



Electricity Demand Reduction UKERC Consultation Response to the Department of Energy and Climate Change

January 2013

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1. Introduction

This document sets out a response of the UK Energy Research Centre (UKERC) to the Department of Energy and Climate Change's (DECC) consultation 'Electricity Demand Reduction'.

The submission is under the control of Dr Nick Eyre from the University of Oxford.

UKERC welcomes DECC's consultation on electricity demand reduction. In our response to the consultation on electricity market reform (EMR) we noted the potential importance of demand reduction and demand side response in achieving the Government's goals for the electricity sector of security, emissions reduction and reasonable cost. We also welcome 'The Energy Efficiency Strategy' published by DECC in November 2012 as a broader statement of government's intent with respect to efficiency and demand reduction.

All our responses are based on evidence from research by UK academic researchers independent of commercial or other vested interest. One particular focus of the response is on the option of premium payments (otherwise known as energy saving feed-in tariffs). UKERC supported research (Eyre, 2013) is the first peer reviewed academic literature on this topic in the world. We believe that an approach along these lines is consistent with addressing a market bias against energy saving that would otherwise be introduced by EMR proposals in their current form.

We begin the response with four key concerns about the evidence base used in the consultation document and its supporting literature. We then respond to some specific questions identified in the consultation document itself.

2. Key Concerns

2.1 The evidence base on electricity saving potential

The underlying evidence base was first published by DECC in summer 2012 in the form of “Draft Report on capturing the full electricity efficiency potential of the UK” by McKinsey. At DECC’s request UKERC researchers were involved in its peer review. We welcome the changes that respond to some of the comments made. However, we note that some of the basic concerns have not been addressed. As a result we believe the report as it stands does not meet the quality threshold we believe appropriate for publication as a final report. We do not believe it would be appropriate to make public all the comments made in a confidential review. Suffice to say that our key remaining concern is as follows:

The literature reviewed largely neglects the relevant UK specific literature, instead relying on a few global scale assessments and the US literature, despite the existence of a very large body of work on UK energy efficiency, much of it supported and/or published by DECC and its predecessors. Energy use patterns in the UK are significantly different from those in the USA, notably electricity use per capita is lower in every sector. In addition deployment patterns for some technologies are very different, for example wet central heating systems are rare in the USA, but predominant in the UK. The assumptions related to cost and potential and presented in MACC curves are not documented within the report, and therefore it is not possible to evaluate the quantitative findings of the report. We remain concerned that the data presented may not provide the best possible estimate of the potential and costs for the UK.

We also note that MACC assessments of efficiency and demand reduction potentials are linked to a ‘market and non-market barriers’ interpretation of energy efficiency opportunities. It is important to emphasise that this is only a partial view. Careful social science research repeatedly finds that many so-called ‘barriers’ are common and deeply embedded features of domestic or commercial life. They cannot simply be removed. They can certainly be shaped and influenced by policy, but policy which acts at a more systemic level, over longer time-scales, and involving a more diverse range of stakeholders than is typically the case. An approach of ‘removing barriers’ is unlikely to be effective in isolation and energy efficiency policy needs to be designed in this broader context.

2.2 The evidence base on barriers to energy efficiency

We agree with the importance of correcting clear market failures. These include unpriced environmental and social externalities, misaligned incentives (also known as principal agent problems), and to some extent, imperfect information and friction in market transactions (although this is a pervasive characteristic of markets). It is essential that market and policy signals are aligned and consistent in their support for efficiency and demand reduction.

The review of barriers to energy efficiency in the consultation document is based on much stronger evidence and analysis than presented in the McKinsey review, which we welcome. Nevertheless there are two important elements missing.

