JRPsolutions
The Energy Specialists

BEIS Consultation

Facilitating Energy Efficiency in the Electricity System

Response by JRP Solutions

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Who we are

JRP Solutions specialise in the delivery of energy efficiencies across the whole asset base in commercial, industrial and public sector environments. We help our clients improve environmental performance, optimise operating costs, improve energy efficiency, achieve their sustainability targets, and implement practical improvement projects to improve service delivery. We believe that from the boiler room to the boardroom, smarter use of energy benefits business at every level, helping to meet the growing expectations of shareholders, customers and employees while generating capital that can be reinvested in clean growth.

Summary of our response

Improving energy efficiency – both using technology and through embedding energy behaviour change – is amongst the easiest and cheapest ways to decarbonise our energy system. In policy discussions however, energy demand is often a secondary consideration. If it is mentioned at all, many commentators fail to adequately capture the scale of the opportunity. This is a mistake. At JRP we believe the case for energy efficiency is much bigger, potentially transformative for the UK, and is critical to us achieving our Clean Growth Strategy targets. Yet despite such a compelling case the untapped potential of energy efficiency remains.

There is an urgent need for increased energy efficiency action to meet both IPCC 2030 targets and the more recent recommendations from the Climate Change Committee (CCC). The CCC's recently published Net Zero strategy, which sets out a science-based roadmap to carbon neutrality for the UK by 2050 has, rightfully recognised energy efficiency as a key pillar for successful delivery. However, in reality the UK remains off track of its targets. The complexity of our energy system means there is no 'silver bullet' solution or policy; a range of policy instruments are required to meet energy policy goals.

At JRP Solutions, we believe a significant part of the solution which is currently largely ignored is Behaviour Change. We see Behaviour Change in a different way to Government: as a major solution to tackle climate change and sustainability issues. Though there is nothing new about the concept of behaviour change, we believe policymakers are failing to think about it in its widest sense. Historically, many think behaviour change is about hands on changes made on the ground: for example, switching off equipment, lighting, or turning down the thermostat. Whilst this is a crucial part, it also needs to be about the decision making our top Executives make and the standards, policies and plans our industry policy-makers put in place. For the potential of Behaviour Change to be realised, it needs a total paradigm shift from Government and business alike to understand and grasp the huge opportunity it presents. **Evidence amassed by ESTA Independent Energy Consultants Group[1] suggests that Behaviour Change offers 50% of the total potential energy savings available in industry. We describe in further detail in our response to Q10, so we ask you pay particular attention to this response.**

[1] https://estaenergy.org.uk/groups/iecg/

A radical re-think on what constitutes behaviour change is required by BEIS. Technology is the common focus currently and support is required from UK Government to ensure that the 'hidden' savings available from Behaviour Change become mainstream. Currently resources (people, availability, skills) are focused in the main on other energy related actions rather than Behaviour change and Government policies and measures will be necessary to change this. **Working in collaboration with the Energy Services Technology Association (ESTA) and other founder partners including the Energy Institute, Vodafone, and The Discovery Mill, we have launched a Behaviour Change initiative, under the working title the 'Energy Conscious Organisation' (a full report on the Energy Conscious Organisation initiative has been discussed with Gary Shanahan (Head of Business Energy Efficiency, BEIS) and is available on request.**

Consultation questions

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

- A useful typology of the barriers to energy efficiency investment is included in the following table. Naturally, Government policy should at all times seek to address one or more of these barriers through regulations, taxes or market based mechanisms that it is implementing. **The 'Behaviour and motivation' barrier is from our perspective, in need of urgent and robust intervention. The potential is significant as this market is largely untapped.** Furthermore, evidence shows that behaviour change projects are low payback and low investment (even when including the cost of internal resources).

