SMART METERING PROJECT PHASE 1

INFORMATION PAPER

6th February 2009

CER/09/024

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1 Purpose of Information Paper

This Information Paper on the Smart Metering Project Phase 1 has been prepared by CER with the purpose of providing public information on the project & its progress. Updated Information Papers will be published periodically.

2 Background to Smart Metering Project Phase 1

The European Commission adopted EU Directive EC 2006/32 on 5th April 2006.[1] Article 13 of this Directive requires that where technically possible and financially reasonable, energy metering should record the time of use and customer billing should be sufficiently comprehensive so as to enable the self regulation of energy consumption. The Directive came into force on 17th May 2006 and must be implemented by Member States by 17th May 2008.

Smart metering is believed to be one method which encourages the self regulation of energy consumption. This method is supported by the government who has stated in their Programme for Government 2007:

> *"Ensure that the ESB installs a new smart electronic meter in every home in the country which will allow people to reduce their bills by cutting back on unnecessary use of electricity" ; and*
> *"Facilitate the introduction of net metering to allow consumers to sell electricity back into the grid from any renewable power supplies they have."*[2]

The Commission has established a Smart Metering Project Phase 1 in late 2007, the results of which will inform an analysis of the feasibility of implementing smart meters throughout Ireland.

3 Smart Metering Project Phase 1 Governance

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 Commission for the Smart Metering Project Phase 1. Both groups are chaired by the Commission and consist of representatives from the Department of Communications, Energy & Natural Resources (DCENR), Sustainable Energy Ireland (SEI), the Northern Ireland Authority for Utility Regulation (NIAUR) and Irish Gas & Electricity Industry Participants.

The Smart Metering Steering Group (SMSG) gives strategic direction to the Smart Metering Working Group (SMWG), reviews proposals presented by the SMWG and makes recommendations to CER for approval. The first Steering Group meeting took place in December 2007.

The SMWG is initially charged with developing proposals for undertaking the detailed planning for & implementation of the Smart Metering Project Phase 1. This involves

[1] DIRECTIVE 2006/32/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_114/l_11420060427en00640085.pdf

[2] Programme for Government 2007 http://www.foe.ie/download/pdf/2007_programme_for_government_final.pdf

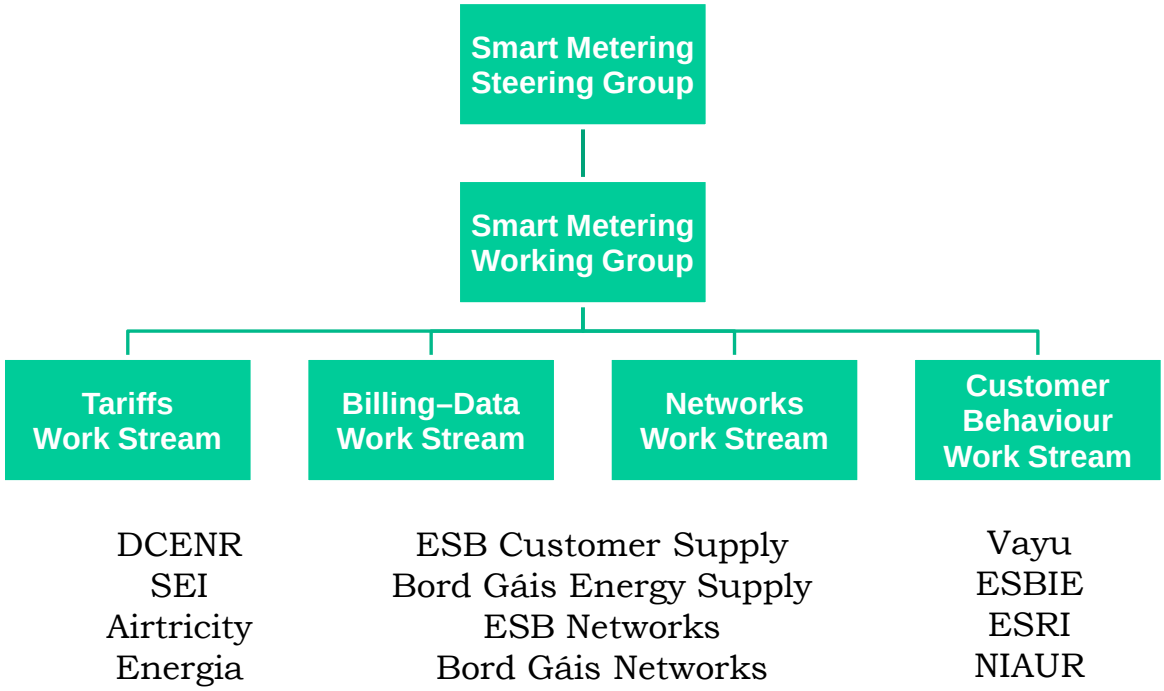
setting up & running Smart Metering Trials & completing other preparation work that will inform decisions relating to the full rollout of an optimally designed universal Smart Metering Project that will embrace all aspects of Smart Metering relevant to the Irish energy market. The first Working Group meeting took place in February 2008.

