

Constructing Policy Success for UK Energy Feedback

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Abstract

Energy feedback tools are commonly used to promote energy saving. In the UK, energy feedback provision (currently via an In-Home Display) is part of the government-mandated roll-out of smart meters to all homes by 2020. A core assumption underlying this widespread provision is that information, or evidence, can lead to positive changes in action. This is analogous to assumptions underlying the notion of ‘Evidence-Based Policy’, which raises questions about how users, researchers and policymakers go about using evidence in aiming for a ‘successful’ outcome. In addition the ‘policy feedback’ research agenda has asked how policies alter the landscapes within which they operate by, for example, affecting relationships between actors. Via an in-depth review of DECC (now BEIS) policy literature over 2010-2016, the UK smart meter roll-out was analysed in terms of how its energy feedback focussed measures may be deemed as ‘successful’. Findings include that direct energy savings played a smaller role than might be expected, and translation from one success measure to another was repeatedly observed. A key conclusion is that acting on feedback requires an assessment of success, but such assessment is highly contextual, for consumers and policymakers alike. Ways to increase reflexivity in this area are discussed.

Introduction

“... there is a lack of clarity about the primary purpose of smart metering. The rollout could have a diverse range of benefits, but we fear that with a disparate set of 11 objectives the success of the project may be difficult to ascertain.”

(House of Commons Science & Technology Committee, 2016, p.3)

Assessments of success are part of the policy evaluation process, in deciding whether to maintain, halt, or adjust course. Such assessments are however highly contextual, will be judged differently by the different actors involved, and are intertwined with the means and purposes of assessment. This paper explores in depth the ways one part of the multi-faceted UK smart meter roll-out – consumer-focussed energy feedback – is being assessed as ‘successful’ or not, in a policy context. Arguably, the majority of energy feedback research literature takes such measures of success somewhat for granted (e.g. success equals reduced energy use), and it is therefore hoped that this piece offers a somewhat different angle from the rest of this special issue. Although there has been some recognition to date of the multiple and dynamic *consumer* experiences of smart energy technologies in the research literature, this study covers new ground by explicitly laying out the variety and instability of success in smart energy *policy*.

First, it is important to place the UK smart meter roll-out in context. Energy use within buildings accounts for more than one-third of global energy demand and half of global electricity demand (IEA, 2013). As such, understanding (and potentially influencing) the ways energy is used in buildings is central in addressing issues from climate change and fuel poverty to energy security and energy infrastructure

renewal (Powell, Monahan, & Foulds, 2015). In Europe, there has been a deliberate policy drive towards smart grids and smart meters which, amongst other things, is expected to enable “*reduc[tions in] emissions in the EU by up to 9% and annual household energy consumption by similar amounts*” (European Commission, 2017). As per this EU policy, the UK government of May 2015-June 2017 repeatedly highlighted its aim “*for all homes and small businesses to have smart meters in place by 2020*” (King, 2016), which are capable of recording energy use up to every 30 seconds and transmitting this information back to suppliers. One distinct element of the Smart Meter Implementation Programme (SMIP) in the UK is that these meters are being accompanied by the offer of a free In-Home Display (IHD) to provide real-time energy feedback (DECC, 2016). Indeed, IHDs have become the visible face of smart meters in the UK, with the two being often conflated by householders (DECC, 2015d). SMIP represents a major infrastructural investment of just under £11 billion up to 2030 (BEIS, 2016a, p.3). As such, the UK government is naturally keen that SMIP, and the energy feedback programme embedded within it, are deemed ‘successes’, and has instigated a number of evaluation processes to track this (see Appendix for a range of examples). However, as described in the opening quote, smart meter success has multiple dimensions.

Energy feedback provision as a specific policy measure is particularly linked to demand side management at the consumer level (helping households use less); this paper examines to what extent this overt priority is being reflected in reported policy evaluation of energy feedback. Although smart meters conveying information to suppliers, and digital energy feedback conveying information to

householders, are intertwined (with the first more readily enabling the second, and the second providing a visible ‘face’ for the first), they are distinct and each can be provided without the other. Indeed, across the world, governments are placing greater or lesser emphasis on each element, and this choice is linked to each government’s aims, or success measures. For example, Italy’s early smart meter rollout has centred on improving the power supply, including minimising electricity theft (Torriti, 2014); energy feedback information to households has not therefore been a central feature. In Denmark, ‘flexibility’ has been a core focus, including better integration of intermittent energy supply from renewables (Schick & Gad, 2015). With this goal of flexibility in mind, the full potential of smart meters may also require roll-out of Time Of Use (TOU) tariffs, encouraging flexible demand patterns through dynamic energy pricing. However it also means that, in the Danish case, IHD or equivalent energy feedback measures have *not* been included, as policymakers report “*it is not believed that such feedback will have any great effect on flexibility*” (Schick & Gad, 2015, p.55).

In the UK, the government has stated that: “*monitoring and evaluation of the smart meter roll-out will provide an essential feedback loop to inform decisions by Government*” (DECC, 2012d; p4). But given the aforementioned choices available, questions remain over *which* measures of success will be explicitly evaluated, and which will not. As argued in this paper, there can be no single or objective measure of success in energy feedback (that is, different actors, and at different times, may use very different measures), and thus it is particularly interesting to examine which measures are being presented (and how). The

relationship between such evaluations of policy, and policy direction, are two-way. Choices regarding what evaluation evidence to collect and present (as informed by *current* policy direction) help set the benchmarks against which policy is judged, and thereby also influence *future* policy direction; one could similarly consider the way that league table criteria actively influence operational choices made by schools and universities (Hazelkorn, 2007). Such questions related to success measures are especially timely given that the main roll-out stage (whereby most householders will have smart meters installed) began in 2016 (BEIS, 2016b), which will feed into a “*comprehensive evaluation of the success of the roll-out in 2018-2019*” (DECC, 2012c, p.68).

Research aim and paper structure

The aim of this paper is therefore to explore the forms of success (and underlying means of measurement and evidence) invoked in the policy evaluation of consumer-focussed energy feedback. To do this, the measures of success with regard to the provision of energy feedback, as described in UK smart meter policy documents from 2011-2016, were systematically reviewed. The focus is on consumer, rather than industrial, feedback which – as part of the SMIP – is primarily being provided via IHDs. The documents were analysed by asking: what is success being taken as; on what evidence are those success measures being chosen; what evidence will be collected relating to them; and why? A predominantly inductive approach was taken, and thus the themes discussed were not solely predefined via these questions, but also emerged from the data.

This exploration was in part inspired by the question of how one might bring together the areas of *energy feedback* and *policy evidence and feedback*, to investigate potential analogies and mirrored assumptions across the two processes. This helped inform the questions asked during the data analysis, and is revisited in the conclusions. In the next section therefore, an overview of relevant literature related to both success in end-user experiences of energy feedback, and evidence and feedback in policy, is presented. The policy document review methodology is then discussed before the findings and discussion. Finally, implications for policy and open questions for research are given in the conclusions.

Background context: treatments of success

This academic literature review section firstly reviews relevant energy feedback research literature, highlighting the dominance of energy savings as a success measure in this research, but also emerging work which has shown experiences linked to the wider smart agenda as being diverse, subjective, and evolving. It then goes on to explore some of the relevant policy research literatures, as part of informing the study's methodological foci.

