



Introduction

IBM welcomes the publication of the 'ESB Networks Proposed Electric Vehicle Pilot' consultation paper (CER/13/240) as it is a firm acknowledgement of the important role that electric vehicles (EV) have to play in both the emerging value chain within the electricity industry and also the move towards the electrification of transportation both globally and at a European and national level.

Positive Global Outlook for EVs

While industry analysts may vary as to the pace of adoption of EVs the consensus view as summarised in the International Energy Agency sponsored report 'Global EV Outlook – Understanding the Electric Vehicle Landscape to 2020' (April 2013) is that *'electric mobility continues to advance toward a better state of art and a more durable market presence'*

This position has been achieved through a commitment of both governments and industry to addressing the barriers impacting on the development of the industry.

Significant investment in the area of research and development by both the automotive and electricity industries and organisations such as IBM, through our involvement in the Battery 500 programme, has seen major reductions in the cost and improvements in the performance of battery technology necessary to drive consumer adoption.

Investment in accessible and efficient charging infrastructure that is reflective of consumer driving patterns in terms of travel times and distances is also key to addressing consumer concerns in relation to the availability of charging facilities. The importance of having publically accessible charging points is recognised in the Clean Package for Transport (EU Directive Proposal January 2013) which is proposing to mandate minimum numbers of charging points for member states by 2020.

Demographic trends are also driving the need for a move towards the electrification of transportation. IBM through our Smarter Cities programme has highlighted that by 2050 almost 70% of the world's population will live in cities and therefore from a sustainability perspective the electrification of transport is key.

Role of EVs in the Emerging Electricity Value Chain

The traditional electricity value chain is based on centralised power generation feeding into a transmission, distribution and supply pathway. It is as summarised in the diagram below, characterised by one way flow of power and information from producer to consumers, where all but the largest consumers are “*passive rate payers*”

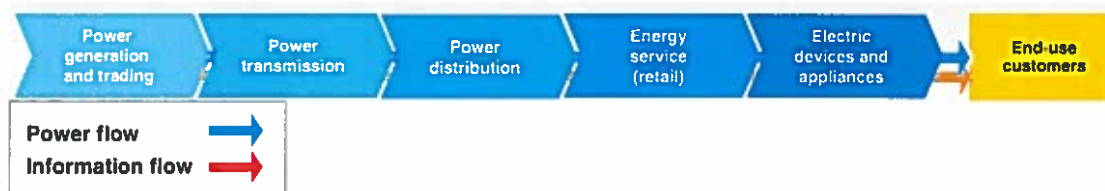


Fig 1 – Traditional Electricity Value Chain

However this industry value chain which has remained relatively unchanged over the last one hundred years is now undergoing a fundamental transformation.

This transformation is being driven by combination of the following factors

- **Shifts in Government and regulatory policies** –Energy sustainability is a focus area for governments looking to meet climate change targets, ensure national energy security and stimulate economic activity via new sustainable industries. This is driving growth in renewable distributed energy which is challenging the traditional centralised power generation model.
- **Advent of new technologies** – New technologies such as smart grid, smart metering, EVs, advanced storage and distributed generation are enabling the multi-directional flow of information and power across electricity networks.
- **More demanding consumers** – In addition to their growing awareness of energy conservation and technological advances consumers are, influenced by their experience in industries such as telecommunications, seeking more control over their involvement in the electricity value chain.

The impact on the traditional electricity value chain of these factors can be summarised as follows

- The value chain is extending further, growing more complex and involving new non-traditional industry participants
- Information and power are flowing in multiple directions and new business models are emerging to leverage these increased information flows.
- Consumers are changing from passive recipients of power to active, empowered value chain participants.
- Distributed resources (e.g., distributed generation, storage and EVs) are playing an increasing role in operations and value creation