To achieve its objectives the SMWG has been divided into four Work Streams each focusing on separate aspects of the Smart Metering Project Phase 1:

- **Networks:** Technical design & rollout of Smart Metering infrastructure.
  Lead: ESB Networks (electricity) & Bord Gáis Networks (gas).
- **Customer Behaviour**: Mainly focusing on the design & implementation of all aspects of the customer behavioural trials, including participant selection, communications & analysis of results.
  Lead: Sustainable Energy Ireland (SEI).
- **Tariffs:** Mainly focusing on design of Tariffs (Time of Use) & development of a Prepayment Market Model.
  Lead: ESB Customer Supply.
- **Billing / Data**: Mainly focusing on data flows from the Smart Metering infrastructure to Suppliers for customer behavior trial billing options.
  Lead: Bord Gáis Energy Supply.

CER will be responsible for undertaking a Smart Metering Cost Benefit Analysis (CBA) and is working with the Economic & Social Research Institute (ESRI) in this regard. As part of this work, CER will identify all information requirements for a CBA, the party responsible for providing such information and the structure of the analysis.

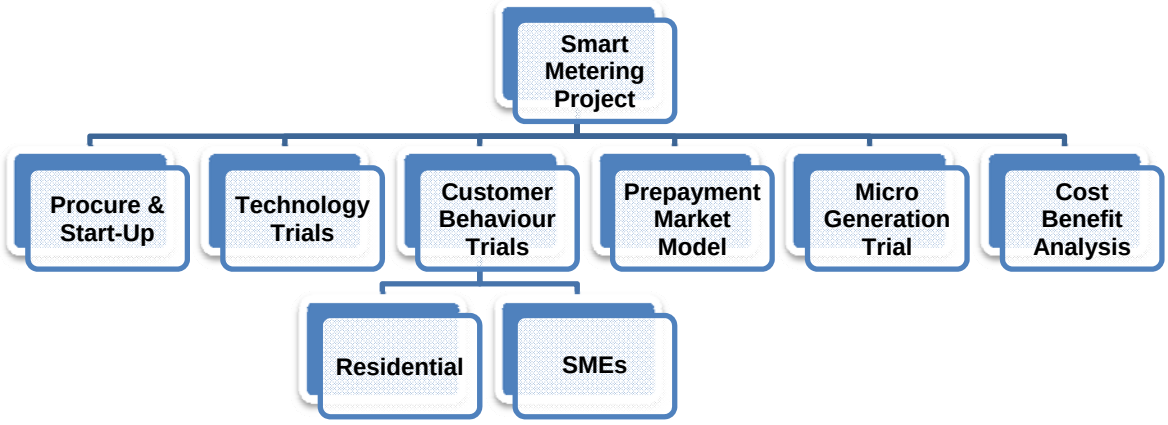
Governance Chart for Smart Metering Project Phase 1



4 Smart Metering Project Phase 1 Deliverables

The key deliverables of the Smart Metering Project are depicted in the diagram below:

High-Level Work Breakdown Structure (WBS) for Smart Metering Project



4.1 Procure & Start-Up

- All work required to procure the required Smart Metering technology infrastructure required for Phase 1 of the Project.
- Project Management activities undertaken to start-up & plan the Smart Metering Project Phase 1, as well as ongoing project management.