Emphasis on energy saving as the rationale for energy feedback

When reporting on the use of energy feedback, the majority of research studies to date have taken the primary metric of success (implicitly or explicitly) to be *energy savings*¹. Even a cursory glance through the most highly cited literature

¹ Indeed, at the TEDDINET energy feedback symposium which led to this special issue, 27 out of the 40 papers presented explicitly gave energy savings as the primary outcome of interest. <https://teddinet2.wordpress.com/activities/energy-feedback-symposium/>

concerning energy feedback shows the dominant motivational framings as being ‘energy savings’, ‘energy conservation’, ‘sustainable energy use’ etc. Darby’s 2006 review of studies to determine the “*effectiveness of feedback*” concentrates on size and persistence of energy savings (Darby, 2006). Buchanan et al.’s 2015 critique of feedback centres on the lack of evidence that it can induce savings (Buchanan, Russo, & Anderson, 2015). Given this underlying aim, research has explored, for example, how different visualisations (e.g. Holmes, 2007; Rodgers & Bartram, 2011), accompanying information (e.g. Carroll, Lyons, & Denny, 2014; Vassileva, Dahlquist, Wallin, & Campillo, 2013), goal setting (Abrahamse, Steg, Vlek, & Rothengatter, 2007), community-level considerations (e.g. Anda & Temmen, 2014; Burchell, Rettie, & Roberts, 2016) may (or may not) support energy savings. However, some users actively use feedback for other purposes, as part of, for instance, the situated practice of ‘energy monitoring’ (understanding energy consumption patterns better, supporting wider learning), to better negotiate with suppliers, or simply due to an enjoyment of ‘data’ (Foulds, Robison, & Macrorie, 2017). These wider aims may be only weakly (if at all) linked to energy reduction, and have received less attention in the energy feedback research literature (Foulds, Robison, & Macrorie, 2017). By (re-)framing energy feedback tools in terms of how they have been enrolled within a particular situated practice – such as energy monitoring – it can be argued that what becomes important is how that practice is actually performed, rather than the normative ambitions of those that provided that technology in the first place (c.f. Bertoldo, Poumadère, Rodrigues Jr., 2015; Skjølsvold, Jørgensen, & Ryghaug, 2017).

This paper does not therefore instrumentally ask “*how might energy feedback better achieve [x]?*”, but instead steps back to look at the (sometimes unquestioned) purposes energy feedback is regarded as serving. Implicitly, this links to insights from energy feedback studies (Hargreaves, Nye, & Burgess, 2010; 2013; Wallenborn, Orsini, & Vanhaverbeke, 2011) that have investigated how feedback has been ‘domesticated’ (Hirsch & Silverstone, 1992). These studies argue that the introduction of new technologies can, via the transformation of actor-relationships, lead to new dynamics, new practices, and indeed new expectations – it is the position of the authors in this paper that such transformations are not solely constrained to the household but have ripple effects within policymaking domains too.

Multiple and dynamic experiences of smart energy technologies

Although, in the research literature, there is certainly a sustained focus on energy savings as a rationale for providing energy feedback, experiences of energy feedback and smart energy technologies more widely have also been found to be diverse, subjective, and dynamic. A large body of work has arisen in recent years – particularly within Science and Technology Studies, although not exclusively – examining the interplay between the organisation of society and the development of smart or future energy technology landscapes (Walker, Karvonen, & Guy, 2015; Bickerstaff, Hinton, & Bulkeley, 2016; McLean, Bulkeley, & Crang, 2016; Groves et al., 2016; Strengers & Nicholls, 2017) of which energy feedback is often regarded as “*the first step*” (Ballo, 2015, p.9). This work has tended to be grounded by the ‘sociotechnical’ paradigm, within which there is a clear

acknowledgement of the co-evolving relationship between social expectations or visions and technical possibilities (Guy, 2006). In addition, there is recognition of the complex connections between a multitude of different actors and communities, each with different understandings of what a technology “*can do and how it should be used*” (Skjølsvold & Ryghaug, 2015). Within energy feedback focussed studies then, a wide variation in end-users’ expectations have been observed. For example, Hargreaves et al. (2010) noted how possible financial gains and environmental benefits, but also information gathering or demonstrating technological savviness, may all play a role. They found: “*the reasons people gave for participating in the [energy monitor] trial were critical in shaping what they expected from the monitors, how they used them and how they evaluated their effectiveness*” (Hargreaves, Nye, & Burgess, 2010, p.6113), emphasising the variety of forms these reasons could take, and thus the multiple nature of evaluations of success.

Since experiences of the smart energy technology complex are diverse and dynamic, this suggests there will never be one objective, stable, measure of success which holds true for all actors at all times – although explicitly examining the range and impact of such success measures has not been done, as far as the authors are aware. Indeed this inherent diversity is recognised by householder participants of smart grid studies themselves. Throndsen and Ryghaug (2015) found some to be sceptical of whether they are really intended to benefit from a smart grid rather than, for example, industry actors; participants in Bertoldo et al.’s study (2015) readily identified tensions between individual and collective

needs related to smart meters. It is then unsurprising that studies involving those enacting smart grid policies or industrial programmes show that they also recognise the complex nature of success for consumers. For example, greater policymaker reflexivity around this issue has been found in interview studies than may be reflected in official documents (Schick & Gad, 2015). However other work has found a tendency of smart grid ‘experts’ to be somewhat fixated on the “*economic rationality expectation*” (Thronsdon, 2017) - i.e. the belief that the bottom line for consumers is real or perceived financial impact.

In the face of this diversity and subjectivity, there are clearly situations where particular ‘objective’ measures of success are sought and/or deemed to have value – for example during policy evaluation processes (Sanderson, 2002), the focus of this study. In considering this then, it is important to recognise and draw on the existing bodies of work on the use of evidence in policymaking, which have also questioned the attainability of objectivity, discussed next.

Evidence and feedback in policy

Despite acknowledgement in the energy and built environment literature of the analogies: “*the need for feedback is as true for policy design as it is for the design of individual buildings*” (Foxell & Cooper, 2015, p.404), the authors are not aware of any academic work which has started a conversation about possible links between energy feedback and policy evidence research literatures, although of course much energy feedback related research seeks to ask policy relevant questions (cf. work on the production of energy use data for policy evidence by

Cooper, Shipworth and Humphreys, 2014). Note that there have been efforts to incorporate some parts of the policy evidence research literatures into studies on UK policies relating to, for example, zero carbon homes (Schweber, Lees, & Torriti, 2015), eco-towns (Warwick, 2015) and the built environment (Simmons, 2015). There remains however potential to examine how these different *feedback*-focussed research agendas may work together in shedding further light on issues such as how evidence on energy feedback policies is treated and presented by policymakers.