Categories	Examples
Financial	• High up front costs • Lack of finance/access to capital • High discount rates • Risk of stranded investments
Hidden costs/risks	• Transaction costs • Hassle Factor (e.g. time spent clearing a loft in order to have insulated • Time taken to evaluate and implement energy efficiency investments • Performance risks, service and quality of workmanship
Information	• Lack of information or imperfect information • Lack of awareness or time to investigate opportunities
Misaligned incentives	• Split incentives between the person responsible for making investment and the person who benefits (e.g. landlord/tenant or builder/homebuyer) • Failure to internalise environmental or other external costs
Behaviour and motivation	• Traditions, sticking to 'defaults', reluctance to alter lifestyle • Values, preferences, social norms • 'Bounded rationality' – households systematically underestimating benefits of energy efficiency, and ignoring small opportunities

Typology of barriers to energy efficiency

Added to this, lack of high level Government leadership is a major barrier to investment in energy efficiency. Government must change its policy focus, and we set out our thinking in the responses below. A reduction in demand across sectors and an increase in flexibility will be 'hugely important' to the energy transition and a mismatch of policies that focuses more heavily on energy supply – at the expense of energy demand reduction – requires closer attention by BEIS.

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

It is incumbent on Government to acknowledge that energy efficiency will never reach its potential without redressing the current weak policy framework. A new framework must involve multiple sectors, institutions and stakeholders, with a range of different timescales for action. What must be done is laid out below:

- **Recognise its potential; show it more respect:** Make energy efficiency a national infrastructure priority for us to stand a chance of hitting net zero targets. Put it on the same footing as renewable energy technologies such as Offshore Wind, perhaps by giving it a Sector Deal. A Sector Deal for efficiency, enabling partnerships between the Government and Industry on sector-specific issues can create significant opportunities to boost productivity, employment, innovation and skills, and not least reduce carbon emissions. Furthermore, we propose that the government establishes a new Energy Efficiency Delivery Unit (EEDU) that parallels Heat Networks Delivery Unit [2] but for energy efficiency. It should focus specifically on the financing and development stage of projects and initiatives to broaden support for energy efficiency, including Behaviour Change.

- **Give ESOS some bite**: ESOS already requires board level sign off but this doesn't translate into board level action. ESOS requirements should go further and require board level action on energy efficiency recommendations by either rejecting or accepting them. The failure to properly measure key metrics such as implementation rates and what proportion of recommendations have been acted upon seriously undermines the ability of policymakers to develop sensible and well targeted policies. Evidence presented to the BEIS Select Committee suggested just 5 per cent of organisations obligated to undertake ESOS audits are acting in full on recommendations[3]. We recommend that Government do more to ensure that organisations act on the energy saving opportunities identified, where it is cost-effective to do so. If organisations are not prepared to act, they should be made outline the reasons why. Subsequently, BEIS can look to develop a typology of why ESOS recommendations are not being taken forward with a view to addressing them.

- **Behaviour change training programmes:** In addition, as many professional energy consultants do not have working experience of energy behaviour change projects, these are often overlooked and it is thought only 5-10% of ESOS reports mention behaviour change whereas we believe this should be 100%! There is always scope for improving behaviour change in organisations. The difficulty for professional energy consultants is understanding how to develop accurate behaviour change business cases. Training the energy consultancy community is required to address this. ESTA could provide training is this area.

[2] https://www.gov.uk/guidance/heat-networks-delivery-unit

[3] https://publications.parliament.uk/pa/cm201719/cmselect/cmbeis/1730/173002.htm

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.

There has been a tendency in policymaking to see the demand side as having the potential to provide quick wins, but not to have a fundamental role in the transition. Energy demand reduction and flexibility will be critical to decarbonisation, and we recommend that Government develop long-term plans for demand-side innovation. We believe BEIS can do this by creating a market framework where energy efficiency is treated effectively as another form of generation or tradeable commodity, i.e. "nega-watts".

For this to happen good quality metered energy efficiency data is key, and Government need to continue to mandate better quality metering across both industry and residential environments. Metering is a way of 'measuring' energy savings and without it, stakeholders will continue to lack the confidence that it can delivered at the scale we at JRP believe it can.

