Decision on the National Rollout of Electricity and Gas Smart Metering

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Abstract:

This paper outlines the decision by the CER, after taking account of responses received to its recent consultation on this topic, to proceed to the next phase (Phase 2) of the National Smart Metering Programme. This decision is based on the positive results of the comprehensive electricity and gas smart metering trials and associated cost-benefit analyses published during 2011. The decision is further underpinned by relevant European and national legislation which promote smart metering and outline specific related requirements.

The decision paper outlines the high level objectives, data requirements, design, functionality, implementation approach and timelines that will be now be formally adopted by the National Smart Metering Programme as it proceeds to the next phase (Phase 2) in delivering a national rollout of electricity and gas smart metering in Ireland to all residential consumers and a significant proportion of small-to-medium enterprise (SME) consumers.

Target Audience:

This paper is for the attention of members of the public, the energy industry, energy consumers and all interested parties.

For further information on this decision contact Gary Martin (gmartin@cer.ie) at the CER.

Responses received to the consultation on the proposed decision (CER/11/191) were published on www.cer.ie on 13th January 2012.
Executive Summary

i. Introduction

Based on the clearly positive findings from the key deliverables of Phase 1, namely the comprehensive electricity and gas smart metering trials and cost-benefit analyses, the CER issued a consultation paper (CER/11/191) in November 2011 outlining that it is minded to proceed with a national rollout of electricity and gas smart metering in Ireland. Consultation paper CER/11/191 also outlined proposals, drawing from European and national legislative requirements as relevant, regarding the high level objectives, data requirements, design, functionality, implementation approach and timelines for the national smart metering end-to-end solution. The consultation period closed in December 2011 and 35 responses were received. This decision paper outlines a summary of the responses received to each of the nine questions posed in consultation CER/11/191, before going on to outline the final CER decisions. Refer to Appendix B for the list of respondents to consultation CER/11/191 and a link to their responses for further detail.

ii. Background

Smart meters are the next generation of meters, which can replace existing electro-mechanical and diaphragm meters and offer a range of benefits for both the individual electricity and gas consumer and for the electricity and gas systems in general. A smart meter is an electronic device that can measure the consumption of energy, adding more information than a conventional meter and giving up-to-date information on usage to the consumer. Smart meters can; (i) facilitate improving energy efficiency by empowering consumers with more detailed, accurate, and timely information regarding their energy consumption and costs; (ii) reduce overall energy consumption; (iii) reduce overall energy bills by shifting any discretionary electricity usage away from peak consumption times. The benefits of smart metering are recognised internationally and there are a number of key EU legislative instruments promoting smart metering to ensure that consumers are properly informed of actual energy consumption and costs frequently enough to enable them to regulate their energy consumption.

The CER, working closely with the Department of Communications, Energy and Natural Resources (DCENR), established the Smart Metering Programme Phase 1 in late 2007 with the objective of setting up and running smart metering trials and assessing their costs and benefits, in order to inform decisions relating to the full rollout of an optimally designed universal National Smart Metering Programme. The key deliverables of Phase 1, namely the comprehensive electricity and gas smart metering trials findings reports and cost-benefit
analyses reports (as depicted in figure 1 below), were published by the CER during 2011\(^1\).

**Figure 1: Smart Metering Programme Phase 1 – Key Deliverables**

- **Customer Behaviour Trials Findings Reports**
  - Electricity: CER/11/080a
  - Gas: CER/11/180a

- **Technology Trials Findings Reports**
  - Electricity: CER/11/080b
  - Dual Fuel: CER/11/180b

- **Cost-Benefit Analyses Reports**
  - Electricity: CER/11/030c
  - Gas: CER/11/180c

**iii. Overview of Decision**

The rollout of smart metering represents a major national infrastructure project, potentially requiring an investment of up to €1 billion. The cost-benefit analyses show that the long-term benefits should clearly exceed these investment costs (by around €229 million net present value over a period of 20 years) and that there are likely to be further non-quantifiable benefits in terms of informed consumers, technological innovation, and synergies with other areas. Taking all this together, the case for proceeding with the full-scale rollout seems very clear, and this is strengthened further when relevant EU legislative requirements are considered.

Thus, after taking account of all the consultation responses received, the CER is publishing this Decision Paper to confirm that the national smart metering rollout programme is proceeding to the next phase (Phase 2) and that the programme will be structured broadly as per the proposals outlined in the consultation paper. This Decision Paper summarises the feedback received from the consultation responses to each of the proposals put forward by the CER and then affirms the final CER position on each of these proposals, which will now be elaborated upon with stakeholders during Phase 2 (Design, Requirements Definition and Procurement), which the CER is currently initiating.

\(^1\) Electricity Smart Metering Reports published 16th May 2011 – refer to Smart Metering Information Paper 4 (CER/11/080) for overview.
Some key energy policy related decisions outlined in the paper include:

- Rolling out electricity smart metering to all electricity residential and business consumers currently on non-interval meters.
- Rolling out gas smart metering to all gas residential consumers and business consumers in the G4 meter category.
- Gas smart metering will leverage the electricity smart metering communications infrastructure.
- Mandating the rollout of in-home display (IHD) devices to all electricity consumers – the IHD will be capable of displaying gas information also for dual fuel consumers.
- Mandating energy usage statements (containing detailed consumption and cost information) to be provided by suppliers to their customers with their electricity and gas bills.
- Mandating time of use electricity tariffs for all electricity consumers.
- Enabling broader and easier access to prepayment services for electricity and gas consumers.

The Decision Paper also outlines:

- The key objectives of the National Smart Metering Programme.
- The high level requirements for the ownership, display and provision of the data/information that rolling out smart metering will facilitate.
- The high level functionality requirements of the national smart metering end-to-end solution that will be required to deliver these data/information requirements and the related energy policy decisions outlined above. This includes specific decisions related to the high level functional requirements for the following key components of the national smart metering solution design:
  - Electricity smart meter and gas smart meter.
  - Wide area network (WAN) communications.
  - Home area network (HAN) communications.
- The procurement model for delivery of the technology components of the end-to-end smart metering system solution.
- The high level implementation approach and timelines for the National Smart Metering Programme.

**iv. Next Steps**

By firming up on the high level design and requirements for the smart metering programme, this now enables the CER to move the National Smart Metering Programme into Phase 2, where the high level design and requirements set out in this Decision Paper will be elaborated upon with the involvement of all relevant
stakeholders under an appropriate governance structure and against a detailed implementation plan – high level timelines are illustrated in Figure 2 below.

**Figure 2: High Level Timelines for National Smart Metering Programme**

The CER would like to thank all parties who have contributed to the successful delivery of Phase 1 of the National Smart Metering Programme and looks forward to their active participation in Phase 2 of this very important national energy infrastructure implementation in order to ensure that the benefits of smart metering are realised by energy consumers, energy systems operation and the environment in Ireland.
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1.0 Introduction

1.1 The Commission for Energy Regulation (CER)

The Commission for Energy Regulation (‘the CER’) is the independent body responsible for overseeing the regulation of Ireland’s electricity and gas sectors. The CER was initially established and granted regulatory powers over the electricity market under the Electricity Regulation Act, 1999. The enactment of the Gas (Interim) (Regulation) Act, 2002 expanded the CER’s jurisdiction to include regulation of the natural gas market, while the Energy (Miscellaneous Provisions) Act 2006 granted the CER powers to regulate electrical contractors with respect to safety, to regulate to natural gas undertakings involved in the transmission, distribution, storage, supply and shipping of gas and to regulate natural gas installers with respect to safety. The Electricity Regulation Amendment (SEM) Act 2007 outlined the CER’s functions in relation to the Single Electricity Market (SEM) for the island of Ireland. This market is regulated by the CER and the Northern Ireland Authority for Utility Regulation (NIAUR). The CER is working to ensure that consumers benefit from regulation and the introduction of competition in the energy sector.

1.2 Purpose of this Paper

The purpose of this paper is to outline the CER decision to proceed to the next phase (Phase 2) of the national rollout programme of electricity and gas smart metering to all residential consumers and a significant proportion of small-to-medium enterprise (SME) consumers i.e. all gas consuming SMEs currently in the G4 meter category and all electricity consuming SMEs currently with non-interval meters. This decision has been taken after considering the responses received to the recent CER consultation on this topic (CER/11/191) and is based on the positive results of the comprehensive electricity and gas smart metering trials and cost-benefit analyses, as well as relevant European and national legislative requirements that promote smart metering and related initiatives.

The Decision Paper confirms that the national smart metering rollout will be structured broadly as per the proposals that were outlined in the consultation paper CER/11/191 regarding the high level objectives, data requirements, design, functionality, implementation approach and timelines for the national smart metering end-to-end solution. This Decision Paper therefore summarises the feedback received from the consultation responses to each of the proposals put forward in CER/11/191 and then affirms the final CER position on each of these proposals. These positions will now be elaborated upon with stakeholders during Phase 2 (Design, Requirements Definition and Procurement), which the CER is currently initiating.
1.3 Background Information

1.3.1 What is Smart Metering?

“An intelligent metering system or ‘smart meter’ is an electronic device that can measure the consumption of energy, adding more information than a conventional meter, and can transmit data using a form of electronic communication. A key feature of a smart meter is the ability to provide bi-directional communication between the consumer and supplier/operator. It should also promote services that facilitate energy efficiency within the home. The move from old, isolated and static metering devices towards new smart/active devices is an important issue for competition in energy markets. The implementation of smart meters is an essential first step towards the implementation of smart grids.”

It is important to note that ‘smart metering’ encompasses more than just the meter itself. Smart metering should be viewed as a system rather than a single device. The following diagram (Figure 3) illustrates the general structure of a smart metering system. It is essentially a hybrid technology consisting of three high level layers:

- Physical meters and associated devices
- Communications layer covering data transport and communications network management
- IT systems which manage the data, applications and services

Figure 3: General structure of a smart metering system
(Source: Figure 6, ERGEG Status Review of Regulatory Aspects of Smart Metering)

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2 Commission staff working paper - 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 (Pg 7)

Smart meters are the next generation of meters, which can replace existing electro-mechanical and diaphragm meters and offer a range of benefits for both the individual electricity and gas consumer and for the electricity and gas systems in general.

The existing standard mechanical meter records the total amount of electricity/gas used over time. These meters are read manually and the information is sent to the network company and then used to calculate customer bills. If a meter reader does not have access to the customer’s meter, estimated consumption information (or a reading provided by the customer) is used to calculate the bill. If the estimated consumption is higher or lower than the actual meter read, this is corrected for when the meter is next read by the customer or the meter reader.

A smart meter is much more sophisticated. It records customers’ actual use of electricity/gas over short intervals (e.g. every 30 minutes). These meters are connected by a communications system to the network company / meter data collector providing the operator with automated, up-to-date information on the amounts of electricity/gas used by customers. Access to this information provides opportunities to reduce network operation costs, including reduced costs of visiting customer premises to manually read the meter and carrying out any necessary connections and disconnections. There are also savings due to reductions in technical losses and theft.

The data collected from smart meters can be used by electricity and gas suppliers, subject to data protection requirements, to deliver useful information to their customers regarding their electricity and gas consumption and costs. In particular, the installation of smart metering will allow electricity suppliers to create innovative pricing arrangements that can be offered to consumers to support the efficient use of electricity, such as time-of-use electricity tariffs. This is where the price of electricity varies at different times of the day to reflect the changes in the costs of producing electricity. This will allow consumers to manage their consumption of electricity in line with price movements and demand patterns.

Smart meters can facilitate improving energy efficiency by empowering consumers with more detailed, accurate and timely information regarding their energy consumption and costs, thus helping consumers reduce any unnecessary energy usage and shift any discretionary electricity usage away from peak consumption times.
1.3.2 EU Legislation

There are a number of key EU legislative instruments promoting smart metering, which include:

a) Third Legislative Package for Further Liberalisation of the Electricity and Gas Markets

The 3rd Package contains provisions regarding intelligent metering systems, with the aim of better informing consumers of their consumption and helping to increase awareness of energy consumption. The implementation of those metering systems may be subject to an economic assessment of all the long-term costs and benefits to the market and the individual consumer or of which form of intelligent metering is economically reasonable and cost-effective and which timeframe is feasible for their installation.

The general principle is that consumers must have access to their consumption data. National Regulatory Authorities (NRAs) must ensure access to consumer consumption data, and the existence of a nationwide harmonised format for consumption data and a process for suppliers and consumers to access the data must be defined.

Intelligent metering systems are promoted twice in the Directives: first, with the aim to promote energy efficiency and demand side management measures; second, with the aim to ensure active participation of consumers in the market. Different provisions apply for electricity and for gas – details below. There are also a number of EU Interpretive Notes which cover smart metering published on these directives.

i) Electricity - Directive 2009/72/EC (Annex 1)

This directive states that:

1. (i) [Member States shall ensure that consumers] are properly informed of actual electricity consumption and costs frequently enough to enable them to regulate their electricity consumption’

2. ‘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

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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.

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 rollout of smart meters is assessed positively, at least 80 % of consumers shall be equipped with intelligent metering systems by 2020.

An EU Retail Markets Interpretive Note on Electricity Directive 2009/72/EC highlights a European Commission Declaration which clarifies that:

“It is understood that in the case 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 2020.”


This directive states that:

1. (i) [Member States shall ensure that consumers] are properly informed of actual gas consumption and costs frequently enough to enable them to regulate their own gas consumption.

2. Member States shall ensure the implementation of intelligent metering systems that shall assist the active participation of consumers in the 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.

Such assessment shall take place by 3 September 2012.

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

b) Proposed Energy Efficiency Directive\textsuperscript{9}

On 22 June 2011 the European Commission adopted a proposal for an Energy Efficiency Directive to establish a common framework for the promotion of energy efficiency across the EU, ensure the achievement of the Union’s target of 20% primary energy savings by 2020 and pave the way towards the realisation of further energy efficiency beyond that date.

The Directive on Energy Efficiency will amend and subsequently repeal the Cogeneration Directive (2004/8/EC, CHP Directive) and the Energy Services Directive (2006/32/EC, ESD)\textsuperscript{10}. Given the assessment that the Union is unlikely to achieve its energy efficiency target of 20% primary energy savings by 2020 based on the current policy mix, the Commission is proposing to take a much firmer line with Member States. While there are no binding targets in the draft there are a number of binding measures.

The European Commission’s proposal for a Directive on Energy Efficiency (COM(2011)370) has direct implications for the activities of regulators, who have to ensure that consumer interests are always taken into account and that competition is not distorted. The Energy Efficiency Directive is covers a range of areas including; Energy Efficiency Obligation Schemes (Article 6), Metering and informative billing (Article 8), Promotion of efficiency in heating and cooling (Article 10) and Energy Transmission and Distribution (Article 12).

c) Directive 2005/89/EC – Security of Supply\textsuperscript{11}

This Directive specifies that member states may encourage “the adoption of real-time demand management technologies, such as advanced metering systems” to maintain balance between electricity demand and supply.


d) Directive 2004/22/EC - Measuring Instruments\textsuperscript{12}

The Directive 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on measuring instruments (MID) establishes the requirements that measurement devices and systems have to 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.

1.3.3 EU Initiatives

There are currently a number of EU coordinated smart metering initiatives underway which include:

- On 8\textsuperscript{th} June 2012, the European Data Protection Supervisor (EDPS) adopted its Opinion on the European Commission Recommendation on preparations for the roll-out of smart metering systems\textsuperscript{13} (see below), which gives data protection related guidance to Member States to prepare for the roll-out of these systems.

- The European Commission published on 9\textsuperscript{th} March 2012 a Recommendation to prepare the roll-out of smart-metering systems\textsuperscript{14}. The Recommendation aims to facilitate the take-up of smart metering by providing step-by-step guidelines for Member States on how to conduct cost-benefit analysis by 3 September 2012. It also sets common minimum functionalities of smart metering systems and addresses data protection and security issues.

- On 1\textsuperscript{st} December 2011 CEER (Council of European Energy Regulators) published its final Advice on the take-off of a demand response electricity market with smart meters.\textsuperscript{15} This advice aims at enhancing the implementation of demand response with household customers and small and medium sized businesses. It describes the roles and


\textsuperscript{13} Opinion of the European Data Protection Supervisor on the Commission Recommendation on preparations for the roll-out of smart metering systems http://www.edps.europa.eu/EDPSWEB/webdav/site/mySite/shared/Documents/Consultation/Opinions/2012/12-06-08_Smart_metering_EN.pdf

\textsuperscript{14} European Commission Recommendation to prepare the roll-out of smart-metering systems http://ec.europa.eu/energy/gas_electricity/smartgrids/smartgrids_en.htm

\textsuperscript{15} CEER Advice on the take-off of a demand response electricity market with smart meters http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_CONSULT/ CLOSED%20PUBLIC%20CONSULTATIONS/CUSTOMERS/PC-62%20CEER%20Draft%20advice%20on%20the%20take-off%20of%20a%20demand%20response/CD
responsibilities for different market actors in order to realise demand response and lists what CEER regard as prerequisites to be in place to perform demand response. The document can be used as a basic checklist for the take-off of demand response with smart meters.

- The European Commission published in October 2011 a **Set of common functional requirements of the smart meter**. Based on an analysis of the 11 member states which had conducted their smart metering cost-benefit assessments (CBAs) the Commission defined a Smart Metering System in terms of 13 key Functionalities and proposed this to the remaining Member States to be used in their CBAs.

- In April 2011 **Opinion 12/2011 on smart metering** was published by the Article 29 Data Protection Working Party, which is an independent European advisory body on data protection and privacy. The opinion’s objective is to clarify the legal framework applicable to the operation of smart metering technology within the energy sector. It thus seeks to address the following issues: the definition of personal data in the context of smart metering, data controllership and reviewing legitimate grounds for processing.

