Commission for Energy Regulation

An Coimisiún um Rialáil Fuinnimh

ESB Networks Proposed Electric Vehicle Pilot

DOCUMENT TYPE:	Consultation Paper
REFERENCE:	CER/13/240
DATE PUBLISHED:	25 October 2013
CLOSING DATE:	25 November 2013
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Executive Summary

ESB Networks as Distribution System Operator (DSO) has made a submission to the CER regarding a pilot project on Electric Vehicles (EVs). This consultation paper outlines the CER's initial view on this pilot project and ESB Networks proposal to recover some of the costs associated with this project from the distribution customer. The pilot by ESB Networks entails the roll out of a charging infrastructure which will enable ESB Networks to fully assess the impact of EVs on the Irish distribution system. ESB Networks has formally requested approval for expenditure on this project from the CER as part of the general allowance for Research and Development under the 2011-2015 distribution network price control (PR3).

As part of the National Energy Efficiency Action Plan[1], Ireland has set a target to have 10% of passenger cars and light commercial fleet powered electrically by 2020 (approximately 230,000 vehicles). ESB Networks, while committed to this target, is concerned of the impact and challenges of the introduction of EVs on the distribution network and the meter registration system. Ireland's current electricity distribution network and data collection systems were not designed with EVs in mind, so planning and research is required to ensure that the increased load can be accommodated in the most efficient way and without having a negative impact on security and reliability of supply. The addition of EVs to the existing electricity distribution network may also provide opportunities for increased demand side participation and improved use of renewable energy.

In light of these issues ESB Networks has developed an EV pilot scheme which it plans to commence in 2013. The pilot will support learning about EV technology and expected interaction with the distribution system in terms of safety, connection standards, mobile lead measurement, controllability and ICT and user behaviour.

ESB Networks has requested funding for this pilot, with a proposal that it should come from the previously approved R&D budget for PR3. The CER's initial view is that, given the potentially huge importance of EVs for the Irish electricity system, there is a case for increasing the R&D budget to fund an efficient pilot project, subject to certain criteria. The criteria which are outlined in full in Section 3 of this paper require that the focus of the pilot should be to maximise the long term benefits for the electricity customer. Any costs incurred during the pilot beyond those deemed recoverable by the CER are to be met by ESB Networks.

[1] Maximising Ireland's Energy Efficiency - The National Energy Efficiency Action Plan to 2009 – 2020 (available at http://www.dcenr.gov.ie/NR/rdonlyres/FC3D76AF-7FF1-483F-81CD-52DCB0C73097/0/NEEAP_full_launch_report.pdf)

1.0 Introduction

1.1 The Commission for Energy Regulation

The Commission for Energy Regulation (CER) is the independent body responsible for overseeing the regulation of Ireland's electricity and gas sectors. The CER was established and granted regulatory powers over the electricity market under the *Electricity Regulation Act 1999. 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 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 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 seek the view of the public and CER's stakeholders on the request made by ESB Networks to approve funding for an EV pilot project.

In order to make an informed and impartial decision on this topic, the CER wishes to obtain comments from members of the public, the energy industry, customers and all interested parties. The CER commits to considering all views and affording each respondent the opportunity to clarify any issue raised in this paper.

1.3 Related Documents

ESB Networks have submitted to the CER a R&D Project Submission Summary and a more detailed Pilot Project Implementation Document outlining their proposed EV pilot. Both documents are published alongside this paper.

- ESB Networks Electric Vehicle Pilot – R&D Project Submission Summary
- ESB Networks, Preparation for EV's on the Distribution System – Pilot Project Implementation Document

1.4 Responding to this paper

Responses to the views set out in this consultation paper should be sent by **25 November 2013**. Responses should be sent, preferably by email, to:

Deirdre Bell (dbell@cer.ie)
Commission for Energy Regulation
The Exchange,
Belgard Square North
Tallaght
Dublin 24

Please note it is the CER's intention to publish all responses, therefore confidential information should be marked clearly as such and where possible placed in a separate annex to the response.

2.0 Overview

2.1 Electric Vehicles

Electric vehicles (pure electric vehicles and plug in hybrids)[2] have been identified as an important method of improving energy efficiency in the transport sector. In a move to increase the number of EVs in Ireland the Government has introduced several incentive schemes to encourage EV ownership such as grants from Sustainable Energy Ireland and VRT relief.

