Status Review of Regulatory Aspects of Smart Metering

Including an assessment of roll-out as of 1 January 2013

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INFORMATION PAGE

Abstract

This document (C13-RMF-54-05) presents a Status Review of regulatory aspects of smart metering, including an assessment of roll-out as of 1 January 2013.

This document seeks to review the extent to which Member States and National Regulatory Authorities are applying the recommendations included in the ERGEG[1] document "Final Guidelines of Good Practice on Regulatory Aspects of Smart Metering for Electricity and Gas." It also reviews how smart metering functionalities are handled and how the relating economic and customer assessments are made.

Target Audience

European Commission, energy suppliers, traders, gas/electricity customers, gas/electricity industry, customer representative groups, network operators, Member States, academics and other interested parties.

Keywords

Smart meters

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[1] The European Regulators Group for Electricity and Gas was a formal advisory group to the European Commisson established in 2003. With the creation of ACER, ERGEG was dissolved as from 1 July 2011. Certain policy areas not covered by ACER have been taken up by CEER including Smart Meters.

Related Documents

ERGEG documents

- "Final Guidelines of Good Practice on Regulatory Aspects of Smart Metering for Electricity and Gas", ERGEG, February 2011, Ref: E10-RMF-29-05: http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_PAPERS/Customers/Tab2/E10-RMF-29-05_GGP_SM_8-Feb-2011.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://eur-lex.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://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0094:0136:EN:PDF
- The five legislatives acts of The 3rd Package (including the two Directives above): http://eur-lex.europa.eu/JOHtml.do?uri=OJ:L:2009:211:SOM:EN:HTML

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1 Executive Summary

Directives 2009/72/EC[2] (Electricity) and 2009/73/EC[3] (Gas) included in the 3rd Package, established that Member States or National Regulatory Authorities (NRAs) shall strongly recommend that electricity and gas undertakings optimise the use of energy, including through the use of smart metering systems, where appropriate.

Both Directives state that Member States shall ensure the implementation of intelligent metering systems that shall assist the active participation of consumers in the energy supply market. The implementation of those metering systems may be subject to an economic assessment. Such assessment shall take place by 3rd September 2012.

Furthermore, the Electricity Directive states that, subject to that assessment, 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. The Gas Directive states that subject to that assessment, Member States or any competent authority they designate, shall prepare a timetable for the implementation of intelligent metering systems.

On February 2011, the European Regulators' Group for Electricity and Gas (ERGEG) released the "*Final Guidelines of Good Practice on Regulatory Aspects of Smart Metering for Electricity and Gas*[4]*"*, (the GGP) which sets out recommendations for Member States regarding smart meter roll-out, cost benefit analysis (CBA) and data security and integrity.

From a policy perspective, it is important to note that ERGEG recommendations are consistent with the European Commission Recommendation 2012/148/EU of 9 April 2012. Indeed, this EC Recommendation was developed using ERGEG's recommendations. There is therefore consistency and convergence between the work of European Energy Regulators and the European Commission regarding smart meter functionalities, in particular those which benefit consumers.

The aim of this Status Review is to review the extent to which Member States and NRAs are applying the recommendations included in the GGP. It also reviews how smart metering functionalities are handled and how the relating economic and customer assessments are made.

The review shows that:

- European Energy Regulators' 2011 recommendations are generally applied. In particular, Member States and NRAs are generally applying the recommendations in terms of conducting a cost benefit analysis (CBA) to determine whether or not to roll-out smart meters.

[2] 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

[3] Directive 2009/73/EC 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

[4] "Final Guidelines of Good Practice on Regulatory Aspects of Smart Metering for Electricity and Gas", ERGEG, February 2011, Ref: E10-RMF-29-05

- All countries that have rolled-out, or are rolling out or intend to roll-out smart meters also gave an indication of their percentage roll-out targets (except for Slovenia[5]):
  - In the case of gas, only one country is rolling out (Italy) and 7 countries plan to roll-out. All of them will target 95% or more.
  - In the case of electricity, 2 countries have completed their roll-out (Sweden 100% and Italy 95% of customers); 1 country should reach the 80% target by the end of 2013 (Finland); and 15 countries are rolling out or plan to roll-out smart meters. 11 of these will target 95% or more; 2 countries will target 80% and one (Germany) will target 15%.

  The less advanced situation in gas, in comparison with electricity, may be explained by the difference in results of CBAs.
- The technical design of smart metering systems varies from one country to another. Generally, there is a common understanding of what capabilities a smart meter should have but often a subset of these capabilities is chosen for their roll-out, as suits the relevant market arrangements and associated CBA. CEER recognises that despite the many years of assessing European standards, Europe unfortunately still faces a situation without a common standard for smart meters, as well as a lack of interoperability. This leads to a lack of economies of scale and innovation in customer services as smart metering should act as an enabler of additional services.

Finally, the review concludes that, as many countries are yet to roll-out smart meters, it may be useful for CEER to repeat this exercise in the future as the regulatory design and technical solutions become clearer.

2 Background

According to the 3rd Package[6], Member States shall ensure implementation of intelligent metering systems, where a roll-out of smart meters is assessed positively. The purpose is to ensure that customers are able to participate actively in the electricity and gas market.

The directives for both electricity and gas, within the 3rd Package, state that Member States shall ensure the implementation of intelligent metering systems that shall assist the active participation of consumers in the electricity 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. Such assessment shall take place by 3 September 2012.

The electricity directive states that subject to that assessment, 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.

[5] This number excludes Slovenia as they have not yet decided on the percentage target, waiting for the result of the CBA (currently in progress).

[6] The 3rd Package proposals for the European Internal Market in Energy were adopted on 13 July 2009 and include five legislative acts, which can be viewed online.

The gas directive states that subject to that assessment, Member States or any competent authority they designate, shall prepare a timetable for the implementation of intelligent metering systems.

On February 2011, ERGEG released the GGP on smart metering, directed at Member States, NRAs and industry. The document contains a set of services for retail market customers (as well as for those that both generate and consume electricity). Furthermore, a set of recommendations are directed towards the Member States and NRAs regarding roll-out, CBA and data security and integrity. The recommendations aimed to provide guidance regarding the 3rd Package provisions on the installation of intelligent metering systems for electricity and gas.

From a policy perspective, it is important to note that ERGEG recommendations are consistent with the European Commission Recommendation 2012/148/EU of 9 April 2012. Indeed, this EC Recommendation was developed using ERGEG's recommendations. There is therefore consistency and convergence between the work of European Energy Regulators and the European Commission regarding smart meter functionalities, in particular those which benefit consumers.

Therefore, in its 2013 work programme, CEER decided to carry out a Status Review of the implementation of the ERGEG GGP by NRAs, including an assessment of roll-out, as of 1st January 2013.

3 Objectives and Contents of the Document

The present report reviews the extent to which NRAs are applying the recommendations included in the ERGEG GGP on Regulatory Aspects of Smart Metering for Electricity and Gas. It also aims to understand how smart metering functionalities are handled and how the relating economic and customer assessments are made.

During the 2012 edition of the Citizens' Energy Forum (London Forum), the European Commission announced the preparation of a Benchmarking report assessing the CBAs carried out by Member States, due to be published in 2013. We hope that the results from this CEER Status Review also provide a contribution to complement the European Commission's work.

Moreover, the present report provides useful information for our on-going review of current practices in terms of customers' access to information on the cost and sources of their energy as well as energy efficiency schemes to be issued by CEER also in 2013. The Status Review can also be used as a basis for developing further work aimed at putting customers at the heart of the Internal Energy Market.

The recommendations included in the GGP are grouped into different categories which will provide the structure for this document:

- Countries decision to roll-out smart meters
- Data Privacy and Security
- Customer services

- Cost and Benefits
- Roll-out

4 Methodology

To assess NRAs' progress, an online questionnaire was developed in the second half of 2012, in order to gather information on CEER members' experience regarding the implementation of smart metering recommendations.

The online questionnaire was sent in January 2013 to the 30 NRA members of CEER . The first section of the questionnaire (Section A) included general questions about the decision of a roll-out for smart meters in each Member State. Each of the remaining sections referred to a group of recommendations in accordance with ERGEG GGP on Regulatory Aspects of Smart Metering for Electricity (Section B) and Gas (Section C), as indicated above, making a distinction between its application to electricity and gas meters.

In cases where smart meters have been rolled-out, or there is a roll-out planned, or a decision made regarding the roll-out, NRAs were advised that answers to the questionnaire should reflect the current or planned situation or a decision made by 1st January 2013.

For those countries where smart meters have not been rolled-out, and there is not a plan or a decision made regarding the roll-out, NRAs were invited to answer those questions marked in a table included in the Annexes of the questionnaire, where it was specified which questions could be answered by all NRAs. This table has been reproduced in Annex 3 for reference.