- On 8th February 2011 ERGEG (European Regulators Group for Electricity and Gas) published its final **Guidelines of Good Practice (GGP) on Regulatory Aspects of Smart Metering for Electricity and Gas (E10-RMF-23-03)**. These final recommendations aim to provide guidance regarding the European Commission’s 3rd Energy Package provisions on the installation of intelligent metering systems for electricity and gas, focusing on consumer services, rollout of smart meters, cost-benefit analysis and data security and integrity.

- European Standards Organisations are progressing **Mandate M/441** 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 consumers’ awareness of actual consumption can be raised in order to allow timely adaptation to their demands. According to Mandate M/441, the

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implementation of this provision requires the definition of new functionalities for smart meters – in addition to those in the Measuring Instruments Directive (MID)\textsuperscript{20}, and as stated by the European Commission in the Mandate M/441.

- The **Open Meter Project**\textsuperscript{21} began in January 2009 with 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. This project concluded in June 2011 and the deliverables are published on [www.openmeter.com](http://www.openmeter.com).

- In January 2010 a **Task Force on Smart Grids**\textsuperscript{22} was launched whose mission is to advise the European Commission on policy and regulatory directions at European level and to coordinate the first steps towards the implementation of smart grids under the provision of the 3rd Package.

### 1.3.4 Smart Metering Rollout Status in Europe

The status of smart metering for electricity and gas in Europe is diverse and changing at a rapid pace.

The last publicly available official report on the status of each country is the *ERGEG Summary of Member State experiences on cost benefit analysis (CBA) of smart meters* published 2nd February 2011\textsuperscript{23} but this document focuses on smart metering cost-benefit analysis (CBA) development rather than specific meter rollout status.

Table 1 is an excerpt from this report and it indicates that, out of the 24 member states that responded to the ERGEG survey, as of 1st January 2011 eleven had completed an electricity CBA and six had completed a gas CBA.

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\textsuperscript{21} Open Meter Project [http://www.openmeter.com](http://www.openmeter.com/)

\textsuperscript{22} Smart Grids Task Force [http://ec.europa.eu/energy/gas_electricity/smartgrids/taskforce_en.htm](http://ec.europa.eu/energy/gas_electricity/smartgrids/taskforce_en.htm)

Table 1: Status of Smart Metering CBA Development in EU Member States
(Source: Page 2, ERGEG Summary of Member State experiences on cost benefit analysis (CBA) of smart meters published 2nd February 2011)

<table>
<thead>
<tr>
<th>Status of CBA in CEER countries</th>
<th>Electricity</th>
<th>Gas</th>
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<tr>
<td>Countries have conducted a CBA</td>
<td>11(^1)</td>
<td>6(^2)</td>
</tr>
<tr>
<td>Positive result of CBA</td>
<td>7(^3)</td>
<td>5(^4)</td>
</tr>
<tr>
<td>Countries plan (or ongoing) to conduct a CBA (in some cases for the 2(^{nd}) time – France, Hungary, Poland, Portugal)</td>
<td>12(^5)</td>
<td>14(^6)</td>
</tr>
<tr>
<td>Countries do not plan a CBA</td>
<td>2(^7)</td>
<td>5(^8)</td>
</tr>
<tr>
<td>Countries with no CBA, but no longer relevant (yes/no of rollout already decided)</td>
<td>3(^9)</td>
<td>0</td>
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1: Austria, Denmark, France, Hungary, the Netherlands, Norway, Poland, Portugal, Slovenia, Sweden, United Kingdom
2: Austria, France, Hungary, Italy, the Netherlands, United Kingdom
3: Austria, France, the Netherlands, Norway, Poland, Portugal, United Kingdom (Poland – study was TSO, not gov’t authority. In Sweden, although result was negative, rollout for electricity proceeded.)
4: Austria, France, the Netherlands, Italy, United Kingdom
5: Belgium, Czech Republic, Germany, France, Greece, Hungary, Ireland, Luxembourg, Latvia, Poland, Portugal, Romania (Belgium – each region conducting its own, no federal one planned) (Portugal - to be decided by gov’t)
6: Belgium, Czech Republic, Germany, Spain, Finland, Greece, Hungary, Ireland, Latvia, Luxembourg, Lithuania, Portugal, Slovenia, Sweden (Portugal - to be decided by gov’t)
7: Lithuania, Slovak Republic
8: Denmark, Norway, Poland, Romania, Slovak Republic (Norway has no gas)
9: Spain, Finland, Italy

The ERGEG Status review on regulatory aspects of smart metering report, published October 2009\(^{24}\) is still the last publicly available official report on the status of each country regarding trials and rollouts of smart metering. Because of the fast pace of development in the area of smart metering it should be noted that the national situations which are reflected in the status review may no longer provide a complete and accurate picture of the national situations.

- Generally in electricity only two countries have undertaken a large scale meter installation programme for consumers - these early adopters are Italy and Sweden with full rollouts. In addition, some other countries have are currently undertaking a large scale rollout of smart electricity meters, such as Britain, Norway, Finland and France. Other countries are considering rollout plans with some undertaking smart metering trials to inform their decisions.

\(^{24}\) E09-RMF-17-03 ERGEG Status review on regulatory aspects of smart metering as of May 2009 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
• In gas, there are fewer uptakes of smart meters, with Italy and Britain having planned rollouts, while a small number of countries are discussing the possibility.

The ERGEG Status review on regulatory aspects of smart metering report also found that the most important policy objectives for supporting and encouraging a rollout of smart meters in both electricity and gas are energy efficiency, peak load management and more frequent meter readings.

1.3.5 Smart Metering Progress in Ireland

1.3.5.1 Government Policy and Legislation

The National Smart Metering Plan in Ireland is a key Government priority in the context of enabling the development of a Smart Grid, facilitating more efficient use of energy and underpinning smart and sustainable economic growth.

The importance of Smart Metering within the Government’s energy policy, and indeed within its wider economic strategy, reflects the fact that, at EU level, Smart Metering is seen as a critical tool in managing energy demand in the interests of consumers and businesses.

In December 2009, the Energy Services Directive (Directive 2006/32/EC) was transposed into Irish law under the European Communities (Energy End Use Efficiency and Energy Services) Regulations 2009, Statutory Instrument No. 542 of 2009. These Regulations also amend the Electricity Regulation Act 1999 to allow the Commission for Energy Regulation (CER) to place requirements on energy undertakings in relation to informative billing and energy efficient tariffing:

Amendments to Act of 1999.
19. The Act of 1999 is amended by inserting after section 9K (inserted by section 14 of the Energy (Miscellaneous Provisions) Act 2006 (No. 40 of 2006)) the following:

“Energy efficient tariffs.
9L. The Commission shall, through licence conditions, place a requirement on energy undertakings to ensure that their tariffs do not create incentives that may unnecessarily increase the volume of distributed or transmitted energy.

Informative billing.

9M. (1) The Commission shall, where it considers it appropriate, having regard to subsection (2), direct an energy undertaking to comply with the requirements of subsection (5), or part thereof, from such date and in such manner as it may specify in that direction.

(2) In determining whether to issue a direction under subsection (1), the Commission shall have regard to the likely costs to the undertaking concerned of complying with such a direction and the likely energy efficiency benefits to final customers of the actions required of the undertaking concerned.

(3) Before issuing a direction under subsection (1), the Commission shall consult publicly.

(4) Nothing in this section shall affect the responsibilities or duties of an energy undertaking under the Data Protection Acts 1988 and 2003.

(5) The Commission may, by direction under subsection (1), require an energy undertaking to do any or all of the following—

(a) provide bills to its final customers, based on actual energy use, at such frequency as may be specified by the Commission to enable those customers to regulate their own energy consumption in a timely manner,

(b) provide such information in or with a bill to its final customers that, in the opinion of the Commission provides a comprehensive account of the customer’s current energy costs,

(c) present bills to its final customers in a manner which, in the opinion of the Commission, is clear and easily understandable,

(d) provide any or all of the following information in or with its bills, contracts, or other relevant communications, in a manner which, in the opinion of the Commission, is clear and understandable—

(i) current actual prices and actual consumption of energy,

(ii) a comparison of the final customer’s current energy consumption with that customer’s consumption for the same period in the previous year, in graphic form where the Commission considers it practicable,

(iii) a comparison of the final customer’s energy use with the energy use of an average normalised or benchmarked final customer, or

(iv) sources of information on available energy efficiency improvement measures, comparative customer profiles or objective
In May 2009 the first National Energy Efficiency Action Plan (NEEAP)\(^{26}\) was adopted in line with EU requirements. The first NEEAP set out the key targets to be met in order to achieve our 2020 commitments, including Action 33:

“We will encourage more energy efficient behaviour by householders through the introduction of smart meters”.

The second NEEAP, due to be published this year, will reiterate the importance of smart metering as a key tool for realising long term energy demand management objectives.

### 1.3.5.2 CER Smart Metering Programme

In March 2007 the Commission for Energy Regulation (CER) issued a Demand Side Management and Smart Metering Consultation Paper (CER/07/038)\(^{27}\) in which the case for providing domestic and small business consumers with time-of-day electricity prices and smart metering arrangements was made. This was followed in November 2007 with the publication by the CER of an information paper, Smart Metering - The Next Step in Implementation (CER/07/198)\(^{28}\) which outlined a proposed framework in which the future scope of smart metering arrangements can be established.

Following on from the conclusions reached in the smart metering information paper CER/07/198 the CER established the Smart Metering Programme Phase 1 in late 2007 with the objective of setting up and running smart metering trials and assessing their costs and benefits, in order to inform decisions relating to the full rollout of an optimally designed universal National Smart Metering Programme.

In order to draw on the experience and expertise of the electricity and gas market a Steering Group and a Working Group was established by the CER for the Smart Metering Project Phase 1. Both groups are chaired by the CER and consist of representatives from the Department of Communications, Energy and Natural Resources (DCENR), Sustainable Energy Authority of Ireland (SEAI) and Irish gas and electricity industry participants (Figure 4).

\(^{26}\) Chapter 07 – Residential Sector, Page 79

ncy+Action+Plan.htm)

\(^{27}\) Demand Side Management and Smart Metering Consultation Paper: [www.cer.ie/en/electricity-

\(^{28}\) Smart Metering - The Next Step in Implementation: [www.cer.ie/en/electricity-retail-market-
To achieve its objectives the Smart Metering Working Group was divided into four Work Streams each focusing on separate aspects of the Smart Metering Project Phase 1 (Figure 5 and Figure 6):

- **Networks**: Technical design and rollout of smart metering infrastructure required for the technology trials and customer behavior trials. Lead: ESB Networks (electricity) and Bord Gáis Networks (gas).

- **Customer Behaviour**: Mainly focusing on the design and implementation of all aspects of the customer behavioural trials, including participant selection, communications and analysis of results. Lead: Sustainable Energy Authority of Ireland (SEAI).

- **Tariffs**: Mainly focusing on design of Tariffs for the customer behavior trials (time of use tariffs for electricity and a variable seasonal tariff for gas) and development of a Prepayment Trial. Lead: Electric Ireland.

- **Billing / Data**: Mainly focusing on data flows from the smart metering systems to Suppliers, for customer behaviour trial billing options, and statisticians, for analysis of results from the customer behavior trials. Lead: Bord Gáis Energy.

The CER was responsible for undertaking Smart Metering Cost-Benefit Analyses (CBAs) for national electricity and gas smart metering rollouts and worked with
Frontier Economics and the Economic and Social Research Institute (ESRI) in this regard. As part of this work, the CER identified the information requirements for a CBA, the parties responsible for providing such information and coordinated the transfer of the required information to the ESRI (Electricity CBA) and Frontier Economics (Gas CBA) for their modelling. The CER also arranged for an external review of the supplier and network operator cost and benefits included in the CBAs, which was conducted by Frontier Economics for both the electricity and gas CBAs. A peer review of the gas CBA was conducted by the ESRI.

**Figure 5: Smart Metering Project Phase 1 – Governance Structure**

The key deliverables of the Smart Metering Project Phase 1 are depicted below:

**Figure 6: Smart Metering Project Phase 1 – High-Level Work Breakdown Structure (WBS)**

Overall, project progress has been very positive with all key milestones having been achieved. The main highlights to date have been the:

- Completion of the electricity customer behaviour trials (CBT) for residential and SME customers in December 2010 and completion of associated
analysis and reporting in April 2011, the detailed report of which was published in May 2011 (CER/11/080a).

• Completion of the electricity technology trials in September 2010, the detailed report of which was published in May 2011 (CER/11/080b).

• Completion of the ‘smart prepayment’ trial in February 2011, the findings of which are included in the electricity CBT report (CER/11/080a).

• Completion of the electricity cost-benefit analysis in April 2011, the detailed report of which was published in May 2011 (CER/11/080c).

• Completion of the gas customer behaviour trials (CBT) for residential and SME customers in May 2011 and completion of associated analysis and reporting in September 2011, the detailed report of which was published in October 2011 (CER/11/180a).

• Completion of the dual fuel technology trials in May 2011, the detailed report of which was published in October 2011 (CER/11/180b).

• Completion of the gas cost-benefit analysis in September 2011, the detailed report of which was published in October 2011 (CER/11/180c).

Further detailed information on the CER Smart Metering Project and its progress to date is available via the consultation papers and information papers that have been published on www.cer.ie.

• Smart Metering Information Paper 5 – CER/11/180 – 11th October 2011

• Smart Metering Information Paper 4 – CER/11/080 – 16th May 2011

• Smart Metering Consultation Papers and Responses:
  – Responses to Consultation Paper 3 – CER/12/004 – 13th January 2012
- Responses to Consultation Paper 2 – CER/11/033 – 18th February 2011
- Consultation Paper 2 – CER/10/197 – 11th November 2010
- Responses to Consultation Paper 1 CER/10/161 – 9th September 2010
- Consultation Paper 1 – CER/10/082 – 11th June 2010

- Other Smart Metering Information Papers:
  - Information Paper 3 - CER/09/186 - 7th December 2009
  - Information Paper 2 - CER/09/118 - 31st July 2009
  - Information Paper 1 - CER/09/024 - 6th February 2009

Other CER publications at this same Website location relating to smart metering which may be of interest are:

- Publication of anonymised data from the electricity and gas customer behavior trials – published January 2012\(^\text{29}\).
- Approved Smart Metering CBTs Gas Tariff – published 1\(^{st}\) April 2010
- Approved Smart Metering CBTs Electricity Time of Use (TOU) Tariffs – original published 2\(^{nd}\) October 2009 and renewed 7\(^{th}\) September 2010
- Arrangements for Micro Generation Decision and Response to Comments Received (CER/07/208) – 20\(^{th}\) Nov 2007
- Smart Metering - The Next Step in Implementation (CER/07/198) – 5\(^{th}\) Nov 2007
- Demand Side Management and Smart Metering Consultation Paper (CER/07/038) - March 2007

1.4 Structure of this Paper

The remainder of this paper is structured in the following manner:

- **Sections 2.0 to 6.0** will outline:
  - An overview of each of the substantive proposals which the CER sought views on as part of the Consultation on the Proposed National Rollout of Electricity and Gas Smart Metering CER/11/191;
  - A summary of the responses received to each of these proposals;
  - The final CER decision on each these proposals after considering the responses received.

- **Section 7.0** outlines the next steps.

- **Appendix A** contains a list of abbreviations used in this paper.

- **Appendix B** contains a list of the respondents to the consultation paper CER/11/191 and a link to their published responses.

\(^{29}\) Data sets available via [http://www.ucd.ie/issda/data/commissionforenergyregulation/](http://www.ucd.ie/issda/data/commissionforenergyregulation/)
1.5 Further Information

If further information is sought on this Decision Paper or the National Smart Metering Programme in general please contact Gary Martin at the CER (gmartin@cer.ie).
2.0 Decision on a National Smart Metering Rollout

2.1 Introduction

This section confirms the overall decision by the CER to proceed to the next phase (Phase 2) of the national programme to rollout electricity and gas smart metering and reaffirms the rationale behind this proposed decision i.e. the positive results of the recently completed electricity and gas smart metering trials and associated cost-benefit analyses, as well as requirements emanating from EU legislation promoting smart metering and related initiatives.

2.2 Consultation Proposal

Section 2 of the Consultation on the Proposed National Rollout of Electricity and Gas Smart Metering (CER/11/191) outlined the CER’s proposal to proceed with a national smart metering rollout and gave an overview of the positive findings from the comprehensive smart metering trials and cost-benefit analyses completed during Phase 1, which were cited as the key rationale behind this proposal (replicated below).

Proposal for Proceeding with a National Smart Metering Programme (CER/11/191 Section 2)

The CER is proposing to proceed with the national rollout of electricity and gas smart metering to all residential consumers and a significant proportion of small-to-medium enterprise (SME) consumers i.e. all gas consuming SMEs currently in the G4 meter category and all electricity consuming SMEs currently with non-interval meters.

This proposed decision is based on the positive results of the recently completed electricity and gas smart metering trials and associated cost-benefit analyses – as detailed in a number of reports published by the CER during 2011 (refer to the sub-sections above [in CER/11/191 Section 2] for an overview of these results and further information on the detailed reports).

Views on this proposal were sought via Question 1 of CER/11/191 (also replicated below).
**Q1.** Respondents are invited to comment on the proposed decision by the CER to proceed with the national rollout of electricity and gas smart metering as outlined in Section 2. Are you in favour of this proposal? Outline reasons for agreement or disagreement.

### 2.3 Response Summary

All responses received were supportive of this CER proposal, some enthusiastically so. It was broadly agreed that the clearly positive findings from the comprehensive smart metering trials and cost-benefit analyses provided a sound basis for the CER proposal to proceed with a national smart metering rollout.

