



The
University
Of
Sheffield.



E-Futures

Smart Meters

Goudarz Poursharif

dtp11gp@sheffield.ac.uk

10.02.2012



The
University
Of
Sheffield.



ASSIGNMENT COVER SHEET 2010/2011

A completed copy of this sheet MUST be attached to coursework contributing towards theme 2 assessment.

Name :	Goudarz Poursharif
Degree Course:	E-Futures DTC
Supervisor:	Professor Jie Zhang
Signature:	

I declare that this work is my own and that I have made appropriate reference to any sources used. I am aware of the handbook section on 'Plagiarism' and declare that this work is consistent with those guidelines.

Mini-Project Mark Sheet

Student:

Grade: fail/satisfactory/good/very-good/excellent

Supervisor:

Feedback:

	Excellent	Good	Average	Poor	Very Poor	Not Done	Not applicable
Introduction to the problem / subject							
Statement of aims							
Experimental description							
Presentation of results / findings							
Quality and depth of discussion / interpretation							
Relevance of conclusions							
Quality of English							
Use of reference material							
Evidence of external reading							
Quality of presentation							
Use of figures							

Comments:

Introduction

Smart cities, smart homes, smart appliances, are amongst some of the most widely used terms in the 21st century, but perhaps in the heart of all of these novel ideas lie the most important feature of all which are smart meters. Basically, smart meters are the enablers of all of the above-mentioned innovations and none of them could become a reality without using more informative metering systems.

With growing concerns over the climate change caused by Carbon emissions released to the air and evermore stringent regulations imposed on countries, the energy industry as one of the major producers of CO₂ is under huge pressure to reduce the amount of CO₂ emitted to the air. On the other hand, the rising costs of energy production and supply and the current financial crisis in Europe and the US contribute to the need for the consumers to be more energy consumption conscious. Potentially, smart meters can make domestic and industrial customers more aware of their energy use and help them save energy which effectively means reducing their bills. At the same time, they can help the energy sector modernise its processes whilst cutting down the production levels and emissions.

However, the way in which smart meters are deployed, used, and regulated are the key factors in determining whether such benefits are achievable or not and that is the reason why this study has been carried out, to investigate those issues. This study attempts to:

- Investigate the full benefits and issues related to smart meters
- Legal and policy issues behind deployment of smart meters in Europe and the UK
- The implementation strategies in some of the leading European countries
- The implementation strategies and roll-out scenarios in the UK
- The landscape of smart meters deployment and use in the UK and how smart meters can be used effectively

As the domestic sector uses about 29% of the energy in the UK¹, the focus of this project is mainly on this sector. The project was carried out by going through the documents and papers issues by the EU, the UK government and regulatory bodies, suppliers and independent researchers.

Benefits and Issues

Smart Meters can play a huge role in transition to low Carbon economies by providing feedback information to the users, suppliers, network operators, regulators and governmental bodies². Potentially, smart meter can bring about important different benefits to various stakeholders such as consumers, suppliers, network and grid operator, regulators, governments, and the societies. The roll-out of smart meters will have the following benefits for consumers²:

- No more estimated bills
- More visibility and control of energy consumption and spending
- Real-time information
- Better service from the suppliers
- Behaviour change
- More energy efficient households
- Easy switching between suppliers
- More innovative tariffs

- Remote automation of services which could reduce costs and increase comfort and control
- Debt management
- Historical data records for complaints
- Bill queries

In a similar vein suppliers and network operators can benefit from the roll-out of smart meters and these benefits are as follows³:

- Carbon emissions reduction
- Being able to read the meters remotely
- Fewer home visits
- Alerts for power cuts, correction action, and outages and Immediate reconnection
- Peak load management
- Reformation and modernization of processes
- Development of super grids and the potential for accommodating more renewable sources of energy
- More informed Investment decisions for further development

Governments and the societies can also benefit from this roll-out in the following ways³:

- £17.8 billion over £7.2 billion net profit from energy saving
- Meeting the national and international carbon reduction commitments
- Following the legal national and international requirements and guidelines
- More innovative and competitive market
- Better consumer engagement and feedback facilities
- Transition to a low Carbon economy and climate change mitigation

However, there are some issues regarding the deployment smart meter, which can affect the viability of the programme and the next section discusses some of those identified issues. These issues are: stakeholder engagement, privacy and data security, design requirements and interoperability.