The first relates to a new market failure created by the existing Electricity Market Reform (EMR) proposals, issued on the same day as this consultation document. In essence these propose, inter alia, to create a system of Contracts for Difference (CfD) that are expected (at least at most times) to pay generators using low carbon technologies a price above the prevailing wholesale market price. UKERC's evidence presented elsewhere supports this broad principle with some caveats. The result will be that low carbon generators receive a price higher than the wholesale market price (even although the CfD will be paid for by socialising its costs over all consumers). This constitutes a barrier to energy efficiency in the usual sense of the term in that there is a market failure that disincentivises investment in energy efficiency (e.g Sanstad and Howarth, 2004; Brown, 2001). This is because, in their current form, the EMR proposals offer no matching support for investment in energy demand reduction, so that electricity efficiency technologies that are cost effective at prices equivalent to the CfD strike price will not be cost effective at the wholesale market price (Eyre, 2013). In short low carbon megawatts will receive support, but low carbon negawatts (all negawatts are low carbon) will not. We accept that this could be addressed by a market wide Feed-in Tariff (FIT) or obligation. However, the consultation as it stands presents these options as additional support to energy efficiency, rather than a market failure correction, which we believe may lead to erroneous conclusions.

Secondly, all the barriers are presented in terms of consumer decision making. We do not think that this is helpful. Applying a 'barriers' framing to consumer decision making is a good example of how a MACC + barriers approach can be misused. The challenge of energy efficiency can be framed in different ways, which help open up other potential productive 'solutions'. This is particularly important with respect to:

1. why and how technologies are used: this resists being reduced to an optimisation problem,
2. the relationship between energy use and energy demand, which is deeply structured into patterns of daily life.

To the extent that the energy efficiency strategy and consultation go beyond narrow efficiency improvements of specific conversion technologies (which they do by frequently mentioning energy use, energy demand, and emissions), then a consideration of how energy use is deeply normalised is essential. The barriers framing sidelines this issue as it assumes that efficiency will flow if only – and as soon as – barriers are removed. As a specific example, the Green Deal is designed to remove the upfront cost 'barrier', but this presupposes homeowners seek to 'maximise' the energy savings from their homes. In fact, what homeowners want to do to their homes is rooted in the meanings, lives, and identities that they live out through their homes. There are many opportunities to think about energy savings through these lenses, but the barriers framing precludes this.

Much research indicates the importance of the supply chain in energy efficiency decision making. The best known example is that of condensing boilers, where the difficulty of finding a gas fitter prepared to recommend the technology before 2003 was well known (Banks, 2001). The situation was only changed by a clear regulatory signal (in the 2003 Energy White Paper) followed by an extensive training programme funded jointly by Government, the gas industry and the EST. The same principle applies widely across the fabric, glazing, heating and lighting systems used in most buildings. Building owners and users are not experts and realistically never will be. They rely very heavily on their professional advisors (e.g. architects), tradespeople (gas fitters, electricians etc) and retailers for advice on appropriate products. Barriers to rational economic decision making lie as much in the practice and incentive structures in these sectors as in end users themselves. UKERC researchers were involved in reviews of evidence on the effectiveness of interventions designed to change energy-using decisions and behaviours. These reviews were conducted for DECC in support of the Energy Efficiency Strategy published in November 2012. Both reviews found a relatively limited scope for energy demand reduction through ‘consumer decision making and behaviour’ alone. This points to the importance of factors outside the control of the final energy user. These include supply chains, technologies and infrastructures, social norms and values.

We welcome the efforts of accreditation provisions within the Green Deal to address the barriers in supply chains, but they are unlikely to resolve them completely, and therefore we believe they should be included in the assessment of barriers here. Initial findings from UKERC-funded research on consumer preferences in the Green Deal market suggest that homeowners do not place as much confidence in accreditation as they do in a reputation for reliability and trustworthiness. Accreditation may certainly be a route to achieving this reputation, but clearly this will take time.

2.3 The evidence base on energy efficiency policies

We strongly agree that electricity demand reduction will need a holistic set of policy instruments, not just incentives, to address the range of barriers identified. We therefore welcome the focus on ‘additional policy’. The focus on international comparison is welcome. However, it has resulted in a lack of attention to existing and prior UK policy in this field, which gives the unfortunate impression that the UK has no track record of evaluated public policy initiatives in this field. This would be an incorrect impression. There are well documented assessments of a number of policies and programmes, which we believe should form part of the evidence base. These include: CERT (and its predecessors), CESP, Energy Saving Advice Centres, Monitoring and Targeting, SME loan schemes and the Energy Efficiency Best Practice Programme.