There were however a few caveats or comments raised by a handful of respondents, including the following:

- Electric Ireland caveated its support upon receiving clarification regarding how suppliers costs associated with a mandated involvement in the programme will be funded and recovered.
- In giving its support EirGrid emphasised that its TSO (transmission system operator) information requirements (i.e. power system real-time balancing needs) must be considered as part of the smart metering solution design prior to concluding Phase 1.
- Energia, while giving its support to the proposal, was dismissive of the strength of the findings from the customer behaviour trials and cost-benefit analyses, but believes that a smart meter rollout is positive as it will facilitate innovation and development in the energy market.
- Airtricity raised concern about the costs that could be faced by suppliers of supporting legacy metering arrangements and advocated that, by law or by process, the programme ensures that customers are obliged to accept a smart meter.
- The Data Protection Commission (DPC) emphasised that a sound legal basis for the mandatory rollout of smart metering needs to be firmly established.

Refer to Appendix B for the list of respondents to consultation CER/11/191 and a link to their responses for further detail.

### 2.4 CER Decision

The CER welcomes the positive support from respondents for the proposal to proceed with the national rollout of smart metering. The majority of respondents endorsed the findings from the comprehensive smart metering trials and cost-
benefit analyses conducted during Phase 1 as providing a sound basis for this proposal.

The benefits of smart metering are recognised internationally and there are a number of key EU legislative instruments promoting smart metering to ensure that customers are properly informed of actual energy consumption and costs frequently enough to enable them to regulate their energy consumption (refer to Section 1.3.2 for details).

The key deliverables of Phase 1, namely the electricity and gas smart metering trials findings reports and cost-benefit analyses reports (as depicted in Figure 7 below), have been published by the CER during 2011. The CER would like to reiterate that this combined suite of electricity and gas smart metering findings reports provide a robust, fact-based information set that has informed the CER and stakeholders of the merits of providing smart electricity and gas meters to residential and SME (small-to-medium enterprise) consumers in Ireland. In addition, the comprehensive cost-benefit analyses helped cast light on the relative attractiveness of various design options for the implementation of smart metering and the main sources of risk associated with a national smart metering rollout.

Figure 7: Overview of Phase 1 Key Deliverables

At a high level the findings from these detailed reports indicate that:

- A national rollout of electricity and gas smart metering and associated initiatives should assist consumers in being more efficient in their use of electricity and gas, and as a result reduce their electricity and gas costs and their carbon emissions.

- There is quantifiable net benefit to Ireland, often substantially so, arising from the different national electricity and gas smart metering rollout options analysed. With the optimal combination of electricity and gas national smart metering rollout options being selected the net present value (NPV) benefit to be achieved would be circa €229 million over a

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30 €229m NPV figure is based on the proposed national rollout option that incorporates a ‘fast’ rollout of electricity and gas smart metering (leveraging a single wide area network communications infrastructure), including the provision of detailed bi-monthly billing (i.e. with energy usage statement) and an in-home display (with duel fuel capability) to all energy
period of 20 years i.e. the benefits arising from smart metering (mainly from energy network operator-related efficiencies, consumer energy usage efficiencies and electricity generation-related efficiencies) more than outweigh the costs of rolling out smart metering nationally (mainly energy network operator-related costs of investment in the end-to-end smart metering technology infrastructure and some energy supplier-related systems investment costs also).

- There are a number of potential costs and benefits from a national rollout of smart metering that are very difficult to put a robust quantifiable estimate on and therefore were excluded from the quantifiable cost-benefit analysis, such as facilitation of and/or synergies with a ‘smart grid’ implementation, micro generation and development of electric vehicles. Generally, these exclusions reflect the conservative approach taken to the quantifiable cost-benefit analysis, which tends towards a likely underestimation of the potential benefits from a national electricity smart metering rollout.

The rollout of smart metering represents a major national infrastructure project, potentially requiring an investment of up to €1 billion\textsuperscript{31}. As mentioned above, the cost-benefit analysis shows that the long-term benefits should clearly exceed these investment costs and that there are likely to be further non-quantifiable benefits in terms of informed consumers, technological innovation, and synergies with other areas. Taking all this together, the case for proceeding with the full-scale rollout seems very clear, and this is strengthened further when EU requirements are considered.

Regarding the specific comments raised by some respondents (outlined in Section 2.3 above) the CER would like to clarify:

- There will be no funding or cost recovery mechanism put in place to cover the costs of suppliers’ participation in the National Smart Metering Programme.
  - The cost-benefit analyses conducted during Phase 1 have given a strong indication that the estimated costs to be incurred by suppliers to interface with the smart metering solution and provide the required services to consumers will be at least cancelled out by the benefits to be reaped by such suppliers. This does not include further benefits that may be gained by suppliers from smart

\textsuperscript{31} Up to €1billion investment figure is based on €600m to €800m range of electricity network operator related smart metering rollout costs estimated in electricity smart metering CBA, plus up to €200m gas network operator related incremental smart metering rollout costs estimated in gas smart metering CBA.
metering facilitating further innovation and development in the energy market of the future.
  - The high level of competition in the retail energy market will minimise supplier costs.

- The CER will engage further with EirGrid to clarify its specific TSO requirements but it is envisaged that this can be progressed as part of Phase 2 of the Programme during which all requirements will be elaborated upon with stakeholders.

- The CER agrees that a sound legal basis for the mandatory rollout of smart metering needs to be firmly established and will work with the DCENR to clarify and achieve this.

- An important component of the National Smart Metering Programme will be consumer engagement and understanding of smart metering and the consumer benefits driving the national rollout. The CER, as stated in consultation CER/11/191, will ensure that a consumer engagement is to the fore of the National Smart Metering Programme. Having a residual of consumers remaining on legacy metering arrangements would undermine the business case for a national rollout. The CER will work with stakeholders to ensure that this risk is minimised. Important lessons in this regard can also be learned from other jurisdictions that have encountered issues with consumer concerns relating to smart metering.

In summary, after taking account of the responses received, the CER sees no reason to deviate from the proposal it set out in Section 2 of CER/11/191 and therefore the CER is confirming the following decision:

**Decision to Proceed with a National Smart Metering Rollout Programme**

The CER has decided, after taking into consideration responses received to consultation CER/11/191, to proceed to the next phase (Phase 2) of the National Smart Metering Programme.

The scope of the national smart metering rollout will cover all residential consumers and a significant proportion of small-to-medium enterprise (SME) consumers i.e. all gas consuming SMEs currently in the G4 meter category.

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32 Non-residential gas meters with a capacity greater than 6.0 m³/hr (i.e. G10 size meters and larger) are outside of the scope of the national smart-metering rollout. There are approximately 17,500 such Industrial/Commercial meters, which are subject to separate technical and safety requirements. These Industrial/Commercial meters are not always located in close proximity to the electricity meter for both practical and safety considerations, and so the proposed dual-rollout technical solution would be very difficult to implement. Bord Gáis Network’s proposes to develop an alternative Automatic Meter Reading (AMR) solution for these meters.
and all electricity consuming SMEs currently with non-interval meters\textsuperscript{33}. Thus the scope of the national rollout would cover circa 2.2 million electricity consumers and circa 600,000 gas consumers\textsuperscript{34}.

The rationale for this decision is as follows:

- It is primarily based on the positive quantifiable results of the recently completed electricity and gas smart metering trials and associated cost-benefit analyses – as detailed in a number of reports published by the CER during 2011 (refer to CER/11/191 Section 2 for an overview of these results and further information on the detailed reports).

- The case for a national rollout is further reinforced after taking into account, in addition to the quantifiable net benefit outlined in the comprehensive cost-benefit analyses, the non-quantifiable benefits in terms of smart metering enabling better informed energy consumers, technological innovation, and synergies with other areas.

- Finally the case for a national rollout is strengthened further when relevant EU legislative requirements are considered.

\textsuperscript{33} Electricity consumers that are currently designated by the Electricity Market rules as Settlement Customers (a.k.a. Quarter Hourly or QH Customers) have interval meters that allow quarter hourly energy consumption data to be captured and remotely read on a daily basis and are therefore not included in the scope of the national electricity smart metering rollout. These consumers include those who use in excess of 300,000 Units (300MWh) of electricity, and all generators and auto-producers who require import and export readings to be recorded. There are in the region of 8,000 consumers in this category.

\textsuperscript{34} CERs Quarterly Retail Market Reports provide exact electricity and gas consumer numbers which tend to fluctuate: Electricity: \url{www.cer.ie/en/electricity-retail-market-reports-and-publications.aspx} ; Gas: \url{www.cer.ie/en/gas-retail-market-reports-and-publications.aspx}
3.0 National Smart Metering Programme – Objectives

3.1 Introduction

This section outlines the finalised objectives of the National Smart Metering Programme after taking into account feedback received to the question asked on this topic in Section 3 of the Consultation on the Proposed National Rollout of Electricity and Gas Smart Metering (CER/11/191).

3.2 Consultation Proposal

Section 3 of the Consultation on the Proposed National Rollout of Electricity and Gas Smart Metering (CER/11/191) outlined the CER proposal for the stated objectives to be adopted by the National Smart Metering Programme (replicated below). This proposal was developed after taking into account the results of the smart metering trials and cost-benefit analyses, progress in European and national legislation relating to smart metering, and responses received to previous CER consultations on this topic (CER/10/197 and CER/10/082).

Proposed Objectives of the National Smart Metering Programme (CER/11/191 Section 3)

The CER is proposing that the National Smart Metering Programme retains the following strategic objectives (which apply to both electricity and gas unless stated otherwise):

1. Encourage Energy Efficiency
   - Encourage end-use energy efficiency via enhanced information and pricing signals, resulting in reductions in overall energy usage and thus reduced emissions of carbon dioxide (CO\textsubscript{2}), nitrogen oxides (NO\textsubscript{x}) and sulphur oxides (SO\textsubscript{x}) as a measure to combat climate change and reduce pollution.

2. Facilitate Peak Load Management
   - Reduce demand for peak electrical power, with consequential electricity generation savings and improved security of supply. This can be achieved via pricing signals such as Time of Use tariffs, where the price of electricity varies at different times of the day to reflect the changes in the costs of producing electricity.
### 3. Support Renewable and Micro Generation
- Assist in achieving of Ireland’s stated national targets for renewable electricity generation (40% by 2020) by facilitating demand response solutions that will complement increasing levels of intermittent wind generation on the electricity system.
- Facilitate the wider take up of micro generation.

### 4. Enhance Competition and Improve Consumer Experience
- Promote competition by enabling suppliers to offer more innovative products to consumers, particularly in the electricity retail market by enabling suppliers to create innovative pricing arrangements that can be offered to consumers to support the efficient use of electricity, such as Time of Use electricity tariffs.
- More accurate billing of consumers with the elimination of estimated billing except in exceptional circumstances.
- Support more timely and efficient change of supplier process for consumers.
- Support more flexible and diverse service offerings to consumers from suppliers including potential for expanding prepayment offerings.
- Empower consumers to make better decisions regarding their energy use by providing them with accurate, detailed and more frequent information on their energy consumption and costs.
- Support any specific needs of vulnerable consumers to ensure they can reap the benefits of smart metering.

### 5. Improve Network Services
- Improve services to consumers, particularly in areas such as meter reading, fault monitoring and electrical power quality.
- Significantly improve theft prevention and measure losses more accurately.
- Review any emerging requirements for smart metering to facilitate a smart electricity network for Ireland.
- Review any emerging requirements for smart metering to provide a platform to support national targets on Electric Vehicles
- Improve network planning and electricity load forecasting, possibly leading to deferment of electricity infrastructure expansion costs in particular.

### 6. Review and Realise Synergies with Water Metering
- The National Smart Metering Programme will continue to review any potential synergies that may exist between the required energy smart metering infrastructure and water metering. The CER is continuing to work with the Department of the Environment, Heritage and Local Government to support any such synergies.
Question 2 of CER/11/191 invited respondents to submit their comments on this proposed list of stated objectives (replicated below).

Q2. Respondents are invited to comment on the proposed objectives of the National Smart Meter Programme outlined in Section 3. Are you in favour of the proposals? Outline reasons for agreement or disagreement.

3.3 Response Summary

In general, the majority of respondents agreed with the stated objectives for the National Smart Meter Programme as proposed in CER/11/191. Some respondents made suggestions for additional objectives to be added or requested minor changes and/or clarifications to some of the existing objectives, including the following:

- **Objective 1 (Encourage energy efficiency):**
  - Include heat import/export metering facilitation in this objective (MEGA).
  - “Goal-based” energy efficiency regulation of suppliers advocated (Opower)

- **Objective 2 (Facilitate peak load management):**
  - Include optimisation of available clean energy resources objective (MEGA)
  - Include provision of real-time CO₂ intensity data to electricity consumers (SEAI)
  - Include automated demand-side management and aggregators facilitation objectives and requirements (EirGrid, Glen Dimplex, TicToc)

- **Objective 3 (Support renewable and micro generation):**
  - Unclear how this objective will be achieved as no provision for real-time data communications to the TSO (EirGrid)
  - Highlight in this objective smart metering facilitation of local power sharing clusters - EU Directive reference (MEGA)

- **Objective 4 (Enhance Competition and Improve Consumer Experience):**
  - Time of use (ToU) tariff mandate could contradict the objective to enhance competition (Electric Ireland)
  - Highlight more and elaborate the prepayment facilitation sub-objective (eMeter)
• **Objective 5 (Improve Network Services):**
  - Make Smart Grid/Network strategy an explicit objective (ESB Networks, eMeter)
  - Trials of smart grid functionalities requested (MEGA)
  - Elaborate the fault monitoring and theft detection sub-objectives (Gemserv)

• **Objective 6 (Water Metering Synergies):**
  - Some respondents urged caution in trying to incorporate any synergies with water metering at this stage of the Programme as there is the risk of delaying finalisation of the energy smart metering design which should be taken into account (Electric Ireland, Energia).
  - In contrast, other respondents expressed confidence that water metering solutions currently exist which would enable synergies with water metering to be realised and that the National Smart Metering Programme should incorporate this into the design requirements without delay (SEAI, DIT Comm’s Eng’, Cylon)

• **Additional Objectives:** Some respondents submitted requests to widen the Programme objectives to include:
  - Enabling synergies with provision of oil and LPG (liquefied petroleum gas) usage data to consumers (SEAI)
  - Explore synergies with an Internet broadband rollout (SEAI)
  - Include a Programme cost control objective (Gemserv)

Refer to Appendix B for the list of respondents to consultation CER/11/191 and a link to their responses for further detail.

### 3.4 CER Decision

The CER welcomes the broadly positive support from respondents for the proposed stated objectives for the National Smart Meter Programme. After taking account of the suggestions received in the responses the CER has decided to retain the proposed set of objectives broadly as outlined in CER/11/191, with a small number of modifications as follows:

• **Objective 2 (Facilitate peak load management) and 3 (Support renewable and micro generation):** The CER recognises that the potential for smart metering to facilitate automated demand side management and direct load control (via aggregators) needs to be considered further during Phase 2, including the potential for undertaking small-scale trials if deemed necessary. The current smart metering design as outlined in this Decision Paper caters for the commercial arrangements for such requirements but whether the smart metering infrastructure is the
appropriate channel to cater for the operational arrangements needs to be further explored. The objectives will be modified slightly to explicitly reflect this. The suggested objective of facilitating provision of real-time CO\textsubscript{2} intensity data to electricity consumers can also be explored further as part of this process in Phase 2.

- **Objective 4 (Enhance Competition and Improve Consumer Experience):** The CER agrees that the sub-objective of facilitating the expansion of prepayment services should be elaborated upon and more explicitly highlighted as this is an important objective and benefit of the national rollout of smart metering.

- **Objective 5 (Improve Network Services):** The CER recognises that a national rollout of smart metering can provide the platform for providing and/or enhancing potential future ‘smart grid’ functionality and services to improve the operation and management of the electricity network. However, this is a relatively immature area and until such ‘smart grid’ functions and services are clearly defined the CER will retain the sub-objective to ‘review any emerging requirements for smart metering to facilitate a smart electricity network for Ireland’. Phase 2 will be used to explore this area further including reviewing the potential for small-scale trials, as suggested by some respondents, if deemed appropriate.

- **Objective 6 (Water Metering Synergies):** The CER has engaged with the Department of the Environment, Heritage and Local Government (now called the Department of the Environment, Community and Local Government), within whose remit water metering rests, throughout Phase 1 of the Programme in order to identify any potential for realising synergies between a national smart energy metering rollout and a national water metering rollout. Conceptually it appeared at the outset that such synergies may exist but unfortunately to date no clear realisable synergies have been identified that would enable a water metering rollout to leverage the energy smart metering infrastructure in an economically cost-effective manner. This is primarily due to the following reasons:

  o Technological obstacles that prevent water meters from reliably and cost-effectively communicating with the wide area network (WAN) communications module that will rest on the electricity smart meter. This is mainly because of issues with the respective meter locations in Ireland as water meters are located underground at the boundary of the property due to the fact that households are responsible for the service connection on their property. This means that the water meter is at a distance from the electricity meter, which is generally either located inside the property or on an external wall, and thus there is generally multiple physical obstacles between the meters. This makes
a reliable and cost-effective communications connection difficult to achieve.

- Even if these technological obstacles can be overcome, interfacing the water meter with the smart electricity meter has a cost and a positive economic business case for water metering leveraging the energy smart metering infrastructure may be difficult to justify when compared to alternatives, especially if the water metering requirements are limited e.g. if only one or two data reads per year are required from the water meter and there is a limited need for instructions to be sent down to the water meter then an alternative solution such as walk-by or drive-by meter reading with handheld devices, as is currently the case for commercial water metering in Ireland, may be more economical.