‘Evidence-Based Policy’ (EBP) has been increasingly emphasised by politicians, and policy workers since at least the late 1990s. Indeed, “*using evidence as the basis for formulating public policy appears so uncontroversial as to be almost impossible to oppose*” (Pearce, Wesselink, & Colebatch, 2014, p. 161). EBP is given serious weight by policymakers, and in the context of the SMIP, two EBP processes are highlighted here which were included in the analysis of this study. Firstly, all policies are subject to scrutiny in regards to costs, and for the SMIP this has involved a number of Impact Assessments. Such Assessments form part of the Appraisal stage of the Treasury’s ROAMEF model (Rationale, Objectives, Appraisal, Monitoring, Evaluation and Feedback) of the policy cycle (HM Treasury, 2003). (In this context, in contrast with how we are considering the term, the formal ‘Feedback’ stage is only associated with the very end of a policy programme.) Second, the UK Parliamentary Select Committees² have begun

² Part of the UK parliamentary scrutiny process, Select Committees (with cross-party membership) run enquiries on different Government policies.

‘Evidence Check’ hearings, including one in 2016 on *Smart Metering of Electricity and Gas*. This drew heavily on the ‘Evidence Transparency Framework’ designed by the Institute for Government³: a tool to quickly assess and compare the evidence base of different policies, as a way of “*spur[ring] improvement*” (Rutter & Gold, 2015, p.3). The framework focusses on the *transparency* of an evidence base (rather than its quality), partly as this can be done without subject specific expertise (Rutter & Gold, 2015).

Critiques of EBP have called for a deeper exploration of the context-dependent and value-laden ways in which evidence is collated and decisions subsequently made (Boaz, Grayson, Levitt, & Solesbury, 2008; Cairney, 2016; Greenhalgh & Russell, 2009). Indeed, one might argue such critiques have significant synergies with the critiques of energy feedback policies, both of which rely too heavily on linear assumptions of individual decision-making as the driver of behaviour (see Figure 1).

Insert Figure 1 here

Figure 1. Commonly assumed rationales underlying (a) energy feedback provision, (cf. Wilhite & Ling, 1995), and (b) Evidence-Based Policy.

One can, in this way, observe common ontological assumptions between the policymaking community (in their advocacy of EBP) and the more traditional

³ A think tank: <https://www.instituteforgovernment.org.uk/>

(economics-led) energy feedback research community. Ontologically, both assume that social order is driven by utility-maximisation, whereby the most optimal decision is usually taken. Herein, there are also commonalities in the sorts of evidence used to direct this decision-making process (e.g. quantitative).

To overcome some of the issues of linearity within the EBP (and analogous issues in energy feedback) agenda, another tranche of policy studies literature may be fruitfully considered: ‘policy feedback’ research. In this context, the term policy feedback does not solely relate to formal evaluation processes, but instead refers to ways in which policies themselves, by changing the status quo, actively construct *politics*, specifically the political priorities of different groups including institutional interests and political participation of citizens (Pierson, 1993; Campbell, 2012). These new politics may in turn affect the future directions of policies, potentially creating feedback loops that better help to represent the ‘messiness’ of policymaking which is recognised by those acting within it – see Figure 2. Although “*the idea that existing policies can have major effects on politics and policy development is hardly new*” (Beland, 2010, p.568), in recent years this literature has expanded to, for instance, ask how one could deliberately design policies to make use of policy feedback mechanisms. For example, how might they be used to achieve ‘lock-in’ of policies, where target groups become (more) interested in the policy’s survival (Jordan and Matt, 2014).

Insert Figure 2 here

Figure 2. (c) The concept of ‘policy feedback’ seeks to emphasise that, as policies are implemented, the landscape within which they operate are altered. (d) This can also be considered in the context of energy feedback.

Collectively, this past research raises the following questions in relation to energy feedback policy: what forms of evidence are seen to determine the success of energy feedback; why were those forms chosen (‘the evidence about the evidence’); and how was the evidence intended to change the direction of subsequent policies?

Methodology

This paper employs a single case study – the UK government’s SMIP – to explore the forms of evidence that can underlie policy evaluation of energy feedback (specifically, to the end-user). A case study approach was utilised because of the “*force of example*” (Flyvbjerg, 2006, p. 228) that it is able to provide, especially through how it brings to the fore the “*little things*” (Nietzsche, 1969, In: Flyvberg, 2006, p.238) that govern the nuances associated with evaluating success. By focusing on policy documents, the review centred on how the policy community is constructing, publicly justifying and choosing to present matters of success. This paper does not therefore seek to collect data on how different communities bundle around different notions of success, nor does it explore behind-the-scenes decision making processes (although comparison of findings of this study to both of these would both be fruitful areas for future investigation). Crucially, it is the energy feedback components that are of interest, noting of

course that it can be difficult to unpick the blurred boundary that exists between the wider SMIP and its energy feedback components.

The case study's data were official documents published by the UK government department responsible for the smart meter roll-out, which was the (now closed) Department for Energy and Climate Change (DECC) up until July 2016, and is now the Department for Business, Energy and Industrial Strategy (BEIS) – it is these that are referred to as SMIP 'policy documents' throughout this paper. A search for 'smart meter' within the 'publications' tab of the gov.uk website yielded 179 DECC publications and 19 BEIS. Of these, 78 were evidently not primarily concerned with the smart meter roll-out and so were immediately omitted. The 120 remaining publications were then categorized as follows: (i) overall SMIP direction and timelines (10); (ii) information leaflets aimed at external dissemination (7); (iii) monitoring and statistics (24); (iv) evaluation reports (9); (v) consumer engagement research and reports (15); as well as (vi) data privacy/security reports (3); (vii) technical documents (27); (viii) Smart Energy Code related documents (19); and (ix) reports on non-domestic settings (6). The scope of this paper does not extend to detailed consideration of publication categories (vi)-(ix), and thus the focus was on the 65 publications in categories (i)-(v). Of those a further 13 were subsidiary to other documents: 8 spreadsheets repeating statistical reports which had already been included, and 5 consumer reports which focussed on very particular target groups (e.g. blind and partially sighted consumers), discussion of which had also been highlighted in the higher-level strategic and consumer overviews. Finally, during the analysis, two

further sources were pointed to by the main data: one was the 2016 Select Committee Evidence check on smart metering, the other the Smart Energy GB website⁴ (categorized under evaluation, and consumer engagement, respectively). The earliest ‘policy overview’ document found through this method was taken as the starting ‘cut-off’, which provided a range of policy material dating from March 2011 to November 2016.

Even after this narrowing process, as “*one of the largest and most complex investment programmes undertaken by the energy industry*” (DECC, 2012d, p.4), the volume of policy documents analysed still spanned over 1400 pages across 54 sources. A full list of the sources included in the final analysis can be found in the Appendix.

The largely inductive analysis was loosely guided by four questions, which build directly upon the questions raised at the end of the previous Background context section:

1. What is ‘success’ presented as being (regarding provision/use of end-user energy feedback)?
2. What evidence is presented to justify choosing these measures of success?
3. What, when, how is evidence being, or planned to be collected related to measures of success?
4. Is that evidence being collected for a stated purpose?

⁴ www.smartenergygb.org

Herein, notions of ‘success’ in the policy documents were broadly defined as being explicitly related to (a) justifications, (b) purposes/aims, and/or (c) formal metrics/targets associated with the energy feedback component of the SMIP.

In reflecting upon these questions, it was vital to be clear about what was deemed to fall within the energy feedback component, as opposed to the wider aspects, of the SMIP. As such, when examining the data, consideration was given to how the SMIP policy text was related to end-user energy feedback. Indeed, sometimes there was a direct link, other times there was no relevance to end-user energy feedback, and at other points it depended on the contexts. Please consult Table 1, which details the 11 objectives referred to in the opening quote of the paper, for an illustration of the filtering process that was employed. These were the sorts of considerations that were taken into account when identifying which parts of the SMIP policy documents were within the boundaries of this paper.