2.4 The Context and Scope of the Evidence Base

We believe there are some risks in constraining analysis to electricity. This has not been done before in UK public policy, for the good reason that there are very considerable overlaps with energy demand reduction relating to other fuels. Moreover, most future

projections indicate significant electrification of heat and transport, so that energy saving in those sectors now (saving largely gas and oil respectively) may result in electricity saving in future.

3. Summary of consultation questions

Consultation Question – Chapter 1

1. DECC would welcome further evidence and analysis to support and increase our understanding of the potential for cost-effective energy-efficiency measures, the abatement potential and the cost of abatement.

Response

See 2.1 above. We believe this needs a full review and analysis of available UK data.

Consultation Question – Chapter 3

2. Do you have evidence on whether offering a financial incentive is likely to be an effective way of overcoming the barriers that prevent efficiency measures being taken up in non-domestic buildings, bearing in mind the policy measures that already drive energy efficiency in non-domestic buildings?

Response

Yes, we believe evidence from supplier obligation schemes (all of which, except in the UK, include parts of the non-domestic sector) shows this, especially in the context of the new barrier proposed under EMR.

3. Do you have evidence on whether offering a financial incentive is likely to be an effective way of overcoming the barriers that prevent efficiency measures being taken up in industrial processes? Explain your point of view.

Response

See 2.2 above.

4. Should Government consider a product-specific financial incentive in the domestic sector in spite of the risks and limited potential (23% of domestic product untapped potential as set out in Chapter 2)? If so, how could we design an incentive that would drive better purchasing or usage, rather than early product replacement?

Response

Yes, we believe evidence from supplier obligation schemes in the UK and elsewhere shows incentives contribute to market transformation policy packages. Incentive design is therefore important. Incentives help raise the salience of efficiency opportunities to consumers, so it is important that they are supported by consistent signals from a broad package of market transformation measures. Incentives used in isolation are likely to be subject to free ridership.

5. Would a financial incentive be effective in driving efficient product choices in the non-domestic sector? What evidence is there of this and what are the differences, if any, to the case with domestic products?

Response

Yes, we believe evidence from supplier obligation schemes (all of which, except in the UK, include parts of the non-domestic sector) shows this, especially in the context of the new barrier proposed under EMR.

6. If a targeted financial incentive for non-domestic buildings were available, which efficiency measures should be a priority for the scheme? What evidence is available to support your view?

Response

All, see 2.2 above.

7. Do you consider a targeted financial incentive an effective way of encouraging higher and additional efficiency in industrial processes? Which efficiency measures should be a priority for any scheme? What evidence is available to support your view?

Response

Yes, especially in the context of the new barrier proposed under EMR.

8. Should Government consider a targeted financial incentive to support the purchasing of higher energy-efficient products? How could the efficiency of such a scheme be maximised? Would a voucher or certificate scheme work? If not, what other options should we consider? Please make clear in your response whether you are referring to the domestic or non-domestic sector or both.

Response

Yes, in all sectors in the context of the new barrier proposed under EMR. Evidence from CERT indicates this is feasible and can effectively engage retailers.

9. What restrictions, if any, should there be on which sectors and measures are eligible to participate in a market-wide scheme? Please explain.

Response

Restrictions are required where deadweight would be very high

10. What are your views on the comparative merits and disadvantages of targeted financial incentive schemes and market-wide ones? Please explain your response.

Response

In the context of the new barrier proposed under EMR a market wide approach is justified.

11. Should Government consider a market-wide financial incentive to support further electricity efficiency measures? Please explain your response.

Response

In the context of the new barrier proposed under EMR a market wide approach is justified.

12. What are the key elements of a financial incentive scheme to encourage participation? Including but not limited to payment level, length of payback period, who manages the scheme, whether the level of payment is known upfront or determined through the sale of a certificate. Please provide evidence to support your views and reference relevance to the different sectors as appropriate (domestic buildings and products, non-domestic buildings and products and industrial processes).