Given that the National Smart Metering Programme is now moving into Phase 2, which will focus on working with stakeholders in a structured and planned process to elaborate the high level design requirements outlined in this Decision Paper and eventually translate these into the final agreed set of requirements for inputting into documentation for procuring the end-to-end energy smart metering solution, the CER is cognisant that the scope of this Phase 2 needs be carefully controlled and tightly managed so as not to deflect from achieving the end goal of enabling energy consumers to realise smart metering benefits as soon as is reasonably possible. On this basis the CER is adopting the position that water metering requirements are out of scope for Phase 2. The CER will continue to engage with the Department of the Environment, Community and Local Government to keep this under review.

The time frame for charging for water on a metered basis is 2014. This date precedes the earliest date that smart energy metering would be in place. However, water meters will require periodic replacement due to wear and so technological developments and the potential suitability of certain areas or properties for integration into the smart energy metering communications infrastructure can be reviewed by Irish Water and the economic regulator for water (the CER) in the future prior to such replacement.

Regarding the specific comments raised by some respondents (outlined in Section 3.3 above) the CER would like to clarify:

- Heat metering is not currently in existence in Ireland and it is not within the remit of the CER. It is thus considered out of scope of the National Smart Metering Programme.
• Oil and LPG usage are outside of the regulatory remit of the CER and are considered out of scope of the National Smart Metering Programme.

• Potential synergies between the national energy smart metering rollout and completion of the national broadband Internet rollout have been explored with the DCENR which has deemed that the technical synergies may be limited and costly. Pending any further proposals which would suggest a value potential, this is deemed out of scope of the National Smart Metering Programme as currently envisaged.

• As stated in the consultation paper CER/11/191 and reiterated later in this Decision Paper the details of the Time of Use tariff mandate for electricity consumers will be developed by the CER during Phase 2 with the involvement of stakeholders. This ToU mandate will be cognisant of relevant EU and national legislative requirements, as well as the need to strike an appropriate regulatory balance between allowing smart metering to facilitate ‘pure’ competition in electricity tariff products offered by suppliers and preventing consumer confusion likely to arise from a proliferation of complex tariff products in the electricity market.

• The CER recognises that cost control will be a fundamental function of the Programme Management of such a large and complex Programme and this is sufficiently addressed as part of the decisions outlined in this paper related to the Regulatory and Commercial Model (Section 5) and Programme Management Approach and Governance Structure (Section 6) that will underpin the National Smart Metering Programme. It is not deemed necessary therefore to also include Programme Cost Control explicitly in the list of objectives.

In summary, after taking account of the responses received, the CER sees no reason to deviate significantly from the proposal it set out in Section 3 of CER/11/191 relating to Programme Objectives, with the exception of some minor amendments to sub-objectives and an update on the current position regarding Objective 6 (Water Metering Synergies). Therefore the CER is confirming the following decision:

**Decision on Objectives of the National Smart Metering Programme**

The CER has decided that the National Smart Metering Programme retains the following strategic objectives (which apply to both electricity and gas unless stated otherwise):

1. **Encourage Energy Efficiency**
   - Encourage end-use energy efficiency via enhanced information and pricing signals, resulting in reductions in overall energy usage and thus reduced
emissions of carbon dioxide (CO\textsubscript{2}), nitrogen oxides (NO\textsubscript{x}) and sulphur oxides (SO\textsubscript{x}) as a measure to combat climate change and reduce pollution.

2. Facilitate Peak Load Management
   - Reduce demand for peak electrical power, with consequential electricity generation savings and improved security of supply. This can be achieved via pricing signals such as Time of Use tariffs, where the price of electricity varies at different times of the day to reflect the changes in the costs of producing electricity. Other options include automated demand side management and direct load control (via aggregators).

3. Support Renewable and Micro Generation
   - Assist in achieving of Ireland’s stated national targets for renewable electricity generation (40% by 2020) by facilitating demand response solutions that will complement increasing levels of intermittent wind generation on the electricity system.
   - Facilitate the wider take up of micro generation.

4. Enhance Competition and Improve Consumer Experience
   - Promote competition by enabling suppliers to offer more innovative products to consumers, particularly in the electricity retail market by enabling suppliers to create innovative pricing arrangements that can be offered to consumers to support the efficient use of electricity, such as Time of Use electricity tariffs. This will need to be balanced by the need to protect consumers from a proliferation of complex tariff products leading to confusion which could negate the positive aspects of greater competition.
   - More accurate billing of consumers with the elimination of estimated billing except in exceptional circumstances.
   - Support more timely and efficient change of supplier process for consumers.
   - Support more flexible and diverse service offerings to consumers from suppliers including in the area of prepayment product offerings. Smart metering will facilitate a greater expansion of prepayment offerings as it will remove a number of current obstacles in the market to the wider take-up of prepayment services by consumers.
   - Empower consumers to make better decisions regarding their energy use by providing them with accurate, detailed and more frequent information on their energy consumption and costs.
   - Support any specific needs of vulnerable consumers to ensure they can reap the benefits of smart metering.

5. Improve Network Services
   - Improve services to consumers, particularly in areas such as meter reading, fault monitoring and electrical power quality.
   - Significantly improve theft prevention and measure losses more accurately.
• Review any emerging requirements for smart metering to facilitate a smart electricity network for Ireland, including reviewing the potential for small-scale trials if deemed appropriate.
• Review any emerging requirements for smart metering to provide a platform to support national targets on Electric Vehicles
• Improve network planning and electricity load forecasting, possibly leading to deferment of electricity infrastructure expansion costs in particular.

6. Review and Realise Synergies with Water Metering
• To date no clear realisable synergies have been identified that would enable a water metering rollout to leverage the energy smart metering infrastructure in an economically cost-effective manner. On this basis the CER is adopting the position that water metering requirements are out of scope. The CER will continue to engage with the Department of the Environment, Community and Local Government to keep this under review.
4.0 Ownership, Display and Provision of Information

4.1 Introduction

This section outlines the finalised high level requirements for smart metering data/information ownership, display and provision, after taking into account feedback received to the question asked on this topic in Section 4 of the Consultation on the Proposed National Rollout of Electricity and Gas Smart Metering (CER/11/191). These data/information requirements will now be further elaborated upon during Phase 2.

4.2 Consultation Proposal

Section 4 of the Consultation on the Proposed National Rollout of Electricity and Gas Smart Metering (CER/11/191) outlined the CER proposals relating to the high level requirements for smart metering data/information ownership, display and provision to be adopted by the National Smart Metering Programme for further elaboration during Phase 2 (replicated below). These proposals were developed after taking into account the results of the smart metering trials and cost-benefit analyses, progress in European and national legislation relating to smart metering, and responses to previous CER consultations on this topic (CER/10/197 and CER/10/082).

<table>
<thead>
<tr>
<th>Proposals Relating to Ownership, Display and Provision of Smart Metering Information (CER/11/191 Section 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Data Granularity</strong></td>
</tr>
<tr>
<td>a. Half hourly intervals for electricity consumption data.</td>
</tr>
<tr>
<td>b. Further investigation required during Design stage to identify appropriate interval for gas data (minimum requirement likely to be hourly data interval).</td>
</tr>
<tr>
<td><strong>2. Data Access for Suppliers</strong></td>
</tr>
<tr>
<td>a. Data portal will be provided through which suppliers can access data for their customers, updated daily, on a push and/or pull basis subject to their requirements (assuming this is technically and economically feasible – Design stage of a full rollout would explore this further, as well as the fair processing requirements of the Data Protection Acts).</td>
</tr>
<tr>
<td><strong>3. Data Access for Consumers</strong></td>
</tr>
<tr>
<td>a. The consumer owns their consumption data generated by smart metering and they should have access to the information in relation to their historical</td>
</tr>
</tbody>
</table>
consumption data in a national harmonised format, free of charge – this may be via the same data portal assumed to be used by suppliers (design stage of a full rollout would explore this further).

b. Consumers will have the right to provide their detailed historical consumption data to other suppliers in order to get an alternative quote for their supply (design stage of a full rollout would explore how this is facilitated).

c. Consumers can give permission to other third parties to access their detailed historical consumption data e.g. for energy management services (design stage of a full rollout would explore how this is facilitated).

d. Consumers will receive cost and usage based consumption information via in-home displays (IHD) and energy statements (with their bills).

4. Billing Content, Frequency and Tariffs

a. After taking into account the results of the customer behaviour trials and associated cost-benefit analyses the CER is proposing to leave it to the marketplace to determine billing frequency but are cognisant of potential future EU legislative developments in this area.

b. The CER is proposing that consumers must receive an energy statement with their energy bills – minimum content requirements will be determined during the Design stage, taking into account requirements from relevant EU and national legislation.

c. The CER is proposing to mandate time of use tariffs for all electricity consumers on smart metering. Detailed proposals will be developed during the Design stage.

5. Data for Prepayments

a. The ‘thin prepayment’ solution will be facilitated by the smart metering functionality.

6. In-Home Data

a. In-home displays (IHDs) will be provided to all energy consumers as part of the full rollout during their electricity smart meter installation.

b. The IHDs will cater for dual fuel consumers.

c. Definition of the IHD’s minimum functionality will be determined during the Design stage.

d. The IHD device will be supported for two years after its installation date (i.e. repairing or replacing faulty devices).

e. Over time other devices in the home should be able to receive the consumption data from the smart meter.

7. Data Security and Protection

a. Full end-to-end security of smart metering systems is a paramount requirement (the Design stage of a full rollout would explore this further).

b. Data protection will be to the fore of smart metering systems design.
8. Vulnerable Consumers
a. Specific considerations for vulnerable consumers should be integrated into
the design of the smart metering systems and accompanying education and
awareness programme at an early stage.

Question 3 of CER/11/191 invited respondents to submit their comments on this
proposed set of high level data/information requirements (replicated below).

Q3. Respondents are invited to comment on the proposed working
assumptions outlined in Section 4 relating to data ownership, display
and provision. Are you in favour of the proposals? Outline reasons
for agreement or disagreement.

4.3 Response Summary and CER Decisions

In general, the majority of respondents agreed with most of the high level
data/information requirements for the National Smart Meter Programme as
proposed in CER/11/191. However, there was strong resistance expressed by
many respondents to the proposed in-home display mandate. Additionally, some
respondents, in particular suppliers, although comfortable with the time of use
(ToU) tariff concept, were not supportive of the idea of a ToU mandate. Finally,
some respondents made suggestions for additional requirements to be added or
requested minor changes and/or clarifications to some of the proposed
requirements.

The CER welcomes the broadly positive support from respondents for most of
the high level data/information requirements for the National Smart Meter
Programme as proposed in CER/11/191. The CER also takes note of the strong
resistance expressed by many respondents to the proposed in-home display
mandate and the dissatisfaction expressed by some respondents, in particular
suppliers, to the time of use (ToU) tariff mandate. However, after taking account
of all the views and suggestions expressed in the responses the CER has
decided to retain the proposed set of high level data/information requirements as
outlined in CER/11/191, with the exception of clarifying the gas data granularity.

These high level data/information requirements will now be elaborated upon with
stakeholders during Phase 2 and in this regard the CER reiterates, as was
outlined in the consultation proposals, that the final detailed data/information
requirements will be subject to data protection provisions.
Below is a summary of the some of the key points from the responses under each of the key data/information requirements proposals, which are followed by the CER decisions relating to each data/information requirement area. Refer to Appendix B for the list of respondents to consultation CER/11/191 and a link to their responses for further detail.

4.3.1 Data Granularity

4.3.1.1 Response Summary

For those respondents that commented on the electricity interval proposal the majority were broadly supportive that a half-hourly (HH) data interval is the appropriate granularity for electricity smart metering, many citing the main reason is that this complements the wholesale electricity market settlement interval. Some respondents did advocate quarter hourly (QH) interval electricity data or at least the ability to remotely configure to QH in future (MEGA, Atos/ERDF, Cylon, Enel).

For those respondents that commented on the gas interval proposal most were in favour of a half-hourly (HH) data interval, mainly citing reasons including that this complements the electricity interval (facilitates consistent energy display information to dual fuel consumers), facilitates more frequent refreshes of gas data on the in-home display (IHD) and is a better frequency for facilitating remote network services with the gas meter e.g. reconnections (Electric Ireland, Bord Gáis Networks, Bord Gáis Energy, SEAI). One respondent advocated a daily gas interval as this is consistent with gas market settlement (Airtricity).

The Data Protection Commission (DPC) highlighted that at this stage it is not aware of the basis for acceptance of a half-hourly interval for smart metering data in general and that a strong justification is required for making available such detailed data. However, the DPC also welcomed the CER caveats to the data granularity proposal that it is subject to data protection requirements and that this will be addressed during Phase 2 with the involvement of the DPC and other stakeholders. Another respondent cited that as part of the recently announced French decision to roll out smart metering nationwide ‘la CNIL’ (the French National Commission of Information and Freedom) has a requirement not to go below a half-hourly data interval in order to preserve the confidentiality of consumer behaviour (Atos/ERDF).

4.3.1.1 CER Decision

Regarding the gas data granularity clarification, the CER agrees with the majority of respondents that a half-hourly (HH) interval is the appropriate data granularity requirement for gas smart metering, because of the advantages that this offers
over less frequent intervals: namely, as cited by respondents, that this complements the electricity interval (thus facilitating the potential for consistent energy display information to dual fuel consumers), facilitates more frequent refreshes of gas data on the in-home display (IHD) and is a better frequency for facilitating remote network services with the gas meter e.g. reconnections.

The CER notes the requests of some respondents to explore opting for a quarter-hourly (QH) electricity interval instead of a half-hourly (HH) interval. However the HH interval is deemed appropriate as this complements the current wholesale market settlement interval and it is not envisaged that a more frequent interval would be required. The possibility of having remotely configurable interval functionality on the meter can be explored further during Phase 2.

The CER notes the views expressed by the Data Protection Commission (DPC) in relation to data granularity and transmission of such detailed data. The CER is of the view that the smart meters should record the appropriate interval of energy data to facilitate the full range of network functions and consumer services that enable the benefits of smart metering to be realised. This appropriate interval is deemed by the CER to be half-hourly for both electricity and gas smart metering. The transmission of this data beyond the consumer’s home will be explored further in Phase 2 with stakeholders including the DPC to ensure that a secure end-to-end smart metering solution is designed and delivered that will comply with data protection requirements while also realising benefits for energy consumers.

4.3.2 Access to Data for Suppliers

4.3.2.1 Response Summary

There was broad agreement from respondents, including suppliers, on the proposal for providing data access to suppliers via a mixed ‘push and pull’ supplier portal, with scheduled daily data updates from the meters.

The DPC response welcomed the caveats in the supplier data access proposal that it is subject to data protection considerations which will be further considered during Phase 2 with the involvement of the DPC and other stakeholders. The DPC advocated that sector specific rules be put in place setting out what are and are not legitimate uses of smart metering data in the energy market, and that these rules would be consistent with the provisions of the Data Protection Acts. In particular the DPC flagged that:

- Suppliers will likely only be allowed to receive data considered to be ‘essential energy data’ required by suppliers as part of their licensed duties and consumers may not be able to choose to limit access to such data.
data. However, such data should be transmitted in aggregated form to suppliers where personal data is not specifically required.

- For personal data not categorised as ‘essential energy data’ then there are strong arguments for requiring suppliers (and other third parties) to obtain consent from consumers to access smart metering data for other commercial purposes – the EU Article 29 Working Party Opinion on Smart Metering is referenced.\(^\text{35}\)

There were also some minor comments and suggestions from other respondents including:

- A couple of respondents emphasised that the supplier portal should be kept separate to the consumer portal as there would be different requirements for each (Electric Ireland, Enel).

- There was a request for ‘new supplier’ requirements to be included (i.e. ‘smart auto-clusters’) and related field trials to be conducted (MEGA).

- Categorise data as ‘consumption’ and ‘operational’ (TicToc).

Although not specifically addressed in this section of the consultation CER/11/191 a number of respondents did make comments in their responses to Question 3 regarding smart metering data access requirements and assumptions for network operators (DSOs and TSO) including:

- Data access assumptions of DSOs – ESB Networks and Bord Gáis Networks are broadly assuming they will have access to all of the smart metering data (consumption and operational) for their respective electricity and gas network management and planning purposes.

- Data access requirements for the TSO needs to be specified (EirGrid)

- Wider data access requirements for analytics and forecasting should be facilitated (Smart Grid Ireland, TicToc)

4.3.2.2 CER Decision

The proposal is retained that a data portal will be provided through which suppliers can access data for their customers, updated daily, on a push and/or pull basis subject to their requirements. Phase 2 will be used to explore further how this can be facilitated and ensure that it is technically and economically

\(^{35}\) Refer to Section 1.3.3 for further information on the EU Article 29 Working Party Opinion on Smart Metering and a link to it.
feasible. The CER reiterates its commitment to ensuring that data protection will be to the fore when developing data transmission and access requirements – for suppliers, network operators and third parties – and notes the DPC comments in this regard.

Regarding the minor comments and suggestions from other respondents the CER can clarify that:

- The details of the data portal(s) and how it caters for suppliers and/or consumers requirements will be elaborated upon in Phase 2.
- ‘New supplier’ requirements (i.e. ‘smart auto-clusters’) can be explored further during Phase 2 and the potential for related small-scale field trials can be examined.
- The suggestion to categorise data as ‘consumption’ and ‘operational’ is noted.

### 4.3.3 Access to Data for Consumers

#### 4.3.3.1 Response Summary

Respondents were broadly supportive of this proposal (3.a. – c.) with the exception of the proposed mandate of the in-home display (IHD) for consumers as part of the national smart metering rollout (3.d.).