4.2 Technology Trials

- Develop an understanding of Smart Metering technology, processes and systems.
- Evaluate how the various communications technologies operate in the Irish environment – specifically in the areas of environmental conditions, meter position, building type and electrical network configurations.
- Evaluate and quantify the technical customer interface problems, procedures and solutions.
- Produce a high quality security architecture design that meets the unique challenges of introducing a large number of additional network points outside of the physical ESB environment.
- Develop processes for installing, repairing and replacing Smart Metering system components.
- Produce a recommendations and conclusions report to inform the business case, risk plan, technology design and deliver strategy for a full roll-out of Smart Metering.

4.3 Customer Behaviour Trials (CBTs)

- The overall objective of the CBTs is to ascertain the potential for smart metering enabled energy efficiency initiatives to effect measurable change in consumer behaviour in terms of reductions in peak electricity demand & overall energy (electricity & gas) use.
- The CBTs will focus on Residential & SME (small-to-medium enterprise) electricity & gas consumers.
- The CBTs will be designed & executed to ensure that statistically robust results will be produced that will give an accurate indication of what would be expected in a national smart metering roll-out scenario and the results will thus inform the Cost Benefit Analysis.

4.4 Prepayment Market Model

- Smart Metering offers new opportunities for expanding & improving Prepayment arrangements in the Irish electricity & gas markets. These opportunities will be analysed with the objective of agreeing a Smart Metering Prepayment Market Model.
- A specific Smart Metering Prepayment Trial can then be undertaken if required.

4.5 Micro Generation

- Smart Metering offers new opportunities for expanding Micro Generation of electricity. These opportunities will be explored as part of the Smart Metering Project.

4.6 Cost Benefit Analysis (CBA)

- Using information gathered via the different Trials conducted as part of the Smart Metering Project Phase 1 & from other sources a CBA will be developed to ascertain the costs & benefits that would be entailed in a full national roll-out of Smart Metering in Ireland.

5 Smart Metering Project Phase 1 Progress Update

2008 Summary Progress Update for Smart Metering Project Phase 1

Customer Behaviour Trials (CBTs)

Electricity Residential	Recruitment & Installation In Progress	
Electricity SME	Recruitment & Installation In Progress	
Gas Residential	Proposal Developed	
Gas SME	Proposal Developed	

Other Areas

Technology Trial	Scoped & Planned	
Prepayments	Scoping under way	
Micro-Generation	Scoping under way	
Cost Benefit Analysis	Scoped & Planned	

5.1 Vendors Selected for Smart Metering Project Phase 1

After an extensive procurement process undertaken by ESB Networks the following are the final Vendor Consortia list selected in Aug 2008 to supply the electricity smart metering infrastructure for the Smart Metering Project Phase 1:

- Elster & Energy ICT
- Trilliant & Iskrameko
- PRI & Aclara
- Sagem

5.2 Electricity Customer Behaviour Trial (CBT) Status

5.2.1 Customer Recruitment

- Letter Invitations began in Sept 2008 – random selection
- Excellent response rates (c.40% acceptance)
- On target to complete recruitment of all 6,400 customers (c.5,500 residential & c.900 SME) by end-March 2009

5.2.2 Meter Installation

- Procurement process concluded with appointment of Vendors in Aug 2008
- Installation started Dec 2008
- 250 meters installed by end-2008

- All 6,400 meters to be installed by May 2009

5.2.3 Trial Design

- The trial has been designed to ensure statistically robust results will be produced. Customers participating in the CBTs will be allocated to "control" groups & "test" groups. Various energy efficiency initiatives enabled by Smart Metering will be introduced to the "test" groups. These initiatives will take the form of:
    - Price signals that will encourage customers to transfer some of their electricity usage away from times of the day when demand for electricity is at its peak i.e. Time Of Use Tariffs.
    - Enhanced & more frequent information on electricity usage & costs for customers – via Billing, Web & Dynamic Display units – so as to enable self regulation of electricity consumption.

5.2.4 Trial Timeline

- *Jul-Dec 2009:* 6mth Benchmark Period (collect current electricity usage data before the Smart Metering enabled energy efficiency initiatives are introduced)
- *Jan-Dec 2010:* 12mth Test Period (measure electricity usage after the Smart Metering enabled energy efficiency initiatives)
- *Feb 2011:* Findings Report (understand effect of the Smart Metering enabled energy efficiency initiatives on customer usage via quantitative analysis of the electricity usage data by Statisticians & results of qualitative analysis by Market Researchers).

