



Facilitating Energy Efficiency in the Electricity System

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About CREDS

CREDS (the Centre for Research into Energy Demand Solutions), is a research centre established in 2018 with a vision to make the UK a leader in understanding the changes in energy demand needed for the transition to a secure and affordable, low-carbon energy system. Working with researchers, businesses and policy makers, our work addresses a broad range of issues. New research questions in the areas of technology, business models, social change and governance, and in their interaction, are needed. Our vision is for research in the UK to rise to the challenge of transforming the energy demand sector. CREDS is funded by EPSRC and ESRC.

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This response is to a consultation issued by the Department for Business, Energy and Industrial Strategy on 22 July 2019. We apologise for the late response.

Q1: Do you agree with the market barriers to energy efficiency investment described? Do you think there are additional barriers?

There is a very substantial literature on barriers to energy efficiency and their relationship to market failures that is not addressed in this consultation. Participants in CREDS have played a substantial role in this over a number of years^{1,2,3}. This work has informed evidence reviews for Government, e.g.⁴, but we would be happy to discuss further with BEIS if this would be helpful.

In the context of this consultation, the key conclusion is that market barriers to energy efficiency cannot be addressed through the design of upstream energy markets alone. The largest market failures are in product markets not energy markets⁵.

Q2: What are the ways we can overcome the market barriers to energy efficiency investment?

The literature cited above comes from different disciplinary perspectives, but points towards similar policy conclusions. These are, firstly, that Government intervention is justified to increase energy efficiency (and therefore economic efficiency). And secondly, that a mix of policy instruments, including regulation, incentives and consumer engagement is likely to be most effective⁶. Importantly, regulation is not necessarily less efficient than market based instruments.

Q3: How can we leverage current markets to facilitate energy efficiency? For example, markets flexibility technologies can access such as the Capacity Market, National Grid Energy System Operator's (ESO) balancing services markets or Distribution Network Operators (DNO) tenders for alternatives to network reinforcement.

We endorse the conclusion that the Capacity Mechanism is very unlikely to provide an adequate incentive for energy efficiency projects under the restrictions trialled in the in the EDR Pilot. This is unsurprising as capacity mechanisms are designed to incentivise power not energy, and therefore more likely to be relevant to demand side response than demand reduction. No one has ever argued that the capacity mechanism can replace contracts for difference for electricity generation, so it is not clear why it was ever envisaged they could be effective for kWh savings. In addition, as noted in this consultation, the detailed rules of the pilot were unattractive to most potential projects, including many that are cost effective. These points were made by energy efficiency stakeholders to DECC during the

¹ Eyre, N. (1997). "Barriers to energy efficiency more than just market failure." *Energy and Environment* **8**(1): 25-43.

² Shove, E. (1998). "Gaps, barriers and conceptual chasms: theories of technology transfer and energy in buildings." *Energy Policy* **26**(15): 1105-1112.

³ Sorrell, S., et al. (2004). *The Economics of Energy Efficiency: Barriers to Cost Effective Investment*. Cheltenham, Edward Elgar.

⁴ Banks, N., et al. (2012). What are the factors influencing energy behaviours and decision-making in the non-domestic sector? A rapid evidence assessment. London Centre for Sustainable Energy and University of Oxford.: 88 pp.

⁵ Eyre, N. (1998). "A Golden Age or a False Dawn? Energy Efficiency in UK Competitive Energy Markets." *Energy Policy* **26**(12): 963-972.

⁶ Rosenow, J., et al. (2016). "Energy efficiency and the policy mix." *Building Research & Information*: 1-13.

consultation on the EDR Pilot and have been confirmed by subsequent research⁷. The successful experience in PJM and New England markets is very largely due to capacity benefits being additional to large and successful policies to promote energy efficiency in individual states⁸. Essentially, the evidence indicates that energy efficiency can contribute to efficient capacity markets, but capacity markets are inadequate to stimulate energy efficiency at the scale of action required.

We are unaware of detailed research relevant to the role of energy efficiency contributions in SO and DNO markets. However, the same issues are likely to arise. SO and DNO markets are likely to incentivise peak power reduction not energy savings. We would therefore expect the conclusions of the previous paragraph to apply in these cases as well.

Overall, it is not clear why Government has expected that policies to incentivise peak power reduction will be effective for energy efficiency, in the face of both theoretical considerations and empirical evidence to the contrary.

Q4: How we can create new markets for energy efficiency? Please provide suggestions on how to design the different mechanisms.

In this context, it is surprising that the consultation does not seem to envisage energy efficiency obligations (EEOs) as more central to the development of energy efficiency markets, given the positive experience with them in the UK to date as a major source of carbon emissions reduction. The impact of EEOs on consumer bills has also been hugely beneficial, as the costs of the investments have been significantly smaller than the lifetime energy saving benefits according to Government's own impact assessments. These benefits are significantly underplayed in the consultation document, as it only refers to the period of ECO (2013-current). EEOs have been in place in the UK market since 1994^{9,10}. They were substantially reduced in 2013¹¹, with consequential damage to consumer interests. They are clearly in the national interest, and consistent with the statutory duty on Government and Ofgem to promote consumer interests.

One of the major changes to obligations from 2013 was the exclusion of most measures that result in reduced electricity demand, i.e. electricity efficiency. Government has never adequately justified that decision and has not developed any effective alternative policies to replace them. Given the very cost effective schemes for lights and appliances in earlier EEOs, this change has been seriously detrimental to policy effectiveness and should be reversed.