Under the *National Energy Efficiency Action Plan 2009-2020* Ireland has set a target to have 10% of passenger cars and light commercial fleets electrically powered by 2020. This target has been set by Ireland's obligations under the EU Renewable Energy Directive – Directive 2009/28/EC 23 April 2009. The European Commission has also put in place a EU-wide initiative called Green eMotion, with the aim of facilitating the roll-out of EVs throughout the EU.

2.2 Impact of EVs on the Irish Distribution System

ESB Networks as the licenced operator of the Irish Distribution System is responsible for building, operating, maintaining and developing the electricity network and serving all electricity customers in the Republic of Ireland. Part of this responsibility includes monitoring the impact of various forms of consumption load on the safe, secure and reliable operation of the system. The DSO now considers that this responsibility includes considering the impact of EVs on the distribution system. ESB Networks must ensure the distribution system is prepared to safely host the charging load created by EVs to meet the driving requirements of owners.

ESB Networks has identified that the connection of EVs in Ireland is likely to have a significant impact on the Irish distribution network and meter management systems, particularly if the number of EVs on the system reach a critical mass in the coming years. Impacts may be localised if there is a high EV load centred in a particular part of the network or they may be system wide as levels of EVs charging across the network increase. The impacts may also be specific to certain times of the day in line with EV owners charging patterns. Key Issues such as connection standards, load management standards and safety standards need to be examined so as to minimise any negative impact on the distribution system.

Information provided by ESB Networks indicates that there are approximately 600 EVs in Ireland at present. Initial research on the habits of charging of these EVs demonstrates that the majority of charging will take place in owner's homes at night time. These charging patterns, if not controlled, could create a significant load to the network, and if penetration of EVs increases it may cause a need for reinforcement of lower and medium voltage networks. Conversely, if managed correctly this extra load may bring benefits to the system, for example it may be used as an opportunity to dampen the volatility created by wind energy, and reduce curtailment levels. Also,

[2] https://www.esb.ie/electric-cars/index.jsp

if there is significantly increased usage of EVs, then this would result in increased usage of electricity in Ireland. If this is managed appropriately, without creating a major need for the reinforcement of networks mentioned above, then this increased usage could have a significant effect on network tariffs, and could potentially drive them down significantly and thus lead to somewhat lower electricity prices. On the other hand, if EV charging increased demand to a very high level at particular times of the day, then there would be the possibility of localised outages or impacts on quality of supply.

Overall, increased usage of EVs presents both major opportunities and threats to the Irish electricity system. As such, they need to be studied carefully in terms of their effects and the possible costs and benefits thereof.

2.3 CER Decision on the 2011 to 2015 Distribution Revenue for ESB Networks

In the *Decision Paper on the 2011 to 2015 Distribution Revenue for ESB Networks* the CER gave an initial view that EV charging infrastructure is not formally part of the distribution system. This initial view has not changed. The request which is now submitted by ESB Networks to the CER is for the purpose of research to prepare the distribution system for the connection of EVs and to assess the impact of EV charging on the distribution system. As the EV pilot is not for the purpose of developing a charging infrastructure, but is primarily for research purposes and preparation of the distribution system, as well as helping to facilitate policy goals the CER is consulting on the issue, and, given the importance of this area, may be minded to increase the PR3 R&D allowance, albeit with a number of conditions attached.

2.4 ESB Networks Proposal

ESB Networks have submitted a detailed proposal to the CER for approval for funding for an EV pilot. The proposed pilot, which is outlined in detail in the attached documents, will involve the development of and roll out of an EV charging infrastructure. The availability of fast, reliable charging infrastructure across the country is a key enabler for the development of EVs. Without charging infrastructure at regular intervals, the issue of “range anxiety” for EV users remains, while EVs will not develop if it takes a significantly long time to charge a car, before completing a journey. The development of pilot charging infrastructure will allow ESB Networks to then determine variables and implications of a full roll out of EV charging infrastructure (to support a high level of EV penetration in line with Government targets) on the network. The pilot will involve working with stakeholders and collaborating with other jurisdictions to ensure use of international best practice. It is envisaged that the trial will take three years to complete and the results of this pilot will aid the formation of future policy decisions on EVs.

