll-out of intelligent metering systems in the Member States could be based on an assessment of the effects of this roll-out. One part of such an assessment could be a cost benefit analysis. ERGEG believes that the cost benefit analysis should be based on an extensive value chain including consumers, network operators, generators, suppliers, metering agents, etc, and which among other aspects takes into account costs for data security and customer privacy as well as the benefits for all stakeholders (in particular the network operators). The roll-out should then be done in a cost-efficient and non-discriminatory way.

ELECTRICITY	
Minimum customer services	1. Information on actual consumption, on a monthly basis
	2. Accurate metering data to relevant market actors when switching supplier or moving
	3. Bills based on actual consumption
	4. Offers reflecting actual consumption patterns
	5. Power capacity reduction/increase
	6. Activation and de-activation of supply
	7. Only one meter for those that both generate and consume electricity
	8. Access on customer demand to information on consumption data
Optional services	9. Alert in case of a non-notified interruption
	10. Alert in case of high energy consumption
	11. Interface with the home
	12. Information on voltage quality
Costs and benefits	13. Information on continuity of supply
	14. When making a cost benefit analysis, an extensive value chain should be used
Roll-out	15. All customers should benefit from smart metering
	16. No discrimination when rolling out smart meters
GAS	
Minimum customer services	17. Information on actual consumption, on a monthly basis
	18. Accurate metering data to relevant market actors when switching supplier or moving
	19. Bills based on actual consumption
	20. Offers reflecting actual consumption patterns
	21. Access on customer demand to information on consumption data
Optional services	22. Hourly flow capacity reduction/increase
	23. Enabling activation and de-activation of supply
	24. Alert in case of high energy consumption
	25. Interface with the home
Costs and benefits	26. When making a cost benefit analysis, an extensive value chain should be used
Roll-out	27. All customers should benefit from smart metering
	28. No discrimination when rolling out smart meters
ELECTRICITY AND GAS	
Data security & integrity	29. Customer control of metering data

Table 1: ERGEG draft guidelines of good practice on regulatory aspects of smart metering (in a non-priority order)

Following the public consultation on this draft GGP, ERGEG will review the responses received and integrate stakeholder comments, where applicable. Given the rapidly evolving nature of this issue and the need to encourage clarity, consistency and a certain degree of harmonisation in the development and deployment of smart meters, ERGEG aims to present the results of this public consultation on draft GGP on regulatory aspects of smart metering to the 3rd Citizens' Energy Forum.

1. Introduction

1.1. Background and Scope

The implementation of the 3rd Package is one of ERGEG's seven priority areas during 2010. ERGEG's 2010 Work Programme³ 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.

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 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 the 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 consumers in the market. In its definition of "active participation", ERGEG has chosen to include the possibility for the consumer 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

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 Grids⁴ 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, and on the other hand it is possible to have smarter distribution and transmission networks without smart metering. There are however potential synergies between smart metering and smart grids.

³ European Energy Regulators' 2010 Work Programme, 10 December 2009, Ref. C09-WPDC-18-03

⁴ 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 real time 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 availability of metering data and a deep awareness of both consumption and injection behaviours that are not possible through electromechanical meters.

1.2. Problem identification

The 3rd Package contains provisions regarding the installation of intelligent metering systems, with the aim of better informing customers of their consumption and helping to increase energy efficiency awareness. According to the new Directives, Member States shall ensure implementation of smart metering systems, the purpose being to ensure active participation of customers in the electricity and gas supply market. The final ERGEG GGP on smart metering will hopefully contribute to the effective implementation of the 3rd Package and the continuous development of the European electricity and gas markets, as far as smart metering is concerned.

The following questions formed the basis for ERGEG's recommendations:

- Which level of customer service is required so that smart metering systems will assist the active participation of retail customers in the electricity and gas markets in a safe and secure manner?; and
- What should be considered from a regulatory perspective by Member States before conducting a roll-out of smart meters?

In addition, the 3rd Package underlines the importance of ensuring the interoperability of the intelligent metering systems to be implemented within the Member State territories and the use of appropriate standards and best practice.

According to the 3rd Package, implementation of smart 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 which form of intelligent metering is economically reasonable and cost-effective and which timeframe is feasible for their distribution.” Part of such an assessment could be a cost benefit analysis. Where the roll-out of smart meters is assessed positively, at least 80 % of customers shall be equipped with intelligent metering systems for electricity by 2020. For gas customers, the Member States shall (possibly subject to an economic assessment) prepare a timetable for implementation of intelligent metering systems, and although no specific target date is mentioned in the 3rd Package for the implementation of gas smart meters, it should be achieved within a reasonable period of time.

The 3rd Package uses the term “intelligent metering systems” and “intelligent metering”. There is

no legal standard definition of the term “intelligent” or “smart” metering or “advanced” metering. ERGEG has in this public consultation document chosen to use the term smart metering which is to be understood as a combination of the terms “smart metering system” and “smart meters”.

1.3. General Provisions and Objectives

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

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.

The draft GGP cover a set of minimum and optional 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. Lastly, one section is dedicated to describing the regulators’ recommendations on data security and customer integrity. With regard to the services to be offered to customers, ERGEG has identified two categories for Member States to cover. Minimum services should be imposed on the industry (metering operator, DSO, supplier) and available for all customers with smart meters. Optional services include other services related to smart metering which Member States may decide to impose on the industry in addition to the minimum services.

The final ERGEG GGP are intended to serve as guidance for Member States, NRAs and industry in their consideration and deployment of smart metering systems.

A number of important issues relating to smart metering go to the heart of regulatory aspects. Since ERGEG recognises that some of these aspects have to be dealt with at a national level, the suggested recommendations in this report do not cover all regulatory aspects. Examples of the types of issues that could be considered and examined by the regulator are:

- Smart meter financing;
- Remote upgrading of smart meters;
- Whether the regulator should monitor or oversee the sales and marketing and offers; and
- The possibility for regulators to measure output/outcomes, with quantifiable criteria within the regulatory framework to measure the effectiveness of the smartness requirements, using e.g.:
 - Incentivisation policies/options
 - Measuring outputs/outcomes

1.4. Legal provisions of relevance to smart metering

This section provides a short description of the legal provisions in force which are applicable to smart metering. For the sake of simplicity, only aspects relevant to the scope and the objectives of this document are mentioned.

3rd Package

Annex I of the 3rd Package⁵ (Measures on consumer protection) stipulates, inter alia, that:

- customers have at their disposal their **consumption data**, and shall be able to, by explicit agreement and free of charge, give any registered supply undertaking access to its metering data; and
- the customers are properly **informed of actual electricity/gas consumption and costs** frequently enough to enable them to **regulate their own electricity/gas 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/gas product in question; and
- the intelligent metering systems shall assist the **active participation of consumers** in the electricity/gas supply market. 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 which form of intelligent metering is economically reasonable and cost-effective and which timeframe is feasible for their distribution; and
- *Gas*: Member States or any competent authority shall prepare a **timetable** for the implementation of intelligent metering systems; and
- *Electricity*: Member States or any competent authority 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**; and
- *Electricity*: Where no economic assessment of the long term costs and benefits is made, at least 80% of all consumers have to be equipped with intelligent metering systems by 2020⁶; and
- Member States or any competent authority shall ensure the **interoperability** of those metering systems to be implemented within their territories and shall have due regard to the use of appropriate **standards** and best practice and the importance of the development of the internal market in electricity/gas.

