Smart metering roll-out

The role of geographic intelligence
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Smart metering is a foundation plank of the Government’s energy policy and is key to meeting the UK’s carbon emission reduction targets.

In March 2011 the Department for Energy and Climate Change (DECC) published its roll-out strategy\(^1\), which included a proposed framework for driving completion.

For energy suppliers the benefits of smart metering include:

- Lower customer care costs – increased self-service, greater call centre productivity, reductions in billing queries, complaints and site visits
- Lower meter reading costs – through remote reading
- Better management of customer debt - through more timely consumption information
- Reduced energy theft – through smart tamper alarms
- Increased customer trust – better, more transparent billing and more information, enhancing the customer experience
- Flexible tariffs - pricing structures that smooth demand peaks and optimise network usage
- Improved bill to cash process – better consumption information will mean more efficient retail billing and wholesale reconciliation

But there will be obligations too. Energy suppliers will have to meet a completion target and provide mandatory reports on progress including not only numbers installed, but also the consumer experience. The government intends the full roll out to begin in the Autumn of 2015 and be completed in 2020. (see Figure 1)

The time before full roll out is intended to allow for a reliable communications infrastructure to be put in place and customers to be better engaged compared to previously published targets in order to secure early delivery of the benefits. This means the mass roll-out to consumers will start in the second quarter of 2014 and be completed in 2019, a year earlier than originally envisaged. Ofgem will monitor compliance with suppliers' obligations as part of its enforcement work. The first tranche of regulatory obligations on suppliers came into force Q2 2012, including the mandated roll-out completion date and the Installation code of practice.

\(^1\) Smart Metering Implementation Programme, Response to Prospectus Consultation, Overview Document, DECC, 30 March 2011.
Some complex challenges

As the end of the foundation stage approaches there are still many challenges on the road ahead.

The smart meter is an infrastructure asset. Energy retailers have the potential to become asset owners, where they will have to design, roll-out, manage and eventually retire asset devices. The smart meter and its display will become a key interface between supplier and consumer. Asset management is new territory for retailers and there are significant risks of sub-optimal rollout. A poor customer experience on top of an already stressed customer-supplier relationship could cause churn. Market share could be lost to competitors who roll out in a more targeted or faster manner.

Smart metering roll-out is a highly complex commercial and logistical problem with many factors to take in to account. As ever the devil is in the detail. Specific challenges include:

- Meter installation rates will need to be three or four times higher than current rates
- A threefold increase in the number of meter installers is predicted to be needed
- The need for information-sharing across industry will necessitate changes to current systems and processes.
- Both corporate reputation and customer trust will be impacted if the transition is not handled well
- An increased level of coordination and planning among industry parties will be needed

All of this will make planning and delivery of field activities a complex problem. Suppliers will need to meet these challenges whilst continuing to achieve the business goals of minimising costs, maximising operational efficiencies and delivering a consistently high standard of customer service.

Benefiting from spatial information

Energy distributors rely upon spatial information in order to plan, design, install and operate network assets. These same tools, datasets and techniques can be used by retailers rolling out smart metering infrastructure. Spatial information can benefit an energy retailer in two specific areas:

1. Planning: Spatial databases have a unique ability to bring together information from disparate sources relating to customers, their buildings and the surrounding environment. Models can be structured to assess what is important and retailers are able to generate fresh insight into their roll-out strategy and planning.

2. Operations: Energy retailers have opportunities to leverage spatial technology within a number of critical environments, including management of the smart meter asset. This might include a marketing department managing on-going customer communication, a call centre agent responding to house moves, faults or supplier changes or a field engineer visiting homes to maintain or replace meters.

How can energy suppliers optimise the efficiency of their smart metering roll-out whilst minimising the disruption to consumers?
Planning

A fundamental decision to be made early on, is which areas to roll-out to first.

Roll-out decision making rests on analysis of multiple datasets, which provide an initial insight into the overall suitability of a customer for smart metering. However, with major volumes of meters to roll-out, energy retailers must give consideration to geography, which can assist in suitability assessments, but also help define realistic work packages. Each energy supplier is likely to rely on different decision making data in line with their particular commercial strategy. For example:

**Customer characteristics**
Customer data is central to defining a roll-out strategy. This data is likely to come from internal sources, but retailers will benefit from additional external data to understand the likely appeal of a smart meter to a customer.

For example, a firm might initially target longstanding customers with high lifetime value. They may also want to consider where they have single fuel customers, dual fuel customers or pre-payment customers. Reference this against other external customer datasets and powerful analysis becomes possible.

Household data on attitudes to the environment and postcode based data on fuel poverty can add fresh insight. Typically there will be a number of characteristics which when taken together, describe the type of household for phase 1 of the roll-out, and potentially different sets of characteristics which describe the targets for subsequent phases.