Full or partial responses were received from 23 NRAs, all of which answered Section A. 20 NRAs answered Section B, which focuses on the roll-out of smart electricity meters. Of these respondents, 18 had rolled out or were planning to roll-out smart electricity meters and therefore could answer every question in Section B. 16 NRAs answered Section C, which focuses on the roll-out of smart gas meters. Of these respondents, 10 had rolled-out or were planning to roll-out smart gas meters and therefore could answer every question in Section C.

Sections B & C included a question on CBA. Only two NRAs, Lithuania and Portugal, answered this question in Sections B & C. Therefore, we have treated the question on CBA separately for the purposes of providing greater clarity.

This report presents a collective review on the progress of smart meter roll-out of all participating NRAs. The NRAs' participation in the questionnaire is set out in Table 1 below.

Most NRAs did not answer every question in a given section. Therefore, for ease of understanding, we have set out the relevant sample size for each indicator in this review.

No.		Country	Answers to the Status Review questionnaire			
			Section A	Section B	Section C	CBA (Section 10 of the report)
1	AT	AUSTRIA	X	X	X	X
2	BE	BELGIUM	X	X	X	X
3	BG	BULGARIA				

No.		Country	Answers to the Status Review questionnaire			
4	CY	CYPRUS*	X	X		X
5	CZ	CZECH REPUBLIC	X	X	X	X
6	DK	DENMARK	X	X		X
7	EE	ESTONIA	X	X		X
8	FI	FINLAND	X	X	X	X
9	FR	FRANCE	X	X	X	X
10	DE	GERMANY	X	X	X	X
11	GR	GREECE				
12	HU	HUNGARY				
13	IS	ICELAND*	X			
14	IE	IRELAND	X	X	X	X
15	IT	ITALY	X	X	X	X
16	LV	LATVIA				
17	LT	LITHUANIA	X			X
18	LU	LUXEMBOURG	X	X	X	X
19	MT	MALTA				
20	NO	NORWAY*	X	X		X
21	PL	POLAND	X	X	X	X
22	PT	PORTUGAL	X			X
23	RO	ROMANIA	X	X	X	X
24	SK	SLOVAK REPUBLIC				
25	SI	SLOVENIA	X	X	X	X
26	ES	SPAIN	X	X	X	X
27	SE	SWEDEN	X	X	X	X
28	CH	SWITZERLAND				
29	NL	THE NETHERLANDS	X	X	X	X
30	UK	UNITED KINGDOM	X	X	X	X
Total NRAs shown by country			23	20	16	22

Table 1: NRAs (shown by country) participating in the Status Review of regulation on smart metering[7]

[7] The countries marked with a (*) did not have a gas system as of 1 January 2013. Grey cells represent countries that have not responded to the survey.

5 Introduction

Based on the background and methodology explained above, this document presents a Status Review of the implementation of the "Final Guidelines of Good Practice on Regulatory Aspects of Smart Metering for Electricity and Gas" (E10-RMF-29-05) by NRAs, as of 1st January 2013.

Intelligent metering systems are promoted for several reasons in the 3rd Package; firstly with the aim to promote energy efficiency and demand-side management measures; and secondly with the aim to ensure active participation of customers in the market.

The GGP was intended to serve as guidance for Member States, NRAs and industry in their consideration and deployment of smart metering systems, including recommendations on aspects that should be taken into account when conducting a CBA and on parameters to consider before conducting a roll-out of smart meters. It also included the regulators' recommendations on data security and customer integrity.

The Status Review does not provide any assessment of the 3rd Package implementation by NRAs. It rather seeks to understand how smart metering functionalities are handled and how the relating economic and customer assessments are made.

6 Assessment of the smart meter roll-out in each country (Recommendation 15 of the GGP)

6.1 Current status of the roll-out

According to recommendations E15 and G15 of the GGP, for both electricity and gas, if assessed positively and a roll-out is decided, all customers should be eligible to obtain a smart meter. However, due to geographical or other special, national circumstances it can be difficult to achieve a 100 percent roll-out.

A series of questions was set out in order to assess each country's progress in terms of their decision to roll-out, their progress to date and the percentage of meters intended to be rolled out.

The following questions were addressed to NRAs:

"Have smart meters for electricity/gas been rolled-out in your country?"

"Is there a legal/formal decision made regarding a roll-out for electricity/gas smart meters in your country?"

"Is a roll-out for electricity/gas smart meters planned in your country?"

"If the answer is yes, specify the percentage of customers affected."

Figure 1, below, sets out those countries that have completed a smart meter roll-out, have begun but not completed a roll-out or have not yet begun a smart meter roll-out. The sample size is 23 for electricity and 20 for gas.

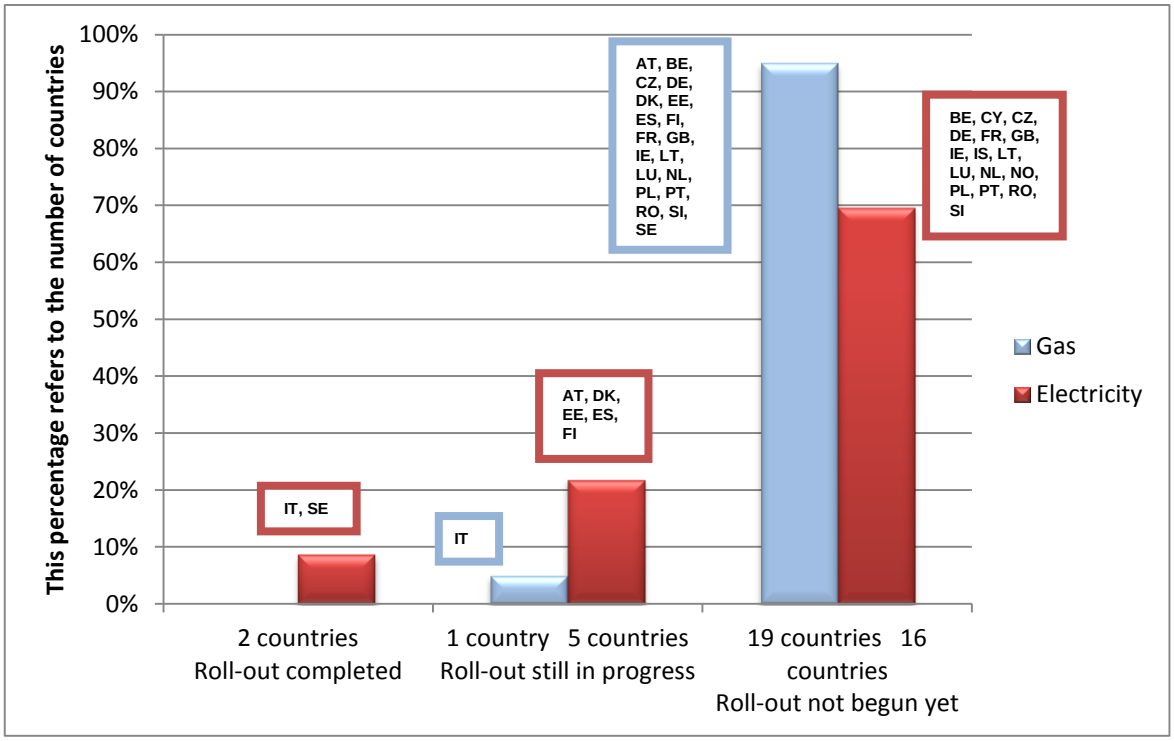

Figure 1: Roll-out progress to date per country

In electricity, 2 countries have completed a smart meter roll-out so far while a further 5 have begun a roll-out but have yet to complete it. Of the countries that have rolled-out or are rolling-out, all but Sweden and Denmark took a legal or formal decision to do so. In Sweden, a legal decision was made to make monthly meter reading available to customers, which in turn led to a decision by distribution companies to roll-out smart meters in order to meet this requirement. However, there was no legal decision on the roll-out of smart meters itself. Danish distribution companies have rolled out smart meters to 60% of customers without a legal or formal government decision to do so but it is expected that a formal decision will be taken to roll-out meters to 100% of customers shortly.

Most countries have not started a roll-out but are at different stages in terms of making the decision to do so. These countries can be categorised as follows;

- Countries that have made a formal or legal decision to roll-out smart meters but have yet to do so in significant numbers[8],
- Countries that have made a formal decision not to roll-out a smart meter due to a negative CBA,
- Countries that are intending to roll out smart meters but have not yet made a formal or legal decision to do so,
- Countries that have not decided to roll out smart meters but have not yet made a formal decision not to do so.

[8] In many of these countries, smart meters have been rolled-out on a trial basis, customers are free to request a smart meter or smart meters are mandated at new installations, such as new or refurbished houses. However, the programme of large scale replacement of existing non-smart meters is yet to begin.