⁵ Directive 2009/72/EC and Directive 2009/73/EC

⁶ 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

Directive on Energy End-use Efficiency and Energy Services

Article 13 of the Directive on energy end-use efficiency and energy services (hereinafter: ESD)⁷ (Metering and informative billing of energy consumption) states, inter alia, that Member States shall ensure that:

- final customers for electricity, natural gas, district heating and/or cooling and domestic hot water are provided with **competitively priced individual meters** that accurately reflect the final customer's actual energy consumption and that **provide information on actual time of use**. When an existing meter is replaced, such competitively priced individual meters shall always be provided, unless this is technically impossible or not cost-effective in relation to the estimated potential savings in the long term. When a new connection is made in a new building or a building undergoes major renovations, as set out in Directive 2002/91/EC⁸, such competitively priced individual meters shall always be provided; and
- **billing** performed by energy distributors, distribution system operators and retail energy sales companies is based on **actual energy consumption**, and is presented in clear and understandable terms. Appropriate **information shall be made available with the bill** to provide final customers with a comprehensive account of current energy costs. Billing on the basis of actual consumption shall be performed **frequently enough** to enable customers to regulate their own energy consumption.

Directive on Measuring Instruments

The Directive on measuring instruments (hereinafter: MID)⁹ establishes the requirements that measurement devices and systems must satisfy before being put on the market and/or put into use. Each measuring instrument must meet the essential requirements (laid down in Annex I of the Directive) and in the relevant instrument-specific Annex.

Essential requirements envisage:

- that a measuring instrument must provide a high level of **metrological protection** in order that any party affected can have **confidence** in the result of measurement, and shall be designed and manufactured to a high level of quality in respect of the measurement technology and **security** of the measurement data;
- protection against corruption, indication of result, processing of data to conclude trading transactions; and
- requirements for gas meters and volume conversion devices, and requirements for active electrical energy meters.

⁷ Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services

⁸ Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings

⁹ Directive 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on Measuring Instruments

1.5. Mandate M/441

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.

In order to comply with provisions of the 3rd Package, Member States must ensure the implementation of intelligent metering systems that assist the active participation of consumers in the electricity and gas supply markets. According to Mandate 441, the implementation of this provision requires the definition of new functionalities for smart meters – in addition to those in the MID¹⁰, and as stated by the European Commission in the Mandate M/441.

Six main additional functionalities have been identified so far in Mandate M/441's ongoing work. These functionalities aim to permit flexibility, innovation and competition:

- F1. Remote reading of metrological register(s) and provision to designated market organisation(s);
- F2. Two-way communication between the metering system and designated market organisation(s);
- F3. To support advanced tariffing and payment systems;
- F4. To allow remote disablement and enablement of supply and flow/power limitation;
- F5. Communicating with (and where appropriate directly controlling) individual devices within the home/building;
- F6. To provide information via web portal/gateway to an in-home/building display or auxiliary equipment.

It is worth noting that some countries have made decisions regarding functionalities even though no European harmonised standards are available as yet¹¹.

EREGG participates in and follows European Commission initiatives related to smart metering and smart grids (See Annex 2). In particular, ERGEG believes that functionalities are crucial to the sound deployment of smart metering systems and to guaranteeing a minimum level of service to consumers and those that both generate and consume electricity, also in light of the future development of smart grids in the electricity sector where the active participation of consumers and those that both generate and consume electricity in the electricity market, with real time electricity pricing, is easily predictable.

In order to make possible the above, ERGEG expects a coordinated framework for

¹⁰ Directive 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on measuring instruments

¹¹ ERGEG Status Review on Regulatory Aspects of Smart Metering, E09-RMF-17-03

standardisation, functionalities and interoperability, a sharing of concepts and a compatible vision of the interoperable multi-utility meter architecture among all involved actors. The absence of these three principles could imply an ineffective and expensive duplication of software and communication devices and thus unjustifiable higher costs for consumers. The recommendations on services outlined in these draft GGP aim to be in line with the six additional functionalities outlined thus far by Mandate M/441.

EREG also expects that open standards and the interoperable architecture 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.

1.6. Public Consultation and Next Steps

This document fulfils the role of the public consultation on the Guidelines of Good Practice (GGP), in line with the EREG rules for conducting public consultations. The results of this public consultation will be duly evaluated and where applicable integrated into the final version of the GGP, which should be published by the end of 2010.

This paper should be considered as an important step in discussions with stakeholders. Ideas presented in this paper should not be considered to represent EREG's definitive position on the subject. Rather, this public consultation intends to capture the most important issues in relation to regulatory aspects on smart metering, with a focus on customer aspects.

EREG has worked with smart metering issues for several years (see Annex 4 for previous work). In the context of the work to prepare the present draft GGP, EREG held a public workshop in Brussels in December 2009. Representatives from distribution system operators (DSOs), suppliers, generators, customers, metering industry and academic institutions attended the workshop. The wide range of issues discussed during the day provided a very good input to the work on the recommendations presented in this paper.

Questions for Public Consultation

EREG invites stakeholders to provide comments to these draft GGP. In particular, EREG would welcome responses to the questions outlined below:

EREG seeks views regarding:

- A. whether any recommendations should be left out of our final GGP; and
- B. whether any insightful recommendations are not present; and
- C. whether any recommendations should be complemented or changed in any other way.

In addition to above, we would also welcome views concerning Recommendations 4 (chapter 2.1) and 20 (chapter 5.1) on interval metering time periods for electricity and gas respectively and Recommendation 13 on further services for customers.

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.

In this document, ERGEG does not propose which stakeholder should be responsible for providing the actual service to the customer, due to possible differences in market design across Europe. However, it is of the utmost importance that there are national solutions for this – roles and responsibilities.

When describing the services a customer should be able to expect from smart metering, ERGEG attempts to identify the functionalities that are needed to accomplish these services. These functionalities are the additional functionalities developed by Mandate 441¹².

The European Commission's services "consider that receiving information on a monthly basis would be sufficient to allow a consumer to regulate his consumption".¹³ 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 as minimum services. Section 2.2 includes some examples of what ERGEG suggests as optional services, which could be implemented where applicable.

ERGEG notes that the MID does not envisage the following functions, which are of extreme importance for roll-outs of electricity smart metering systems:

- Measurement of active power;
- Interval metering and recording of active energy;
- Remote reading;
- Time of use consumption registers;
- Consumption registers copies, used for billing purposes, switching, change of price scheme, deactivation of supply;
- Clock calendar; and
- Measurement of reactive power and recording of reactive energy.