Implementation strategies in Europe

As it was mentioned earlier most European countries have been trying to implement some kind of intelligent metering systems due to the regulatory push from the EU and their own national initiatives. These countries and their status can be divided into five categories based on their legal and regulatory status and their implementation progress (figure1). Based on these two criteria the European countries are divided into the following groups: ***The Dynamic Movers*** are the countries which have got clear plans for the roll-out of smart meters and the mandate for the roll-out is provided as well as targets and goals⁴ (figure1). ***The Market Drivers*** are the countries in which there is no legal force for the deployment but the distribution networks or suppliers have decided to roll-out smart meters due to the consumers demand or market competition⁴ (figure1). ***The Ambiguous Movers*** are the ones where the roll-out is an important issue and the legal requirements are in place but due to lack of clarity, progress in implantation cannot be achieved⁴ (figure1). ***The wavers*** are the countries that show some interest in smart meters but there is no regulatory push in place to enforce

the roll-out of smart meters⁴ (figure1). *The Laggards* are the countries in which smart meters are not even an issue⁴ (figure1).

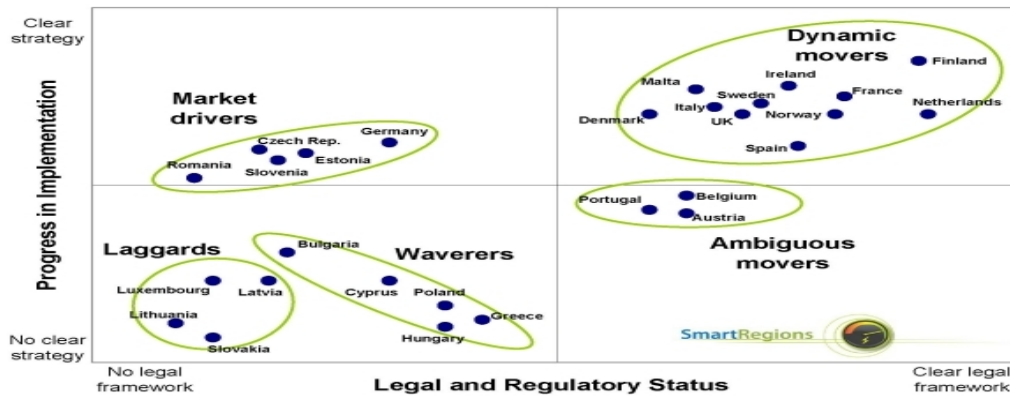


Figure 1: Smart Meter Implementation Status in Europe⁴

Implementation strategies in the UK

The UK’s approach for the roll-out of the smart meters has been a staged approach, which consists of three stages. The first stage was the consultation phase from 2008-2011, during which consultation documents were issued by OFGEM and the cost-benefit study was carried out by Mott MacDonald on behalf of OFGEM. After the decisions were made on the policy designs, meter and communication systems specifications, and data privacy and security measures, the implementation moved to the second stage which was the foundation stage (figure2)⁵.