Detailed notes, including key quotations, were thus made on each of the SMIP policy documents relating to each of these four questions and discussed between the two authors. Key themes were then identified which formed the basis of this paper’s findings.

Insert Table 1 here

It is also true that the case study data undoubtedly draws attention toward more explicit forms of evidence; specifically it will focus on what is *said* (or perhaps

‘promised’ – c.f. Foulds & Morosanu (2016)) rather than what is *done* (e.g. more experiential aspects). However, as people change roles (both in government and industry), these documents do become one point of continuity. Government may be held to the written plans set out, particularly in an era of Evidence-Based Policy; they set the expectations of key groups, notably industry.

Findings and discussion

In this section, the multitude of policy success measures related to energy feedback are briefly presented. Key findings from the study, as discussed in the subsequent subsections, are then as follows:

1. Energy savings are repeatedly given upfront as a key success measure; however, in fact, direct savings metrics have played a surprisingly small role in SMIP evaluations of the success of energy feedback to date;
2. Other measures, such as consumer engagement with feedback, may be framed as needed for the purpose of achieving energy saving success, but then emerge as primary success measures themselves;
3. The balancing of *multiple* success measures in order to simply get IHDs installed, is a success measure in its own right (with the most consistent tracking of achievement);
4. Finally, alternative success measures (to those chosen) are rarely laid out in SMIP public policy documents, and therefore the active role they play may be overlooked.

Diversity of energy feedback success

Firstly, a huge array of potential measures of success were implicitly and explicitly raised in the policy material reviewed. Public SMIP documents include reference to, amongst other things: promoting competition between suppliers; supporting smart grids, including better incorporation of ‘prosumers’; delivering industry cost savings; ensuring data security. Such diversity also reflects the high ‘interpretive flexibility’ of (in particular, new) technologies – that is, that their purpose and use is not somehow pre-defined but continues to dynamically evolve as multiple actors are involved in their formulation, distribution and use. Consequently, differences emerge as to purpose, function and understanding of such technologies, that is:

“Advanced electricity meters, for example, can take on different meanings for different social groups such as policy makers, electricity grid companies, the building industry and the users of the technology”

(Skjølsvold & Ryghaug, 2015, p.880).

Crucially, much of the literature focusses on such differences *between* communities (e.g. between policymakers and households – Nyborg, 2015). Yet this study examines the huge variation that clearly exists *within* policymaking communities.

When it comes to the *energy feedback* focussed objectives, Table 2 below (not exhaustive) illustrates this diversity by listing the numerous sub-objectives under the energy feedback focussed policy objectives from Table 1. A key observation is that *any one* of these sub-objectives could entail *any one of a number* of formal metrics, and indeed different objectives and metrics could play a more or less

prominent role at different stages in the policy programme, with various subsequent implications. Energy feedback researchers may be interested to note which objectives (if any) inform their, and others', choices over data collection when interrogating energy feedback performance.

Insert Table 2 here

The following three subsections go on to focus on three success measures of particular salience to energy feedback provision: (1) consumer energy savings facilitated through feedback; (2) consumer engagement with feedback; and (3) energy feedback provision, simply getting IHDs into homes. As later discussed, one framing of the latter two aims (consumer engagement and 'getting it done') sees them being subsidiary to energy savings (i.e. the reason they are important is *in order to achieve* savings); however they can also emerge as primary measures of success in their own right.

Role of energy savings in measuring success of energy feedback

As described earlier, energy savings are a key focus of much academic energy feedback research, in terms of whether feedback facilitates savings, by how much, and how to increase this figure. And, when it comes to the energy feedback (IHD) element of the SMIP, energy savings (whether motivated by carbon or financial savings) *are* repeatedly given as the primary measure of policy success in the documents reviewed for this study. This can be seen from the very first policy objective in Table 1, and the way IHDs are consistently presented as a direct route

to energy saving: “suppliers must provide consumers with help in understanding how to use the IHD and save energy” (DECC, 2012a, p.8), “improved feedback ... will give consumers the tools necessary to reduce their energy consumption” (DECC, 2012c, p.11).

Further evidence of the stated centrality of energy savings in SMIP success can be found in current considerations of alternative to IHDs. In 2016 the UK Government began considering whether to alter the regulation concerning the compulsory offer of IHDs and invited suppliers to propose possible alternative methods of feedback provision. However “for DECC to consider changing policy [i.e. not requiring suppliers to offer consumers an IHD] ... we will need evidence on how any specific approach impacts on domestic energy consumption outcomes” (DECC, 2016b, p.2). The kind of ‘outcomes’ envisaged are set out in more detail when discussing how suppliers could test such IHD alternatives. For example, it is proposed they ask consumers about: amount of water in kettles, switching lights off, and washing clothes at lower temperatures. These are also the types of behaviours targeted by Smart Energy GB in their media campaigns⁵. These specific lines of thinking then, reflect the traditional view that the purpose of energy feedback information is to directly alter (or ‘correct’) specific energy consuming behaviours (which can be pre-identified).

However, it is notable that a key change was made to the wording of the *Consumer Engagement Strategy* aims through a consultation process in 2012.

⁵ <https://www.youtube.com/watch?v=CKilTySiGzI>

Several respondents proposed augmenting the aim from “*delivering cost-effective energy savings*” to include, for example, bill savings, altering consumption patterns, or uptake of new (potentially energy efficient) tariffs. The fact that respondents had highlighted that energy savings might not be the only aim was used as the stated reasoning behind reference to energy savings being scrapped altogether, in favour of the vaguer “*facilitat[ing] the realisation of consumer benefits*” (DECC, 2012c, p12).

Notably, data on energy savings directly calculated by suppliers for their customers with smart meters/IHDs (for example, by comparing to a control group) is very limited in the Annual Progress Reports (DECC 2012b; 2013; 2014b; 2015e). Instead, early supplier findings in the First Annual Progress Report focussed on metrics such as the (reported) *frequency of looking at an IHD* (rather than direct energy figures), or the *perceptions of energy saving and other benefits* (payment flexibility, accurate bills). The Second and Third Annual Progress Reports present the estimated savings figures (in financial rather than energy terms) as given in the Impact Assessments (IAs). The Second and Fourth Annual Progress Reports each do report savings found in one supplier trial (British Gas, and E.ON respectively) but both focus on very particular elements (Time Of Use tariffs, and prepayment customers) rather than the overall picture of energy savings across all customers. Estimated consumer savings figures in the early 2011 IA of 2.5% for electricity and 4% for gas are based on a single source, being reported as “*in line with the changes seen in trials carried out by the Carbon Trust*” (DECC, 2011a, p.24). Greater depth is then given in the 2014 IA (DECC,

2014a), which outlines in some detail the range of findings concerning levels of energy savings, but still does not report on savings data from the current roll out. The 2016 Cost-Benefit analysis again reverts to headline estimates only (this time in financial terms) for consumer savings (BEIS, 2016a).