**Communications network coverage**
Smart meters depend upon communications networks in order to function. But coverage and capacity of both wired and wireless networks have significant local variations. This is especially the case with indoor mobile network coverage within flats, basements and old properties with solid walls. Energy suppliers will want to roll-out to locations where service levels are sufficient.

**Other factors**
There are likely to be additional factors that affect smart meter roll-out, many with a spatial dimension. For example there may be safety issues at a building, street or area specific level. It is well know that there are certain housing estates to which field crews are only dispatched in pairs for security reasons. Some areas or properties can be especially difficult to access either due to the local geography or to the lifestyle patterns of the people who live there.
Case study
Identifying areas of greatest economic benefit

The case study below, illustrates how spatial analysis of economic indicators can play a part in strategic decision making about roll-out. In this example economic data is used to scope out the areas where the benefits of smart metering are expected to be greatest.

Esri UK has collaborated with the Centre for Economic and Business Research (Cebr) to develop an economic indicator of the potential benefits of smart metering to households. The Smart Energy Consumer Choice Indicator (SMECC) gives an indication of how households are likely to respond to a smart metering offering. The SMECC Indicator takes into account electricity usage intensity (electricity consumption per person), price sensitivity (the amount of electricity consumed relative to disposable income) and socioeconomic status of households. Households with high energy intensity are expected to benefit from the additional choices and control over consumption that a smart meter will bring. Households with high price sensitivity are expected to be attracted to the potential cost saving. The SMECC has been built using data from the Office for National Statistics and the Department of Energy and Climate Change.

The thematic map, in Figure 2, shows the SMECC broken down by UK district. It also gives the top 20 cities by SMECC. Some of the key findings:

- Two areas of the UK emerge prime potential beneficiaries of smart metering:
  1. The Midland hub, including Nottingham, Wolverhampton, Birmingham, Leicester, Coventry and Stoke-on-Trent
  2. The Trans-Pennine corridor from Liverpool to Hull via Manchester, Bradford, Leeds and Sheffield.
- There is no North-South divide. Instead the benefits of smart metering are widely distributed. London, for example, ranks just 20th by SMECC.
- Local, granular analysis is critical. Whilst London overall is not as highly ranked as might be expected, districts such as Kensington & Chelsea, Bromley, Sutton and Barnet stand out as areas where the benefits could be high.

An interactive map version of Figure 2 is available at: www.esriuk.com/industries/smartmetering.asp

The SMECC provides a new perspective on the choices to be made in roll-out strategy. It shows that our preconceptions about where the benefits lie may not always be correct. We believe that fresh thinking is critical so that smart meters first reach the households where the benefits are greatest, in a way that is as efficient as possible for the energy suppliers.
Spatial analysis can help in other areas beyond identification of target homes and areas for roll-out.

This goes well beyond roll-out planning and management through to day-to-day operational management once the new systems go live. And whilst spatial analysis in the planning stages is a sophisticated tool for expert users, spatial analysis can also be built into everyday tools that are used by operational staff such as customer care agents, field engineers and schedulers.

**Customer relationship management**

Prior to roll-out, retailers are likely to run a customer awareness and engagement campaign which, area-by-area, communicates the benefits of smart metering. Call centre staff will need to take inbound calls from those that have received communications and also calls from those that have not. Being able to relate enquiries geographically with the help of spatial software, helps to co-ordinate activity in an efficient manner.

**Field crew management**

Having captured details of customers seeking a smart meter, work packages need to be co-ordinated in an efficient manner. Here spatial data can help with the routing and scheduling of programmes. Furthermore, work programmes can be made available to field crews through field devices, who can test devices in conjunction with office based staff and ‘tag’ a meter to a physical address, with a unique property reference number.

**Customer retention**

Smart meters and in-home displays are expected to result in better engagement from customers in energy consumption. Here spatial information has further value in supporting benchmarking and peer analysis within a local area or across similar areas over a wider region. Furthermore, when combined with data on network infrastructure and capacity levels, one is in a good position to offer new time of use tariffs, or demand management services.

**Incident response**

Network reliability is a key issue for both distributors who need to deliver reliability, and retailers who are in the service frontline. Distributors are incentivised to minimise customer interruptions and customer minutes lost by the regulator. Spatial data from smart meters will enable network operations teams to more rapidly identify the precise location of a fault or incident. When combined with GPS location information for targeting maintenance crews, the fastest possible response time can be achieved.
How can Esri UK help?

Esri UK has been providing GIS solutions for over 20 years to electricity, gas and water utilities across the UK. Over 60% of UK utilities now rely on Esri solutions to run their daily operations.

About Esri UK

Esri UK is the leading provider of geographic information system (GIS) technology, helping businesses become more profitable and public service more efficient through a better understanding and analysis of location-based information.

Esri UK offers an extensive range of GIS technology and professional services and is the only company in the UK providing a complete and entirely integrated GIS solution.

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For more information and case studies visit www.esriuk.com/utilities.