5.3 Technology Trials

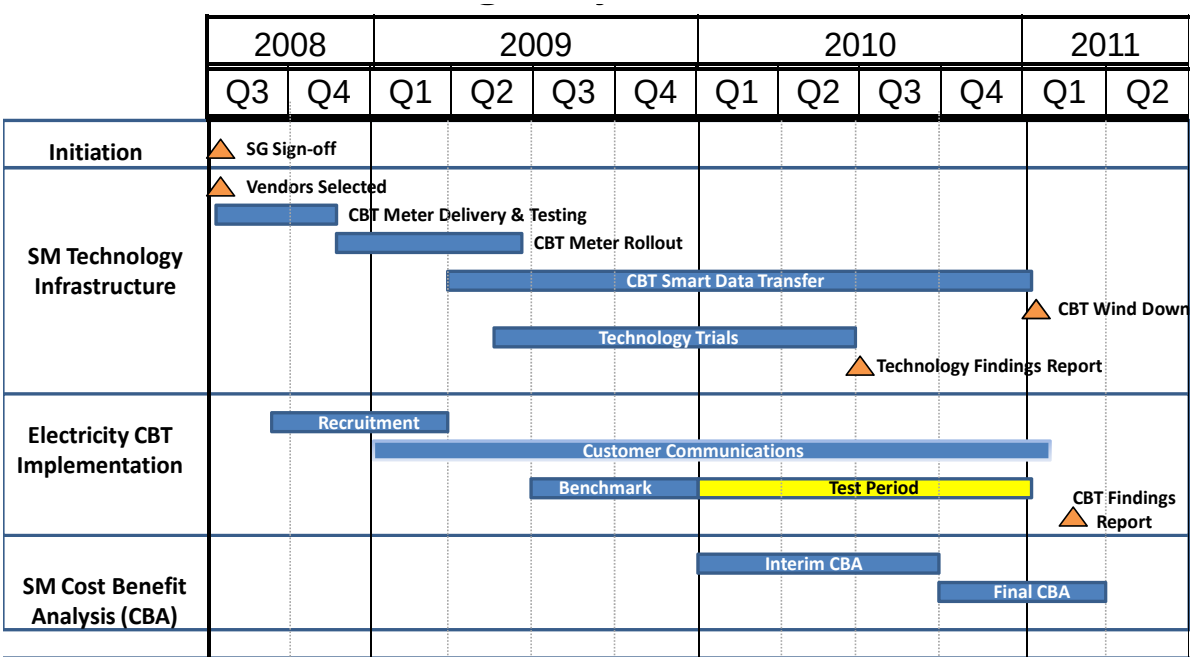
- Up to 10,000 smart meters to be installed.
- Trial various communication technologies viz. GPRS/3G, PLC, DLC & RF Mesh.
- Trial various functionality:
    - Interval and TOU Register Data
    - Kw and KVar – import and Export
    - Events/Tamper Alarms
    - Firmware Upgrades
    - Remote Configuration
    - Self registration
    - Outage Recording on Meter
    - Basic Power Quality Monitoring
    - Load Limiting, Variable settings
    - Embedded LAN communications chips
    - Remote Disconnection/Reconnection of customer supply
- Discussions kicked off in Dec 2008 between ESB Networks & the selected Vendors to agree detailed installation plans.
- Findings Report due June 2010.

5.4 Gas Customer Behaviour Trial (CBT)

Initial analysis appears to indicate that gas smart meters are only economic when leveraging off an electricity smart metering infrastructure. In order to further understand the Gas Smart Metering requirements CER have engaged in discussions with the Gas Industry (Bord Gáis Networks, Bord Gáis Energy Supply, Energia, Vayu, Flogas) during 2008. Proposals for Customer Behaviour Trials for Gas Residential & SME customers have been developed as a result of these discussions & are currently being reviewed by the Commission. In addition the Technology Trials will include some trialing of gas smart metering within the smart meter infrastructure selected for Phase 1 of the Project.

6 Smart Metering Project Phase 1 Timelines

High-Level timelines for the Smart Metering Project Phase 1 are depicted below. Timelines for the Gas CBT, Prepayment & Micro Generation work packages will be added when details are finalized.



7 Smart Metering Project Phase 1 Branding / Logo