Successful consumer engagement with energy feedback

Whilst, within public SMIP policy documents, energy savings are often invoked early on as the rationale behind IHDs, it is in fact ‘consumer engagement’ which is given more attention. Indeed, the explicit policy aim to “*plac[e] a much stronger emphasis on consumer benefits and the potential for energy efficiency savings than many other countries*” (DECC, 2012b, p.27) led to a dedicated *Consumer Engagement Strategy* which was consulted on and finalised in 2012. As highlighted earlier, often other countries have started with a focus on energy management (supplier) benefits in provision of smart meters, and thus have not mandated IHDs. However, in their Norwegian study (where obligations on suppliers regarding feedback provision are limited) Skjølsvold and Ryghaug (2015, p.888) still observed that:

“user engagement seems to be the ultimate target, and developing suitable technology and organizational platforms on top of the smart meters is probably what separates success from failure”.

The Consumer Engagement Strategy emphasises the wider conceptualisation that exists in the data of the consumer’s wants and needs relating to energy feedback. This mainly reaffirms findings of other recent energy feedback research (Burchell,

Rettie, & Roberts, 2016; Foulds, Royston, Buchanan, & Hargreaves, 2014; Hargreaves, Nye, & Burgess, 2010; Strengers, 2013). For instance it was implied, or explicitly stated, across the majority of documents, that: (1) consumers wanted greater choice (e.g. easier switching) and highly valued control over the use of their data; (2) individual consumers are ‘responsible’ for energy savings, which can be achieved through ‘better’ choice; (3) information provision will play a central role in consumer engagement (albeit with the caveats that this should be tailored, delivered across multiple channels and over time, and using face-to-face means if possible) (DECC, 2012c); and (4) it is possible to pin down “*causal mechanisms that lead to behaviour change and energy savings*” (DECC, 2016b, p.13). A consequence of such framing was that memories about information provision - had they been “*sent something that prepared them for the new technology*”? (DECC, 2015a, p.25) - formed a point of evaluation in the *Early Learning Project*, and it becomes clear how a focus on engagement may mean *perceptions* of changes in behaviours may be particularly important.

So, given this underlying conceptualisation, what is successful consumer engagement presented as meaning in the SMIP? The aims of the finalised SMIP consumer engagement strategy are threefold: (1) building consumer support for and acceptance of the roll-out; (2) helping consumers “*manage their energy consumption*”; and (3) ensuring certain key groups (vulnerable, low income, pre-payment customers) “*benefit*” from the roll-out (DECC, 2012c, p.4). These aims outline the (qualitative) benchmarks which have been set for successful consumer engagement in this context.

The focus on the first of these aims, consumer acceptance as a successful outcome of engagement, is justified as follows:

“in order for consumers to receive these benefits [e.g. ending estimated billing, energy saving], consumers need to accept the installation of a smart meter and In-home Display (IHD) in their home”

(DECC, 2012c, p12).

Given the phase of the roll-out which the policy documents analysed cover, ensuring a ‘positive installation experience’ (or reporting one) is regarded as vital to this acceptance, and receives repeated attention (DECC, 2012b). For example, concerns are raised by DECC that a change in regulation, whilst saving money/resources, could undermine a *“positive experience for consumers”* (DECC, 2015c, p.18). Therefore, from (i) the expected benefits of having an IHD (including energy saving), the focus moves to (ii) acceptance of an IHD in the first place, then to (iii) the need for a positive installation experience, and new points of evaluative interest emerge, for example, asking questions about *“How your property was left after installation visit”* (DECC, 2015b, p.17). In this way the evolution, or creep, of ‘success’ can be observed: what is vital is often the chain of *what* is seen to rely on *what*. This is not to suggest that installation experience does not play a role in accessing IHD benefits, but highlights how measures of success may deliberately shift over time (cf. ideas on the dynamic implementation of policy, Wittrock & de Leon (1986)).

When examining the UK and Ireland smart meter roll-outs, Jennings (2013) noted two different aims: (1) demand management (including energy reduction) and (2) accurate billing. He suggested these aims require fundamentally different policy instruments to achieve – implementing new tariffs or legislating for accurate bills respectively. In its role as the official body working to build consumer acceptance for smart meters, it is notable that the Smart Energy GB website focusses first and foremost⁶ on how smart meters:

“mean no more estimated bills... [enabling you to] keep track of what you’re using and how much you currently owe in pounds and pence.”

Accurate billing was also the subject of their most visible advertising campaign; whereas impacts on energy use are presented less prominently. Accurate billing is thus being used as a way to ‘sell’ the smart meter to the public. Undoubtedly this is a real and potentially desirable outcome, but if this strategy is in part being used in order to build *acceptance* to facilitate *energy savings*, this raises questions about (i) the conflating of different policy goals, which may need different approaches, and (ii) whether this conflation is recognised.

Success: balancing multiple aims to simply get it done?

The roll-out is a huge logistical challenge, potentially involving visits to 30 million homes and businesses. Success therefore also involves keeping many *different* measures of success in balance, as if one group of stakeholders or logistical element is neglected, the whole programme could fall apart. This is in

⁶ Quote taken from very front page of Smart Energy GB website, under ‘Why get a Smart Meter?’. Accessed 9 January 2017.

part why choosing one single measure of success might be deliberately avoided (or seen to be unhelpful). The SMIP was in fact criticised in the Science & Technology Select Committee Evidence Check for having too many objectives (see opening quote of paper). With many stated objectives, potential tensions may be more obvious, for example, between consumer acceptance and positive installation experience, and running to time and budget. However it is questionable as to whether removing an objective actually resolves this problem, or rather, simply renders it less visible. Essentially, multiple objectives are always, inevitably, in play. Indeed, whilst apparently recommending a reduction in the number of aims then, the Select Committee conversely cautioned that:

“the Government should ensure that in its bid to complete the smart meter rollout by 2020 it does not compromise on consumer engagement before, during and after installation”

(House of Commons Science & Technology Committee, 2016, p.18).

This emphasises that multiple objectives *are* important, and perhaps it is the balance which is critical.

In balancing multiple aims an underlying measure of success emerges – which is not stated as one of the 11 SMIP objectives – literally ‘getting the job done’. The rate of installation of smart meters (and, less centrally, IHDs) is the most fundamental and openly reported metrics of interest throughout the SMIP documents reviewed. In official requests for data very early on in the programme from suppliers, the focus is on how many meters are installed/planned to be installed and what their functionality is (DECC, 2011b). In quarterly statistical

reports, as well as each Annual Progress Report (DECC, 2012b; 2013; 2014b; 2015e), the key data presented is the number of smart meters installed so far by suppliers together with installation projections. Metrics to be monitored other than installation rates are often less precisely defined in advance, *“impacts such as energy saving levels”* (DECC, 2012c, p.6) or *“operational metrics to support tracking of costs and benefits”* (DECC, 2012c, p.7). ‘Getting it done’, as in, number of smart meter installations, is the most consistently and clearly defined metric. As time has gone on, success is implied as being an increase in the rate of roll-out:

“This represents a 15 per cent increase in smart meter installations compared to the previous quarter”

(BEIS, 2016b, p.3)

And, in that same report, only one key finding was highlighted:

“There are now over 4.2 million smart and advanced meters operating across homes and businesses in Great Britain, by both large and small energy suppliers”

(BEIS, 2016b, p.3)

Although many of the documents state upfront that the programme *“aims to roll out 53 million smart electricity and gas meters to all domestic properties ... by the end of 2020”* (DECC, 2013, p.7), there has at various points been suggestion of the smart meter roll-out being scaled back due to deadlines being missed (Utility Week, 2016). Achieving particular rates of installation helps maintain a consistent narrative of delivery, including sticking to *“manifesto commitment[s]”* (BEIS, 2016b, p.4). It also carries implications for the level of influence new ‘evidence’

is able to have if there is a strong incentive to stick to the current course, and the role of such evidence is discussed next.