In light of the recent major power outage think Government could do more to bring energy efficiency into grid balancing. Power outages caused widespread disruption on Friday 9th August in Great Britain, after two large generators dropped off the system and back-up capacity was not sufficient to stabilise the grid frequency. Potential contributing factors include low inertia due to high wind and low thermal generation. Low system inertia (responsiveness to increasing/decreasing generation) can be managed if there is enough flexible capacity (e.g. batteries, reciprocating engines, demand side response) able to provide 'synthetic inertia' and fast response in the case of an outage. Government needs to look more at improving the market structures for grid balancing to try and facilitate demand-side response.

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

We view lack of political will as the main barrier to scaling up flexibility and markets for energy efficiency and demand side response. Other barriers include lack of integration between energy systems and current market structures around flexibility. Energy efficiency can be included to a greater degree in these markets, if they are designed correctly. Different mechanisms can be designed following the principles outlined below, BEIS needs to:

- Introduce a FIT like approach for specific industrial and commercial Behaviour Change projects which can individually demonstrate, using IPMVP, reductions in baseloads;
- Support large non-domestic industrial and commercial consumers to participate in demand-side response schemes;
- Ensuring that storage/ energy efficiency and demand flexibility can compete in markets for network stability and grid balancing;
- We recommend that end users should be enabled to benefit from the reform of the pricing settlement. Ofgem's recent decision to move to half-hourly settlement enables suppliers to know how much their customers consume every half hour. Hence, suppliers could offer tariffs based on dynamic pricing, such as time of use (ToU) tariffs, which have the potential to shift usage away from times when demand is higher. A reduction in the amount of consumption at peak times should reduce the need for investment in new generation and network capacity and hence bill payer cost;

- We recommend reform of the current system of double charging for storage. To avoid this, the Ofgem Access Framework should be modified to develop clearer definitions of capacity rights as distinct from connection capacity. In practice, changes to the Electricity Act 1989 will need to include the definition of storage as a subset of generation asset class and not as end consumers of energy; and
- Adapting network charges to an energy system less focused on central power generation.

Demand-side response and energy efficiency has to be a major part of the strategy for an affordable, secure, net-zero carbon energy system. Delivering it will not be easy, as it is a broad and complex agenda. But delivering a zero carbon UK without doing this would be much more difficult.

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

California – Demand side response, energy efficiency and solar energy

The traditional lines between power generation, energy efficiency and demand response are blurring in California, USA[4]. For example, during the mild yet sunny days when solar generation isn't being consumed by air conditioning load, California can experience dips in its supply-demand balance, or even be forced to curtail excess generation for lack of customers to consume it. This is becoming known as the 'California Duck Curve'.[5]