A minority of respondents expressed support for the IHD mandate proposal (Bord Gáis Networks, ESB Networks, PrePayPower, Enel, SEAI), but the majority were against the IHD mandate for various reasons including:

- Customers should have choice of the method/channel they use to receive their smart metering information via and many alternatives to an IHD exist, some relatively lower cost such as Web based channels (Airtricity, Electric Ireland, Eaton/Echelon, Silver Spring, TicToc, Cylon, eMeter).
- Should be an optional IHD offering as this would be more cost effective (Airtricity, Atos/ERDF, Cylon).
- One respondent expressed their opinion that there is a lack of evidence for the persistence of IHD energy reduction effect on consumers (Opower).
- Another respondent requested that a more thorough study of the distributional impact of the IHD effect among consumers in the customer behaviour trials findings is required (Powersavvy).
However, although the majority of respondents expressed they weren’t in favour of an IHD mandate, many of these same respondents did outline their views regarding how such an IHD mandate should be implemented if it does proceed (and also what procurement model it should follow – covered later as part of Question 8 responses summary) including:

- The mandated IHD rollout should be optional and thus more cost effective i.e. only give IHDs to those consumers who want them (Airtricity, Atos/ERDF, Cylon).
- Costs of the mandated IHDs should be socialised and there should be open protocols to facilitate other non-mandated IHDs (Energia).
- Most were in favour of the Network-led mandated IHD rollout option as opposed to a Supplier-led one (covered further as part of Question 8 responses summary)

There was also a request from SEAI for the IHD to be able to cater for CO₂ intensity of electricity data (and energy statements) as well as data on consumption of other fuels (oil/LPG) and water.

### 4.3.3.2 CER Decision

The proposal is retained unchanged. The CER welcomes that respondents were broadly supportive of this proposal (3.a. – c.) but notes the lack of support of the proposed mandate of the in-home display (IHD) for consumers as part of the national smart metering rollout (3.d.).

Regarding the decision to retain the IHD mandate despite the lack of support from many respondents for this, the CER maintains that this decision is justified for a number of reasons:

- Primarily by the fact that the combined electricity and gas cost-benefit analyses have demonstrated that there is an incremental positive net benefit to be achieved from including an IHD as part of the national rollout of smart metering i.e. the additional costs involved in purchasing, rolling out and supporting (for a limited period) IHDs is more than outweighed by the additional benefit to be gained by consumers from having such a device in their homes providing near real-time, as well as historical, information on their energy usage and costs.
- Provision of an IHD will also provide the potential for an instant positive impact to be made on consumers from the installation of smart metering, many of whom incorrectly assume that the IHD either is the smart meter or is a standard part of it. Without the IHD, as the cost-benefit analyses
demonstrated, there is still a positive (but relatively less so) net benefit to be achieved from rolling out smart metering. However, there is a risk of a negative anti-climax on consumer door steps when they realise that it will be a while after installation before they start to receive tangible benefits from having a smart meter i.e. for most consumers this is likely to be when there first ‘energy statement’ arrives.

- The CER views the mandated IHD as a ‘stepping stone’ channel that will kick-start active consumer interest and engagement in accessing energy information available from smart metering. The CER recognises that a dedicated energy display device such as an IHD is only one of a broad range of possible channels for consumers engaging with the energy information available from smart metering. The design of the smart metering solution will enable this inevitable future proliferation of diverse access channels which could include other devices in the home such as smart TVs, laptops/PCs and smart phones. However it will take time for these channels to mature and for consumers to become actively engaged with them as a means of accessing energy information.

- It should also be reiterated that the smart metering solution will not preclude the secure connection of other ‘non-mandated’ IHDs to the smart metering data. Suppliers or other third parties are free to offer consumers higher spec’ IHD models. The mandated IHDs will only be supported for a limited period.

Finally, it is noted that although many respondents expressed resistance to the IHD mandate proposal most of the same respondents then went on to express views on how such a mandate should structured if it proceeds. The majority of respondents, including most suppliers, expressed a preference that ESB Networks would be the sole entity with responsibility for centrally procuring, rolling out and supporting (for a limited period) the mandated IHDs, which is the assumed position that CER will take into Phase 2. This subject is covered further in Section 5.3.1 (Procurement model).

Regarding the request for the IHD to be able to cater for CO₂ intensity of electricity data (and energy statements) this can be explored further during the design stage of Phase 2. However, as noted previously (Section 3.4), catering for displaying consumption data of other fuels (oil/LPG) and water are out of scope and hence the request for these to part of the IHD data requirements cannot be accommodated.
4.3.4 Billing Content, Frequency and Tariffs

4.3.4.1 Response Summary

Most respondents to this proposal indicated that they were in favour of smart metering facilitating the Time of Use (ToU) tariff concept but expressed concerns with the proposed ToU mandate:

- One responded asserted that the CER does not have the authority to mandate ToU tariffs (Endesa).
- A number of respondents, mainly suppliers, indicated that suppliers should be allowed absolute flexibility and control in setting ToU tariffs for customers (Airtricity, Bord Gáis Energy, Electric Ireland, Enel).
- One respondent requested that more clarity is required on the detail of the ToU mandate before it could confirm its support for it and speculated on a number of possible options for the mandate – below (Energia)
  - Mandate offering of a ToU product?
  - Mandate offering of certain defined ToU products?
  - Mandate offering of homogenous ToU time banded products?
- One respondent advocated that a mandated ToU tariff should include margins for demand response and intermittent distributed generation (TicToc).

Most respondents to this proposal were in favour of the mandating of energy statements for consumers but some were against and some raised issues and comments, including:

- Leave energy billing and energy information provision options for consumers to suppliers (Airtricity, Bord Gáis Energy).
- There should be no requirement for a letter-based statement (Energia).
- Need to clarify that prepay customers get energy statements (SVP).
- Monthly energy statement recommended (Opower).

4.3.4.2 CER Decision

The CER welcomes that most respondents to this proposal indicated that they were in favour of smart metering facilitating the Time of Use (ToU) tariff concept but notes the expressed concerns with the proposed ToU mandate. As stated in the consultation paper CER/11/191 the details of the Time of Use tariff mandate for electricity consumers will be developed by the CER during Phase 2 with the involvement of stakeholders. This ToU mandate will be cognisant of relevant EU
and national legislative requirements, as well as the need to strike an appropriate regulatory balance between allowing smart metering to facilitate competition in tariff products offered by suppliers and preventing consumer confusion likely to arise from a proliferation of complex tariff products on the electricity market.

Regarding the authority of the CER to mandate ToU tariffs, the CER draws interested parties attention to the requirements of the EU Energy Services Directive (2006/32/EC, ESD)\textsuperscript{36} which in December 2009 was transposed into Irish law under the European Communities (Energy End Use Efficiency and Energy Services) Regulations 2009, Statutory Instrument No. 542 of 2009\textsuperscript{37}. These Regulations also amend the Electricity Regulation Act 1999 to allow the Commission for Energy Regulation (CER) to place requirements on energy undertakings in relation to informative billing and energy efficient tariffing (refer back to Section 1.3 of this Decision Paper for further details on these and other smart metering related legislative instruments and initiatives).

The CER also welcomes the general support for the proposal to mandate energy statements for consumers with their bills but notes that some suppliers expressed concerns, preferring to retain control and flexibility in terms of billing and energy information provision to their customers. However, the CER reiterates that the findings from the smart metering customer behaviour trials and associated cost-benefit analyses have indicated the benefits to consumers of providing them with energy statements. It should also be noted that EU legislation is moving further in the direction of specific requirements regarding provision of energy information with billing and likely developments in this area will be taken into account during the design stage of Phase 2. Some final points to note regarding the decision to mandate energy statements:

- The CER would like to once again reiterate that provision of energy statements need not be paper-based. If a consumer opts to receive there bill electronically then the energy statement would also be electronic.

- The CER would like to clarify that consumers on prepayment services would also receive energy statements as part of the mandate.


4.3.5 Data Required for Prepayments

4.3.5.1 Response Summary

There was broad support from respondents to this proposal for smart metering facilitating the expansion of prepayment services to consumers but respondents had differing views on the smart prepayment model for delivering such services – there were various advocates of either the smart ‘thick’ or the smart ‘thin’ prepayment models or some combination of both – pro’s and con’s of the different models were cited – including:

- ‘Thick’ model should be considered (Bord Gáis Networks)
- ‘Thin’ model advocated (ESB Networks, Eaton/Echelon)
- Combination on both ‘thick’ and ‘thin’ models proposed (Enel, Itron)
- A potential signal blocking issue with the ‘thin’ model was raised (Bord Gáis Energy)
- A review of the British experience of smart prepayment ‘thick’ and ‘thin’ model pro’s and con’s was recommended (Elster)

4.3.5.2 CER Decision

The CER welcomes the broad support from respondents to this proposal for smart metering facilitating the expansion of prepayment services to consumers but notes that respondents had differing views on the smart prepayment model for delivering such services. Phase 2 will be used to explore further the pro’s and con’s of the various options for implementing a ‘smart prepayment’ model which removes the need for consumers and network operators to manually interact with the meter.

4.3.6 In-Home Data

4.3.6.1 Response Summary

Barring the resistance expressed to the IHD mandate (covered under Section 4.3.3 above) most respondents to this proposal were in favour of the smart metering design facilitating data transfer to various devices in the home and not just an IHD.

Some respondents advocated that the design should facilitate automated DSM (demand-side management) solutions for testing, development and deployment (Glen Dimplex, Cylon)
4.3.6.2 CER Decision

The CER notes the requests from some respondents for the smart metering design to facilitate automated DSM (demand-side management) solutions for testing, development and deployment. This will be explored further during Phase 2 and the potential for small-scale trials will be examined.

4.3.7 Data Privacy and Security

4.3.7.1 Response Summary

Respondents to this proposal broadly expressed general support for security and privacy considerations being to the fore of the smart metering solution design and some made specific comments and suggestions, including:

- The Data Protection Commission (DPC) welcomed that the importance of security and data protection was one of the key findings of the Electricity Technology Trials and that there is an emphasis being made in the smart metering design proposals on ensuring full end-to-end security with strong data encryption.

- The DPC also highlighted the EU Article 29 Working Party Opinion on Smart Metering which stresses the importance of security and recommends the adoption of privacy by design principles, which it contends would ensure that meter readings are only transmitted as frequently as necessary for the operation of the system or the provision of a service the consumer has agreed to receive. Working Party recommendations on technical and organisational safeguards are also referenced.

- Other comments from the DPC in relation to data protection are covered in: Section 4.3.1 (Data Granularity), Section 4.3.2 (Data Access for Suppliers) and Section 5.2.1 (Retention of data on meter).

- The European Commission Task Force for Smart Grid (Expert Group 2) work on security and privacy should be considered (Elster).

- It was highlighted that the Californian regulator (CPUC) has published smart metering security and privacy rules (eMeter).

- It was also highlighted that as part of the recently announced French decision to roll out smart metering nationwide ‘la CNIL’ (the French

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38 Refer to section 1.3.3 further information on the EU Article 29 Working Party Opinion on Smart Metering and a link to it.
National Commission of Information and Freedom) has a requirement not to go below a half-hourly data interval in order to preserve the confidentiality of consumer behaviour (Atos/ERDF).

- Specific security suggestions from the French experience (Atos/ERDF) and British experience (Gemserv) were put forward.
- A single agency should be designated by the CER to oversee security (TicToc).
- Additional security risks can arise from the smart prepayment solution (Gemserv)

4.3.7.2 CER Decision

The CER will continue to ensure that security and privacy considerations are to the fore of the smart metering solution design and looks forward to working with the DPC and other stakeholders during Phase 2 in this regard, and will take note of the specific comments and suggestions in this area put forward by respondents.

4.3.8 Vulnerable Consumers

4.3.8.1 Response Summary

Respondents to this proposal broadly expressed general support for integrating specific considerations for vulnerable consumers into the national smart metering solution design. Some respondents made some specific comments:

- Existing payment methods (e.g. Household Budget Scheme) and benefit schemes (e.g. Household Benefits Package) need to catered for (SVP).
- Energy under-usage monitoring of prepayment customers should be included as a requirement (SVP)
- Application of Universal Design principles was emphasised by the National Disability Authority (NDA) as the ideal way of accommodating the specific needs of vulnerable consumers as part of the smart metering solution design. It was highlighted that the CER and NDA are currently working on producing a National Standards Authority of Ireland (NSAI) guidance standard for energy suppliers on universal design in customer services to be launched in 2012 – covering written, verbal and electronic based communication with customers.
• The need for compliance with the Disability Act and Equality Acts was highlighted (NDA, NCBI) with the NDA making specific references to procurement obligations of public bodies contained within the Disability Act.

• Catering for the needs of consumers with sight loss was emphasised including some suggestions (NCBI).

• OFGEM’s (the British energy regulator) vulnerable consumer smart metering requirement recommendations were cited (eMeter).

• It was requested that the design phase consider in detail the incremental technical and financial implications of delivering an overall design which takes account of the needs of the vulnerable customer category as currently defined (Electric Ireland).

• There is a danger of utilities ‘cherry picking’ the more profitable customers (DIT Energy Lab).

4.3.8.2 CER Decision

The CER will continue to ensure that specific considerations for vulnerable consumers should be integrated into the design of the smart metering systems and accompanying education and awareness programme at an early stage. The CER looks forward to working with relevant stakeholders during Phase 2 in this regard, and will take note of the specific comments and suggestions in this area put forward by respondents. In particular it is noted that the National Standards Authority of Ireland (NSAI) guidance standard for energy suppliers on universal design in customer services launched in February 2012 will provide a useful reference point.

4.3.9 Summary

In summary, after taking account of the responses received, the CER sees no reason to deviate from the proposals it set out in Section 4 of CER/11/191 relating to Ownership, Display and Provision of Smart Metering Data/Information, with the exception of clarifying the gas data granularity. Therefore the CER is confirming the following decisions, which will now be elaborated upon with stakeholders during Phase 2.

Decisions Relating to Ownership, Display and Provision of Smart Metering Data/Information
(Appplies to electricity and gas unless stated otherwise)
### 1. Data Granularity
- a. Half hourly intervals for electricity consumption data.
- b. Half hourly intervals for gas consumption data.

### 2. Data Access for Suppliers
- a. Data portal will be provided through which suppliers can access data for their customers, updated daily, on a push and/or pull basis subject to their requirements (assuming this is technically and economically feasible – Design stage of a full rollout would explore this further, as well as the fair processing requirements of the Data Protection Acts).

### 3. Data Access for Consumers
- a. The consumer owns their consumption data generated by smart metering and they should have access to the information in relation to their historical consumption data in a national harmonised format, free of charge – this may be via the same data portal assumed to be used by suppliers (design stage of a full rollout would explore this further).
- b. Consumers will have the right to provide their detailed historical consumption data to other suppliers in order to get an alternative quote for their supply (design stage of a full rollout would explore how this is facilitated).
- c. Consumers can give permission to other third parties to access their detailed historical consumption data e.g. for energy management services (design stage of a full rollout would explore how this is facilitated).
- d. Consumers will receive cost and usage based consumption information via in-home displays (IHD) and energy statements (with their bills).

### 4. Billing Content, Frequency and Tariffs
- a. After taking into account the results of the customer behaviour trials and associated cost-benefit analyses the CER has decided to leave it to the market place to determine billing frequency subject to ongoing review and is cognisant of potential future EU legislative developments in this area.
- b. The CER has decided that consumers must receive an energy statement with their energy bills – minimum content requirements will be determined during the Design stage, taking into account requirements from relevant EU and national legislation.
- c. The CER has decided to mandate time of use tariffs for all electricity consumers on smart metering. Detailed proposals will be developed during the Design stage.

### 5. Data for Prepayments
- a. The ‘thin prepayment’ solution will be facilitated by the smart metering functionality.

### 6. In-Home Data
- a. In-home displays (IHDs) will be provided to all energy consumers as part of the full rollout during their electricity smart meter installation.
b. The IHDs will cater for dual fuel consumers.
c. Definition of the IHD’s minimum functionality will be determined during the Design stage.
d. The IHD device will be supported for two years after its installation date (i.e. repairing or replacing faulty devices).
e. Over time other devices in the home should be able to receive the consumption data from the smart meter.

7. Data Security and Protection
a. Full end-to-end security of smart metering systems is a paramount requirement (the Design stage of a full rollout would explore this further).
b. Data protection will be to the fore of smart metering systems design.

8. Vulnerable Consumers
a. Specific considerations for vulnerable consumers will be integrated into the design of the smart metering systems and accompanying education and awareness programme at an early stage.
5.0 Smart Metering End-to-End Technology Solution

5.1 Introduction

This section outlines the finalised high level requirements for the design and functionality of the national smart metering end-to-end technology solution including metering, communications and back-end IT systems. Section 5 also outlines the commercial and regulatory model that will be adopted for ensuring that the most cost-effective smart metering end-to-end solution is put in place. The decisions contained within Section 5 have been finalised after taking into account feedback received to the questions asked on these topics in Section 5 of the Consultation on the Proposed National Rollout of Electricity and Gas Smart Metering (CER/11/191). These high level design and functionality requirements, as well as the procurement strategy, will now be further elaborated upon during Phase 2.

5.2 Smart Metering System End-to-End System Requirements

At a high level the national smart metering end-to-end solution will cater for core smart metering system functionality that supports remote meter reading, multiple supplier tariffs, profile data and remote operation. It will also provide additional functionality to provide near real-time communications (one-way and two-way) between an in-home display (IHD), or equivalent device, and smart metering systems. A key feature of the design of the solution is that both electricity and gas smart metering will leverage a single communications infrastructure – wide area network (WAN) and home area network (HAN) – and a single in-home display device. It is therefore assumed that the electricity meter will act as a hub for a gas meter, facilitating the exchange of data to and from the gas meter.

The CER also notes the potential for including water metering on the same communications infrastructure. However, as outlined in Section 3, no such synergies with water metering have yet been identified and therefore at this stage the high level smart metering solution design will proceed on the basis that water metering is not included. The CER will continue to engage with the Department of the Environment, Community and Local Government to keep this under review.