What is evidence being used for, in the provision of energy feedback?

In this subsection, four observations are made regarding the use of evidence itself in the SMIP.

Although, as found elsewhere in the EBP literature (Shaw, 1999; Sanderson, 2002; Pearce & Raman, 2014), quantitative forms of evidence continue to dominate in terms of how decisions are sought to be made and explicitly justified – “*Quantitative evidence (validation/‘stage 3 testing’) [is] anticipated to be needed in order to actually make a derogation decision*” (DECC, 2016b, p13) – it is important to note that qualitative forms of evidence, in particular responses to consultation processes, can play a central role in directing the final formulation of guidance and strategy (a specific example was discussed earlier in subsection ‘*Successful consumer engagement with energy feedback*’). There are also clear reminders that both quantitative and qualitative evidence are products of the specific means through which they are collected:

“as with previous waves, this [the number of people who report having a smart meter] is thought to be an overestimate due to confusion about what constitutes a smart meter despite the explanation provided and images shown (previous research has found that smart meters are often confused with IHDs)”

(DECC, 2015d, p.4).

Similarly, the repeated use of questionnaires with multiple choice answers (and how those choices are decided upon) carries implications regarding how pre-formulated answers influence the construction of evidence, which may be easily overlooked.

Second, it is not just the *results* of evidence collection activities but the *process of collection* which forms part of the policy process. For example, in the formal evidence requests from industry actors who wish to apply to use alternative feedback measures to IHDs, it was highlighted that: “*Trials at this stage can also provide valuable practical lessons related to the implementation and installation of a product*” (DECC, 2016b, p.16). Much detail was then given in that same guidance on considerations for research design (DECC, 2016b), which will direct evidence collected by suppliers in a particular way. Thus evidence collection can be (and is) used as a way to *concentrate attention* of key stakeholders on particular areas.

Third, of the four questions which guided this paper’s whole policy document analysis, the least data was found on *why* a particular measure of feedback success was chosen, or what alternatives were considered. Within the Institute for Government (IfG) Evidence framework (Rutter & Gold, 2015), currently promoted as a best practice tool, each of five ‘factors’ are assessed: Diagnosis, Proposal, Implementation, Value for Money, Evaluation. Within the first four of these areas, policy officials are asked to assess the evidence base upon which decisions are being/were made, and (for Proposal and Implementation) the

alternatives considered. However, for Evaluation, the emphasis is on presenting plans, rather than examining alternative options, and how these may themselves affect e.g. Implementation. Whilst recognising that it is impossible to list or provide evidence on *all* the possible alternatives to a policy or policy strategy, and choosing which to consider will also involve subjectivity, the data of this study nevertheless highlights a potential gap in the application of EBP tools.

Fourth, analysis of the policy documents of the SMIP enables consideration of the way evidence is being presented (not just how it is being sought). In line with wider efforts to promote Evidence-Based Policymaking there is a keenness in the SMIP to demonstrate transparency, e.g. by providing “*underlying figures... in full*” (BEIS, 2016b, p.4). In this way, ‘evidence about evidence’ is key: demonstration that evidence has been engaged with in some way. This reflects the IfG framework’s focus on assessing *transparency* of evidence, rather than quality, as highlighted earlier. In addition, consistency in results is often a marker of policy success, in proving things are ‘on the right track’, leading to incentives for policies to be presented as extremely consistent and potentially affecting how much change is explicitly attributed to evaluation results. In this data, evidence was thus presented as having “*confirmed*” (DECC, 2012c, p.33) the validity of previous policy choices (e.g. relating to the need for a central body to oversee consumer engagement). However this also means changes in direction are rarely explicitly presented, which can expose the difficulties in ascertaining how evaluation results have impacted direction. Indeed the impacts of evaluation may themselves be interpreted differently by different actors.

Inevitably then, policy documents are ‘constructing’ reality in a different way to how other data would (e.g. policymaker interviews) which re-emphasises the constructivist philosophy of science that this paper draws on (Saurugger, 2013). This has been implicitly made clear both within and beyond this subsection, as demonstrated by regular reiteration of: (1) the active role that the researcher/policymaker/individuals plays in determining success and producing policies etc.; and (2) the multiplicity of aims, purposes, successes and ultimately ‘truths’ when considering the same problem/foci (which all sit in parallel).

Conclusions

This study has explored the measures of success relating to the energy feedback component of the UK’s smart meter policies, as presented in official policy documents. This has involved considering how the stated political priorities (e.g. relating to what has been deemed to be a success) for energy feedback have evolved following the introduction of those policies. This evolution has brought with it a number of intentional and unintentional changes to the status quo (e.g. in terms of actor-relationships and expectations of what energy feedback technologies are meant to do). To explore these themes, the inductive analysis drew on an array of related literatures, including those that cover: energy feedback; consumer experiences of (smart) technologies; evidence-based policymaking; and policy feedback.

As well as demonstrating the wide variety of possible and actual success measures used (and indeed, the huge volume of policy sources these can be found in), four salient points emerged of relevance for energy feedback research. Firstly, it was shown firstly that despite being an overt success measure, direct energy savings metrics have played a surprisingly small role in SMIP evaluations of feedback to date. Indeed, on the basis of stakeholder feedback, one reference to energy savings as an objective of the SMIP was changed in favour of wider ‘consumer benefits’. Secondly, and relatedly, it was observed that precise success measurement could involve translation from one objective to another - such as from the objective of consumer ‘engagement’ with IHDs, to the (sub-)objective of consumer ‘acceptance’ of IHDs. But this can be problematic if the policy tools to achieve different targets vary. Indeed, what success was regarded as being was sometimes only possible to determine through how it was ultimately measured. For example, it was only through examination of questionnaires that target energy saving behaviours involved in ‘managing energy better’ were identified. Thirdly, the metric which received the most attention was in fact installation rates, and achieving this clearly requires the balancing of *multiple* success measures. Fourthly, when considering the use of evidence itself, the emphasis on justification for and consistency in policy direction may be making it more difficult to ascertain how evidence is feeding back into policy changes, and less likely that data is presented on *why* particular measures of success were chosen, or possible alternatives.