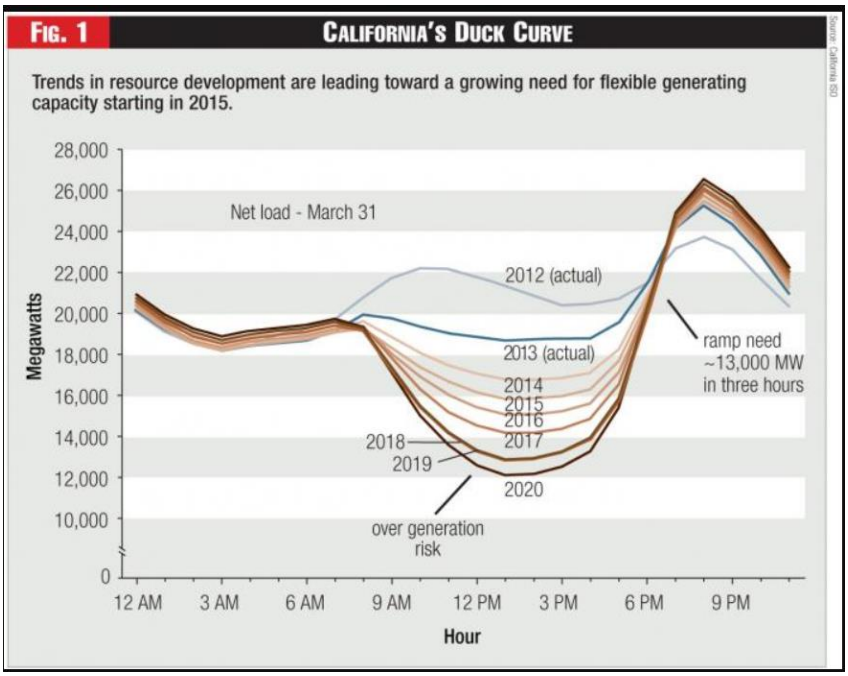

Figure 1 - California Duck Curve

One of the solutions is energy efficiency, as it can be reliably metered and counted on to show up at certain hours, or at certain locations, day after day and year after year, can provide utilities with a far more reliable and useful grid resource than the efficiency of the past. This is allowing energy efficiency measures, which is the cheapest form of

[4] https://www.greentechmedia.com/articles/read/new-programs-test-californias-pay-for-performance-efficiency-paradigm#gs.yfmr7n

[5] http://euanmearns.com/a-more-detailed-look-at-the-california-grid-data/

distributed energy resource, to play a more central role in efforts to tap demand response as alternatives to grid investments, as California is planning to do through a variety of policy measures.

Germany and France: help to improve loans in Germany and France have had an impact in making properties more efficient. The Sustainable Energy Association has also recommended a 'Help to Improve' loan scheme for the UK, which it said was already used successfully in other countries including Germany and France[6].

Data is key: Metered energy efficiency is the building blocks to energy efficiency market commodification. It is impossible to trade kilowatt hours from energy efficiency without a standard understanding of what that is. Delivering the roll-out of smart meters and introduction of half-hourly smart metering across the market, mandated for all suppliers, should be a BEIS priority as soon as possible. For an energy efficiency market to work savings must be measured. Reliable data and standard methods for calculating "nega-watts" can make energy efficiency bankable for investors.

What other countries tell us is the need for high quality data, benchmarking and metrics to enable successful targeting, monitoring and measurement. At present, the UK lacks the data and institutional framework to deliver such a programme. Data on energy consumption linked to industrial processes is very poor, with economic data often being used to derive proxies for energy use. This makes assessments of progress and potentials very difficult, with non-energy intensive sectors being particularly poorly understood. The first step to implement an energy and material efficiency scheme for industry is to establish the necessary structures around data and management. This ensures that a transparent platform is in place for Government to engage in a transformative plan with UK industry to deliver a net-zero target by 2050.

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

There is a need for the grid as a whole to be more dynamic and flexible. If flexibility is to play a major role, the rules have to be changed entirely. The capacity market is an ineffective instrument to provide flexibility. We believe demand-side response (DSR) through energy efficiency has great growth potential. Though it currently needs to be made more commercially attractive for large energy consumers to justify the business case. It needs Government support and enabling market conditions, which need to be adapted for the future. This can happen through the following:

- **Lower clip size thresholds for energy efficiency and DSR to access markets (e.g. Capacity Market)**

To build real flexibility through energy efficiency, companies need to be able to access the markets, through small clip sizes. BEIS recently mooted plans to reduce the 2MW minimum threshold for Capacity Market of the scheme participation, noting the 1MW threshold for some National Grid flexibility services. We believe a 100kW minimum threshold is necessary and optimal to unlock load flexibility, rather than behind the meter generation, which makes up around 70 per cent of DSR. More needs to be done to ensure energy efficiency can access DSR revenues.

[6] Sustainable Energy Association, 'Energy Efficiency—A Policy Pathway: Addressing the Able to Pay Sector' (2017), p25

- **Multi-year contracts and the Capacity Market**

The Capacity Market has been rightly criticised for restricting participation, and arbitrarily limiting contract lengths for DSR providers, who are currently eligible for only 1 year contracts. Conversely, new build or refurbished generation (e.g. diesel farms) are eligible for 3 or 15 year contracts. Tempus Energy argued successfully that this aspect of the Capacity Market was flawed, which in part led it to be suspended. The current structure of the Capacity Market means investors are incentivised to build diesel and gas engines, at the expense of low carbon and more efficient gas solutions.