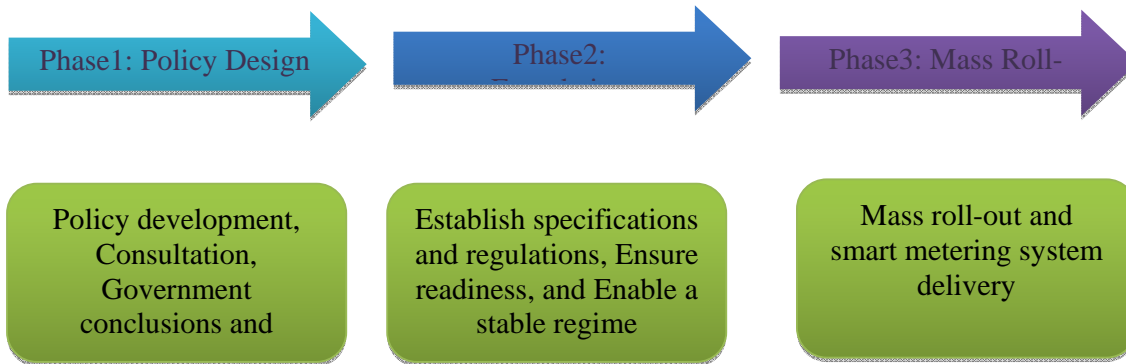


Figure 2: Programme Phasing

The foundation phase is the beginning of the establishment of the regulatory and commercial framework and development of trials and consumers engagement schemes⁵. The foundation stage is an opportunity to test and identify potential problems ahead of the third stage which is the mass roll-out stage (figure2)⁵.

Conclusion

Unfortunately, the energy industry, especially the gas and electricity sectors within the industry, have been lagging behind in terms of switch over from analog to digital. However, this change is being made by the industry due to the availability of more advanced devices, the rising energy production costs, the need for more efficient and less polluting processes. Governments have also been promoting the roll-out of smart meters and smart grids due to their national and international commitments, especially in terms of their Carbon emissions reduction targets. The EU has been trying to promote the use of more intelligent metering systems in the member states, but each country has chosen its own approach. More detailed Directives, a more appropriate regulatory push along with more specific targets and guidelines can lead to a more uniform approach across the whole of Europe. This can increase the chances of obtaining the full benefits of smart meters deployment in Europe. The EU can also publish guidelines which can promote market competition in metering systems, communication design and tariffs. The UK is one of the most dynamic countries in Europe in terms of smart meters roll-out plans and targets. Cost-benefit studies have been carried out, roll-out and regulation policies have been defined, measures for data security and privacy have been foreseen, trials have been done and targets are clear. However, consumer engagement plays a vital role in the fate of these plans. Consumers come from diverse backgrounds, different households with a variety of needs and priorities. The public interest in smart meters is usually due to the savings they can make on their bill and the more control and awareness that they can have on their energy consumption. In order for smart meters to work and successfully contribute to the industry and country consumers need to be in the centre of any plans.

Tariffs should be tailored in a way that approaches needs and priorities of specific groups and households. The “one size fits all” approach cannot achieve the optimum results. There must be flexible tariffs defined for different types of household and in order for these tariffs to be fully representative of various households, community group meetings and networking sessions must be held continuously, even after installation of meters, because feedback must be gathered from different users and the suppliers should be able to react appropriately. Installation visits are also of utmost importance and should not be treated by the suppliers as a marketing visit. As the code of practice published by OFGEM clearly states and the studies have also proved, the installation visits should be treated as an opportunity to ensure the optimum use of the meter is achieved by the consumers. If this is achieved, the suppliers, the network operators, the regulatory bodies, the government, and the whole society will benefit from smart meters in the long term.

References:

1. Perry, Mike. Smart meters, renewable energy technologies and housing refurbishment, BRE. 2011
2. Department of Energy and Climate Change and the Office of Gas and Electricity Markets. Smart meters prospectus. 2011
3. Department of Energy and Climate Change and the Office of Gas and Electricity Markets. Smart meters functional requirements catalogue. 2011
4. Stephen Renner et al. European Smart Metering Landscape Report. 2011, Smartregion
5. Department of Energy and Climate Change and the Office of Gas and Electricity Markets. Response to prospectus consultation. 2011.