This study represents an initial exploration of bridging between the energy feedback and policy feedback agendas. It has taken the core concept of policy feedback – *policies actively construct politics, through changes to the status quo* – but conceptualised those ‘changes’ on the basis of literature that lies beyond the policy feedback literature itself. The authors found the policy feedback (and EBP) literature particularly useful in raising questions to guide the analysis, including how energy feedback provision might alter the landscape within which it operates by, for example, affecting relationships between actors, and thus altering (political) expectations about ‘success’ itself. As well as supporting findings of earlier research (e.g. highlighting the linear assumptions underlying some characterisations of feedback processes), a number of novel contributions to this bridging can be drawn out from across the findings discussed above. Firstly, any formal framework which seeks to enable deliberate *action based on feedback* requires *an assessment of success*; otherwise feedback has no reference point, and cannot be used to steer future direction. This assessment however is highly contextual and subject to change, for consumers (using energy feedback devices) and policymakers (implementing energy feedback policies) alike. Secondly, the data showcase a variety of success measures which were given greater or lesser prominence; they may be included in lists of key objectives, used as the basis of a formal metrics, repeatedly stated as aims, or simply given passing reference to. ‘Success measures’ need not be formalised (or, for example, quantified) to be influential; they may be multiple (and diverse), assumed or hidden, conflictual, and changeable. Relatedly, the data expose the way that success may be – and has been – translated from one measure to another, often in seeking more formal

metrics. Taken together, these first two findings can thus inform the policy feedback literature more generally: that when asking questions about how policy implementation and its effects are ‘feeding back’ to impact on the policy itself, a wider variety of success measures than simply the continuation of the policy could be considered. Thirdly, in the widespread provision of energy feedback there is an explicit tension present, in the policy desire to both (i) *assess* what consumer’s success measures are (what’s important to them? how are IHDs really being incorporated in to daily life?), and (ii) *influence* these success measures (e.g. promoting the benefits of accurate billing) in order to set appropriate expectations and increase acceptance rates. The data clearly shows then how different actors may seek to influence the success criteria of each other. By mandating roll-out of energy feedback, policymakers have also prompted significant new investments by energy suppliers into new technologies; this is one way policy ‘lock-in’ may be encouraged. However, if success is ‘consumer engagement’ (or indeed energy savings) then lock-in may require something different, such as, for example, a change in consumer expectations around the availability of energy data.

Now this exploration of the integration of energy feedback and policy feedback literatures has been opened up, it could be taken further. The data used in this study has predominantly focussed on causes (policies) of energy feedback provision, rather than investigating its direct effects – work which seeks to bring these together could be of value. One might also ask how these success measures will ‘settle down’ over time, indeed a long timescale is needed to fully appreciate policy processes and to allow new technologies to bed into the sociotechnical

make-up of society. There are also many different, overlapping foci within the SMIP – of which energy feedback is just one – and future work could examine the interactions between these. This analysis also focussed on just one data stream from the policy process: further insights could be gained from work which considered the on-the-ground experience of those using evaluative data to make decisions. Finally, this study predominantly took its point of departure from the socio-technical literature, but others may suggest different ways to link energy feedback and policy feedback. For example, other conceptualisations of society could be utilised to further compare and contrast *how* policies may be regarded as actively constructing politics, and there will inevitably also be different conceptualisations (e.g. including boundaries and scope) of what is meant by politics, too.

Policy evaluation criteria of smart meter roll-outs play a critical role in shaping what they achieve since the assessment of success “*actively constructs the contexts in which it operates*” (Power, 1994; p7). Findings from this study suggest a number of ways strategies may be developed to increase the policymaking reflexivity of this process:

- it is important to pay particular attention to the points at which a (potentially broad or qualitative) success measure ‘A’ is either narrowed into specific metric/s, or superseded by new success measure ‘B’, ostensibly for the purpose of helping achieve success measure ‘A’;
- similarly, where different measures of success are believed to be in tension, greater scrutiny would be enabled if this is acknowledged;

- measures of success will inevitably evolve over time, however the desire to achieve policy consistency makes this difficult to assess openly;
- justifying why one success measure is chosen over is inherently subjective and is influenced by one's own positionality, all of which could be discussed more openly (by researchers and policymakers alike);
- given that 'success' plays a role in determining policy direction, it is important space is left open for ongoing conversations about what success is, and for whom;
- whilst choosing particular success metrics focusses the field of enquiry, alternative measures do not cease to play a role - they simply become less visible.

This paper has reiterated that there is an inevitable messiness to the construction of evidence, as well as in its subsequent evaluation and policy formation. There have been calls for researchers to have a fuller appreciation of the policy process, in order to provide more appropriate advice (Müller, 2016). By bringing some of the existing political science literature to the energy feedback community's work, which has also facilitated a broader questioning some of the positivist ontology underlying invocation of 'evidence', this paper has aimed to support this endeavour. Policy researchers have often exposed the messy realities of the use of evidence in policy making, in the same way energy feedback researchers have sought to highlight that energy feedback cannot be considered simply an external 'input' to the situation of domestic energy use. Part of the value in bringing these

areas together is thus to demonstrate the similar challenges in each, which it is hoped is useful in bridging between the two communities.

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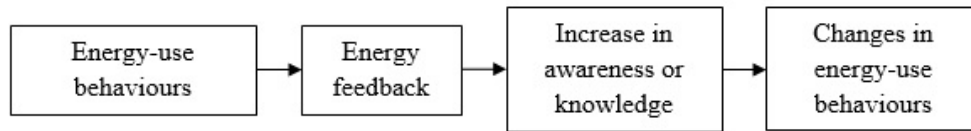
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Figure 1.

(a) Energy feedback



(b) Evidence Based Policy

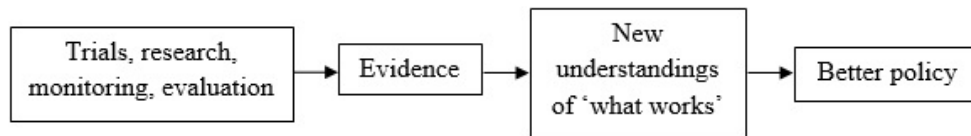
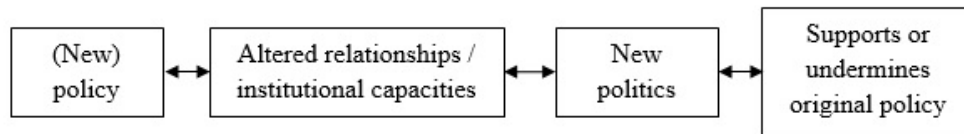


Figure 2.

(c) Policy feedback



(d) Policy feedback on energy feedback provision

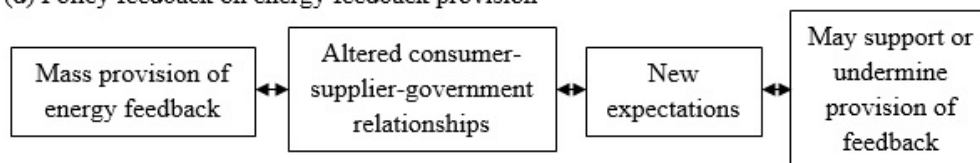


Table 1. The 11 SMIP policy objectives, as given on p.10 of the *Smart Meter Roll-Out Cost-Benefit Analysis, Part 1*. (BEIS, 2016a), together with a brief assessment how each objective links to energy feedback.