However, these functions may be covered by national legislation. Their absence in EU

¹² See chapter 1.5

¹³ 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

legislation could have an impact in Member States where, despite the MID equivalence, the institutions responsible for metrological verifications and auditing on measuring instruments could block the use of smart meters containing the above functions, because they are not foreseen by MID, thus risking decelerating or stopping roll-outs. This could lead to obstacles in competition and increases in costs for manufacturers and/or system providers, which could in turn have a negative impact on customers.

Another important aspect coming from the MID is the statement according to which the reading of the display is the only measurement result that serves as the basis for the price to pay. ERGEG considers this provision to be realistic only in the specific case where the value transmitted through the telecommunication systems from the meter to the control centre does not match the displayed value (the customer can compare the value in the bill with the displayed value and complain to the supplier, thus requiring a manual reading on site).

ERGEG observes that Article 13 of the ESD calls for the meter to provide information on actual time of use.

Finally, ERGEG observes that the services described in this paper should be guaranteed to consumers independently of the national implementation of the metering architectures conceived and developed by mandate M/441 or by the Open meter project (See Section 1.5 and Annex 4).

2.1. Draft recommendations on minimum customer services - electricity

When developing the services stated below, the key point for ERGEG was to define what level of service a customer should be able to expect from smart metering. Another key point was to lower the barriers regarding the customer's possibilities to act as a producer of energy.

Recommendation 1. Information on actual consumption, on a monthly basis

ERGEG believes that the customer should be properly informed of actual electricity consumption and costs frequently enough to enable him/her to regulate the electricity consumption. Furthermore, information should be given by using a sufficient time frame.¹⁴ This information would not necessarily be presented through monthly billing.

With *remote data reading*, information should be easily available and should be transmitted monthly to the relevant market actor. At a minimum of once a month, the customer as well as those that both generate and consume electricity should receive information on consumption and injection as well as costs and earnings. This information should be free of charge.

¹⁴ Directive 2009/72/EC, Annex I, par. 1 i

Recommendation 2. Accurate metering data to relevant market actors when switching supplier or moving

According to the 3rd Package, customers are entitled to receive all relevant consumption data.¹⁵ More accurate metering data and service to the customer and to the relevant market actors when switching supplier or moving should result from the ability to *remotely read the meter* and *registering of data or interval metering*. Remote reading allows quick access to metering data and implies that registering or interval metering the consumption can be split in a more exact way.

Recommendation 3. 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 consumers' actual consumption.

Recommendation 4. Offers reflecting actual consumption patterns

Member States or, where a Member State has so provided, the regulatory authority, shall strongly recommend that electricity undertakings optimise the use of electricity, developing innovative pricing formulas which reflect actual consumption.¹⁶

It is key that the supplier should 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. These offers may reflect consumption between peak and off-peak time periods, such as time of use prices. Furthermore, the customer and those that both generate and consume electricity should be informed of the costs/earnings of the usage/injection divided into the different time periods. To enable this service, the metering interval needs to be divided into periods that would be less than monthly, i.e. through *interval metering*.

4. a) Question to stakeholders:

When interval metering is applied, which interval should be used for customers and those that both generate and consume electricity? Please specify timeframes and explain.

1. *Less than half an hour*
2. *Half an hour*
3. *One hour*
4. *More than one hour*

4. b) Question to stakeholders:

When Time-of-use (ToU) registers are applied for customers and those that both generate and consume electricity, what would be an appropriate number of registers? (Comment: In this case, registers are equivalent to prices)

¹⁵ Directive 2009/72/EC, Chapter 2, Art. 3, par. 5

¹⁶ Directive 2009/72/EC, Chapter 2, Art. 3, par. 11, Annex I, par. 1 i

Recommendation 5. Power capacity reduction/increase

In order to promote energy efficiency, Member States or, where a Member State has so provided, the regulatory authority, shall strongly recommend that electricity undertakings optimise the use of electricity, for example by providing energy management services, developing innovative pricing formulas, or introducing intelligent metering systems, where appropriate.¹⁷

If a customer has the possibility to regulate his/her electricity supply by capacity reduction /increase this would enable two main benefits. The first benefit being the possibility to reduce power to better manage one's electricity consumption rather than face the risk of disconnection in cases, for example, of bad payment. In this way, the customer would have the ability to control his/her usage and to choose to have a decreased power capacity during a certain period. That being said, the national legislative framework should always be respected (in particular with regard to customer protection and public service rights/obligations).

The other benefit is that *remote management* of capacity offers the possibility for the relevant market actor to execute remote power capacity reduction and increase of power, and through the formulation of individually-designed contract enhancements would benefit the customer in allowing him/her to meet his/her specific needs. ERGEG also recognises that improved peak load management would be possible due to this service but this is a benefit/service for stakeholders other than the customer. Any decision of reduction of power made by a party other than the customer should follow the applicable national legal framework.

Recommendation 6. Activation and de-activation of supply

There are certain situations when a customer may wish to activate or de-activate electricity supply, for example when moving in/out or when leaving a second (or seasonal) residence. *Remote management* allows the customer to remotely initiate activation and/or de-activation of the supply, thus reducing the time to perform either operation. For example, DSO crews are not required to go on-site when a customer moves, etc. Procedures and timeframes within the regulatory framework and contracts should always be applied when activation or deactivation is initiated by a party other than the customer. Customer protection and public service rights/obligations should be respected to ensure this service is used correctly.

Recommendation 7. Only one meter for those that both generate and consume electricity

The possibility to register injected as well as consumed energy with only one metering device should be offered to all customers that both generate and consume electricity. The decision on the specific metering equipment needed, if varying from case to case, should be left to the customers that both generate and consume electricity.

¹⁷ Directive 2009/72/EC, Chapter 2, Art. 3, par. 11

Recommendation 8. Access on customer demand to information on consumption data

On demand, the customer should be able to access information on his/her up to date consumption data. Different channels may be used to provide this information (e.g. sms, internet, call centre, in-home displays). Member States should consider whether this could be subject to a fee.

Summary of recommendations on minimum customer services - electricity

In the table below, ERGEG relates the customer services to the functionalities necessary for their operation. The functionalities listed in the left-hand column (F1-F6) stem from the additional functionalities for smart meters that have been developed by Mandate 441 (see Section 1.5). Regarding the interface with the home (F5) and information through webportal/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.

Additional functionalities according to Mandate 441	Minimum customer services - electricity							
	1. Information on actual consumption, on a monthly basis	2. Accurate metering data to relevant market actors when switching supplier or moving	3. Bills based on actual consumption	4. Offers reflecting actual consumption patterns	5. Power capacity reduction /increase	6. Activation and de-activation of supply	7. Only one meter for those that both generate and consume electricity	8. Access on customer demand to information on consumption data
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								

Table 2: Summary of recommendations on minimum customer services, electricity

2.2. Draft recommendations on optional customer services - electricity

Recommendation 9. Alert in case of non-notified interruption

In case of non-notified interruptions which originate on networks that are not monitored and controlled by tele-control systems (typically LV networks) smart meters¹⁸ could send an alarm to the central systems informing the grid operator of the ongoing interruption. As interruptions originating on low voltage (LV) networks normally have a longer duration than those originating on medium voltage (MV) and high voltage (HV) networks, the customer can receive immediate information on non-notified energy interruptions at his/her connection point (e.g. by sms), and thus act upon it. This can minimise the extent of the damage resulting from the outage when the customer is away from the home.