A high level systems architecture overview of the national smart metering solution design is depicted in Figure 8 and described below. This will now be elaborated upon in Phase 2.
The left-hand portion of Figure 8 depicts the ‘consumer premises’ component of the end-to-end smart metering solution. This component contains the electricity smart meter. The home area network (HAN) communications functionality is assumed to reside on the electricity smart meter. This HAN facilitates two-way communications with the in-home display, other in-home devices and applications, the gas smart meter (for dual fuel consumers) and potentially a micro generator (for consumers with micro generators).

The middle portion of Figure 8 depicts the wide area network (WAN) communications technology component i.e. the link between the consumer premises and the back-end IT systems which will facilitate two-way data communications. The WAN communications module is assumed to reside on the electricity smart meter in the consumer premises.

The right-hand portion of Figure 8 depicts the back-end IT systems which process all of the data flowing to and from the smart meters over the WAN. These back-end IT systems link to electricity and gas market systems and supplier systems via defined interfaces and also directly to consumers (via a Web portal).
The key components of the high level national smart metering end-to-end solution design are listed below and described further in the sub-sections that follow, including a summary of consultation responses received to the CER proposals and confirmation of the final CER decision in each of the areas:

- Electricity meter functionality - section 5.2.1.
- Gas meter functionality - section 5.2.2.
- Wide area network (WAN) - section 5.2.3.
- Back-end IT Systems (MDMS and Web portal) - section 5.2.4.
- Home area network (HAN) - section 5.2.5.
- Market and Supplier Systems and Processes – section 5.2.6.
- Potential Emerging Requirements - section 5.2.7

5.2.1 Electricity Meter Functionality

5.2.1.1 Proposal for Consultation

Below is a summary of the CER proposals relating to electricity smart meter functionality as outlined in Section 5.2.1 of the Consultation on the Proposed National Rollout of Electricity and Gas Smart Metering (CER/11/191). These proposals were developed after taking into account the results of the smart metering trials and cost-benefit analyses, progress in European and national legislation relating to smart metering, and responses received to previous CER consultations on this topic (CER/10/197 and CER/10/082).

<table>
<thead>
<tr>
<th>Proposals Relating to Smart Meter Functionality (CER/11/191 Section 5.2.1)</th>
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</thead>
<tbody>
<tr>
<td><strong>Electricity Meter:</strong></td>
</tr>
<tr>
<td>1. Half-hourly profile data.</td>
</tr>
<tr>
<td>2. Facilitate a minimum of three types of tariffs: energy import tariffs, energy export tariffs and possible network tariff. The meter will provide a minimum of twelve rate registers.</td>
</tr>
<tr>
<td>3. Import and export measurement.</td>
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<tr>
<td>4. Wattless energy measurement.</td>
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<tr>
<td>5. Events such as power outages recordable on the meter.</td>
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<tr>
<td>6. Alerts can be recorded on the meter, for example if there are attempts to remove the meter cover or tamper with the meter.</td>
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<tr>
<td>7. Voltage / Power quality monitoring available as required.</td>
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<tr>
<td>8. Remotely operable embedded switch for de/re-energisation.</td>
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<tr>
<td>9. Single controllable physical circuit for legacy loads such as night storage heating.</td>
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<tr>
<td>10. Load limiting capability.</td>
</tr>
<tr>
<td>11. Firmware upgradeable.</td>
</tr>
</tbody>
</table>
12. Strong encryption and secure mechanisms for joining the smart metering network.
13. Ability to store data on meter for agreed period of time (to be finalised during the Design stage).
14. Life of meter typically 15-20 years.
15. The communications module, which will provide the WAN and HAN capability, will be incorporated in the electricity meter.
16. Potential requirements for prepayment functionality on the meter will be determined during the Design stage.

Question 4 of CER/11/191 invited respondents to submit their comments on this proposed functionality list for the electricity smart meter (replicated below).

Q4. Respondents are invited to comment on the proposals outlined in Section 5.2.1 in relation to the electricity smart meter functionality requirements. Are you in favour of the proposals? Outline reasons for agreement or disagreement.

5.2.1.2 Response Summary

In general, the majority of respondents to Question 4 agreed with most of the proposed electricity meter functionality list, with some minor queries and requests for minor changes, including:

- Demand response functionality requirements are not clear (Smart Grid Ireland, EirGrid, MEGA) and real-time data (1-5sec) should be recorded to assist facilitation of renewable generation and demand response functionalities (TicToc)

- Differing queries raised over tariff register requirement:
  - 12 registers is excessive, 4 will do (Eaton/Echelon)
  - There are multiple ways of achieving the ToU requirement (Elster)
  - 4-6 registers are enough as there is an exponential cost associated with adding more registers than this (Enel)
  - Don’t put any ToU registers on the meter – collect HH data only (eMeter)
  - Unclear regarding ‘third network tariff’ (Itron)

- A small number of respondents raised various issues regarding proposal 15 (WAN and HAN communications modules will be incorporated into the electricity meter):
Some respondents expressed concern regarding the exclusion of an alternative ‘independent hub’ option for WAN and HAN communications (Bord Gáis Energy, DIT Dep’t of Comm’s Eng’)

One respondent advocated separate WAN and HAN modules (Eaton/Echelon)

One respondent proposed a different communications solution featuring an all-PLC (power line carrier) WAN with no HAN for the electricity meters, and an RF (radio frequency) solution for gas meters (Enel)

There were other detailed queries and comments including:

- Battery requirement for power outage notification – ‘last gasp’ and tamper detection (Bord Gáis Energy, Gemserv)
- Audio capability for sight impaired (NCBI)
- Digital key storage support on meter advocated (Eircom)
- Additional power quality data requirements suggested (Eaton/Echelon)
- Configurable data interval via firmware suggested (Atos/ERDF)
- Queries raised regarding scheduled versus on demand data transmission over WAN (Atos/ERDF)
- Additional detailed data requirements recommended (Enel)
- Don’t measure reactive energy flows (eMeter)
- Additional theft detection requirements suggested (eMeter)

In addition to the more technical comments covered above, the Data Protection Commission (DPC) highlighted, in relation to the data storage requirement (13.), that the Data Protection Acts require data controllers to retain personal data for only as long as necessary to achieve a specified and lawful purpose, and that short retention periods are recommended from a data protection perspective, except where an individual specifically consents to its retention for longer periods for a set purpose. The DPC also suggested that data could be held locally on the meter thus allowing the individual to control its retention.

Refer to Appendix B for the list of respondents to consultation CER/11/191 and a link to their responses for further detail.

5.2.1.3 CER Decision

The CER welcomes the broad support for the high level functionality list for the electricity meter and can confirm that the list as proposed is the final list that will now be elaborated upon with stakeholders during Phase 2.

Regarding the specific comments received the CER would like to clarify:
• As stated previously in Section 3.4, the CER recognises that the potential for smart metering to facilitate demand response, via automated demand side management and direct load control, needs to be considered further during Phase 2 including the potential for undertaking small-scale trials if deemed necessary. The current smart metering design as outlined in this Decision Paper caters for the commercial arrangements for such requirements but whether the smart metering infrastructure is the appropriate channel to cater for the operational arrangements needs to be further explored.

• The differing views from respondents, mainly smart metering vendors, relating to the ToU register functionality requirement indicates that there may be different options for facilitating the ToU tariff requirement. The functionality requirement for 12 registers will be retained but kept under review during the design stage of Phase 2.

• Regarding the comments relating to the WAN and HAN communications resting on the electricity smart meter the CER would like to reiterate the reasons, as previously outlined in CER/11/191, why an ‘independent communications hub’ option has been ruled out as being part of the proposed high level design of the national smart metering solution:
  o Following the Dual Fuel Technology Trial of the wireless M-BUS solution ESB Networks and Bord Gáis Networks are satisfied that the electricity and gas smart meters can be ‘paired up’ and that the gas data can be successfully transmitted via the electricity smart meter. Refer to the Technology Trials Findings Report CER/11/180b for further details on this trial.
  o There would be additional costs associated with a separate independent communications hub including:
    ▪ Cost of module itself
    ▪ Cost of installation (each installation could be unique depending on space requirements – in particular for indoor meter boxes for which a significant number would have space issues).
    ▪ Cost of cabling the module to a power supply
  o Additionally, issues would arise regarding the ownership, control and regulation of such an independent communications hub model, which would appear to be an unnecessary overhead to implement in the context of the Irish energy market.

• Including functionality on the smart meter for an ‘alert in case of exceptional energy consumption’ for electricity and gas is one of the recommendations made in the ERGEG Guidelines for Good Practice document (refer to Section 1.3.3 for further details). However, this is not deemed to be a necessary functionality requirement for electricity smart
meters in Ireland – the fuse will handle safety issues relating to ‘exceptional’ electricity flows.

- As stated previously in Section 4.3.7 the CER will ensure that data protection is to the fore in the smart metering solution design, including considerations around data storage, which will be examined further during the Design stage of Phase 2.

The remaining detailed queries raised by respondents will be addressed as part of the Design stage of Phase 2 which will elaborate upon the final high level electricity meter functionality list outlined below.

**Electricity Smart Meter Functionality Decision**

1. Half-hourly profile data.
2. Facilitate a minimum of three types of tariffs: energy import tariffs, energy export tariffs and possible network tariff. The meter will provide a minimum of twelve rate registers - this will be kept under review during the Design stage.
3. Import and export measurement.
4. Wattless energy measurement (where justifiable).
5. Events such as power outages recordable on the meter.
6. Alerts can be recorded on the meter, for example if there are attempts to remove the meter cover or tamper with the meter.
7. Voltage / Power quality monitoring available as required (where justifiable).
8. Remotely operable embedded switch for de/re-energisation.
9. Single controllable physical circuit for legacy loads such as night storage heating (only where legacy load requires).
10. Load limiting capability (where justifiable).
11. Firmware upgradeable.
12. Strong encryption and secure mechanisms for joining the smart metering network.
13. Ability to store data on meter for agreed period of time (to be finalised during the Design stage).
14. Life of meter typically 15-20 years.
15. The communications module, which will provide the WAN and HAN capability, will be incorporated in the electricity meter.
16. Potential requirements for prepayment functionality on the meter will be determined during the Design stage.
17. Meter serial number or other identifier
18. Clock synchronisation
5.2.2 Gas Meter Functionality

5.2.2.1 Proposal for Consultation

Below is a summary of the CER proposals relating to gas smart meter functionality as outlined in Section 5.2.2 of the Consultation on the Proposed National Rollout of Electricity and Gas Smart Metering (CER/11/191). These proposals were developed after taking into account the results of the smart metering trials and cost-benefit analyses, progress in European and national legislation relating to smart metering, and responses received to previous CER consultations on this topic (CER/10/197 and CER/10/082).

Proposals Relating to Gas Smart Meter Functionality (CER/11/191 Section 5.2.2)

Required gas meter output functionality:

1. Minimum half hourly profile volume usage data (actual interval to be confirmed during Design stage) and volume index reads (m³) with date and time stamp.
2. Other data that will be required to support meter equipment servicing;
   a. Open/closed valve status
   b. Meter serial number or other identifier
   c. Alarm/Event codes
   d. Battery warning flag/code
   e. Valve usage counter
   f. Excess flow warning

Optional gas meter output functionality for further consideration:

1. Volume usage data to support remote reading and provision of data to ancillary devices in the home, to be provided at defined frequencies (e.g. half hourly, hourly, 4 hourly, Daily);
   a. Temperature sensor readings (gas temperature at meter point)
   b. Temperature compensated volume index readings (m³)
2. The gas meter may also be required to provide energy usage interval data (in kWh) for the IHD depending on the final detailed design.

Gas meter input functionality:

1. Remote disconnection instruction (valve closure)
2. Remote reconnection enablement instruction (health and safety validation checks required to allow consumer to self re-connect / open valve)
3. Calorific Value where required (can be used by in-home ancillary equipment or IHD for the conversion of volume output data from the meter into energy values - kWh)
4. Clock synchronization (for the gas meter and communications modules)
5. Tariff settings
   a. Block (volume related) tariff settings (can be used by IHD if required for advanced tariff and payment systems)
   b. Seasonal or time of use (ToU) tariff settings (can be used by IHD if required for advanced tariff and payment systems)
6. Firmware upgrades (to meter and communications modules)
7. Tariff prices (can be used by in-home ancillary equipment or IHD if required for advanced tariff and payment systems)
8. Encryption key changes for secure data communication
9. Potential requirements for prepayment functionality on the meter will be determined during the Design stage.
10. Life of meter typically 15-20 years (with possibility of one battery replacement if necessary)
11. Ability to store data on meter for agreed period of time (to be finalised during the Design stage)

Optional gas meter input functionality for further consideration:
1. Signal strength indicator (on LCD display) for low power radio link between gas meter and electricity meter/communications hub.

Question 5 of CER/11/191 invited respondents to submit their comments on this proposed functionality list for the gas smart meter (replicated below).

**Q5.** Respondents are invited to comment on the proposals outlined in Section 5.2.2 in relation to the gas smart meter functionality requirements. Are you in favour of the proposals? Outline reasons for agreement or disagreement.

### 5.2.2.2 Response Summary

In general, the majority of respondents to Question 5 agreed with most of the proposed gas meter functionality list, with some minor queries and requests for minor changes, including:

- Half-hourly (HH) gas data interval recording on the meter was recommended by the majority of respondents that commented on this proposal (as per the feedback received to the Data Granularity proposal – see Section 4.3.1).

- Additional gas meter functionality suggestions included:
  - Alert in case of exceptional energy consumption as a safety requirement – EU documentation referenced (eMeter)
  - Audio capability for sight impaired (NCBI)
Digital key storage support on meter advocated (Eircom)
Temperature compensation functionality can be included at minimum added cost (Bord Gáis Networks)
Signal strength indicator advocated (Bord Gáis Networks)
Optional requirements listed should be moved to the ‘required list’ (Electric Ireland)
‘Last transmission quality’ query (Itron)

Other queries and comments included:
- Some functionality should be removed – CV (calorific value) and tariffs (Energia)
- Battery constraint highlighted for provision of data to auxiliary devices (Elster)
- French decision to opt for ‘basic’ gas meters cited – no valve (Atos/ERDF)
- Gas transmission data queries raised (Gemserv)

Other queries and comments included:

Refer to Appendix B for the list of respondents to consultation CER/11/191 and a link to their responses for further detail.

5.2.2.3 CER Decision

The CER welcomes the broad support for the high level functionality list for the gas meter and can confirm that the list as proposed, with the exception of the clarification of a half-hourly gas interval requirement (refer to Section 4.3.1 for further details), is the final list that will now be elaborated upon with stakeholders during Phase 2.

Regarding the specific comments received the CER would like to clarify:

- The requirement to have ‘tariff prices’ on the gas meter has been moved from the ‘required’ meter input functionality to the ‘optional’ list. It would appear that the main driver for having functionality to cater for tariff prices on the gas meter would be to facilitate a ‘thick’ smart prepayment solution. However, as outlined in Section 4.3.5 the detail of the ‘thick’ versus ‘thin’ smart prepayment debate will have to be explored further during the design stage of Phase 2 and thus it is deemed prudent to move this function into the ‘optional’ requirements list pending the outcome of this further examination.

- Including functionality on the smart meter for an ‘alert in case of exceptional energy consumption’ for gas is one of the recommendations made in the ERGEG Smart Metering Guidelines for Good Practice and it does warrant further investigation as a potential safety requirement for gas smart meters. This requirement has thus been added to the gas meter
output functionality ‘optional’ list for further examination during the Design stage of Phase 2.

The remaining detailed queries raised by respondents will be addressed as part of the Design stage of Phase 2 which will elaborate upon the final high level gas meter functionality list outlined below.

**Gas Smart Meter Functionality Decision**

**Required gas meter output functionality:**

1. Half hourly profile volume usage data and volume index reads (m³) with date and time stamp.
2. Other data that will be required to support meter equipment servicing:
   a. Open/closed valve status
   b. Meter serial number or other identifier
   c. Alarm/Event codes
   d. Battery warning flag/code
   e. Valve usage counter
   f. Excess flow warning

**Optional gas meter output functionality for further consideration:**

1. Volume usage data to support remote reading and provision of data to ancillary devices in the home, to be provided at half-hourly frequencies:
   a. Temperature sensor readings (gas temperature at meter point)
   b. Temperature compensated volume index readings (m³)
2. The gas meter may also be required to provide energy usage interval data (in kWh) for the IHD depending on the final detailed design.
3. Alert in case of exceptional energy consumption.

**Gas meter input functionality:**

1. Remote disconnection instruction (valve closure)
2. Remote reconnection enablement instruction (health and safety validation checks required to allow consumer to self re-connect / open valve)
3. Calorific Value where required (can be used by in-home ancillary equipment or IHD for the conversion of volume output data from the meter into energy values - kWh)
4. Clock synchronization (for the gas meter and communications modules)
5. Tariff settings
   a. Block (volume related) tariff settings (can be used by IHD if required for advanced tariff and payment systems)
   b. Seasonal or time of use (ToU) tariff settings (can be used by IHD if required for advanced tariff and payment systems)
6. Firmware upgrades (to meter and communications modules)
7. Encryption key changes for secure data communication
8. Potential requirements for prepayment functionality on the meter will be determined during the Design stage.
9. Life of meter typically 15-20 years (with possibility of one battery replacement if necessary)
10. Ability to store data on meter for agreed period of time (to be finalised during the Design stage)

Optional gas meter input functionality for further consideration:
1. Signal strength indicator (on LCD display) for low power radio link between gas meter and electricity meter/communications hub.
2. Tariff prices (can be used by in-home ancillary equipment or IHD if required for advanced tariff and payment systems).