⁷ Liu, Y. (2018). "Role of a forward-capacity market to promote electricity use reduction in the residential sector—a case study of the potential of social housing participation in the Electricity Demand Reduction Pilot in the UK." *Energy Efficiency* **11**(4): 799-822.

⁸ Liu, Y. (2017). "Demand response and energy efficiency in the capacity resource procurement: Case studies of forward capacity markets in ISO New England, PJM and Great Britain." *Energy Policy* **100**: 271-282.

⁹ Rosenow, J. (2012). "Energy savings obligations in the UK—A history of change." *Energy Policy* **49**(0): 373-382.

¹⁰ Mallaburn, P. S. and N. Eyre (2014). "Lessons from energy efficiency policy and programmes in the UK from 1973 to 2013." *Energy Efficiency* **7**(1): 23-41.

¹¹ Rosenow, J. and N. Eyre (2013) "The Green Deal and the Energy Company Obligation." *Proceedings of the ICE - Energy* **166**, 127-136.

We accept that EEOs will be insufficient, alone, to drive the major programmes of deep refurbishment and heat decarbonisation required to meet the Government's goal of net zero carbon emissions by 2050. It is highly likely that mandatory standards, and low cost loans will also be needed¹². But EEOs are the principal tool that can be used in energy markets.

Q5: What can we learn from other countries' electricity systems from an energy efficiency perspective?

The reduction in scale of EEOs in GB since 2013 has not been mirrored in other countries, many of which have introduced and strengthened energy efficiency obligations in recent years¹³. So, there is now much that the UK can learn from other countries. Two particular changes could help and should be considered.

The first change would be to broaden the base of the obligation. UK EEOs are focussed entirely on low income household heating, despite there being no evidence that this is their most effective use. UK EEOs have been unusual, since 1998, in being confined to households; other countries use them to support business energy efficiency as well and some to support transport efficiency. In GB, since 2013, almost all electricity use and 'able to pay' households have been excluded as well. Since the collapse of the Green Deal this is a huge anomaly, for which there is no supporting justification¹⁴. Including energy efficiency measures in business and non-heating end uses within the scope of the obligations would increase the number of obligated suppliers and increase cost effectiveness.

The second change would be to place EEOs on gas and electricity distribution companies, as well as or instead of suppliers. This is the current practice in Denmark and Italy. At the time of the unbundling of the Public Electricity Suppliers in 1998, both supplier and DNO options were discussed and both are allowed under the relevant primary legislation. However, the supplier obligation option was preferred, as it was argued that this would encourage suppliers to be energy service companies, selling energy efficiency as part of their core business. This has clearly never happened. DNOs are showing an increased interest in end use efficiency as part of the toolkit for delaying or avoiding network investment. There are a number of reasons to think a distribution option would be preferable. Distribution companies could bear obligations without impeding competition. Their longevity and asset management focus is better suited to infrastructure investment. And costs to consumers could be spread over a price control period rather than incurred in the year of the measures.

¹² Mallaburn, P., Oreszczyn, T., Elwell, C., Hamilton, I., Heubner, G. and Lowe, R. Reducing energy demand from buildings, in Eyre, N and Killip, G. (eds). 2019. Shifting the focus: energy demand in a net-zero carbon UK. Centre for Research into Energy Demand Solutions. Oxford, UK

¹³ Fawcett, T., Rosenow, J. & Bertoldi, P. (2018). Energy efficiency obligation schemes: their future in the EU. *Energy Efficiency*, **12** (1): 57–71.

¹⁴ Rosenow, J. and N. Eyre (2016). "A post mortem of the Green Deal: Austerity, energy efficiency, and failure in British energy policy." *Energy Research & Social Science* **21**: 141-144.

Q6: How could networks ensure that energy efficiency can compete fairly with other solutions as a potential alternative to network reinforcement?

The option of placing the obligations of network companies, as set out under the response to the previous question, would clearly help the network companies consider this.

Q7: Are there potential benefits from combining EE and flexibility? How can we maximise these benefits?

For the reasons set out in response to question 3, it seems unlikely that a single policy instrument will effectively address both energy efficiency and demand side response. Policy instruments to support each will need to consider the implications for the other, but each should have a primary focus.

Q8: What is the role of aggregators?

Under an obligation, the obligated party acts as an aggregator and is free to use other specialist aggregators if this is more cost effective.

Q9: How should we best align with existing policies, particularly those referenced in section 2.4?

As set out in our response to question 2 above, our reading of the evidence is that a combination of policies will be most effective. With good policy design, there is synergy rather than conflict between standards (to eliminate the worst performing products/vehicles from the market and provide certainty), incentives (for early action and to go beyond minimum standards) and information and engagement programmes.

Q10: Should we support behaviour change? If so, should it be supported in the same way as energy efficiency, which requires installation of measures?

The evidence on energy demand reduction tends to show that changes in human behaviour and technology are linked rather than separate issues. "Behaviour change" potentially encompasses the purchase and use of more efficient equipment, as well as changes to practices that have lower energy service demands. We believe that this is a more useful dichotomy than "behaviour" and "technology".

Evidence on behaviour changes towards more efficient equipment is addressed in our responses to other questions. We agree that behaviour changes to lower levels of energy service demands should also be addressed. There are clearly some complex issues to consider in doing this. For example, no-one would wish to encourage under-heating of homes of vulnerable people. However, where alternatives exist, there is significant scope for energy service demand reduction, with co- benefits rather than social costs. For example, in transport, low impact modes and public transport tend to reduce energy demand and to improve air quality, and in the food sector, plant based diets are both lower energy and better for health. We recognise that many of the policies that might influence these are largely the scope of BEIS policy control. This reinforces the need for energy demand reduction to be a priority across Government.