The information will be important for the TSOs and DSOs in operating their networks, including through the optimised use of resources when interruptions occur in a large geographical area.

Recommendation 10. Alert in case of high energy consumption

According to the 3rd Package, it is important that customers are properly informed of actual electricity consumption and costs frequently enough to enable them to regulate their own electricity consumption.¹⁹

With an alarm distress signal in the smart metering system, immediate information on a malfunction or a sudden high increase in consumption could be transferred to the customer. The alarm would depend on how often the meter values are being registered and transmitted.

Recommendation 11. Interface with the home

According to the 3rd Package, it is important that customers are properly informed of actual electricity consumption and costs frequently enough to enable them to regulate their own electricity consumption.²⁰

Meters could be equipped with/connected to a gateway that enables home automation and which allows for future customisation as demand response and other technologies come online. This would allow the customer to react to a price signal and adapt consumption.

¹⁸ In combination with data concentrators

¹⁹ Directive 2009/72/EC, Annex I, par. 1 i

²⁰ Directive 2009/72/EC, Annex I, par. 1 i

Recommendation 12. Information on voltage quality²¹

Power quality (PQ) measurement instruments must comply with relevant international standards when measured values are to be compared to limits in standards or regulations. ERGEG's understanding is that smart meters and PQ analysers are likely to be differentiated also in the future. It is ERGEG's understanding that today's smart meters have not been proven able to provide reliable measurements for voltage quality according to relevant European and global standards, including EN 50160 (Voltage characteristics for electricity supplied by public distribution networks) and IEC 61000-4-30 (Testing and measurement techniques - Power quality measurement methods). PQ analysers have to comply with relevant standards. However, information on voltage quality is not considered useful in all supply terminals from a society point of view. The inclusion of measurements of a few selected voltage quality parameters in (selected) smart meters should be subject to cost benefit analysis, and the service should be optional for DSOs. Still, today's meters can provide information about voltage deviations which are important for the DSO, and can supply preliminary information for further measurements, even if not done according to relevant standards. It is still important to use the already available capability for today's smart meters to the extent and benefit possible.

This service should be optional for DSOs, who will choose whether to use an "improved smart meter" or a traditional PQ analyser at those points in the network considered useful to monitor voltage quality. The availability or not of this service does not interfere with the DSO duties regarding dealing with customers' complaints about voltage disturbances. Please see the CEER 4th Benchmarking Report on Quality of Electricity Supply²² for further information about quality regulation in European countries, including individual verification of voltage quality.

Recommendation 13. Information on continuity of supply

Referring to the CEER 4th Benchmarking Report on Electricity Quality of Supply, "*Countries that do not monitor incidents at LV are encouraged to investigate the use of electronic energy meters (known as "smart meters") in an automated scheme for logging interruptions.*" By being able to measure interruptions through smart meters, 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: Testing and measurement techniques - Power quality measurement methods), otherwise various smart meters will contain differing definitions of what an interruption is. The standard IEC 61000-4-30 includes measurement technique for voltage interruptions.

Recommendation 13. Question to stakeholders:

What further services should be envisaged in order to allow consumers and those that both generate and consume electricity to be aware and active actors in smart grids?

²¹ All measurement instruments for quality of electricity supply have to comply with the global standard IEC 61000-4-30; "Testing and measurement techniques - Power quality measurement methods". This standard has also been adopted by CENELEC as EN 61000-4-30. EN 50160 includes limits for some parameters and refers to EN 61000-4-30 regarding measurements.

²² Ref. C08-EQS-24-04, 10 December 2008

Summary of recommendations on optional customer services – electricity

In the table below, ERGEG relates the customer services to the functionalities necessary for their operation. The functionalities listed in the left-hand column (F1-F6) stem from the additional functionalities for smart meters that have been developed by Mandate 441 (see Section 1.5). Regarding the interface with the home (F5) and information through webportal/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.

Additional functionalities according to Mandate 441	Optional customer services - electricity				
	9. Alert in case of non-notified interruption	10. Alert in case of high energy consumption	11. Interface with the home	12. Information on voltage quality	13. Information on continuity of supply
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					

Table 3: Summary of draft recommendations on optional customer services - electricity

3. Costs and benefits - electricity

The 3rd Package²³ stipulates that an assessment could be made by Member States before rolling out smart meters. This economic assessment may contain all long term costs and benefits to the market and the individual consumer. 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). 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 targets²⁴.

The term “positively” in the above is important to define. Examples of the assessment could be based on:

- Calculation of the net present value considering a temporal horizon for the analysis;
- Actual ROI (the ratio of money gained or lost on an investment relative to the amount of money invested); or
- Expected impact on customer charges.

A CBA could also start from a minimum scenario, such as domestic consumers versus small business consumers, or the size of the operator making the investments on smart metering, etc.

From a regulator’s perspective, special attention must be paid to the issue of cost recovery and split incentives when conducting a cost benefit analysis (CBA) on implementing smart metering systems. The range of potential benefits from smart metering for customers can be extensive. These benefits could be system wide; i.e. not only for customers but also for DSOs, metering operators, suppliers, energy efficiency and market competition. Synergies between electricity and gas smart meters need to be considered. In general, there needs to be a comparison between different scenarios.

The benefits for customers depend on the level of services that the customers can use; this in turn depends on the functionalities of the smart metering systems.

3.1. Draft recommendation on costs and benefits - electricity

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

Apart from the customer benefits reached through the (minimum and optional) 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 in

²³ Directive 2009/72/EC, Annex I, par. 2

²⁴ Directive 2009/28/EC

particular on the benefits for network operators acting under a regulated regime. Considering these benefits, EREG 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 section outlines some of the possible benefits for different market parties on the smart metering 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 scheme²⁵
Load shedding schemes driven by the meter could allow customers to fully and easily benefit from new tariffs.
- C) Reduction of peak load
By 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, cost and delay 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.
- 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 meter 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 meters should speed up the

²⁵ Cutting of the electric current on certain connections when the demand becomes greater than the supply.

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.

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

- K) 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:*

- L) Reduction of peak load
By customer information and settlement of incentive tariffs, network operators could reduce peak load situations.
- M) 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 consumer 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.
- N) Balancing
The support that smart meters 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.
- O) 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.

P) Continuity of supply

Being able to measure interruptions through smart meters, 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 meters will contain differing definitions of what an interruption is.

Q) Faster fault location

Smart meters can help grid operators to locate faults more quickly 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.

R) Voltage quality

ERGEG's understanding is that smart meters and PQ 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 have to comply with relevant standards. Information on voltage quality is not considered needed in all supply terminals. Still, today's meters can bring information about voltage deviations important for the DSO, and can bring preliminary information for further measurements, even though not done according to relevant standards. It is important to use the already available capability for the today's smart meters to the extent and benefit possible.

S) 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.

T) 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 if such a limit exists.

U) Detection of fraud/theft

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

V) 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.

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

- W) 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.