Figure 2, below, sets out these decision stages. The sample size is 21 for electricity and 19 for gas.

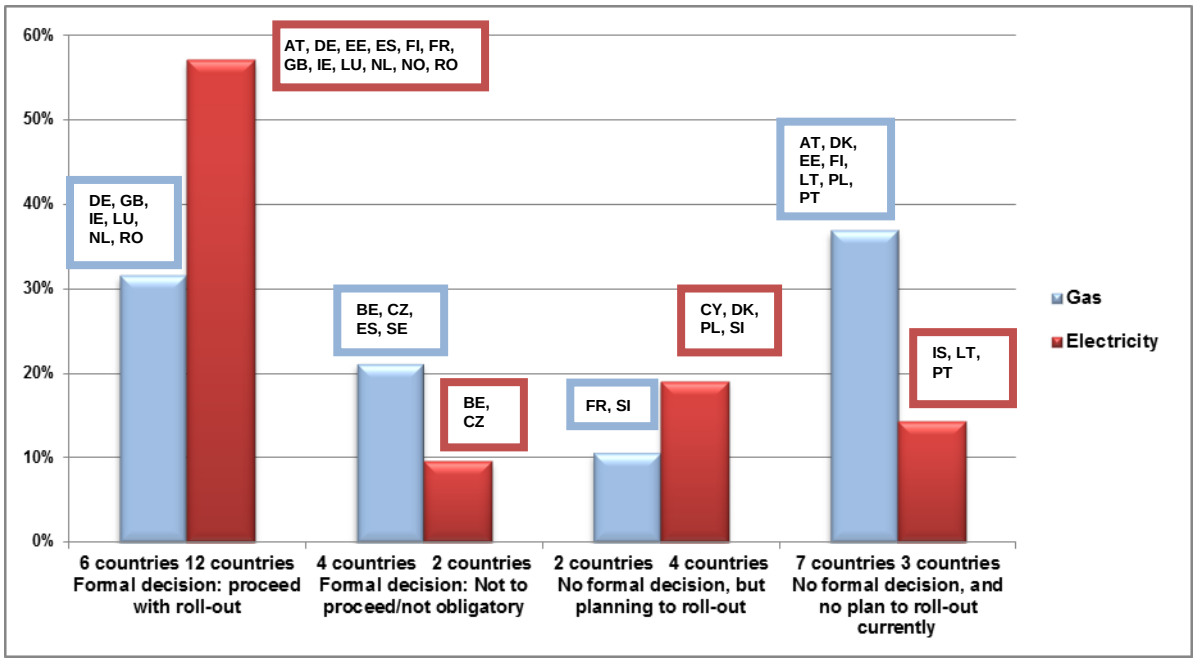

Figure 2: Current status of countries that have not rolled-out

The chart shows that among countries that have yet to begin rolling out smart meters, there is an even divide between those who have made a formal decision and those who have not. Most of those that have made a formal decision will proceed with a roll-out.

All countries (except for Slovenia[9]) that have rolled-out, or are rolling out or intend to roll-out smart meters also gave an indication of their percentage roll-out targets.

- In the case of gas, only one country is rolling out (Italy) and 7 countries plan to roll-out. All of them will target 95% or more.
- In the case of electricity, 2 countries have completed their roll-out (Sweden 100% and Italy 95%) and 16 countries are rolling out or plan to roll-out. 11 of these will target 95% or more, i.e. a smaller proportion if compared with gas; 3 countries will target 80% and only one (Germany) will target 15%.

Of those with smaller roll-out targets, all but Germany have targeted a roll-out rate of at least 80%, in line with the requirements of the 3rd Package. In Germany, a roll-out target of 15% is currently planned but this may be extended subject to the outcome of a CBA.

[9] This number excludes Slovenia as they have not yet decided on the percentage target, waiting for the result of the CBA (currently in progress).

Figure 3, below, sets out these decision stages. The sample size is 17 for electricity and 8 for gas.

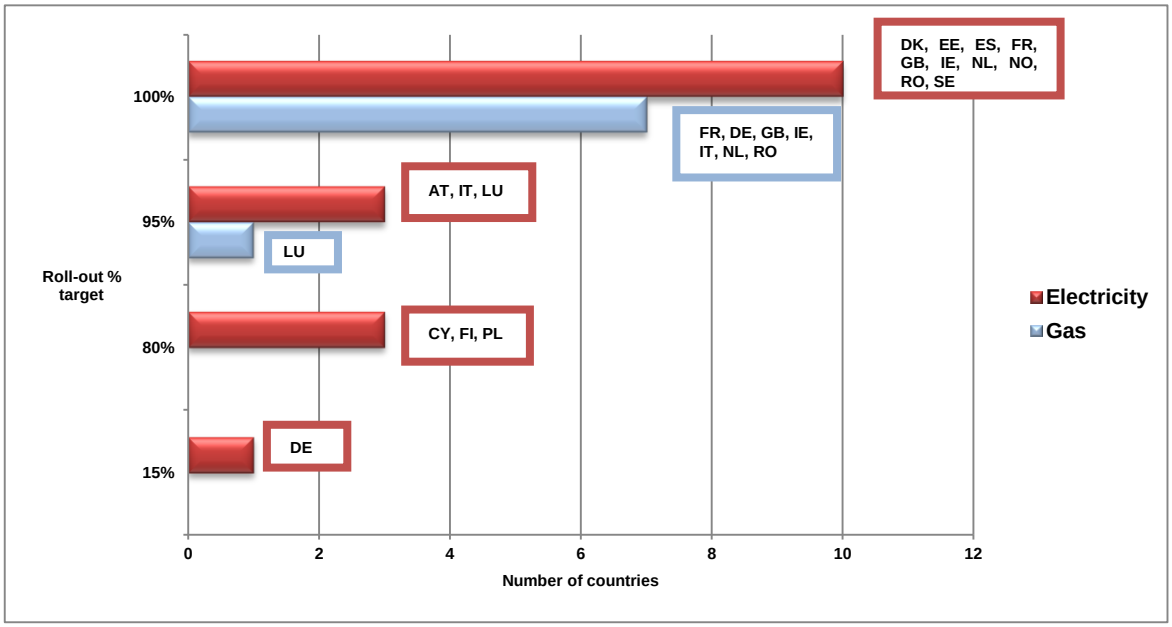

Figure 3: The roll-out target of each country

6.2 Functionality of smart meters

A series of questions was set out in order to assess each country´s definition of smart electricity and gas meters. The responses are provided in Table 2, below. Note the colour codes for this table and similar examples in the review indicate as follows:

- √ = Yes
- X = No
- ● = Not applicable

The sample size is 22 for electricity and 15 for gas.

	Remote reading		Two-way communication		Interval metering		Remote management		Home automation		Web portal	
	Elec	Gas	Elec	Gas	Elec	Gas	Elec	Gas	Elec	Gas	Elec	Gas
AT	√	√	√	√	√	√	√	√	√	X	√	√
BE	√	√	√	√	√	√	√	√	√	√	√	√
CY	√	●	√	●	√	●	√	●	√	●	√	●
CZ	√	√	√	X	√	√	√	X	√	√	√	√
DK	√	X	√	X	√	X	√	X	√	X	√	X
EE	√	●	√	●	√	●	X	●	X	●	X	●
FI	√	●	√	●	√	●	√	●	X	●	X	●
FR	√	√	√	√	√	√	√	X	√	√	√	√
DE	√	●	√	●	√	●	√	●	√	●	√	●
GB	√	√	√	√	√	√	√	√	√	√	√	√
IS	●	●	●	●	●	●	●	●	●	●	●	●
IE	√	√	√	√	√	X	√	√	√	√	√	√
IT	√	√	√	√	√	√	√	√	X	√	√	√
LT	√	√	√	√	X	√	√	X	√	√	X	X
LU	√	√	√	√	√	√	√	√	√	√	√	√
NO	√	●	√		√	●	√	●	√	●	√	●
PL	√	●	√		√	●	√	●	√	●	√	●
PT	√	√	√	X	√	√	√	X	√	√	X	X
RO	√	√	√	√	√	√	√	√	√	√	√	√
SI	√	√	√	√	√	√	√	√	√	√	√	√
ES	√	●	√		√	●	√	●	X	●	X	●
SE	√	√	√	X	√	X	√	X	X	X	X	X
NL	√	√	√	√	√	√	√	√	X	X	√	√
TOTAL	22	14	21	11	21	12	21	9	16	11	16	11

Table 2: The definition of a smart electricity and gas meter in each country

The table shows that most countries' understanding of the level of functionality associated with smart meters includes most or all of the suggested functionalities in the GGP.

7 Data Privacy and Security (Recommendation 1 of the GGP)

According to recommendations E1 and G1 of the GGP, for both electricity and gas, it is always the customer that should choose in what way metering data shall be used and by whom, with the exception of metering data required to fulfil regulated duties. The customer should be aware of what metering data is available and should be able to obtain such data for free or for a reasonable fee.