Impact Assessment objective	Energy feedback relevance
“To promote cost-effective energy savings, enabling all consumers to better manage their energy consumption and expenditure and deliver carbon savings”	Energy feedback to end-user
“To facilitate anticipated changes in the electricity supply sector and reduce the costs of delivering (generating and distributing) energy”	Energy feedback, but to supplier
“To promote effective competition in all relevant markets (energy supply, metering provision and energy services and home automation)”	Possible outcome of energy feedback provision
“To deliver improved customer service by energy suppliers, including easier switching and price transparency, accurate bills and new tariff and payment options”	Energy feedback to end-user
“To deliver customer support for the Programme, based on recognition of the consumer benefits and fairness, and confidence in the arrangements for data protection, access and use”	Arrangements for provision of energy feedback to the end-user

“To ensure that timely information and suitable functionality is provided through smart meters and the associated communications architecture where cost effective, to support development of smart grids”	Energy feedback, but to supplier
“To enable simplification of industry processes and resulting cost savings and service improvements”	Energy feedback, but to supplier
“To ensure that the dependencies on smart metering of wider areas of potential public policy benefit are identified and included within the strategic business case for the Programme, where they are justified in cost-benefit terms and do not compromise or put at risk other Programme objectives”	Connecting to other policy areas, some of which may be relevant to energy feedback
“To deliver the necessary design requirements, commercial and regulatory framework and supporting activities so as to achieve the timely development and cost-effective implementation of smart metering, and meeting Programme milestones”	Energy feedback to supplier. General progress of wider roll-out
“To ensure that the communications infrastructure, metering and data management arrangements meet national requirements for security and resilience and command the confidence of stakeholders.”	Includes use of end-user energy feedback data
“To manage the costs and benefits attributable to the Programme, in order to deliver the net economic benefits set out in the Strategic Business Case.”	Includes energy feedback provision running to cost

Table 2. Variety of (a) justifications and (b) aims of the energy feedback component of the SMIP, as noted through the policy document analysis, grouped under the feedback focussed objectives from Table 1.

<p><i>“To promote cost-effective energy savings, enabling all consumers to better manage their energy consumption and expenditure and deliver carbon savings”</i></p>
<p>affordability for the consumer, consumer behaviour change, help consumers reduce the amount of energy they use, help consumers save money, help consumers save carbon, better consumer management of energy, avoiding wasting energy and money, encouraging the right behaviours, encouraging longer-term energy savings, encouraging consumers to buy more energy efficient goods, developing the habit of regularly using IHD, continuing to use an IHD over time, having IHD still plugged in, full potential of IHD features being used, better outcomes than without IHDs</p>
<p><i>“To deliver improved customer service by energy suppliers, including easier switching and price transparency, accurate bills and new tariff and payment options”</i></p>
<p>better customer service, more flexible payment options, better management of customer debt, ending estimated billing, more convenient ways to top up, clear and easy to understand IHD info (with inclusive design for consumers with disabilities), modernising the grid – e.g. to include ‘prosumers’, keeping smart meter/energy feedback functionality when switching supplier</p>

“To deliver customer support for the Programme, based on recognition of the consumer benefits and fairness, and confidence in the arrangements for data protection, access and use”

consumer engagement, positive consumer experience (e.g. of meter/IHD installation), minimal disruption for consumers, consumers voluntarily having energy feedback installed, not ‘leaving people behind’ or ‘alienating’ those who choose not to have one, customer satisfaction, confidence in data privacy, consumer choice over use of data, building consumer acceptance, reassurance on areas of consumer concern, promotion of positive consistent messages and countering of misinformation, safety of equipment, ensuring that vulnerable, low income and pre-payment consumers can benefit, helping consumers realise the benefits

Appendix. Documents and other sources included in the policy document analysis.

Categories: (i) overall policy = P, (ii) information leaflet = L, (iii) statistics = S, (iv) formal evaluation = E, (v) consumer research = C.

Date first published	Title	Category	Length (pages)
30 Mar 2011	SMIP - Response to Prospectus Consultation	P	64
30 Mar 2011	Smart meter rollout for the small and medium non-domestic sector: Impact Assessment	E	49
26 Jul 2011	Smart Meters Hothouse - leaflet on industry working groups	L	1
21 Dec 2011	SMIP - Delivery Plan	P	5
22 Dec 2011	Open letter: possible exemption for small suppliers from the smart meters roll-out obligation	P	6
Apr 2012	SMIP - Programme Update April 2012	P	13
4 May 2012	Smart meter rollout for the domestic sector (GB): Impact Assessment (Govt response stage)	E	88
30 May 2012	Smart meters: research into public attitudes	C	61
21 Aug 2012	Quantitative research into public awareness, attitudes, and experience of Smart Meters: Wave 1	C	55
11 Dec 2012	Smart Metering Implementation Programme – domestic leaflet	L	2

20 Dec 2012	Smart Meters Programme Plan (update on Delivery Plan)	P	4
19 Dec 2012	First Annual Progress Report on the Roll-out of Smart Meters	E	30
Dec 2012	Government response to the consultation on the consumer engagement strategy	C	99
Dec 2012	Government Response on information requirements for Monitoring and Evaluation	E	60
21 Feb 2013	Quantitative research into public awareness, attitudes, and experience of Smart Meters: Wave 2	C	65
10 May 2013	Smart Meters Programme (update on Delivery Plan)	P	3
9 Sep 2013	Quantitative research into public awareness, attitudes, and experience of Smart Meters: Wave 3	C	84
8 Oct 2013	The Smart Metering System leaflet	L	2
31 Oct 2013	Helping consumers with energy	L	20
18 Dec 2013	Smart Metering summary plan	P	6
18 Dec 2013	Second Annual Progress Report on the Roll-out of Smart Meters	E	44
29 Jan 2014	Smart Metering	L	2
31 Jan 2014	Smart meter roll-out for the domestic and small and medium non-domestic sectors (GB): Impact Assessment	E	139

4 Feb 2014	Quantitative research into public awareness, attitudes, and experience of Smart Meters: Wave 4	C	32
11 Dec 2014	Third Annual Progress Report on the Roll-out of Smart Meters	E	42
12 Dec 2014	The implementation and regulation of smart metering: a joint DECC/Ofgem open letter to the industry	P	4
22 Jan 2015	Smart Meters, Smart Data, Smart Growth	L	6
2 Feb 2015	Freedom Of Information release: smart meters (on installation numbers)	S	3
2 Mar 2015	DECC's Policy Conclusions: Smart Metering Early Learning Project and Small-scale Behaviour Trials	C	47
2 Mar 2015	Smart Metering Early Learning Project: synthesis report	C	73
31 July 2015	Smart Metering Rollout Strategy	P	33
18 Nov 2015	Fourth Annual Progress Report on the Roll-out of Smart Meters	E	38
22 Dec 2015	Quantitative research into public awareness, attitudes, and experience of Smart Meters: Waves 1-4 underlying dataset and technical note	C	6
12 Feb 2016	Household energy savings through switching: supporting evidence	S	1

9 Mar 2016	What the Government is doing to keep your energy bill down (webpage)	L	1
27 April 2016	Smart Meters Derogation Guidance: supporting energy supplier applications for trials of in-home display alternatives	C	69
Aug 2016	Smart Meter Roll-Out Cost-Benefit analysis (part I)	E	140
Sep 2016	House of Commons Select Committee Evidence Check	E	57
Nov 2016	A Smart, Flexible Energy System: a call for evidence	P	104
	Smart Energy GB website	C	
	Smart meter installation statistics and methodology note – released every quarter, from Quarter 2 2013 to Quarter 2 2016 (14 reports in total)	S	