Summary of draft recommendation on cost benefit analysis - electricity

Costs and benefits
14. When making a cost benefit analysis, an extensive value chain should be used

Table 4: Summary of draft recommendation on cost benefit analysis - electricity

4. Roll-out - 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 Directive²⁶.

Roll-outs of smart metering systems must be adapted to the varying conditions in each Member State. A roll-out should be carried out in a cost-efficient way, taking into account for example geography or customer consumption levels. Another parameter that could be taken into account includes prioritising vulnerable customers.

Article 13 in the ESD states that traditional meters must be replaced by smart meters in the case of meter replacement for new connections or for renovated buildings. In the absence of smart metering implementation plans, these provisions imply potential inefficiencies for metering operators for the following reason: even in the presence of replacement obligations, metering operators would be put in the position to plan the installation programme according to industrial and efficient criteria.

It is essential that all possible synergies, e.g. between electricity and gas smart meters, are be deployed, to ensure a cost-effective and efficient implementation of smart meters.

Regulators can have a number of roles in the roll-out of smart metering. Some examples:

- Definition of the roll out timetable;
- Definition of minimal services;
- Participation in the roll-out project management;
- Definition of ROI: the ratio of money gained or lost on an investment relative to the amount of money invested;
- Making a cost-benefit analysis; and
- Ensure the interoperability at national level.

²⁶ Directive 2006/32/EC

4.1. Draft recommendations on roll-out - electricity

Recommendation 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 in order to enable customers to become active on the energy market.

Recommendation 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 different suppliers 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 the customers, the timing of the actual metering installation in different regions may have to be considered.

Summary of recommendations on roll-out - electricity

Roll-out
15. All customers should benefit from smart metering
16. No discrimination when rolling out smart meters

Table 5: Summary of draft recommendations on roll-out of smart meters, electricity

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 the actual gas consumption may trigger changes in customer behaviour and thus reduce e.g. the overall gas consumption. To a certain extent, the ERGEG recommendations on smart metering for gas are the same as those for electricity in the previous chapters of this document and there is a degree of repetition. ERGEG's aim is to provide full and 'stand-alone' descriptions for smart metering for electricity and gas, respectively. It should be noted, however, that some differences do exist between the two types of energy (e.g. electricity voltage deviations vs. gas pressure) and these are addressed specifically in these gas chapters.

In this document, ERGEG does not propose which stakeholder should be responsible for providing the actual service to the customer, due to possible differences in market design across Europe. However, it is of the utmost importance that there are national solutions for this – roles and responsibilities.

When describing the services a customer should be able to expect from smart metering, ERGEG attempts to identify the functionalities that are needed to accomplish these services. These functionalities are the additional functionalities developed by Mandate 441²⁷.

The European Commission's services "consider that receiving information on a monthly basis would be sufficient to allow a consumer to regulate his consumption".²⁸ 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 underlines that the MID does not envisage the following functions, which are of extreme importance for roll-outs of gas smart metering systems:

- Interval metering;
- Remote reading;²⁹
- Time of use consumption registers;³⁰
- Consumption registers copies, used for billing purposes, switching, change of price scheme, deactivation of supply;
- Clock calendar; and
- Measurement of the pressure compensation.

²⁷ See chapter 1.5

²⁸ 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

²⁹ This function could be implicitly included in bullets 7.6, 8.1 and 8.4 of Annex I "Essential requirements" to MID

³⁰ This function could be implicitly included in bullet 8.5 of Annex I "Essential requirements" to MID

However, these functions may be covered by national legislation. Their absence in EU legislation could have an impact in Member States where, despite the MID equivalence, the institutions responsible for metrological verifications and auditing of measuring instruments could block the use of smart meters containing the above functions because they are not foreseen by MID, thus risking slowing down or stopping roll-outs. This could lead to obstacles in competition and increases in costs for manufacturers and/or system providers, which could in turn have a negative impact on customers.

Another important aspect coming from the MID is the statement according to which the reading of the display is the only measurement result that serves as the basis for the price to pay. ERGEG considers this provision to be realistic only in the specific case where the value transmitted through the telecommunication systems from the meter to the control centre does not match the displayed value (the customer can compare the value in the bill with the displayed value and complain against the supplier thus requiring a manual reading on site).

ERGEG observes that Article 13 of the ESD envisages that the meter must provide information on actual time of use.

Finally, ERGEG observes that the services described below should be guaranteed to consumers independently of the national implementations of the metering architectures conceived and developed by Mandate M/441 or by the Open meter project (see section 1.5 and Annex 4).

5.1. Draft recommendations on minimum customer services - gas

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

Recommendation 17. Information on actual consumption, on a monthly basis

ERGEG believes that the customer should be properly informed of actual gas consumption and costs frequently enough to enable them to regulate their gas consumption. Furthermore, information should be given by using a sufficient time frame.³¹ This information would not necessarily be presented through monthly billing.

With *remote data reading*, information should be easily available and should be transmitted monthly to the relevant market actor. At a minimum of once a month, the customer should receive information on consumption. This information should be free of charge.

Recommendation 18. Accurate metering data to relevant market actors when switching supplier or moving

According to the 3rd Package, customers are entitled to receive all relevant consumption data.³²

³¹ Directive 2009/73/EC, Annex I, par. 1 i

³² Directive 2009/73/EC, Chapter 2, Art. 3, par. 6

More accurate metering data and service to the customer and to the relevant market actors when switching supplier or moving should result from the ability to *remotely read the meter* and *registering of data or interval metering*. Remote reading allows quick access to metering data and implies that registering or interval metering the consumption can be split in a more exact way.

Recommendation 19. 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 consumers' actual consumption.

Recommendation 20. Offers reflecting actual consumption patterns

Member States or, where a Member State has so provided, the regulatory authority, shall strongly recommend that gas undertakings optimise the use of gas, developing innovative pricing formulas which reflect actual consumption.³³

It is key that the supplier should be able to make offers to the customer that better reflect actual consumption divided into different time periods. These offers may reflect consumption between peak and off-peak time periods, such as time of use prices. Furthermore, the customer should be informed about the costs/earnings of the usage divided into the different time periods. To enable this service, the metering interval needs to be divided into periods that would be less than monthly.

Recommendation 20. a) Question to stakeholders:

When interval metering is applied, which interval should be used for customers? Please specify and explain.

- One hour
- One day
- One week
- Other

20. b) Question to stakeholders:

When time-of-use (ToU) registers are applied for customers, what would be an appropriate number of registers? (Comment: In this case, registers are equivalent to prices)

Recommendation 21. Access on customer demand to information on consumption data

On demand, the customer should be able to access information on his/her up to date consumption data. Different channels may be used to provide this information (e.g. sms, internet, call centre, in-home displays). Member States should consider whether this could be subject to a fee.

³³ Directive 2009/73/EC, Chapter 2, Art. 3, par. 8, Annex I, par. 1 i

Summary of draft recommendations on minimum customer services – gas

In the table below, ERGEG relates the customer services to the functionalities necessary for their operation. The functionalities listed in the left-hand column (F1-F6) stem from the additional functionalities for smart meters that have been developed by Mandate 441 (see Section 1.5). Regarding the interface with the home (F5) and information through webportal/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.