The following questions were addressed to NRAs:

"Is the customer in control of the metering data, for example able to choose in which way metering data shall be used and by whom (regulated duties are excluded)?"

"Is the customer informed about what meter generated data is available (stored data regarding consumption, power failure disruptions etc)?"

"Is the obtaining of this information, the above, subject to any fee?"

Table 3 below sets out the position of each country with respect to data privacy and security regardless the current status of the roll-out, i.e. countries have responded regarding the existing data privacy framework. The sample size is 21.

	In control & informed	In control & not informed	No control over data	Not available
Free	**13** AT, BE, DK, FI, FR, DE, GB, IE, IT, LU, NO, PL, NL		**8** CY, CZ, EE, IS, RO, SI, ES, SE	**2** LT, PT
Not free				

Table 3: Data privacy and security policies in each country with or without smart meters

The table shows that many countries inform, give control and make metering data available to customers free of charge. Conversely, a number of countries do not give customers control over data.

8 Customer Services (Recommendation 2 – 13 of the GGP)

8.1 Monthly information on consumption and cost through multiple channels

According to recommendations E2 and G2 of the GGP, for both electricity and gas, the customer should be properly informed, at least once a month, of actual electricity consumption and cost, free of charge. This information should be offered through multiple channels.

The following questions were addressed to NRAs:

"Is there regulation in place so that customers with smart meters are informed, at least once a month and free of charge, of actual consumption and costs?"

"Does the customer have a choice of different channels to get this information for free?"

"What is the frequency of this information and channels for customer without smart meters?"

Figure 4, below, sets out the regulations in different countries with regard to the provision of consumption and cost information to smart meter customers. The sample size is 18 for electricity and 10 for gas.

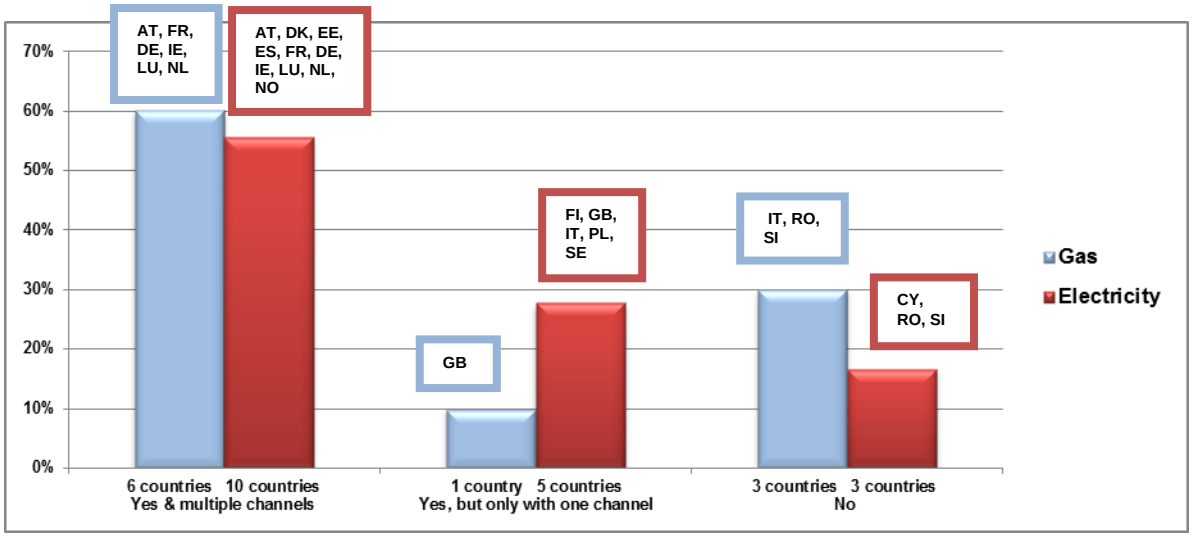

Figure 4: Regulations concerning the provision of smart meter consumption and cost information to customers

The chart shows that most countries have regulations in place mandating the provision of consumption and cost information at least once a month. Of those that do not, only Italy has indicated that they intend to put regulations in place for gas customers.

Respondents were also asked to indicate how frequently consumption and cost information is provided to non-smart meter customers. This information is set out in Figure 5 below. The sample size is 19 for electricity and 16 for gas.

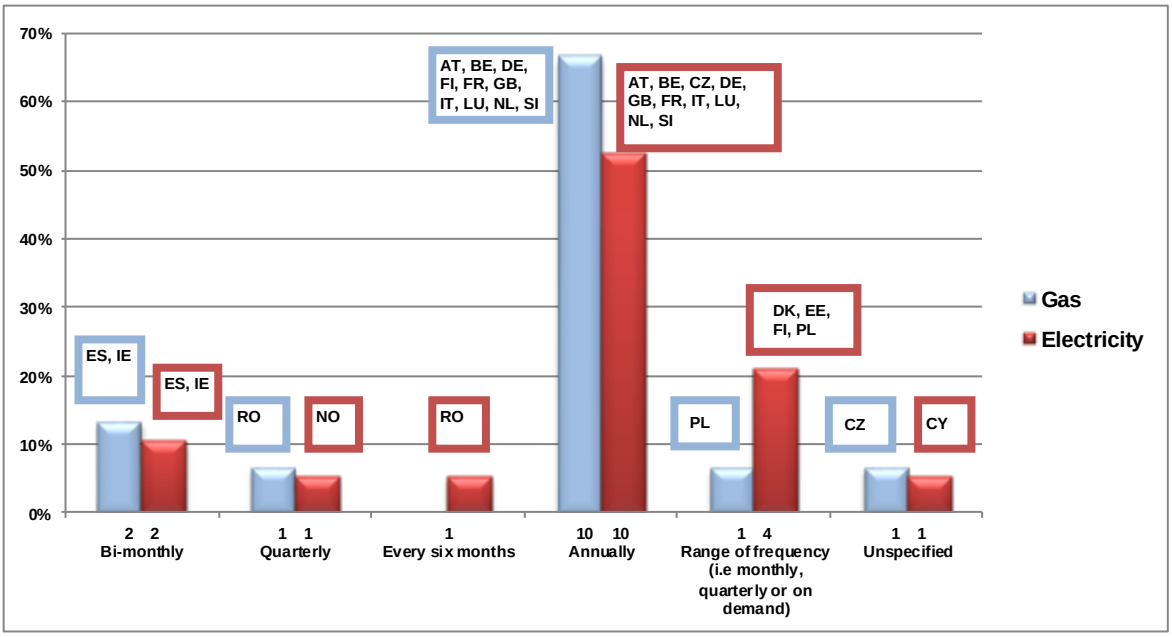

Figure 5: Regulation on the provision of accurate (not estimated) consumption and cost information, free of charge, to customers without smart meters

The chart shows that this information is provided on a range of different frequencies but annual provision is the most common[10].

8.2 On demand information on consumption and costs through multiple channels

According to recommendations E3 and G3 of the GGP, for both electricity and gas, customers with smart meters should be able to access their up to date consumption and injection data and costs, on demand.

Two questions were set out in order to assess the regulatory arrangements.

The following questions were addressed to NRAs:

"Have customers the possibility to access, on demand, information on up to date consumption, injection data and costs?"

"When communicating this information to customers, do service providers offer a choice of different channels to provide this information?"

[10] In several countries customers have the possibility to provide their supplier/DSO with self-readings in order to obtain accurate billings with a different range of frequency e.g.:

- Monthly: Romania, Slovenia
- Bi-monthly: France
- Quarterly: Austria

In Ireland suppliers are required to provide information about customer consumption and the cost of that consumption at least every 2 months, based on a target of 4 accurate & 2 estimated meter reads per annum provided to suppliers by the DSO/DNO.

In Germany companies have the obligation to offer monthly, quarterly or every six months billing based on actual consumption. However this service is not free of charge.

Figure 6 below indicates the regulatory arrangement of each country. The sample size is 19 for electricity and 14 for gas.