Some of the key steps involved in the proposed trial include:

- Trialling a range of electric cars across a wide spectrum of potential users
- Trialling a range of electric cars across a range of network topographies – rural and urban
- Installation of metering systems and IT systems to monitor charging patterns
- Installation of up to 1,500 AC charge points, 29 DC Fast-Charge points and up to 2,000 home chargers to establish a wide spread charging infrastructure
- Identification of and trialling of solutions to increase the distributions network capability of hosting EVs without customer involvement
- Development of price structures with EirGrid and Suppliers to encourage smart charging through incentives, whilst ensuring network limitations are accommodated
- Evaluate the benefits to the system in terms of demand side management and optimising use of renewables
- Evaluation of overall impact on customers
- Collaboration with electricity suppliers to consider tariff options and the post-trial market structure design
- Engagement with the public to promote awareness of EVs and the benefit of integrating EVs to the distribution system

Full details of the trial are outlined in the accompanying documents. Respondents to the consultation are invited to respond with any comments on the proposed trial, its scope and network impacts which it seeks to measure.

3.0 CER Proposed Decision

3.1 CER Proposals

Given Ireland's target to achieve 10% of EVs by 2020, the CER recognises that the distribution system must be ready to support the connection of EVs. Notwithstanding the CER's view that the charging infrastructure itself is not part of the distribution network, the CER is of the view that it is important to determine the likely impacts of EVs on the distribution system. For this reason, the CER agrees that an extensive pilot project is required to ensure that the increased load that will be created by EVs is accommodated in the most efficient way possible, without compromising safety, security and reliability of supply and with the least possible impact on the customer. It is therefore the initial view of the CER that the PR3 R&D revenue allowance be increased to accommodate funding for the EV pilot proposed by ESB Networks, and allowed from DUoS (Distribution Use of System) tariffs, subject to the following considerations:

- The pilot must focus on the impact of EVs on the existing network under a range of scenarios such as rural and urban network and various network topologies and locations;

- The pilot must take into account relevant safety risks associated with the roll out of installations of EV charging points. This includes risks relating to the

distribution system and also relating to the safety of work completed on the customer side of the meter;

- The pilot project must quantify the benefits of EVs on the network, such as demand side management and curtailment optimisation. The pilot needs to identify what, if any network reinforcements will be required in the future if EV penetration reaches 10% by 2020. The impact on and benefit to electricity customers from EVs must be reported on in the final assessment of the trial;

- ESB Networks should take all measures to minimise the cost of the undertaking of this pilot and that any savings which are made will be passed to the DUoS customer.

- ESB Networks must design the EV pilot such that the assets and infrastructure could be sold to a third party. This option will be considered at the end of the trial as part of the options to minimise costs to consumers.

3.2 Recovery of Costs

ESB Networks have requested approval of €25m for the pilot which would be composed of the remaining €6m of their existing R&D budget approved in PR3 and a further €19m to be allowed by the CER to be recovered from the DUoS customer. Subject to the above criteria being met, the CER is taking an initial view that there should be an increase in the R&D budget. It does not yet have a view as to the total amount to be recovered, but would assume that €25m will be the absolute maximum recoverable to ESB Networks through the DUoS tariffs over the course of this project. Any overrun cost of the pilot beyond whatever may be allowed will be carried by ESB Networks. Any savings accrued if the cost of the pilot runs under will be passed to the customer.

3.3 RAB

The CER propose that any infrastructure developed over the course of the pilot will not be added to ESB Networks RAB at this point. Once the pilot has been completed the CER will discuss the future use of or sale of the infrastructure developed, whilst taking into account the DUoS customer investment and the results of the trial.

3.4 Reporting

The CER propose that ESB Networks provide the CER with annual reports on the progress of the pilot including a final report at the end of the trial outlining in detail the results of the pilot. This report will be published on the CER website.

4.0 Conclusion

4.1 Conclusion

The CER welcomes comments on any of the issues raised in this consultation paper and it will consider the responses prior to making a decision on the proposed ESB Networks EV pilot.

5.0 Next Steps

Responses are invited on the proposals set out in this consultation paper by **25 November 2013.** After the consultation period closes the CER will review all responses and may engage further with ESB Networks on any material responses it receives.

It is envisaged that a Decision Paper will be published in **December 2013**.

Responses should be sent, preferably by email, to:

Deirdre Bell (dbell@cer.ie)
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