Additional functionalities according to Mandate 441	Minimum customer services - gas				
	17. Information on actual consumption on a monthly basis	18. Accurate metering data to relevant market actors when switching supplier or moving	19. Bills based on actual consumption	20. Offers reflecting actual consumption patterns	21. Access on customer demand to information on consumption data
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					

Table 6: Summary of draft recommendations on minimum customer services - gas

5.2. Draft recommendation on optional services - gas

Recommendation 22. Hourly flow capacity reduction/increase

In order to promote energy efficiency, Member States or, where a Member State has so provided, the regulatory authority, shall strongly recommend that gas undertakings optimise the use of gas, for example by providing energy management services, developing innovative pricing formulas, or introducing intelligent metering systems, where appropriate.³⁴

If a customer has the possibility to regulate his/her gas supply by capacity reduction/increase this would enable two main benefits. The first benefit being the possibility to reduce hourly flow to better manage one's consumption rather than face the risk of disconnection in case of bad payment. In this way, the customer would have the ability to control the usage and to choose to have a decreased hourly flow capacity during a certain period. That being said, the national legislative framework should always be respected (in particular with regard to customer protection and public service rights/obligations). Any decision of reduction of hourly flow made by a party other than the customer should follow the applicable national legal framework.

The other benefit is that remote management of capacity offers the possibility for the relevant market actor to execute remote hourly flow capacity reduction and increase of hourly flow, The other benefit is that *remote management* of capacity offers the possibility for the relevant market actor to execute remote hourly flow capacity reduction and increase of hourly flow, and through the formulation of individually-designed contract enhancements would benefit the customer in allowing him/her to meet his/her specific needs. ERGEG also recognises that improved peak load management would be possible due to this service but this is a benefit/service for stakeholders other than the customer.

Recommendation 23. Activation and de-activation of supply

There are certain situations when a customer may wish to activate or de-activate gas supply, for example when moving in/out or when leaving a second (or seasonal) residence. *Remote management* allows the customer to remotely initiate activation and/or de-activation of the supply, thus reducing the time to perform either operation. For example, DSO crews may not be required to go on-site when a customer moves, etc, depending on safety issues (in particular as regards reactivation). Procedures and timeframes within the regulatory framework and contracts should always be applied when activation or deactivation is initiated by a party other than the customer. Customer protection and public service rights/obligations should be respected to ensure this service is used correctly.

Recommendation 24. Alert in case of high energy consumption

According to the 3rd Package, it is important that customers are properly informed of actual gas consumption and costs frequently enough to enable them to regulate their own gas consumption.³⁵

³⁴ Directive 2009/73/EC, Chapter 2, Art. 3, par. 8

³⁵ Directive 2009/73/EC, Annex I, par. 1 i

With an alarm distress signal in the smart metering system, immediate information on a malfunction or a sudden high increase in consumption could be transferred to the customer. The alarm would depend on how often the meter values are being registered and transmitted.

Recommendation 25. Interface with the home

According to the 3rd Package, it is important that customers are properly informed of actual gas consumption and costs frequently enough to enable them to regulate their own gas consumption.³⁶

Meters could be equipped with a gateway that enables home automation and which allows for future customisation as demand response and other technologies come online.

³⁶ Directive 2009/73/EC, Annex I, par. 1 i

Summary of draft recommendation on optional customer services – gas

In the table below, ERGEG relates the customer services to the functionalities necessary for their operation. The functionalities listed in the left-hand column (F1-F6) stem from the additional functionalities for smart meters that have been developed by Mandate 441 (see Section 1.5). Regarding the interface with the home (F5) and information through webportal/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.

Additional functionalities according to Mandate 441	Optional customer services - gas			
	22. Hourly flow capacity reduction/increase	23. Activation and de-activation of supply	24. Alert in case of high energy consumption	25. Interface with the home/Home automation
<i>Remote reading, meter reading of injected and consumed energy, F1</i>				
<i>Two-way communication, F2</i>				
<i>Interval metering/registers, F3</i>				
<i>Remote management, F4</i>				
<i>Interface with the home, home automation, F5</i>				
<i>Information through webportal/gateway, F6</i>				

Table 7: Summary of draft recommendations on optional customer services - gas

6. Cost benefit analysis - gas

The 3rd Package³⁷ stipulates that an assessment could be made by Member States before rolling out smart meters. This economic assessment may contain all long term costs and benefits to the market and the individual consumer. 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). 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 targets³⁸.

Under which circumstances is it relevant to implement smart metering for gas? Examples of a ‘positive’ assessment could be based on:

- Calculation of the net present value considering a temporal horizon for the analysis;
- Actual ROI (the ratio of money gained or lost on an investment relative to the amount of money invested); or
- Expected impact on customer charges.

A CBA could also start out from a minimum scenario, such as domestic consumers versus small business consumers, or the size of the operator making the investments on smart metering, etc.

From a regulator’s perspective, special attention must be paid to the issue of cost recovery and split incentives when conducting a CBA on implementing smart metering systems. The range of potential benefits from smart metering for customers can be extensive. These benefits could be system wide; i.e. not only for customers but also for DSOs, metering operators, suppliers, energy efficiency and market competition. Synergies between electricity and gas smart meters need to be considered. In general, there needs to be a comparison between different scenarios.

The benefits for customers depend on the level of services that the customers can use; this in turn depends on the functionalities of the smart metering systems.

³⁷ Directive 2009/73/EC, Annex I, par. 2

³⁸ Directive 2009/28/EC

6.1. Draft recommendation on cost benefit analysis - gas

Recommendation 26. 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 section outlines some of the possible benefits for different market parties on the smart metering 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 scheme³⁹
Load shedding schemes driven by the meter could allow customers to fully and easily benefit from new tariffs.
- C) Reduction of peak load
By 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, cost and delay 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.
- 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) New services
The possibility to offer real-time pricing and innovative tariffs, as well as interfaces between the smart meter 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.
- G) Easier switching
Automation and simplification of data exchange through smart meters should speed up the

³⁹ Cutting of the hourly flow on certain connections when the demand becomes greater than the supply.

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:*

H) Better customer information

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

I) Better frequency and quality of billing data

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

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

J) 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:*

K) Reduction of peak load

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

L) 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 consumer, per geographical area, per supplier, and as a function in the calculation of network losses, etc.

M) Balancing

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

N) System security

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

O) 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.

*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.

Summary of recommendation on cost benefit analysis - gas

Costs and benefits
26. When making a cost benefit analysis, an extensive value chain should be used

Table 8: Summary of draft recommendation on cost benefit analysis – gas

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, a time table should be prepared and the roll-out should be achieved within a reasonable period of time.⁴⁰ The 2009 Gas Directive (2009/73/EC) does not state how many of the customers shall be equipped with smart metering systems.

ERGEG understands that the 3rd Package seems to address the potential inefficiencies introduced by Article 13 in the ESD Directive⁴¹.