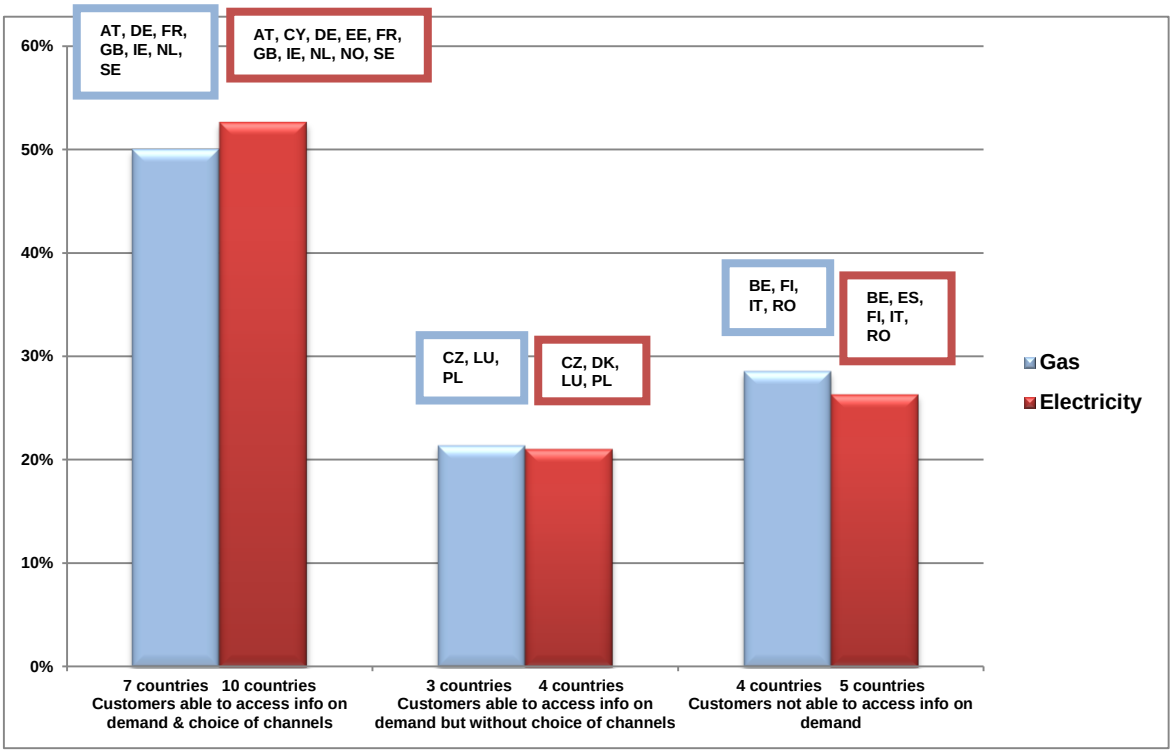

Figure 6: Regulations concerning the provision of up to date consumption and injection data and costs, on demand to customers with smart meters

The chart shows that most countries intend to allow customers access to their consumption and cost data on demand. Of those countries that do not, Finland and Italy provide access to consumption data only. In Belgium, such access is limited to customers in the Brussels region, who only have access to information on their injection data.

8.3 Easier to switch supplier, move or change contract

According to recommendations E4 and G4 of the GGP, for both electricity and gas, the timely provision of smart metering data should allow for improvements in market processes.

The following question was set out in order to assess each country's progress in terms of improvements in market processes brought on by the smart meter roll-out.

The following question were addressed to NRAs:

"Have smart meters facilitated:

Supplier switching process?

Moving process?

Change of contract?

Time of use tariffs, innovative pricing formulas etc?"

Table 4, below, summarises what improvements to market processes have been made by countries that have rolled out or are rolling out smart meters. The sample size is 7 for electricity and 1 for gas.

	Supplier switching process		Moving process		Change of contract		Time of Use tariffs, innovative pricing formulas etc	
	Elec	Gas	Elec	Gas	Elec	Gas	Elec	Gas
AT	√	●	√	●	X	●	√	√
DK	X	●	X	●	X	●	X	●
EE	X	●	X	●	X	●	X	●
FI	√	●	√	●	X	●	√	●
IT	√	X	√	X	√	X	√	X
ES	X	●	X	●	X	●	X	●
SE	√	●	√	●	●	●	√	●

Table 4: Improvements to market processes made by countries that have rolled out or are rolling out smart meters

Italy and Sweden have already completed their roll-out of electricity smart meters. In Finland, 80% of customers must have active smart meters by the end of 2013 and most Finish DSOs expect to achieve a 100% of the roll-out by the end of 2014. Other countries will be in a position to realise the benefits towards the end of decade when their roll-outs reach a critical mass of meters.

Of those countries who plan to roll-out smart meters, Cyprus, Denmark, Estonia, Great Britain, Ireland, Luxembourg, Norway, Slovenia, Estonia, and the Netherlands all stated that they intended to make changes to market processes as smart meters are rolled out. None of the respondents stated that they are not intending to improve market processes as a consequence of rolling out smart meters.

8.4 Offers reflecting actual consumption patterns

According to recommendations E6 and G6 of the GGP, both for electricity and gas, smart metering systems should be capable of recording consumption on a configurable time basis, in order to facilitate innovative pricing formulas that reflect actual consumption. At a minimum, consumption should be recorded on an hourly basis for electricity and a daily basis for gas.

A series of questions were set out in order to assess each country's arrangements in this regard.

The following questions were addressed to NRAs:

"Have innovative pricing formulas, flexible offers, which better reflect actual consumption been developed in your country?"

"Specify the time basis established for recording consumption in smart metering systems in your country."

"Do you have any regulation that allows/promotes suppliers to make offers to the customer that better reflect actual consumption/injection into different time periods?"

"Has your country made an overview of legislation, for example marketing rules, in relation to the possible increased complexity (more tariffs/offers) for the customer?"

Figure 7 below sets out the level of granularity at which smart meters record consumption in each country. The sample size is 14 for electricity and 7 for gas.

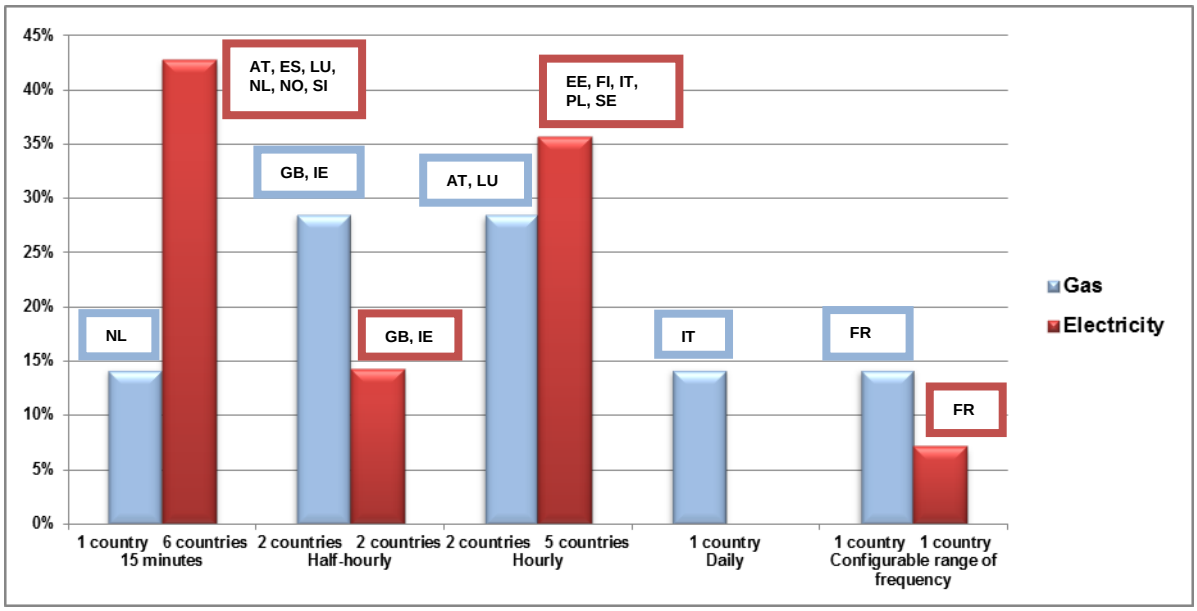

Figure 7: The level of granularity at which smart meters record consumption in each country

The chart shows a range of answers among respondents with no discernible pattern. France's smart metering system can be configured to measure on a 10, 30 and 60 minute basis for electricity and a daily and hourly basis for gas.

Table 5 below shows what regulations are in place to allow or promote offers that better reflect actual consumption and injection. It also indicates which countries have undertaken a review of legislation related to possible increased tariff complexity. The sample size is 20 for both electricity and gas.

	Regulation that promotes suppliers to make offers that better reflect actual consumption /injection		Overview of legislation on increased tariff complexity	
	Elec	Gas	Elec	Gas
AT	X	X	√	√
BE	√	X	X	X
CY	X	X	X	X
CZ	X	X	X	X
DK	√	X	X	X
EE	X	X	X	X
FI	√	X	X	X
FR	X	X	X	X
DE	√	X	X	X
GB	√	X	√	√
IE	√	X	X	X
IT	√	X	√	X
LU	X	X	X	X
NO	√	X	X	X
PL	X	X	X	X
RO	X	X	X	X
SI	X	X	√	X
ES	X	X	√	X
SE	√	X	X	X
NL	√	X	√	√

Table 5: Regulations to promote flexible tariffs and review of legislation related to increased tariff complexity

The chart shows that while a number of countries have regulations allowing or promoting time of use tariffs in electricity, no similar arrangements exist in gas. A number of countries have made review of legislation with regards to increased tariff complexity. In practice, what this means varies widely, from conducting a comprehensive review of current market arrangements with regard to tariffs in the case of Great Britain to the provision of information through the regulator's website in the case of the Netherlands. We also note that some NRAs allow customers to compare tariffs from all competing suppliers through the NRA website.