5.2.3 Wide Area Network (WAN) Communications Technology

5.2.3.1 Proposal for Consultation

Below is a summary of the CER proposals relating to the smart metering wide area network (WAN) communications high level functionality as outlined in Section 5.2.3 of the Consultation on the Proposed National Rollout of Electricity and Gas Smart Metering (CER/11/191). These proposals were developed after taking into account the results of the smart metering trials and cost-benefit analyses, progress in European and national legislation relating to smart metering, and responses received to previous CER consultations on this topic (CER/10/197 and CER/10/082).

Smart Metering Wide Area Network (WAN) Communications Technology Proposals (CER/11/191 Section 5.2.3)

It is proposed that the WAN communications layer of the smart metering system will have the following functionality:

- Facilitate two-way communication with the backend smart metering infrastructure.
- Facilitate the collection of both on-demand (real time) and cyclical data from the meter e.g. daily interval reads.
- Facilitate remote operation of the meter to de-energise and re-energise the customer (subject to safety arrangements).
- Facilitate remote re-configuration and upgrades of meter.
The CER would like to emphasise that all viable wide area network (WAN) solutions will be considered for the national smart metering rollout solution and ultimately the guiding principle will be to ensure that the most cost effective communications solution is put in place through a public procurement process.

The detailed requirements for the WAN will be determined during the Design stage.

The proposed responsibility for procuring and managing the WAN is outlined in section 5.3.

Question 6 of CER/11/191 invited respondents to submit their comments on this proposed high level smart metering WAN functionality list (replicated below).

Q6. Respondents are invited to comment on the proposals outlined in Section 5.2.3 in relation to the Wide Area Network (WAN) functionality and technology. Are you in favour of the proposals? Outline reasons for agreement or disagreement.

5.2.3.2 Response Summary

In general, the majority of respondents to Question 6 agreed with most of the proposed high level smart metering WAN functionality list, with some minor queries and requests for minor changes, including:

- One respondent expressed disagreement with ESB Network’s technology trial findings for DLC (distribution line carrier) WAN performance (Eaton/Echelon).
- A potential different WAN solution was proposed - PLC for all electricity meters and RF169MHz for gas meter (Enel).
- Detailed WAN requirements and queries were suggested/raised, including:
  o Terminology issue – DLC v’s PLC (Elster)
  o IP (Internet Protocol) architecture based solution recommended (ESB Networks, Eircom, Silver Spring)
  o MDMS (meter data management system) should summarise and prioritise data for network management purposes (ESB Networks)
  o Detailed WAN technical and performance requirements were proposed (Bord Gáis Networks)
  o Multiple reads per day and instant portal refresh requirements advocated (Silver Spring)
  o Is WAN firmware upgradeable? (PrePayPower)
5.2.3.3 CER Decision

The CER welcomes the broad support for the proposed high level smart metering WAN functionality list and can confirm that, after taking into account the responses received, it has decided to retain the list as proposed which will now be elaborated upon with stakeholders during Phase 2.

Regarding the specific comments received the CER would like to clarify that these can be examined further during the Design stage of Phase 2.

### Smart Metering Wide Area Network (WAN) Communications High Level Functionality Decision

The WAN communications layer of the smart metering system will have the following functionality:

- Facilitate two-way communication with the backend smart metering infrastructure.
- Facilitate the collection of both on-demand (real-time) and cyclical data from the meter e.g. daily interval reads.
- Facilitate remote operation of the meter to de-energise and re-energise the customer (subject to safety arrangements).
- Facilitate remote re-configuration and upgrades of meter.

The CER would like to emphasise that all viable wide area network (WAN) solutions will be considered for the national smart metering rollout solution and ultimately the guiding principle will be to ensure that the most cost effective communications solution is put in place through a public procurement process.
The detailed requirements for the WAN will be determined during the Design stage.

The proposed responsibility for procuring and managing the WAN is outlined in section 5.3.

5.2.4 Back-end IT Systems

The back-end IT Systems to manage smart metering will consist of systems to manage the meters and communications infrastructure including:

- A local data collector or concentrator
- A Head End System(s) to manage the communications infrastructure
- A Meter Data Management System (MDMS) - the MDMS system will interface with all other systems via a Middleware Hub or Enterprise Service Bus solution.

The back-end IT systems issues and requirements will be driven by the outcomes of decisions made in relation to the functional requirements. This area was therefore not a subject for consultation proposals as part of CER/11/191. The Design stage of Phase 2 will examine the requirements for back-end IT systems functionality in greater detail.

5.2.5 Home Area Network (HAN)

5.2.5.1 Proposal for Consultation

Below is a summary of the CER proposals relating to the smart metering home area network (HAN) communications high level functionality as outlined in Section 5.2.5 of the Consultation on the Proposed National Rollout of Electricity and Gas Smart Metering (CER/11/191). These proposals were developed after taking into account the results of the smart metering trials and cost-benefit analyses, progress in European and national legislation relating to smart metering, and responses received to previous CER consultations on this topic (CER/10/197 and CER/10/082).
### Smart Metering Home Area Network (HAN) Communications Technology Proposals
(CER/11/191 Section 5.2.5)

The CER would like to emphasise that all viable home area network (HAN) solutions will be considered for the national smart metering rollout solution and ultimately the guiding principle will be to ensure that the most cost effective communications solution is put in place through a public procurement process. The detailed requirements for the HAN will be determined during the Design stage based on the following high level requirements:

**Utility HAN:**
1. The electricity meter will act as a hub for the gas meter, via the utility HAN, thereby facilitating a single communications infrastructure to support both electricity and gas smart metering.
2. The utility HAN should also accommodate if required a second electricity meter installed to measure actual output of embedded micro generator.
3. The CER will continue to work with the Department of the Environment, Heritage and Local Government to review any potential synergies that may exist between the required energy smart metering infrastructure and water metering.

**Non-Utility HAN:**
1. The non-utility HAN refers to devices in the home other than utility meters and the initial IHDs rolled out. The functionality for the smart metering full rollout solution should enable secure communications between the smart meter and in home devices i.e. any authenticated device in the home and not just the in-home display.
2. Due the immaturity of the associated technologies and evolving business requirements further evaluation of secure communications functionality will be required during the design stage of a full rollout to ensure that a premature decision is not taken.
3. Cost information is part of the requirements for display of data in home. However, how exactly price information is provided to the in home devices (i.e. via the smart metering infrastructure or via another method e.g. IP based) will be examined further as part of the Design stage of a full rollout.
4. A “watching brief” will be kept on developments in ‘Smart Home’ and ‘Smart Grid’ technologies area to ensure that the smart metering solution is ‘future proofed’ as far as possible to cater for any emerging functionality requirements in these areas, assuming they are technically and economically viable to implement.

Question 7 of CER/11/191 invited respondents to submit their comments on this proposed high level smart metering HAN functionality list (replicated below).
Q7. Respondents are invited to comment on the proposals outlined in Section 5.2.5 in relation to the Home Area Network (HAN) functionality and technology. Are you in favour of the proposals? Outline reasons for agreement or disagreement.

5.2.5.2 Response Summary

In general, there was no clear agreement from respondents to Question 7 on the HAN proposals, with some respondents in support and others raising issues, mainly from an ownership and control perspective, including:

- Separate utility and customer HANs proposed with a linking ‘gateway’ (ESB Networks)
- HAN ownership queried (Bord Gáis Networks)
- Concern raised over ESBN controlling HAN access (MEGA)
- Independent hub option advocated – separate ownership (Bord Gáis Energy)
- Shouldn’t rule out independent hub option – future proofing benefit (Glen Dimplex)
- Interdependencies between Bord Gáis Networks and ESB Networks for HAN responsibilities flagged (Atos/ERDF)
- Advocate secure 2-way utility HAN with open standard 1-way customer HAN (SEAI)
- Dutch port model favoured (Eaton/Echelon)
- Security concern raised – multiple HANs recommended (Eircom)
- Secure authentication should be emphasised further on non-utility HAN (Elster)
- Simple process advocated for devices joining HAN – ‘plug and play’ (Powersavvy)
- Modular/upgradeable HAN recommended (Glen Dimplex)

There were also a number of other minor queries and requests for minor changes, including:

- Different HAN model proposed by Enel.
- Utility HAN should cater for other fuels – oil/LPG (SEAI)
- Open protocols advocated (Electric Ireland)
- Dynamic pricing readiness questioned - €2 peak price cited (PrePayPower)
- Highlighted that there may be more than one micro generator per home (MEGA)
- HAN interval of less than 10 seconds recommended (Glen Dimplex)
• HAN as a platform for energy control rather than display advocated - OpenHAN standard cited (Cylon)
• Multiple HAN solutions likely to be required based on British experience which is cited. The following variables will likely influence solution required: Residential/SME/Meter location/apartments/building materials – pre-installation survey recommended – British analysis underway (Gemserv)

Refer to Appendix B for the list of respondents to consultation CER/11/191 and a link to their responses for further detail.

5.2.5.3 CER Decision

After considering the responses received the CER has decided to retain the high level HAN functionality list as proposed, with the exception of the clarification regarding water metering requirements now being considered out of scope (refer to Section 3.4 for further details). This high level list will now be elaborated upon with stakeholders during Phase 2.

Regarding the specific comments received the CER would like to clarify that:

• The rationale for excluding the ‘independent communications hub’ model was outlined in CER/11/191 and reiterated again earlier in Section 5.2.1.3 (Electricity Meter Functionality Decision) of this Decision Paper.

• The detailed comments received can be further examined during the Design stage of Phase 2.

Smart Metering Home Area Network (HAN) Communications High Level Functionality Decision

The CER would like to emphasise that all viable home area network (HAN) solutions will be considered for the national smart metering rollout solution and ultimately the guiding principle will be to ensure that the most cost effective communications solution is put in place through a public procurement process. The detailed requirements for the HAN will be determined during the Design stage based on the following high level requirements:

Utility HAN:
1. The utility HAN will support communications with the mandated in-home display rolled out.
2. The electricity meter will act as a hub for the gas meter, via the utility HAN, thereby facilitating a single communications infrastructure to support both electricity and gas smart metering
3. The utility HAN should also accommodate if required a second electricity meter installed to measure actual output of embedded micro generator.

4. Water metering requirements are out of scope. The CER will continue to engage with the Department of the Environment, Community and Local Government to keep this under review.

**Non-Utility HAN:**

1. The non-utility HAN refers to devices in the home other than utility meters and the mandated IHDs rolled out. The functionality for the smart metering full rollout solution should enable secure communications between the smart meter and in home devices i.e. any authenticated device in the home and not just the mandated in-home display.

2. Due the immaturity of the associated technologies and evolving business requirements further evaluation of secure communications functionality will be required during the design stage of a full rollout to ensure that a premature decision is not taken.

3. Cost information is part of the requirements for display of data in-home. However, how exactly price information is provided to the in-home devices (i.e. via the smart metering infrastructure or via another method e.g. IP based) will be examined further as part of the Design stage of Phase 2.

4. A ‘watching brief’ will be kept on developments in ‘Smart Home’ and ‘Smart Grid’ technologies area to ensure that the smart metering solution is ‘future proofed’ as far as possible to cater for any emerging functionality requirements in these areas, assuming they are technically and economically viable to implement.

### 5.2.6 Market and Supplier Systems and Processes

The detailed functional requirements of the smart metering end-to-end solution need to be understood in order to be in a position to properly assess the impact on current electricity and gas market and supplier systems and processes. It is assumed that there will be an impact on the existing systems and processes and that the Design stage of the National Smart Metering Programme (Phase 2) will be used to explore in detail the nature of these impacts and agree any changes required.

### 5.2.7 Potential Emerging Requirements

The CER will during the Design stage of Phase 2 continue to monitor potential emerging functionality requirements in the national smart metering solution to facilitate the concepts of the ‘smart home’, ‘smart grid’ and electric vehicles. This is very much at the leading edge of smart metering functionality and standards to support all of these concepts are being developed but are still in their infancy, so
cannot currently be designed for. A ‘watching brief’ will be kept on developments in ‘Smart Home’ and ‘Smart Grid’ technology areas to ensure that in as much as possible the smart metering solution is ‘future proofed’ to cater for any emerging functionality requirements in these areas, assuming they are technically and economically viable to implement.

5.3 Smart Metering System End-to-End System Commercial and Regulatory Requirements

Section 5.3.1 outlines the CER decisions in relation to the commercial procurement model to be adopted by the National Smart Metering Programme to ensure that the most cost-effective national smart metering end-to-end solution is procured which delivers the required benefits with an acceptable risk profile. The CER emphasises that ultimately the guiding principle will be to ensure that the most cost-effective end-to-end national smart metering solution is put in place through a public procurement process.

Section 5.3.2 reiterates the standard regulatory model that CER will utilise to ensure that network operator-related costs of a national smart metering rollout passed on to consumers via the regulatory approved network tariffs will reflect efficiently incurred costs and the realisation of the substantial network-operator related benefits that arise from implementing smart metering.

5.3.1 Procurement Model

5.3.1.1 Proposal for Consultation

Below is a summary of the CER proposals relating to the smart metering end-to-end solution procurement model as outlined in Section 5.3.1 of the Consultation on the Proposed National Rollout of Electricity and Gas Smart Metering (CER/11/191).

<table>
<thead>
<tr>
<th>Proposed Smart Metering End-to-End Solution Procurement Model (CER/11/191 Section 5.3.1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultimately the guiding principle will be to ensure that the most cost effective end-to-end national smart metering solution is put in place through a public procurement process.</td>
</tr>
<tr>
<td>Proposed model for procuring smart meters:</td>
</tr>
<tr>
<td>• ESB Networks will be responsible for procuring electricity smart meters with a communications module (for wide area network and home area network) that</td>
</tr>
</tbody>
</table>
meet the agreed functionality requirements and will be responsible for installation and ongoing maintenance of these meters.

- Bord Gáis Networks will be responsible for procuring gas smart meters with a communications module (for home area network) that meets the agreed functionality requirements and will be responsible for installation (in coordination with ESB Networks) and ongoing maintenance of these meters.
- The CER will approve the functional requirements and the procurement strategy.

Proposed model for procurement and management of the wide area network (WAN) and back-end IT systems (including meter data management system (MDMS) and Web portal):

- These will be procured as separate or combined lots and on an ownership or service provision basis.
- ESB Networks will own the contracts for the WAN and electricity back-end IT systems and will be responsible for their procurement.
- Bord Gáis Networks will own the contract for the gas back-end IT systems and will be responsible for their procurement.
- The CER will approve the procurement strategy.

Proposed model for procurement and management of the in-home display (IHD):

- The IHDs will be procured on an ownership or service provision basis.
- The CER will approve the minimum functional requirements.
- Regarding responsibility for procurement, installation and maintenance of IHDs either:
  1. ESB Networks will be responsible for procurement for all consumers. In which case the CER will approve the procurement strategy.
  2. Electricity suppliers will be responsible for procurement for their customers.

Question 8 of CER/11/191 invited respondents to submit their comments on this proposed procurement model (replicated below).

Q8. Respondents are invited to comment on the proposals outlined in Section 5.3.1 in relation to the procurement model. Are you in favour of the proposals? In particular, which of the two IHD provision responsibility options outlined do you prefer? Outline reasons for agreement or disagreement.

5.3.1.2 Response Summary

In general, most respondents to Question 8 were broadly supportive of the proposed procurement model but some respondents were against it or raised some concerns:
• Against proposal – independent communications hub model with periodic contract for WAN/MDMS/Portal management recommended (Bord Gáis Energy)
• WAN ownership queried (Bord Gáis Networks)
• Concern raised with DSO close relationship with utilities (MEGA)
• Involve suppliers in meter procurement (Energia)
• Ensure access for Irish firms to procurement (Enterprise Agencies)
• Procurement obligations on ‘public bodies’ highlighted – Disability Act 2005 (NDA)
• Interoperable and interchangeable meters recommended (Atos/ERDF)
• If IHD mandate proceeds most are in favour of Network led option, but many are advocating optional approach to rollout.
  o Programmeable firmware possible in IHD? (Bord Gáis Energy)
  o Socialisation of IHD costs? (Energia)
  o 2yr maintenance requirement is too long – 1yr in Britain – restrict supplier competition. (Gemserv)

Refer to Appendix B for the list of respondents to consultation CER/11/191 and a link to their responses for further detail.

5.3.1.3 CER Decision

After considering the responses received the CER has decided to retain the procurement model as proposed, with the exception of the clarification regarding provision of the IHD. This procurement model will now be elaborated upon during Phase 2, with the initial focus for the CER being on agreeing a procurement strategy with ESB Networks and Bord Gáis Networks.

Regarding the specific comments received the CER would like to clarify that:

• The rationale for excluding the ‘independent communications hub’ model was outlined in CER/11/191 and reiterated again earlier in Section 5.2.1.3 (Electricity Meter Functionality Decision) of this Decision Paper.

• The CER notes the preference of most respondents to this question that if a mandated IHD rollout proceeds then it should be ESB Networks that is responsible for centralised procurement, rollout and support of the mandated IHD devices. This will be the assumed IHD delivery model for elaborating upon in Phase 2. The alternative proposal for suppliers to be mandated to provide the IHDs is not favoured for the following reasons:
  o It would lack efficiencies and synergies arising from economies of scale when compared to the centralised Network-led model - in terms of design, procurement, installation, support and consumer education activities that each supplier would individually be responsible for – this may especially be the case in terms of smaller
suppliers and could act as a potential market barrier to entry for new small suppliers.

- IHD related responsibilities and procedures for change of supplier instances would also have to be determined.

