



Understanding consumer motivations for participating in a smart power system

Project to be funded under the Technology Strategy Board's Smart Power Distribution & Demand stream

Partners: Centre for Sustainable Energy (Lead), the Happy City Initiative and Triangle Design

Summary

Smarter power systems need consumers to engage willingly with a range of new service offers from power system interests to manage demand and shift and/or reduce demand peaks. This project will seek to understand what is needed to secure that engagement from domestic consumers. It will market test a range of potential smart services across two dimensions: (i) automated/passive vs user-controlled active services; and (ii) motivators based on financial rewards vs motivators based on non-financial rewards known to enhance wellbeing. In theory, the system might gain most 'smartness' from automated demand response services taken up by consumers in return for the modest financial value which that response creates for the system. This project will find out whether this holds true in practice for consumers and how consumers respond to different smart approaches based on different motivational rewards.

Background: the need

The emergence of a smarter power system relies in part on new behaviours from consumers (and/or their power-using equipment) which change the timing, nature and scale of their electricity demand in accordance with the system's dynamic needs.

These behaviours relate mainly to: (a) shifting demand around over any 24 hours period to fit better with availability of naturally intermittent supplies (particularly wind and, to a lesser extent, solar) i.e. same kW but at different times; (b) reducing average demand (i.e. fewer kWh over time); (c) permanently reducing peak demand (to reduce capacity needs in distribution networks) i.e. lower max kW at any time, and; (d) storing energy in local devices (e.g. electric vehicle batteries, new/better storage heaters/hot water) i.e. storing kWh when the system has 'spare' and using them when the system has a shortage.

In the absence of compulsion, these behaviours can only result from electricity consumers willingly engaging with, and responding to, services, products and 'offers' from electricity system interests such as energy suppliers, distribution network operators and third parties granted access to smart meter data. Yet there is little understanding of what might secure that willing engagement; what will motivate the consumers to engage with the offered services and stimulate appropriate responses from them and/or the power-using equipment in their premises? Indeed, there is a tendency to assume that price signals and automated interventions to manage demand are proven mechanisms. This study will help to develop this understanding, thereby informing the design of more effective versions of the consumer-oriented demand-response services that are a vital component of a smarter power system.

To date, the focus of research investment in smarter power systems has been the very significant technical and system configuration challenges; little attention has been paid to the interests and motivations of consumers in playing the roles assumed of them in smarter system modelling. Some UK research looking at domestic demand side response is now being funded by Ofgem and the Low Carbon Network Fund but this is not exploring consumer motivations. TSB funding is therefore required to enable this partnership of three small, innovative enterprises to open up this important area and bring it to the attention of electricity system interests.

The study's objectives

This study will design a creative range of potential smart meter-driven demand response services and 'offers' for domestic consumers. It will then test: (a) their broad attractiveness to domestic consumers; and (b) the sorts of rewards which consumers believe will be sufficiently motivating to stimulate the required response.

The study will test consumer responses across two dimensions: (i) automated/passive services vs user-controlled active services; and (ii) motivators based on financial rewards vs motivators based on non-financial rewards known to contribute to wellbeing. These two dimensions are important to test with consumers because: (i) automated responses (such as remote control of appliance power consumption and usage) are of most value to the electricity system because of the response certainty they offer, but may encounter consumer resistance to the notion of 'giving up control'; and (ii) the potential financial rewards available to consumers for their responses are likely to be modest (given the modest value they create for the system) and price elasticity of energy demand is notoriously low, suggesting non-financial motivators and rewards may be more appealing to consumers and therefore effective.

The partners

The study will be led by the charity the Centre for Sustainable Energy (see www.cse.org.uk), drawing on their expertise in consumer perspectives on smart meters (e.g. recent consumer review of the UK smart metering programme for Which?) and smart meter data analysis (incl. a TSB-funded 'big data' project). CSE's partners will be The Happy City Initiative (see www.happycity.org.uk), a social enterprise with extensive understanding of the promotion of wellbeing-related non-financial rewards, and Triangle Design (see www.triangledesign.biz), an innovative design agency with a skill for creating meaningful visualisations of new service concepts to test with consumers. The study has six stages outlined below.

The process

Stage 1: Deliver a workshop of designers, technologists and energy data experts from commercial and academic interests in the Bristol and Bath area to develop a short-list of smart meter-driven services to secure smarter energy use in homes, including both automated and user-controlled mechanisms.

Stage 2A: Establish financial and non-financial 'wellbeing' reward structures for each service concept.

Stage 2B: Design input to work up short-list concepts into visualisations presentable to consumer focus groups.

Stage 3: Develop and test focus group structure, method and scripts using visualisations.

Stage 4: Deliver a series of four deliberative focus groups with consumers (segmented through use of a professional focus group recruitment agency by age, socio-economic class) to test interest in and reactions to different service concepts and different reward structures.

Stage 5: Qualitative and quantitative analysis of focus group outputs to reveal preferences and issues for service design

Stage 6: Write report on findings, including implications for smart meter data policy and related aspects of smart metering programme and produce demand response service design guidance for industry interests and consumer advocates. This study report and design guidance is the project deliverable.

Contact

Simon Roberts OBE, Chief Executive, E: simon.roberts@cse.org.uk T: 0117 934 1441 M: 07736 808796
Centre for Sustainable Energy | 3 St Peter's Court, Bedminster Parade, Bristol, BS3 4AQ | Charity no. 298740