8.5 Remote power capacity reduction

According to recommendation E7 of the GGP, the smart electricity metering system should be capable of customer or industry stakeholder (e.g. the supplier or distributor) instigated remote power capacity reduction.

A series of questions was set out in order to assess each country's arrangements with regard to remote capacity reduction.

The following questions were addressed to NRAs:

"Is remote management of power capacity decrease/increase on customer demand available in your country?"

"Can this functionality be initiated by a stakeholder other than the customer?"

Figure 8 below shows the arrangements in each country with regard to remote power capacity reduction in electricity. The sample size is 19.

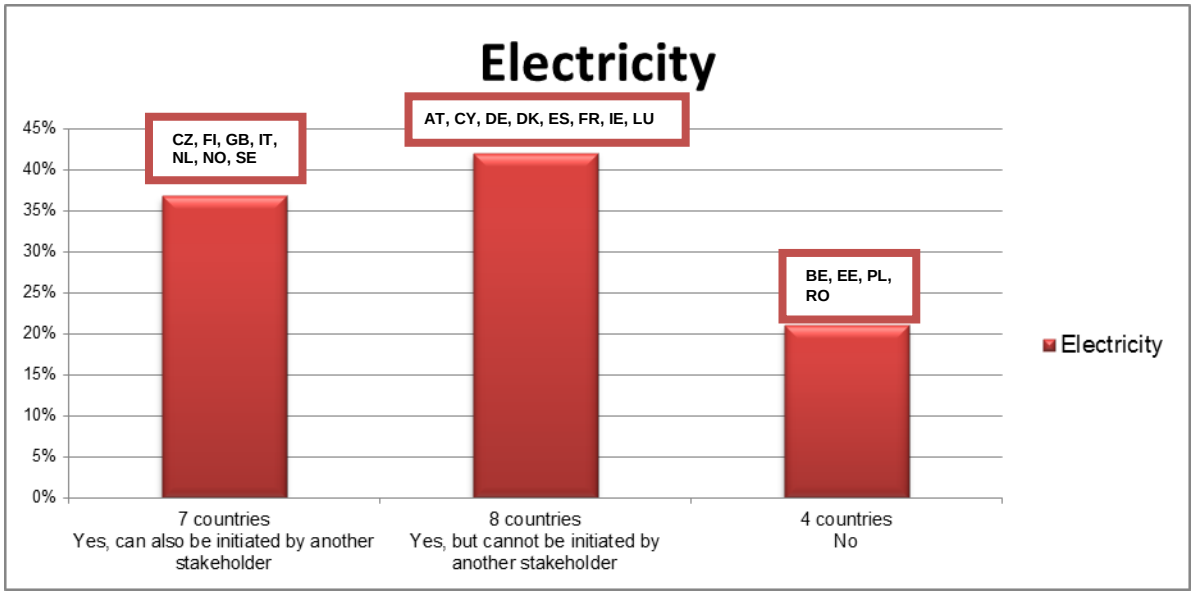

Figure 8: Remotely activated load control arrangements in each country

The table shows no clear trend among countries with regard to the application of this recommendation.

8.6 Remote activation and de-activation of supply

According to recommendations E8 and G8 of the GGP, for both electricity and gas, the smart metering system should be capable of customer or industry stakeholder (e.g. the supplier or distributor) instigated remote de-activation of supply.

A series of questions was set out in order to assess arrangements with regard to remote capacity reduction.

The following questions were addressed to NRAs:

"Are customers in your country able to request remote activation or de-activation of their supply?"

"Is it possible for another stakeholder than the customer to initiate these processes?"

Figure 9, below, sets out the arrangements in each country with regard to remote de-activation of supply. The sample size is 19 for electricity and 13 for gas.

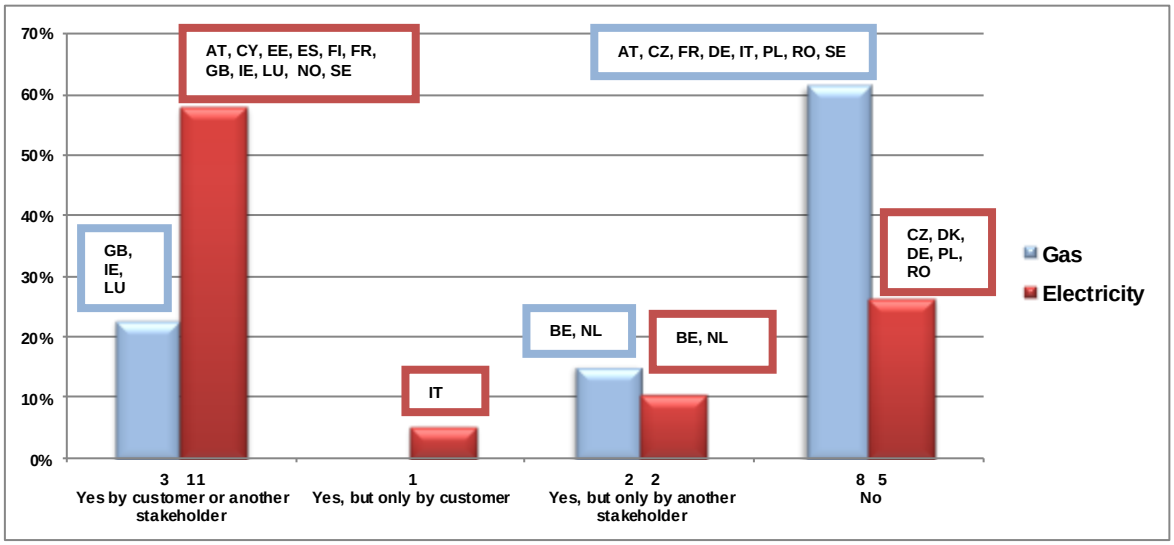

Figure 9: Arrangements for the remote activation or de-activation of supply in each country

The chart shows that the most popular arrangement for electricity is for both customer and other stakeholders to be capable of initiating remote activation or de-activation of power. Conversely, the most popular arrangement for gas is not to accommodate remote activation or de-activation of power.

8.7 The functionality of the smart metering system

Recommendations E9 - 13 and G11 - 13 of the GGP, for both electricity and gas, relate to the desired level of functionality electricity and gas meters should possess. The GGP recommends that electricity and gas smart metering systems should possess the following:

- An alarm alerting the customer of exceptional energy use;
- An open gateway through which the customer can access and control their consumption;
- A remote upgrade capability.

In addition to this, electricity smart metering systems should possess the following:

- The capability to measure injected as well as consumed energy;
- The capability to receive immediate information on non-notified energy interruptions at the connection point.

Table 6, below, sets out which of these features each country's smart metering system has or is intended to have. The sample size is 18 for electricity and 10 for gas.

	Injected & consumed energy		Energy interruptions		Exceptional energy consumption		Connected to open gateway		Software can be upgraded	
	Elec	Gas	Elec	Gas	Elec	Gas	Elec	Gas	Elec	Gas
AT	√	●	X	●	X	X	X	X	√	√
CY	√	●	√	●	X	●	X	●	√	●
DK	X	●	X	●	X	●	X	●	X	●
EE	X	●	X	●	X	●	√	●	X	●
FI	√	●	√	●	X	●	X	●	√	●
FR	√	●	X	●	X	X	√	√	√	√
DE	X	●	√	●	X	X	X	X	X	X
GB	√	●	√	●	√	X	√	√	√	√
IE	√	●	X	●	X	√	√	√	√	√
IT	√	●	√	●	√	X	X	√	√	√
LU	√	●	X	●	X	X	√	√	√	√
NO	√	●	√	●	√	●	√	●	√	●
PL	√	●	X	●	X	●	√	●	√	●
RO	X	●	X	●	X	X	X	X	X	X
ES	√	●	X	●	X	●	X	●	√	●
SE	X	●	X	●	X	●	X	●	X	●
NL	√	●	√	●	√	√	√	√	√	√

Table 6: functionalities of each country's smart metering system[11]

The table shows a wide variety of functionalities among countries. In general, countries are more likely to have remote upgrade and the measurement of injected and consumed energy (electricity only) than they are to have interruption alerts, exceptional usage alarms or an open gateway for access and control of consumption.