Ofgem need to increase the available contract length for DSR (from 1 year), to put it on the same footing as other forms of generation. Energy consumers who want to be flexible – and are prepared to change their behaviour to provide DSR should be enabled to earn a fair return on their flexibility. The result will be a cheaper, cleaner energy system which we can all enjoy.

- **Distribution networks innovation**

Some of the distribution network operators have reduced minimum thresholds for flexibility to as low as 50kW. This is a welcome development, as is the collective DNO commitment to consider flexibility alongside reinforcement, but points out the DNO opportunity is currently tiny, and requires regulatory innovation. The regulatory framework does not go far enough in forcing those changes.

A market for energy efficiency needs to be at the table with demand-side response, storage and all the other flexible technologies being talked about. Major energy efficiency improvements will only occur if organisations can commercially gain from it. Contracts need to enable sites and businesses, through load shifting, to turn energy efficiency into a profit centre. DNOs can support this by working out the cost of upgrading, reinforcing or building in resilience and instead of building new substations and commensurate infrastructure, rewards load shedding and energy efficiency.

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

Yes, there are benefits of combining energy efficiency and flexibility. Industry feedback has often sighted complexity and a lack of transparency as a barrier to entry for flexibility contracts.

A policy structure built around enabling energy users to participate in markets could allow customers to become huge drivers for change in the energy system. Companies need to be better rewarded for their efforts. This framework does not exist effectively to realise the potential.

Q8: What is the role of aggregators?

The aggregators would install batteries at large sites that use power at peak. Energy stored off peak would be used to reduce power. The demand reduction would not require the site to reduce energy use but use the stored power thereby reducing demand from the grid.

If the market is designed correctly by Government, allowing small clip size (such as 100 kW) to be bid into the Capacity Market and other grid stability mechanisms, then energy efficiency and demand side response bids should not be depending on aggregators, and more of the value could be captured by the contracting party, with less fees going to intermediation. For energy efficiency and flexibility to take off, companies should be able to access the market directly. This will prevent a major existing barrier.

In the future one of the roles of aggregators, could be to ensure that consumers have access to good data on energy, and are able to share this easily with service providers. Good data will be critical to optimising a flexible system, and the sector must work with customers to rebuild a relationship of trust with energy data and with those that use it.

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

The government has created a complex package of policy instruments to achieve these objectives such as the Streamlined Energy and Carbon Reporting (SECR), Energy Savings Opportunities Scheme (ESOS), Climate Change Levy (CCL), Climate Change Agreements (CCAs), the Carbon Price Support (CPS), EU Emissions Trading Scheme (EU ETS) and Enhanced Capital Allowances (ECAs). These often overlapping policies often have elements of compliance. This can mean that the same information needs to be provided by the business/user/energy manager multiple times in slightly different forms. Compliance needs to be as streamlined as possible so that it is effective and easy; this will allow users to move away from tick-box exercises and instead to use the data collected to enable positive steps.

Ensuring compliance can be very time consuming and complex and detracts from the day-to-day task of managing and reducing energy consumption. However, energy-related legislation is not going to go away, and it is important to try to find a way in which to help, not hinder, a company's efforts.

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

A radical re-think on what constitutes Behaviour Change is required by BEIS. Behaviour Change is one aspect of Energy Efficiency and Technology the other. Technology is the common focus currently and support is required from UK Government to ensure that the 'hidden' savings available from Behaviour Change become mainstream. Working in collaboration with the Energy Services Technology Association (ESTA) and other founder partners including the Energy Institute, Vodafone, and The Discovery Mill, we have launched a Behaviour Change initiative, under the working title 'Energy Conscious Organisation'. Currently 99% of resources (people, availability, skills) are focused on other energy related actions rather than Behaviour change and both understanding and incentivisation would be necessary to change this.

