CER Consultation on the Proposed National Rollout of Electricity and Gas Smart Metering

CER11191

ESB Networks Response

Status: Submitted

Date: 13/12/2011

ESB Networks Ltd.

Contents

1 INTRODUCTION

ESB Networks welcomes the proposal from the CER to recommend proceeding with a national rollout of smart meters to electricity customers. The functionality proposed is probably the most advanced in Europe to date. This will present major challenges in relation to technology, standards and costs. Nevertheless as meter owner, operator and data collector for the electricity market we have confidence that we can deliver a system which will enable the benefits identified in the national CBA to be achieved.

We believe that we should provide a smart metering system that has the customer benefits at its core. Such a system will enable better and more timely usage of information, facilitate time of use and other innovative tariffs and lead to better customer service. The rollout of a correctly specified smart metering system is also a key step in the development of the smart electricity network. The intelligent edge of the electricity network will be extended from the existing sub transmission distribution network to the customer's home. Smart metering and smart electricity networks are best supported by robust and secure communications network which would offer the operational flexibility not only to support smart metering but also the continued transformation of the electricity network.

2 Response to the List of Substantive Questions

2.1 Question 1 – Full rollout decision

We endorse the proposal for a full rollout of smart metering.

2.2 Question 2 – Proposed objectives of the National Smart Meter Program

We support the objectives as outlined in the paper.

The addition of gas metering by the CER will increase the complexity and risks around the rollout and these risks must be managed to ensure there is no negative impact on the benefits to the electricity customer.

We also believe that smart meters are a key step in the development of the smart electricity network. The "smartness" of the network over time will be manifested in making better use of technologies and solutions to better plan and run existing electricity network, to intelligently control generation, optimise investment and to enable new energy services and energy efficiency improvements. In particular the near real time and highly granular data from smart meters will help improve the operation of the network. While the thinking around smart networks continue to develop we believe it is important that the national smart metering program has as an objective **that smart metering is an essential and key component of the smart electricity network.**

While the functionality proposed at the meter level will likely support smart network requirements, ESB Networks is of the view that the communications infrastructure rollout for smart metering should support the needs of the smart electricity grid. Smart metering and smart grids are best supported by robust and secure communications network which would offer the operational flexibility not only to support smart metering but also the continued transformation of the electricity network. Such an infrastructure could provide the flexibility to facilitate the wide-scale installation of many thousands of remote controllable devices and monitoring points across the network.

In summary ESB Networks support the objectives outlined by CER but believe a greater emphasis should be put on smart metering and smart metering infrastructure being a key component and enabler of the smart electricity network.

2.3 Question 3 – Proposals relating to the Ownership, Display and Provision of Smart Metering Information

ESB Networks support the proposal in relation to data granularity. While the frequency at which this data is collected is not covered, we believe that for the long term benefits of smart metering to be achieved, we must have a system capable of reliably collecting this data at least once per day from all metering points from the outset.

The precise mechanism for providing data to suppliers should be determined at the next stage. Currently ESB Networks push all meter readings to suppliers through the market systems as set out in the Retail Market Design. The web portal will likely need to complement this approach.

We also support the thin prepay concept. The reliable and robust communications infrastructure will enable this. This concept is tried and trusted in the mobile phone industry. Smart metering is a new concept and to date however, this concept has already been shown to work in the electricity industry in Texas where many electricity suppliers are offering this version of prepayment. We believe that the thin prepay concept is a very satisfactory solution for suppliers and prepay customers. The other option, the so called thick prepayment has a number of significant disadvantages, namely it could impede a smooth change of supplier process, involve ESB Networks continually updating supplier tariff price changes on the meter and also be potentially limited to non standard and proprietary offerings.

We fully endorse the position in relation to data security, protection and vulnerable customers. ESB Networks has a proven track record on data protection and security. The security of the smart metering systems and the customer data on the system is of paramount importance to us. We will ensure that all data is confidential, retains its integrity and is only available to authorised entities when needed. As with any IT or OT implementation, the following basic security core principles should apply:

- Confidentiality and Privacy
- Integrity
- Availability
- Authentication and Identification
- Authorisation
- Non-Repudiation
- Auditing and Accounting

Security will have to apply to all components of the solution – this includes not just the IT systems but the communications systems, the smart meters and associated devices. Given the immature and proprietary nature of many of the potential components of the solution as they exist today there are many security issues to be addressed before any final rollout. ESB Networks takes the view that security capabilities are generally weak in many of the existing smart metering infrastructure solutions, but that the entry into the AMI market of significant IT, Networking and Communications companies is increasing the focus on addressing these security weaknesses. Initiatives and significant efforts are also being made to address security issues by organisations such as the National Institute of Standards and Technology (NIST) and the North American Electric Reliability Corporation (NERC) in the US and to a lesser extent the MD 441 and other standards activity in Europe. These efforts are already beginning to show progress and it must be assumed that the security capabilities of most smart metering system offerings will have advanced considerably before our procurement phase. We will apply the highest standards in the design procurement, testing and operation of the meters and associated system.

In relation to data protection, we believe the use of smart metering information for optimal network management, operation and development will be a core benefit of the smart meter system. ESB Networks consider that smart meter information comes under the existing terms of use of metering data for this purpose.

2.4 Question 4 – Electricity Smart Metering Systems functionality

ESB Networks supports the proposals in this section. The functionality is necessary to deliver the benefits of smart metering. From a cost, security and implementation perspective ESB Networks supports the communications module as part of the smart meter. This is consistent with almost every smart metering implementation worldwide to date.

2.5 Question 5 – Gas Smart Metering Systems functionality

No comment.