In many cases, the level of functionality that the countries are rolling out is a subset of the functionalities the countries see as being associated with smart meters as set out in Table 2.

[11] In the case of Slovenia, functionalities depend on the outcome of the CBA that was being carried out at the time this report was published.

9 Anti-discrimination provisions for roll-out (Recommendation 16 of the GGP)

According to recommendations E16 and G16 of the GGP, for both electricity and gas, countries should avoid discriminatory behaviour by the party responsible for the roll-out while accepting that the timing of the actual metering installation in different regions may have to be considered to avoid unnecessary costs. Respondents were asked about national arrangements in this regard.

The question addressed to NRAs was:

"Has your NRA established measures to avoid discriminatory behaviour by the party responsible for the roll-out?"

Figure 10, below, sets out which countries have put in place anti-discrimination measures. The sample size is 16 for electricity and 9 for gas.

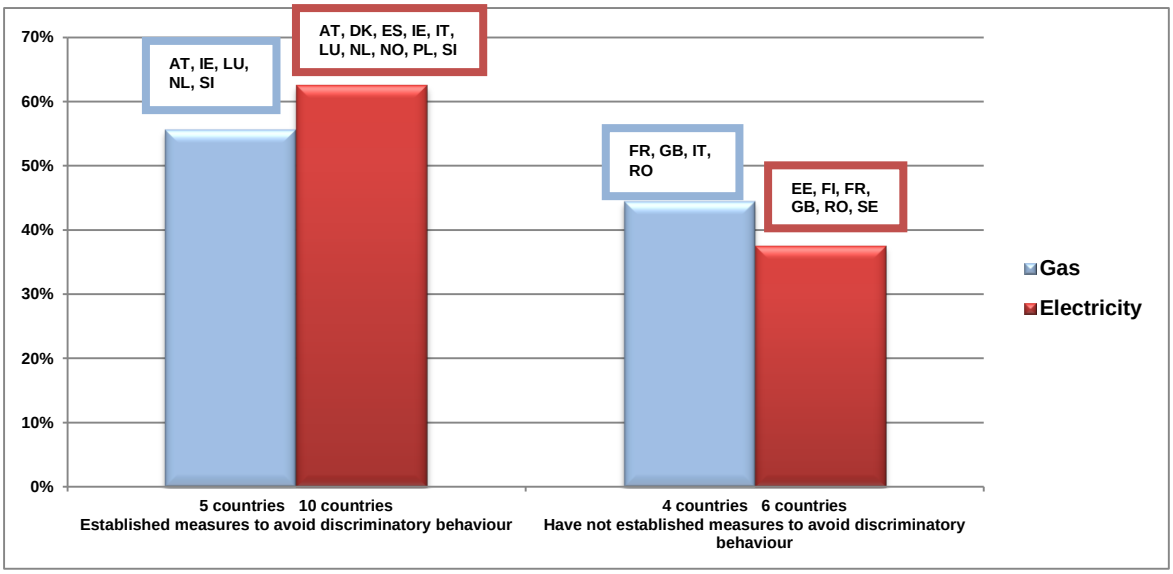

Figure 10: Anti-discrimination arrangements

The chart shows that most countries have put in place anti-discrimination measures. Of those that have not, France, Great Britain, Romania, Estonia and Sweden are all targeting to roll-out meters to 100% of customers by 2020, thereby greatly diminishing the potential for discriminatory behaviour.

10 Cost Benefit Analysis (Recommendation 14 of the GGP)

According to recommendations E14 and G14 of the GGP, for both electricity and gas, a country's CBA for smart meter roll-out should account for an extensive value chain, covering DSOs, suppliers, metering operators, generators and data security in as quantitative a manner as possible.

A series of questions was set out in order to assess each country's approach to conducting a CBA.

The following questions were addressed to NRAs:

"Has your country carried out a CBA of smart metering deployment?"

"Has the CBA taken into account an extensive value chain covering customers, DSOs, suppliers, metering operators, generators, etc?"

"Has the CBA taken into account the cost involved, regarding data privacy and security?"

"When was the analysis carried out?"

"Who carried out the analysis?"

"What was the outcome of the CBA?"

"What functionalities in the smart metering system were taken into account?"

"If a roll-out in your country has been decided, how will it be financed?"

Figure 11 below sets out the status of the CBA in each country. That is, whether an analysis has been carried out and if so, its outcome. The sample size is 22 for electricity and 18 for gas.

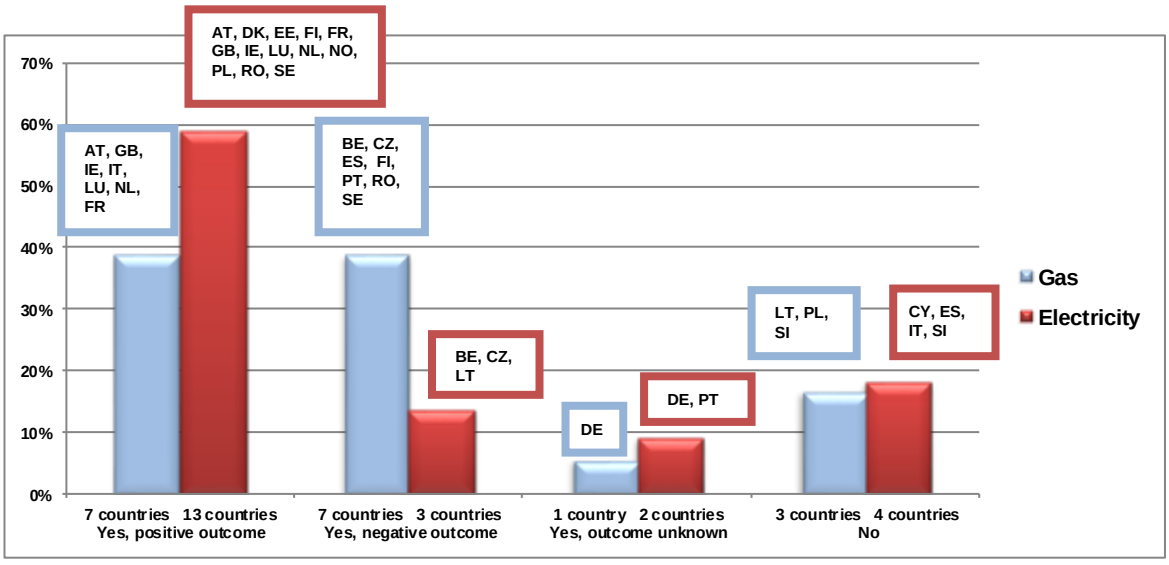

Figure 11: Status of CBA in each country

The chart shows that most countries have carried out or are still carrying out a CBA. Of those countries that have not conducted a CBA for electricity, Finland, Italy and Spain all decided to roll-out smart meters anyway. All countries that have carried out or are carrying out a CBA have taken into account an extensive value chain[12] with a few exceptions. In electricity, only Sweden and Norway's CBA did not take into account the cost of data security. However, Norway did consider data security in a subsequent study. In gas, Italy and Luxembourg did not take into account the cost of data security and Sweden's did not take into account an extensive value chain (including data security) due to the small size of the gas market. It should be noted that in the case of Sweden (electricity), Norway (electricity) and Italy (gas), these CBAs were all carried out before 2009 whereas all other CBA were carried out in 2009 or later. In Sweden's case, the CBAs concerned the provision of monthly metering, which prompted DSOs to roll-out smart meters.

Figure 12 below indicates those countries that have carried out a CBA, and which body conducted it. The sample size is 18 for electricity and 15 for gas.

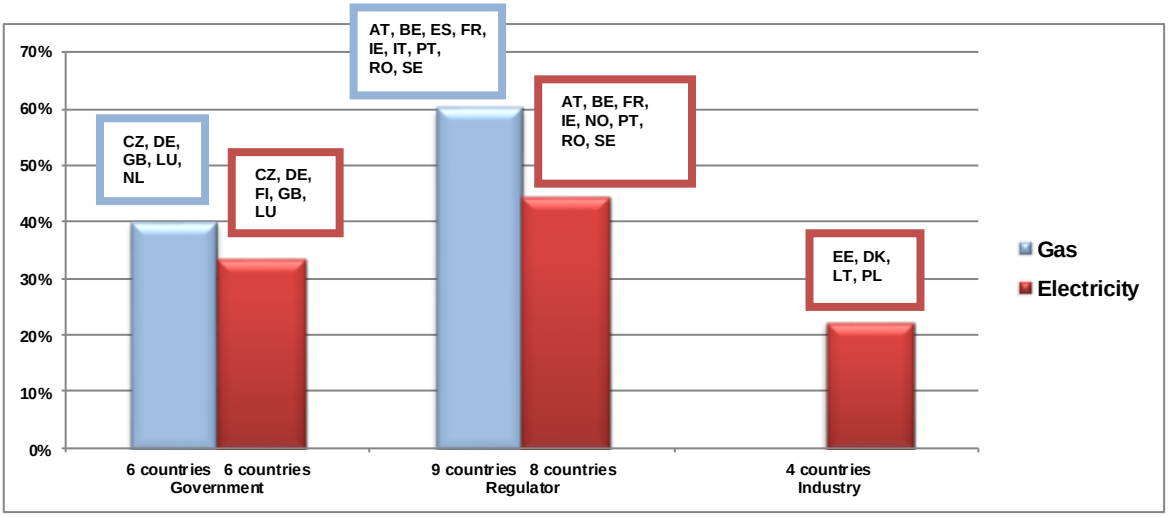

Figure 12: Who carried out the CBA in each country

Figure 13 below sets out how the roll-out is being financed in each country. The sample size is 15 for electricity and 9 for gas.