The potential is for organisations across the UK to adopt long term behaviour change methodologies. Mechanisms do now exist to be able to *prove* behaviour change projects using IPMVP and there are a handful of case studies proven in this way such as one major one delivered by JRP Solutions.

Behaviour Change projects embrace the 'Lean' priority within the 'Energy Hierarchy' of 'Lean → Clean → Green' so delivering 'non-consumption' and avoiding energy use through people actions rather than technology. The current situation of this long-known solution is sporadic; implementation of behaviour change projects throughout end-user organisations tends to be occasional, partial and without a long-term structured approach.

This means there is a whole range of different people we need to work with to deliver success: company directors, energy & sustainability managers, operations and maintenance teams and service partners, procurement teams, building design teams, investment fund managers, utility suppliers, industry professional and trade bodies (e.g. CIBSE), government departments, NGOs, etc. All these are significant energy users in that they either have hands on control or decision-making ability or influence that can impact on significant energy use.

We need to look beyond technology, facilities, systems, processes, equipment etc, in terms of better energy performance. It is people who are the ultimate consumers of energy; it is people who will ultimately deliver the better buildings and sustainability improvements we need. Behaviour change projects represents 50% of the potential energy efficiency improvements available throughout the UK with technology representing the other 50%.

The challenge is that Behaviour Change projects are not generally recognised as having a significant contribution to make to energy savings. Implementation of behaviour change projects in end-user organisations tends to be occasional, partial and without a long-term structured approach. However, even with this being so there are case studies that clearly demonstrate significant energy savings as a result of a Behaviour Change programme, some of them measured using the International Protocol for the Measurement and Verification of Projects (IPMVP). One of the goals of this ESTA initiative is, for the first time, to collect such evidence on specific projects into one single evidence base. ESTA is asking organisations to contribute case studies, however small, to be hosted on its dedicated web page. This goal is of critical importance as it is recognised that there are not currently enough case studies for decision makers to recognise the significant contribution that Behaviour Change projects can make.

This is more than just end-users with hands on control of energy. The secret is being able to balance and integrate our technical and behavioural solutions through our policies, task procedures, standards and plans. One of main barriers to the uptake of energy efficiency schemes occurs when there is an asymmetry or a lack of information about what measures need to be taken and how they should be implemented. This is another area where behaviour change comes in.

An accredited scheme for training providers (just one element of Behaviour Change) already exists through ESTA and a number of organisations are currently accredited. This number needs to increase but until demand increases, the supply will not increase. Government can help to set an agenda and direction that will enable growth in this area, the outcome of which will be substantial energy savings. Government can tangibly support behaviour change through the following:

- **Incentivising 'non-consumption' through trading or taxation type mechanisms**
- **Maintaining a tool to track and verify collective savings through a UK register or bank**
- **The industrial energy efficiency scheme should be expanded**
- **Support an accredited scheme for behaviour change training providers**
- **Support an Energy Conscious Organisation accreditation scheme for end user organisations (something which ESTA could provide)**
- **Provide funding for the development of a best practice approach and methodology for delivering behaviour change programmes. This includes a standard behaviour change gap analysis approach, standard behaviour change business case approach and development of guidance notes (ESTA, a not for profit organisation, could provide these if supported – cost approximately £300k)**
- **Government should convene a series of workshops and roundtables on Behaviour Change and energy efficiency to ensure the initiative is fully understood by all industry stakeholders. How this could be delivered is to be explored later.**

We believe in Behaviour Change

For most people, their main interaction with the energy system is through using energy, at home, at work and in transport. We've become accustomed to these interactions being simple – rarely something that we consider actively – even as the UK has achieved substantial reductions in emissions from electricity supply. As we look forward to a zero carbon future, the technologies that manage and consume energy will change, affecting people's experience and even their behaviour will become ever more essential. We recommend that Government accepts the need to address questions of lifestyle and behaviour change to deliver energy and material efficiency. We recommend that embedding behaviour change practices among end users and throughout supply chains should be more central to the low carbon agenda.

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