Roll-outs of smart metering systems must be adapted to the varying conditions in each Member State. A roll-out should be carried out in a cost-efficient way, taking into account for example roll-out plans for electricity smart meters, geography or customer consumption levels. Another parameter that could be taken into account is e.g. prioritising vulnerable customers.

Article 13 in the ESD states that traditional meters must be replaced by smart meters in the case of meter replacement for new connections or for renovated buildings. In the absence of smart metering implementation plans, these provisions imply inefficiencies for metering operators for the following reason: even in the presence of replacement obligations, metering operators would be put in a position to plan the installation programme according to industrial and efficient criteria.

It is essential that all possible synergies e.g. between electricity and gas smart meters are deployed to ensure a cost-effective and efficient implementation of smart meters.

Regulators can have a number of roles in the roll-out of smart metering. Some examples:

- Definition of the roll out timetable;
- Definition of minimal services;
- Participation in the roll-out project management;
- Definition of ROI: the ratio of money gained or lost on an investment relative to the amount of money invested;
- Making a cost-benefit analysis; and
- Ensure the interoperability at national level.

⁴⁰ 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

⁴¹ Directive 2006/32/EC

7.1. Draft recommendations on roll-out of smart meters - gas

Recommendation 27. 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 in order to enable customers to become active on the energy market.

Recommendation 28. 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 different suppliers 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 the customers, the timing of the actual metering installation in different regions may have to be considered.

Summary of draft recommendations on roll-out of smart meters, gas

Roll-out
27. All customers should benefit from smart metering
28. No discrimination when rolling out smart meters

Table 9: Summary of draft recommendations on roll-out of smart meters - gas

8. Data security and integrity - electricity and gas

In relation to the concept of smart metering, concerns might be raised on the security of the metering data and how this data is being used, including questions regarding privacy for the customer. Customers can allow any registered supply undertaking to have access to their consumption data.⁴² When metering data is collected infrequently (sometimes from once every three years up to twelve times a year), the question of privacy might not be a very important. But when the metering data is being collected hourly or more even frequently, the data can describe the customer's life in quite some detail. This can be worrying for customers, especially when there are no clear rules on who has access to the data or how the data is retrieved. It is of the utmost importance that the customers' opinions of the smart metering system are positive, and not a source of anxiety.

Member States should have due regard to the confidentiality of customer information as provided for in Article 16 of the Treaty on the Functioning of the European Union.⁴³

Furthermore, the data needs to be protected from fraud while in the meter itself and when transmitted between the meter and the customer, between the meter and the DSO/metering operator and between the meter/DSO/metering operator to the supplier. The key is that the customer must be the one who decides who should have access to what data and when. The DSO would obviously need to have access to some data to be able to safeguard the basic operations as the network operator.

For ERGEG it is of the utmost importance that the privacy of customers is protected. All reasonable endeavours have to be undertaken to ensure data security. ERGEG suggests that national solutions are applied but stresses the importance of cooperation with national agencies dealing with privacy issues, to make sure that the specifics relating to energy are taken into account.

⁴² 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

⁴³ The Treaty on the Functioning of the European Union, Article 16, European Union 9.5 2008

8.1. Draft recommendation on data security and integrity - electricity and gas

Recommendation 29. 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 customer's approval for this.

Summary of draft recommendation on data security and integrity, electricity and gas

Data security and integrity
29. Customer control of metering data

Table 10: Summary of draft recommendation on data security and integrity - electricity and gas

9. Conclusions

This document presents to all interested parties the draft Guidelines of Good Practice on smart metering systems for electricity and gas. With this consultation, ERGEG hopes to receive input from stakeholders in order to develop the final GGP. To this end, a list of questions is included in Chapter 1.6 (as well as for Recommendations 4, 13 and 20) to which we would particularly welcome responses.

For retail market customers, it is essential that the smart metering systems provide services that are of benefit to them, in an obvious and easy way. ERGEG regards some of these services as basic which should therefore be offered to every customer, while other services should be offered if a customer prefers. ERGEG recommends that Member States stipulate that the minimum services are a requirement for the industry (metering operator, DSO, supplier). In addition the Member States could impose other services, as described herein under optional services.

For the Member States, it is important that the cost benefit analysis is based on an extensive value chain, which among other aspects takes into account data security and integrity as well as the benefits for network operators. The subsequent roll-out could then be done in a well considered and non-discriminatory manner.

ERGEG finds that the minimum services an electricity customer, those that both generate and consume electricity and a gas customer can expect from a smart meter are:

- Information on actual consumption, on a monthly basis;
- Accurate metering data to relevant market actors when switching supplier or moving;
- Bills based on actual consumption;
- Offers reflecting actual consumption patterns;
- Power capacity reduction/increase (for electricity);
- Activation and de-activation of supply (for electricity);
- Only one meter for those that both generate and consume electricity (for electricity only); and
- Access on customer demand to information on consumption data.

ERGEG finds that the following services should be optional for electricity customers:

- Alert in case of non-notified interruption;
- Alert in case of high energy consumption;
- Interface with the home;
- Information on voltage quality;
- Information on continuity of supply; and

ERGEG finds that the following services should be optional for gas customers:

- Hourly flow capacity reduction/increase;
- Enabling activation and de-activation of supply;

- Alert in case of high energy consumption;
- Interface with the home.

The Member States should take the following into account when deciding on a roll-out of smart meters for electricity and/or gas:

- All customers should benefit from smart metering; and
- No discrimination when rolling out smart meters.

The Member States should take the following into account when conducting a cost benefit analysis for electricity and/or gas smart meters:

- When making a cost benefit analysis, an extensive value chain should be used.

Member States should consider the following concerning security and integrity:

- Customer control of metering data.

Annex 1 – Findings of previous ERGEG work relating to smart metering

ERGEG Position Paper on Smart Grids, December 2009

The ERGEG Position Paper on Smart Grids (Ref. E09-EQS-30-04) aims to initiate a dialogue with all stakeholders of the European electricity power systems and markets, in order to assist regulators in understanding how smart grids can benefit network users and, assuming that cost-effective benefits can be identified, to explore ways in which the development of smart grids can be encouraged. The paper explores the drivers and opportunities for 'smarter' networks from the users' perspective and discusses the regulatory challenges and priorities.

The paper underlines that the terms smart grids and smart metering are often used together, 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. Therefore, it is important to bear in mind that smart metering provide a smarter grid, and on the other hand it is possible to have smarter distribution and transmission networks without smart metering.

The paper highlights many benefits deriving from the implementation of smart metering systems: they allow interval metering for both active and reactive components of electricity consumed and injected into the network, so contributing to more accurate balancing, losses and power factor calculation, to promoting peak and off-peak prices and to discouraging bad practices in the use of the network. Smart metering technologies may further provide information on quality of electricity supply at each connection point, thus contributing to more effective investments and renovation plans of the grids, thereby increasing security of supply. The most important benefit is that, due to the accurate information and two-way communication that smart meters can provide on actual time of use, customers could be encouraged to modify their load profile. Customers could be encouraged to increase their efficiency in consuming energy and be part of demand response. However, it must be noted that increasing their efficiency in consuming energy will also depend on other parameters, e.g. the financial capability of customers to invest in more efficient appliances or the skill to understand the information provided by the smart meters, and the need for energy and the ability to take optimal actions. Finally, smart metering systems can facilitate supplier-switching processes and in general increase innovation in commercial offers to customers. In summary, smart metering enhances and enables a number of smart grid functions. Nevertheless, 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.