[12] Covering areas such as customers, DSOs, suppliers, metering operators, generators and data security.

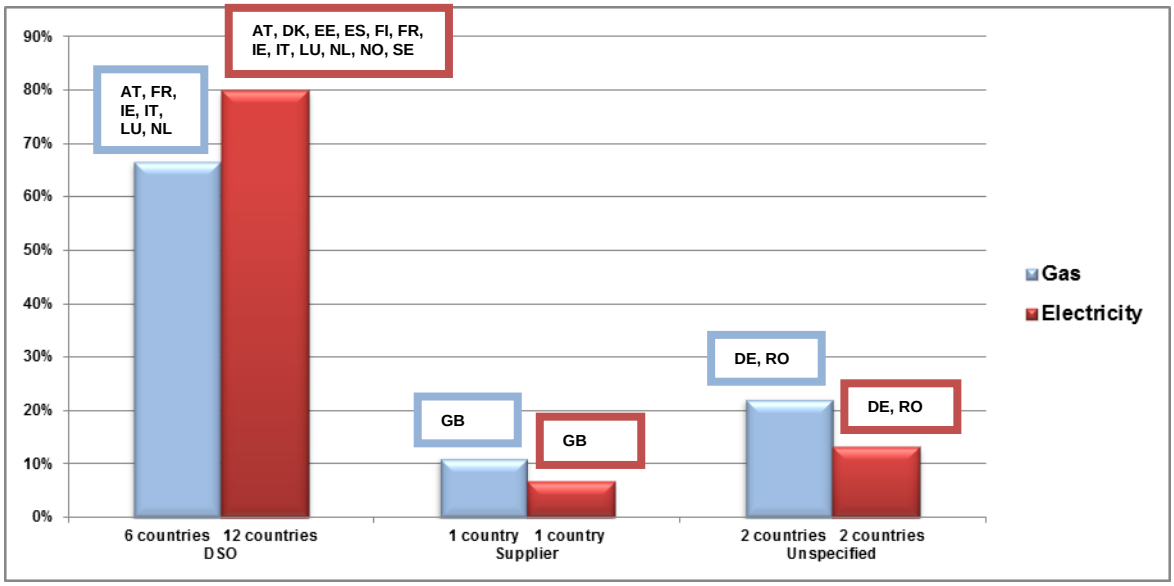

Figure 13: How the roll-out is being financed in each country

In terms of those countries that have not specified who will finance the roll-out, Romania is in discussions with DSOs on this and Germany is yet to decide how the roll-out will be financed.

11 Conclusions

While roll-outs have already been completed in some countries, most have not yet begun or are still in the early stages. As such, it is difficult to draw a firm conclusion at this stage. However, some findings can be inferred from this review.

In terms of the approach to determining whether smart meters should be rolled out or not, the countries are generally applying the recommendations of the GGP. Countries have only decided against rolling out smart meters where the result of a CBA was negative. Generally, those CBAs have taken into account the full value chain, except in cases where it was carried out before 2009. In terms of roll-out targets, a majority of countries have gone beyond the 80% minimum target set out in the 3rd Package and opted for a 95% to 100% roll-out. In some cases, countries have not followed the recommendations of the GGP for certain reasons. For example, those with a 100% roll-out target have been less inclined to put in place anti-discrimination regulations due to its lack of relevance in this scenario.

The technical design of smart metering systems varies widely across countries. They generally have a common understanding of what capabilities a smart meter should possess but often chose a subset of these capabilities for their roll-out as suits the market arrangements and CBA of their country. CEER recognises that despite the many years of assessing European standards, Europe unfortunately still faces a situation without a common standard for smart meters, as well as a lack of interoperability.

Many countries will begin rolling out electricity smart meters within the next two years. Regulatory and technical arrangements will be finalised, which should then allow for a clearer picture of whether the countries are following the recommendations of the GGP. Therefore, CEER may repeat this review in the future.

Annex 1 – CEER

The Council of European Energy Regulators (CEER) is the voice of Europe's national regulators of electricity and gas at EU and international level. Through CEER, a not-for-profit association, the national regulators cooperate and exchange best practice. A key objective of CEER is to facilitate the creation of a single, competitive, efficient and sustainable EU internal energy market that works in the public interest.

CEER works closely with (and supports) the Agency for the Cooperation of Energy Regulators (ACER). ACER, which has its seat in Ljubljana, is an EU Agency with its own staff and resources. CEER, based in Brussels, deals with many complementary (and not overlapping) issues to ACER's work such as international issues, smart grids, sustainability and customer issues.

The work of CEER is structured according to a number of working groups and task forces, composed of staff members of the national energy regulatory authorities, and supported by the CEER Secretariat.

This report was prepared by the Retail Market Functioning Task Force of CEER's Customer and Retail Markets Working Group.

Annex 2 – List of abbreviations

Term	Definition
CBA	Cost Benefit Analysis
CEER	Council of European Energy Regulators
DSO	District System Operator
ERGEG	The European Regulators' Group for Electricity and Gas
GGP	Guidelines of Good Practice
NRA	National Regulatory Authority
RMF	Retail Market Functioning (A CEER Task Force)

Note: Country abbreviations are found on page 9 (Table 1).

Annex 3 – List of Questions

SECTION	Subsection	Questions	Recommendation	Can be answered by all NRAs?
A. GAS AND ELECTRICITY	A.1. Preliminary questions	I-VIII	E/G 15. All customers should benefit from smart metering	Yes
	A.2. Data Privacy and Security	1.1	E/G 1.Customer control on metering data	Yes
		1.2		Yes
		1.3		Yes
B. ELECTRICITY	B.1.Customer services	2.1	E 2. Information on actual consumption and cost, on a monthly basis, free of charge	
		2.2		Yes
		2.3		Yes
		3.1.	E 3. Access to information on consumption and cost data on customer demand	Yes
		3.2		Yes
		4.1	E 4. Easier to switch supplier, move or change contract	
		6.1	E 6. Offers reflecting actual consumption patterns	Yes
		6.2		
		6.3		Yes
		6.4		Yes
		7.1	E 7. Remote power capacity reduction/increase	Yes
		7.2		Yes
		8.1	E 8. Remote activation and de-activation of supply	Yes
		8.2		Yes
		9.1	E 9. All customers should be equipped with a metering device capable of measuring consumption and injection	yes
		10.1	E 10. Alert in case of non-notified interruption	Yes
		11.1	E 11. Alert in case of exceptional energy consumption	Yes
		12.1	E 12. Interface with the home	
		13.1	E 13. Software to be upgraded remotely	
	B.2. Costs and benefits	14.1	E 14. When making a cost benefit analysis, an extensive value chain should be used	Yes
	B.3. Roll-out	16.1	E 16. No discrimination when rolling out smart meters	
C. GAS	C.1.Customer services	2.1.g	G 2. Information on actual consumption and cost, on a monthly basis, free of charge	
		2.2.g		Yes
		2.3.g		Yes
		3.1.g	G 3. Access to information on consumption and cost data on customer demand	Yes
		3.2.g		Yes
		4.1.g	G 4. Easier to switch supplier, move or change contract	
		6.1.g	G 6. Offers reflecting actual consumption patterns	Yes
		6.2.g		
		6.3.g		Yes
		6.4.g		Yes
		8.1.g	G 8. Remote enabling of activation and remote de-activation of supply	Yes
		8.2.g		Yes
		11.1.g	G 11. Alert in case of exceptional energy consumption	Yes
		12.1.g	G 12. Interface with the home	
		13.1.g	G 13. Software to be upgraded remotely	
	C.2.Costs and benefits	14.1.g	G 14. When making a cost benefit analysis, an extensive value chain should be used	Yes
	C.3.Roll-out	16.1.g	G 16. No discrimination when rolling out smart meters	

For those countries where smart meters have <u>not</u> been rolled-out, and there is not a plan or a decision made regarding the roll-out, NRAs were invited to answer the questions marked "Yes" in the above table.