- The viability of making a mandated IHD rollout ‘optional’ for consumers, in terms of trying to target only those consumers likely to optimise use of the IHD or use it at all, is questionable given that it will be difficult to pinpoint in advance such consumers. The CER preference is to ensure IHDs are installed as standard with an electricity smart meter installation so that all consumers have the opportunity to benefit from them.

- The contracting bodies, i.e. ESB Networks and Bord Gáis Networks, will need to be cognisant of all procurement obligations on them, including any contained within the Disability Act 2005.

- All stakeholders will be involved in developing the detailed final smart metering requirements to be included in the procurement documentation and the CER will agree a procurement strategy with ESB Networks and Bord Gáis Networks. However, it will be the sole responsibility of ESB Networks and Bord Gáis Networks to go to tender via a public procurement process for the different components of the smart metering solution and make the associated vendor selections. No other stakeholders, including the CER, will be involved in this tendering and selection process.

- The question of socialisation of mandated IHD costs (in an ESB Networks-led model) will be dealt with as part of the normal regulatory price control process for all network operator related smart metering costs, as outlined in Section 5.3.2 below.

- The two year support period for the mandated IHD will continue to be the assumed requirement, but will be kept under review during the Design stage of Phase 2.

The final smart metering procurement model is summarised below and will be elaborated upon and progressed as part of Phase 2 of the National Smart Metering Programme.

**Smart Metering End-to-End Solution Procurement Model Decision**

Ultimately the guiding principle will be to ensure that the most cost-effective end-to-end national smart metering solution is put in place through a public procurement process.

Model for procuring smart meters:
**ESB Networks** will be responsible for procuring electricity smart meters with a communications module (for wide area network and home area network) that meet the agreed functionality requirements and will be responsible for installation and ongoing maintenance of these meters.

**Bord Gáis Networks** will be responsible for procuring gas smart meters with a communications module (for home area network) that meets the agreed functionality requirements and will be responsible for installation (in coordination with ESB Networks) and ongoing maintenance of these meters.

**The CER** will approve the functional requirements and the procurement strategy.

**Model for procurement and management of the wide area network (WAN) and back-end IT systems (including meter data management system (MDMS) and Web portal):**

- These will be procured as separate or combined lots and on an ownership or service provision basis.
- ESB Networks will own the contracts for the WAN and electricity back-end IT systems and will be responsible for their procurement.
- Bord Gáis Networks will own the contract for the gas back-end IT systems and will be responsible for their procurement.
- The CER will approve the procurement strategy.

**Model for procurement and management of the in-home display (IHD):**

- The IHDs will be procured on an ownership or service provision basis.
- The CER will approve the minimum functional requirements and the procurement strategy.
- ESB Networks will own the contract for the IHD and be responsible for their procurement for all consumers.

## 5.3.2 Regulatory Model

The CER will ensure via its standard regulatory price control process that ESB Networks and Bord Gáis Networks are allowed to pass on to end energy consumers, via their regulatory approved network charges, only the efficient costs associated with the national rollout of smart metering i.e. the efficient network operator-related costs derived following a public procurement process (as outlined in Section 5.3.1) and depreciated over an appropriate time period (e.g. 15 years), minus the value of the significant network operator-related benefits that will be gained from new smart metering operational efficiencies.

Also the CER, as outlined next in Section 6 (Programme Approach and Timelines), will undertake to revisit at the end of each phase of the National Smart Metering Programme (when more information will be available to refine
assumed costs and benefits) the business case for proceeding with the national rollout of smart metering so as to ensure that there remains a significant net benefit for the energy consumer.

5.4 Summary

Section 5 has given an overview of the high level system architecture of the end-to-end national smart metering technology solution. It then outlined the CER decision in relation to each of the components of this solution including metering, communications, back-end systems and in-home displays. It notes that these are high level decisions that will be developed further in the Design stage of Phase 2 of the National Smart Metering Programme. Section 5 also outlined the procurement model for ensuring that the most cost-effective smart metering end-to-end solution is put in place, and concluded by outlining the regulatory model for ensuring efficiently incurred network operator-related costs and benefits are passed on to end-consumers.
6.0 Implementation Approach and Timelines

6.1 Introduction

This section confirms the overall decision by the CER for a phased approach to be taken to the National Smart Metering Programme implementation and outlines the associated high level deliverables and timelines scheduled for each phase. The CER also re-emphasises that consumer acceptance is critical in achieving any of the potential benefits from smart metering and confirms that a specific consumer awareness and education work programme will be included as part of the implementation.

6.2 Consultation Proposal

Section 6 of the Consultation on the Proposed National Rollout of Electricity and Gas Smart Metering (CER/11/191) outlined the CER’s proposal for a phased approach to be taken to a National Smart Metering Programme implementation and outlined the proposed associated high level deliverables and timelines for each phase – proposals are replicated below.

Proposed High Level Programme Implementation Approach and Timelines (CER/11/191 Section 6)

A phased approach will be taken to the national implementation of electricity and gas smart metering and high level deliverables and timelines for these phases are outlined below. However, it should be noted that throughout the project implementation the CER will keep timelines under review and will endeavour to accelerate timelines where feasible.

The CER will issue a detailed Programme Plan and details of the proposed Programme Governance structure in Q1 2012.

Phase 1: Discovery, Exploration and Business Case Development (Q1 2012)

We are currently nearing the end of Phase 1 of the programme which will conclude early 2012 when a final Smart Metering Decision Paper is issued by the CER.

Phase 2: Planning, Requirement Definition, Procurement and Selection (≤2yrs)

Phase 2 involves activities such as (this phase could take up to 2 years):
- Development of the requirements with the stakeholders.
- Agreement on the high level changes to the market system
- Overall system design
- It will also include the preparation by ESB Networks / BG Networks of the technical and business requirements
- Specification for smart meters, communications, IT
- Procurement and selection process
- Develop consumer education and awareness programme
- Revisit business case

The current lack of standards around smart metering means that a lot of detailed work will be required at this stage. Given the immature and risky nature of the technology and the experience of the trials it is very important that adequate time is allowed in the selection process for the various components of the solution.

**Phase 3: Detailed design, System testing and Pre-Deployment rollout (≤2yrs)**
Phase 3 will involve activities such as (this phase could take up to 2 years):
- Implement consumer education and awareness programme
- Detailed Design
- Install and test IT systems
- Testing of meters and communications
- Required changes to market systems and processes
- End to end testing
- Deployment system and procedures (to minimise installation costs)
- Deploy first block of smart meters (approx. 20,000)
- Revisit business case

**Phase 4: Deployment Phase (2-4yrs)**
Phase 4 will involve ramping up of installation activity for full rollout. This phase could take between two and four years.

Views on this proposal were sought via Question 9 of CER/11/191 (also replicated below).

**Q9.** Respondents are invited to comment on the proposals outlined in Section 6 relating to the implementation approach and timelines. Are you in favour of the proposals? Outline reasons for agreement or disagreement.

**6.3 Response Summary**

In general, the majority of respondents to Question 9 agreed with the proposed implementation approach and high level activities listed for the National Smart Meter Programme, but there was some difference of opinions expressed
regarding the proposed timelines – some stating they are too slow, other stating they are too fast and others believing they are just right. Some respondents made suggestions for additional activities to be added or requested minor changes and/or clarifications to some of the existing activities, including the following:

- Supplier involvement clarification sought for Phase 2 (PrePayPower) and Phase 3 (Electric Ireland)
- Timeline slippage raised (Bord Gáis Energy)
- Phase 2 and 3 timelines are excessive (DIT Energy Lab)
- Phase 2 and 3 timelines are aggressive (Cylon)
- The timelines are achievable (Gemserv)
- Keep timelines flexible – caution against early business rules lock-down (Energia)
- Accelerate timelines – specifications are already available from other jurisdictions and the implementation can be ‘de-risked’ by undertaking a modular solution (Elster, Silver Spring, Enel)
- Reference National Adult Literacy Agency for consumer awareness texts (SVP)
- Widen the Smart Metering Steering Group representation (Smart Grid Ireland)
- Field trials with ‘smart clusters’ in Phase 2 requested (MEGA)
- ‘Smart grid’ field trials requested (Eaton/Echelon)
- Insert a Phase 3 task for Bord Gáis Networks and ESB Networks to submit rollout schedules to CER for tracking progress (Gemserv)
- Wider stakeholder engagement in Phase 2 advocated and ‘lessons learned’ check in Phase 3 recommended (Atos/ERDF)

Refer to Appendix B for the list of respondents to consultation CER/11/191 and a link to their responses for further detail.

### 6.4 CER Decision

The CER welcomes the broadly positive support from respondents for the proposed implementation approach and high level activity list for the National Smart Meter Programme and takes note of the different opinions regarding timelines.

The CER would like to reiterate that the National Smart Metering Programme represents a very large and complex programme of work over several years that will have a major impact not only on energy industry stakeholders, processes and systems but will also impact every home and small-to-medium business in Ireland. A robust programme governance structure and implementation plan will be required to ensure that the National Smart Metering Programme successfully
delivers all the benefits of smart metering for all stakeholders, particularly energy consumers. Early stakeholder engagement will be vital as the business and technical expertise of the energy industry organisations and other non-energy industry organisations will be required to progress the detailed requirements for the national smart metering end-to-end solution during Phase 2.

6.4.1 Programme Governance and Management

For the National Smart Meter Programme to be successful all stakeholders will have to deliver their elements of the programme. It will be necessary to agree clear roles and responsibilities for the delivery of each element. An overall industry programme will have to be agreed and followed. The CER will be responsible for the overall governance of the programme. The CER will continue to oversee the development of the Smart Metering Programme. It will coordinate Industry inputs, keep all stakeholders informed and up-to-date, and will also manage and coordinate the implementation programme.

Strong programme management will be required to successfully deliver the National Smart Metering Programme. Given the breadth of the impact of the programme and the multiple stakeholder involvement required, a centrally managed programme will be essential to a successful implementation. To this end the CER will publish details of the Programme Governance structure and Programme Plan in July/August 2012.

6.4.2 Consumer Education and Awareness

The CER reiterates that it is important to recognise that consumer acceptance is critical in achieving any of the potential benefits from smart metering. A programme of work will be undertaken as part of the National Smart Metering Programme to promote awareness and educate consumers on the benefits of smart metering to themselves, the energy systems and the environment. This work will also examine specific education and awareness requirements for vulnerable consumers to ensure that they also have the opportunity to benefit from smart metering.

6.4.3 Phased Deliverables and Timelines

After reviewing the responses received to CER/11/191 the CER has decided to retain the phased approach and high level timelines as proposed in CER/11/191 for the National Smart Metering Programme implementation. The following are therefore the high level phases for the National Smart Metering Programme and the high level timelines:
**Phase 1**: Discovery, Exploration and Business Case Development (Complete)
**Phase 2**: Planning, Requirement Definition, Procurement and Selection ($\leq$2yrs)
**Phase 3**: Detailed Design, System Testing and Pre-Deployment Rollout ($\leq$2yrs)
**Phase 4**: Deployment Phase (2-4yrs)

Phase 1 has formally completed with the publication of this Smart Metering Decision Paper and Phase 2 has now formally begun. Figure 9 below depicts the high level timetable currently envisaged for each of the remaining phases of the Programme. This will be kept under review and will be informed by the outputs from Phase 2 planning, requirements definition, procurement and selection. It should be noted that throughout the Programme implementation the CER will keep timelines under review and will endeavour to accelerate timelines where feasible. The CER will publish a Programme Plan in July/August 2012.

**Figure 9: High Level Timelines for National Smart Metering Programme**

Below is a summary of the CER decision regarding the phased implementation approach and high level timelines for the National Smart Metering Programme.

**High Level Programme Implementation Approach and Timelines Decision**

A phased approach will be taken to the national implementation of electricity and gas smart metering and high level deliverables and timelines for these phases are outlined below. However, it should be noted that throughout the project implementation the CER will keep timelines under review and will endeavour to accelerate timelines where feasible.

The CER will issue a Programme Plan and details of the Programme Governance structure in July/August 2012.
Phase 1: Discovery, Exploration and Business Case Development (Complete)
The publication of this Smart Metering Decision Paper marks the formal end of Phase 1 of the National Smart Metering Programme. Phase 2 now formally begins.

Phase 2: Planning, Requirement Definition, Procurement and Selection (≤2yrs: 2012-14)
Phase 2 involves activities such as (this phase could take up to 2 years):
- Development of the requirements with the stakeholders.
- Agreement on the high level changes to the market system
- Overall system design
- It will also include the preparation by ESB Networks / Bord Gáis Networks of the technical and business requirements
- Specification for smart meters, communications, IT
- Procurement and selection process
- Develop consumer education and awareness programme
- Revisit business case
The current lack of standards around smart metering means that a lot of detailed work will be required at this stage. Given the immature and risky nature of the technology and the experience of the trials it is very important that adequate time is allowed in the selection process for the various components of the solution.

Phase 3: Detailed design, System testing and Pre-Deployment rollout (≤2yrs: 2014-15)
Phase 3 will involve activities such as (this phase could take up to 2 years):
- Implement consumer education and awareness programme
- Detailed Design
- Install and test IT systems
- Testing of meters and communications
- Required changes to market systems and processes
- End to end testing
- Deployment system and procedures (to minimise installation costs)
- Deploy first block of smart meters (approx. 20,000)
- Revisit business case

Phase 4: Deployment Phase (2-4yrs: 2015-19)
Phase 4 will involve ramping up of installation activity for completion of the full rollout and continued consumer engagement activities.
This phase could take between two and four years.
7.0 Next Steps

By finalising the national smart metering rollout decision and firming up on its high level design and requirements this now enables the CER to move the National Smart Metering Programme into Phase 2, where the high level design and requirements set out in this Decision Paper will be elaborated upon with the involvement of all relevant stakeholders under an appropriate governance structure and against a detailed implementation plan – high level timelines are illustrated in Figure 10 below.

Figure 10: High Level Timelines for National Smart Metering Programme

The CER would like to thank all parties who have contributed to the successful delivery of Phase 1 of the National Smart Metering Programme and looks forward to their active participation in Phase 2 of this very important national energy infrastructure implementation in order to ensure that the benefits of smart metering are realised by energy consumers, energy systems operation and the environment in Ireland.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>BGN:</td>
<td>Bord Gáis Networks</td>
</tr>
<tr>
<td>CBA:</td>
<td>Cost-benefit analysis</td>
</tr>
<tr>
<td>CBT:</td>
<td>Customer Behaviour Trial</td>
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<tr>
<td>CER:</td>
<td>Commission for Energy Regulation</td>
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<tr>
<td>CO₂:</td>
<td>Carbon Dioxide</td>
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<tr>
<td>DCENR:</td>
<td>Department of Communications, Energy and Natural Resources</td>
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<tr>
<td>DLC:</td>
<td>Distribution Line Carrier</td>
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<tr>
<td>DSM:</td>
<td>Demand Side Management</td>
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<tr>
<td>ERGEG:</td>
<td>European Regulators Group for Electricity and Gas</td>
</tr>
<tr>
<td>ESBN:</td>
<td>ESB Networks</td>
</tr>
<tr>
<td>ESRI:</td>
<td>Economic and Social Research Institute</td>
</tr>
<tr>
<td>EU:</td>
<td>European Union</td>
</tr>
<tr>
<td>GGP:</td>
<td>Guidelines for Good Practice</td>
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<tr>
<td>HAN:</td>
<td>Home Area Network</td>
</tr>
<tr>
<td>IHD:</td>
<td>In-Home Display</td>
</tr>
<tr>
<td>kWh:</td>
<td>Kilo Watt Hour</td>
</tr>
<tr>
<td>LAN:</td>
<td>Local Area Network</td>
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<tr>
<td>MDMS:</td>
<td>Meter Data Management System</td>
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<tr>
<td>NEEAP:</td>
<td>National Energy Efficiency Action Plan</td>
</tr>
<tr>
<td>NPV:</td>
<td>Net Present Value</td>
</tr>
<tr>
<td>NRA:</td>
<td>National Regulatory Authority</td>
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<tr>
<td>PLC:</td>
<td>Power Line Carrier</td>
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<tr>
<td>RF:</td>
<td>Radio Frequency</td>
</tr>
<tr>
<td>SEAI:</td>
<td>Sustainable Energy Authority of Ireland</td>
</tr>
<tr>
<td>SME:</td>
<td>Small-to-Medium Enterprises</td>
</tr>
<tr>
<td>TOU:</td>
<td>Time of Use</td>
</tr>
<tr>
<td>WAN:</td>
<td>Wide Area Network</td>
</tr>
</tbody>
</table>
Appendix B – List of Respondents to CER/11/191

The decisions in this paper have been informed by the 35 responses received from the following respondents (published 13th January 2012) to the CER consultation (CER/11/191, published 15th November 2011):


1. Airtricity
2. ATOS
3. Bord Gáis Energy
4. Bord Gáis Networks
5. Cylon Controls Ltd
6. Data Protection Commission (DPC)
7. Dublin Institute of Technology (DIT) Dept. of Communications Engineering
8. Dublin Institute of Technology (DIT) Energy Lab
9. Eaton
10. Echelon
11. Eircom
12. EirGrid
13. Electric Ireland
14. Elster
15. eMeter
16. Endesa Ireland
17. Enel
18. Energia
19. ESB Networks
20. Forfás/IDA/Enterprise Ireland (Joint Enterprise Development Agency)
21. Gemserv
22. Glen Dimplex
23. Itron
24. Micro Electricity Generation Association (MEGA) Of Ireland
25. National Council for the Blind of Ireland (NCBI)
26. National Disability Authority (NDA)
27. Opower
28. Powersavvy Ltd.
29. PrePayPower
30. Silver Spring
31. Smart Grid Ireland
32. Society of St. Vincent de Paul (SVP)
33. Sustainable Energy Authority of Ireland (SEAI)
34. Temetra
35. Tictoc Platforms

END