2.6 Question 6 – WAN functionality and technology.

ESB Networks broadly supports the CER's proposal for WAN functionality and technology. We believe that the communications system should be designed to allow information to be collected at least daily from each meter. In addition the communications network should have low latency (Sub 10seconds) for on demand activities such as meter operations and readings. It must also facilitate speedy remote firmware upgrades. The communications infrastructure is the riskiest component of the solution. We believe that it is probably best to have an end-to-end IP smart meter and communications architecture which can leverage 30 years of Internet Protocol technology development guaranteeing open standards and interoperability.

ESB Networks currently have trials ongoing on Conservation Voltage Reduction. This involves slightly reducing the network voltage so that many end user and network devices operate more efficiently thereby resulting in a reduction in energy consumption. These trials are showing positive results and that management of voltage on the network could be very beneficial. In addition other network trials such as dynamic network sectionalising will be tested. There are different levels of voltage control that could be implemented, and by increasing the tightness of the control, complexity will be increased. The ultimate complexity is to have a real time feedback loop from a set of end-of line customers at key points on distribution feeders to inform the degree by which the voltage can be reduced or sectionalising can take place, but at the same time ensure that the quality of supply is within standard. The eventual design of this system will depend on the marginal benefit that will be achieved through the very tight management of voltage, or other mechanisms for delivering almost the same result – such as measuring at medium voltage level. However at this stage we think it would be prudent to put provision in the Smart Meter Wan System for the ability to collect near real time voltage information from up to 15,000 customer meters so that these can be used as effective network sensors informing the operation of the network in real time.

The document outlines the services that may be provided by the back-end IT systems and specifically the Meter Data Management System (MDMS) to customers and suppliers. The MDMS should also summarise and prioritise information for the purpose of network operation and management and also the messaging interface with the network operators for the purpose of services over the smart metering infrastructure.

2.7 Question 7 – HAN functionality and technology.

We generally support the HAN proposals as outlined in the document.
Unlike most other European rollouts we will also need to have an embedded HAN in the meter. This is necessary to support the likely business requirements of the full rollout such as an In-Home Display (IHD) or equivalent for all customers. In addition we have to support secure two way communications with a gas meter in about 30% of our installations. The HAN delivery model, technology, and software will be a major challenge as there are currently no ideal solutions available and we may find ourselves 'blazing a trail' here in Ireland.

The HAN will also represent a major security challenge, we have to ensure that we are not introducing a backdoor point of attack into our smart metering system. The level of functionality to be supported in the HAN will determine the nature of the security solution required. Because the metering data sent into the home can be intelligently interpreted to establish a given consumers living patterns, this data must be secured from unauthorised access (this has been one of the concerns stalling the smart metering rollout in Holland for example). In addition, if the HAN is to be used to pass data to support demand response, then the integrity and the availability of the HAN services must be guaranteed.

The model, which we support, assumes that all metering devices (Electricity, Gas, other electricity meter plus display device) would exist on a secure utility controlled HAN. All other devices could exist on a separate customer controlled HAN which might be linked to their supplier(s) via the internet. A Gateway between the Utility HAN and the Customer HAN would be required to allow exchange of consumption data and possibly messages. This is a high level proposal and the technical challenges involved in implementing it have not yet been determined.

2.8 Question 8 – Procurement and regulatory Issues

We agree with CER's proposal in relation to the procurement model.

We support the view that ESB Networks should have responsibility for the communications solution. ESB Networks believe that the best approach will be for us to procure the communications solution based on its ability to meet business requirements, performance requirements, security and meet appropriate standards while delivering lowest total cost of ownership. For the 30% or so of homes with gas, that the electricity meter can also act as the hub to communicate with the smart gas meter. We believe that this approach makes economic sense. We welcome the opportunity to co-operate based on this concept with BGN. It is important that the economic benefits and additional potential risks of such an approach are shared fairly between the electricity and gas customers.

In relation to the IHD, we recognise that for many customers an IHD will provide a great help to them in managing their electricity. This was demonstrated in the pilot. ESB Networks will put in place through the HAN, the capability for the consumption information to be passed in a secure and reliable manner based on open standards to the IHD or equivalent display device. This approach will allow the customers to purchase their own suitable display devices that can receive usage information from the meter or energy suppliers could also provide such displays as part of their service to the customer.

Rolling out the initial IHD's to all customers as part of the rollout will be a complex undertaking. We recognise the economic, logistical and implementational benefits of ESB Networks providing a simple and standard initial display in conjunction with the rollout of smart meters for all. Therefore, based on these assumptions it is better for the industry as a whole if we provided the initial IHD.

The preferred approach is:

- ESB Networks provide a relatively simple IHD based on agreed functional and technical requirements signed off by CER and the Industry
- IHD has assumed working life of 5 years
- The IHD would be designed to cater for the mandated time of use tariff.
- First level user support for customers would be provided by all suppliers
- ESB Networks puts in place arrangements for second level or technical support for up to 2 years after the IHD has been installed.
- Replacement IHD's or other future display options are a matter for either the customer or their energy supplier. The smart meter HAN should have the capability for consumption information to be passed in a secure and reliable manner based on open standards to these devices.

.

2.9 Question 9 – Implementation timetable

We would support the timetable set down. Smart metering will be a large and complex project – it is about much more than meters. There are major new IT systems together with new businesses and market processes to be implemented. These systems need to be designed, specified, procured, installed, tested and integrated. The IT work alone could be of the same order of magnitude as that for the opening of the Electricity Retail market. In the case of meters and IHD's our experience is that you need to also allow considerable time (many months) for testing in the field as any hardware related problem not discovered in testing would require revisits post install. In addition given the risk and immaturity of many of our communications options it may be necessary for us to include in the procurement process a significant element of in the field evaluation. When it comes to the installation phase this will be a huge logistical exercise requiring hundreds of installers working at any given time over a three to four year period.