This emerging electricity value chain is summarised in the diagram below

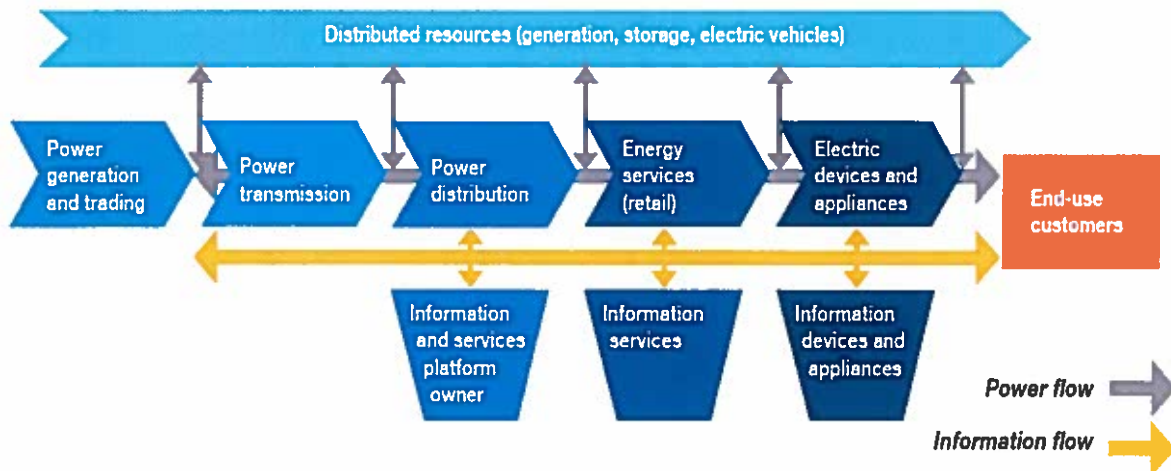


Fig 2 – Emerging Electricity Value Chain

EVs have a key role to play in this value chain both in terms of being a consumer of energy but also with the advent of vehicle to grid technologies as a means of storing energy. For countries such as Ireland where it is planned that renewable generation will form a very significant part of the generation mix then having an effective means of energy storage will be increasingly important in achieving a balance between production and consumption of energy.

Therefore EVs have not only a key role to play in the future of the transport sector but also will be an integral part of the electricity industry value chain of the future.

EVs - Attractiveness of Ireland as a Location

As referenced earlier in this response IBM is committed to the development of the EVs sector and has made significant investment in the area globally.

Having studied the EV initiatives taking place across a large number of countries we recognise that Ireland has a unique combination of factors that makes it an attractive location for the development of EVs. In addition to having a supportive government policy Ireland also has a climate that enables high levels of wind generation as well as being ideally suited for EV battery performance.

The approach adopted by Ireland to the provision of a charging infrastructure that is truly nationwide is also forward thinking. Many of the initiatives taking place elsewhere have focused exclusively on single urban locations (e.g. single city) with limited if any consideration of rural locations. However the adoption of such an all inclusive infrastructure does present a series of challenges from a DSO perspective. Fully understanding the system impact of such loads on the distribution system does require further research.

Therefore it is welcome that the scope of the proposed pilot will see



IBM Response to CER Consultation Paper (CER/13/240)

- 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 a national charging infrastructure inclusive of AC and DC public chargers plus home chargers to establish a sufficient basis for analysis of customer behaviour and energy usage patterns
- Identification of and trialling of solutions to increase the distributions network capability of hosting EVs in line with the forecast take up levels

Customer focus – Education, Awareness and Understanding Behaviour

In spite of the significant progress made in addressing the barriers to the wide spread adoption of EVs hurdles to the adoption of EVs do remain, with concerns primarily centred on price and vehicle range.

To further understand these hurdles and gauge consumer and industry attitudes about EVs, IBM coupled interviews with executives from both leading and emerging automotive companies with a survey of US consumers who rely on cars as their primary transportation mode

Through our survey, we discovered that average consumers seem to appreciate the sustainability benefits of driving an EV. However, they aren't particularly interested in paying a higher premium to purchase one. In addition, they have concerns regarding total miles per battery charge – despite the fact that today's electric cars can typically handle the average driver's daily needs without needing to recharge.

Our study also revealed another potential roadblock that can certainly be addressed by the industry – the simple fact that many consumers don't know enough about EVs. Even those who consider themselves knowledgeable had misconceptions

Therefore it is welcomed that the scope of the proposed pilot will include

- Evaluation of overall impact on customers
- Engagement with the public to promote awareness of EVs and the benefit of integrating EVs to the distribution system

Importance of Open Standards and Compatibility with Developing Standards

It is critical that the EV initiative in Ireland continues to take cognisance of developments that are taken place at both a European and global level in relation to the development of standards.

In order to ensure inter-operability and to protect the investment in charging infrastructure and supporting IT systems it is key that the proposed pilot should adhere to existing and emerging standards in the area



Developing an Appropriate Market Structure

In addition to the power engineering, IT and consumer behaviour related issues that need to be addressed by the pilot it is equally important that the pilot address the development of a market structure that seeks both to leverage the existing investment in market systems but also recognises that mobile nature of the charging activity

Accordingly it is to be welcomed that the scope of the proposed pilot includes

- Collaboration with electricity suppliers to consider tariff options and the post-trial market structure design

Adopting Scalable Solutions

Solutions that are considered during the proposed pilot need to have the ability to scale to handle the anticipated levels of demand following wide spread adoption of EVs while at the same time provide an affordable operating model during the early adopter phase of the market.

Accordingly it is welcomed that the scope of the proposed pilot will include

- Installation of metering systems and IT systems to monitor charging patterns