ERGEG Status review on regulatory aspects of smart metering, October 2009

The ERGEG Status Review (Ref. E09-RMF-17-03) carried out in 2009 provides an overview of the status regarding the introduction of smart meters in ERGEG member and observer countries. The report examines the issue from a regulatory perspective with a focus on 4 areas of particular importance when considering smart meters: meter value management; roll-out policy; access to data and privacy issues and functional and technical aspects. Among other things, the report illustrates the diversity of approaches to smart metering. This is visible partly

by the lack of common definitions of key concepts, even at national level. It is worth taking note of the fast development in the area of smart meters. The national situations which are reflected in the status review may no longer provide a complete and accurate picture of the national situations since developments are moving forward at great speed.

CEER 4th Benchmarking Report on Quality of Electricity Supply, December 2008

The 4th Benchmarking Report on the Quality of Electricity Supply (Ref. C08-EQS-24-04) provides an in-depth review of continuity of supply, voltage quality and commercial quality. This detailed report analyses data from 21 European countries and contributes to a better understanding of the quality of electricity supply levels and policy throughout Europe.

EREGEG Position Paper on Smart Metering with a Focus on Electricity Regulation, October 2007

The ERGEG paper (Ref. E07-RMF-04-03) analyses some major aspects relevant to smart meters: the new customer perspective taking shape from the full opening of the electricity market as from 1st July 2007, costs and benefits, technical aspects, meter data management and functional requirements. The paper identified a range of policies that NRAs can adopt to promote smart metering, in particular: obligatory roll-out of smart meters and financial incentives; the introduction of minimum functional requirements (providing a minimum set for them) and more frequent meter readings.

The position paper provides a picture of the situation and points out essential aspects as of 2007. However, the reader should take note of the fast development in the last few years in the area of smart meters. Today the situation is to a large extent different from what was the case when this ERGEG paper was developed.

Annex 2 - European Commission initiatives

EREG fully agrees with the need for standardisation and interoperability and supports the initiatives taken by the European Commission in this sense. Nevertheless, ERGEG must underline that these initiatives could potentially induce a contrary effect; that is a slow-down of roll-outs. Even if national legal and regulatory frameworks vary from Member State to Member State, national regulatory authorities (NRAs) need to pursue objectives (e.g. market development, energy efficiency, more accurate billing, etc.), not only in view of and after 2020, as requested by the 3rd Package, but for today and in the shorter term. The implementation of smart metering systems can greatly facilitate or accelerate the achievement of these objectives.

Open meter project

Separately from the Mandate 441 (see Section 1.5) a second important initiative, supported by the European Commission's DG Research, is the "Open Meter Project"⁴⁴, financed within the EU's Seventh Framework Programme. It has the main objective 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.

The scope of the project is to address knowledge gaps for the adoption of open standards for smart multi-metering equipments. All relevant aspects – regulatory, environmental, smart metering functions, communication media, protocols, and data formats – are considered within the project.

The result of the project will be a set of draft standards, based on already existing and accepted standards wherever possible. Existing standards will be complemented with new standards, based on innovative solutions developed within the project, to form the new body of smart metering standards. The resulting draft standards will be fed into the European and international standardisation process. The project is closely coordinating with the Mandate M/441 initiative. This project officially started on 1st January 2009 and will be accomplished in 30 months, by 30th June 2011.

Standards are voluntary technical specifications and common technical rules for products or systems to be placed on the market. According to M/441, a standard is considered to be open when:

- it is adopted and will be maintained by a not-for-profit and its ongoing development occurs on the basis of an open decision-making procedure available to all interested parties;
- it has been published;
- standardised interfaces are not hidden or controlled other than by the standard definition organisation promulgating the standard; and
- there are no constraints on the re-use of the standard.

⁴⁴ "Open" is an acronym for Open Public Extended Network

Task Force on smart grids

In January 2010, the European Commission's DG ENER launched a Task Force on Smart Grids. Its mission is to advise the Commission on policy and regulatory directions at European level and to coordinate the first steps towards the implementation of smart grids in line with the 3rd Package provisions.

The ultimate goal of the Task Force's work programme is to identify and produce a set of regulatory recommendations to ensure EU-wide consistent and fast implementation of smart grids, while achieving the expected smart grid services and benefits for the network users, notably:

- What does active participation mean for consumers?
- How is electricity data different from other data?
- How to best protect consumer data?
- How to best inform consumers of the benefits of smart meters and smart grids?
- What mechanisms are available for the protection of vulnerable consumers?

EU recommendations for the roll-out of smart meters and EU policy for the implementation of smart grids need to be elaborated. They should identify who does what and interrelations to deploy smart grids, including recommendations for funding through regulatory means.

The initial duration of the Task Force is 20 months, until May 2011. The Task Force's work programme is organised under three initial Expert Groups, in which ERGEG is participating as members in EG 1 and EG 2 and as chair of EG 3:

Expert Group 1: Functionalities of smart grids and smart meters. The key deliverable is to provide an agreement among all actors involved on a set of minimum functionalities for smart grids and smart meters.

Expert Group 2: 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.

Expert Group 3: Roles and responsibilities of actors involved in smart grid deployment. The key deliverable is the development of recommendations on the roles and responsibilities of all involved actors in the implementation of smart grids as well as the definition of criteria and recommendations for funding of smart grid deployment.

Annex 3 – Glossary of Terms

The descriptions of terms provided here serve the purpose of providing a common understanding of the different subjects and they 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 3rd Package and Regulation (EC) 1228/2003 apply.

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

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 3rd 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 market actors. 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 smart meters 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 market actors. 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 market actors. It gives the ability to the relevant market actors 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 smart meters to record consumption and injection in 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 market actor. 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 smart meters to record consumption in 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 market actor. The remote management offers the capability of the metering system to securely exchange data with home and building or energy management systems.

Annex 4 – ERGEG

The European Regulators for Electricity and Gas (ERGEG) was set up by the European Commission in 2003 as its advisory group on internal energy market issues. Its members are the energy regulatory authorities of Europe. The work of the 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 5 – List of abbreviations

Term	Definition
AMI	Advanced Metering Infrastructure
CBA	Cost Benefit Analysis
CEER	Council of European Energy Regulators
DG	Directorate General (of the European Commission)
DSO	Distribution System Operator
ERGEG	European Regulators Group for Electricity and Gas
ESD	The Directive on energy end-use efficiency and energy
GGP	Guidelines of Good Practice
IEC	International Electrotechnical Commission
LV	Low voltage; refers to voltage levels up to and including 1 kV, ref IEC
MID	The Directive on measuring instruments
MV	Medium voltage; refers to voltage levels above 1 kV up to and including 35 kV, ref IEC
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
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
ToU	Time of Use

Table 11: List of Abbreviations