Response

This is a complex question requiring detailed consultation. Our assessment is that different approaches will be needed in different sectors (see Eyre, 2103). For the residential sector and other small consumers, evidence from CERT and supplier obligation scheme worldwide is that a single cashback payment will be most effective. Research in a US context (Stern et al. 1986) found that upfront incentives were more effective than delayed incentives, and that increasing the magnitude of incentives had diminishing returns on effectiveness. This shows that incentives do not just improve the economics of a purchase decision, but also help raise the salience of efficiency considerations in that decision.

13. Do you have any other views or evidence on the relevance of a financial mechanism not captured by the questions above?

No response

Consultation Question – Chapter 4

14. For businesses, what would be a useful form of information on the efficiency of the products and equipment you purchase, recognising how decisions are taken in your organisation? Would your organisation find it useful for running cost information to be included in product information? Please provide an explanation.

No response

15. Is there interest in a dedicated information source on industrial electricity efficiency opportunities?

No response

16. What available sources of information could the Hub include that are not covered elsewhere? How could this information be sourced and validated?

No response

17. Are there any other better ways of raising awareness in the industrial sector that the Government should consider? Please provide relevant evidence.

Response

See 2.3 above, there is significant UK public policy experience in the work of the Carbon Trust, Best Practice Programme etc, which is now at risk of being lost.

18. If organisations need more specific information about electricity use, can the Government intervene helpfully in this space – for example to encourage a higher take up of sub metering?

No response

19. Would a Buyer's Commitment to purchase high-efficiency products be of interest to your business? What aspects make this approach appealing?

No response

20. What kind of recognition would be valuable to your organisation if considering engaging in a Buyer's Commitment? Would a recognised accreditation that you could display externally increase your interest in participating in a Buyer's Commitment?

No response

21. To what extent do you think efficiency standards in buildings will deliver permanent reductions in electricity demand when implemented?

Response

Analysis of energy efficiency and demand reduction in jurisdictions with strong efficiency standards compared to those without shows that standards are an effective approach for managing demand (e.g., Geller et al. 2006; Horowitz 2007). It is not possible, however, to verify permanent reductions in demand ex ante. Rebound effects may erode demand reductions as efficiency measures lower the effective cost of energy services and so more services are demanded. Rebound effects can be mitigated if energy prices rise to hold the cost of the energy services broadly constant.

22. Do you have relevant evidence on the effectiveness of standards in driving electricity demand reduction?

Response

Yes. See Boardman, 2004.

23. Do you agree with the Government's assessment against minimum efficiency standards for industrial processes? If not, please provide evidence of how mandatory minimum standards for industry could be set and why, and the impact they could be expected to have.

Response

Yes.

24. Should Government consider any other policy options aimed at overcoming the barriers that prevent the full take up of efficiency opportunities in:

- Domestic or non-domestic buildings
- Domestic or non-domestic product choices
- Industrial processes?

No response

Consultation Question – Chapter 5

25. What further evidence exists on the accuracy of these approaches to M&V, and how this varies by types of efficiency intervention? What may be the basis for distinguishing which approaches are most relevant for which efficiency projects?

Response

There is a very large evidence base both in UK assessments of CERT and more widely.

26. For which electricity demand reduction measures and technologies do you believe new policy would most likely be additional? What evidence is available on this?

No response

27. Specifically, what evidence is available on the likely additionality of measures in industrial processes and non-domestic buildings?

No response

28. In the context of a financial incentive scheme, would the flexibility and accuracy of taking a case-by-case approach to additionality justify the administrative burden that this would require? What evidence is available on this?

Response

We believe evidence from supplier obligation schemes shows this is likely.

29. What, if any, is a practical approach to identifying the additionality of projects ex-ante (including measures such as those identified above)? Which types of measures and sectors are suitable for financial incentives and how should the acceptable projects be identified?

Response

There is a very extensive evaluation literature that addresses this type of issue (e.g. Vine 2008)

30. Could coefficients be used to reward projects which are *partly* additional? How should such coefficients be calculated? If so, what are the best practice examples of this approach we should consider further?

Response

There is a very extensive evaluation literature that addresses this type of issue (e.g. Vine 2008)

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