

By email – DECC.capacity.mechanism@decc.gsi.gov.uk

For the attention of: Matt Wieckowski, Department of Energy and Climate Change
4th Floor, Area D, 3 Whitehall Place, London SW1 A 2AW

Sustainability First

GB Electricity Demand-Side

Possible Models for a Capacity Mechanism

Response to DECC Consultation¹.

This short Sustainability First submission **raises issues about the electricity demand-side** in response to the Energy White Paper and the associated Consultation on possible models for a Capacity Mechanism, published in July 2011.

It addresses Questions 5 and 22 of the DECC consultation.

It is organised under the following headings.

1. **Sustainability First project on GB Electricity Demand**
2. **Energy White Paper, Electricity Market Reform and the Electricity Demand Side**
3. **Incentives for Electricity-Reduction and Electricity Demand-Response**
4. **Electricity Demand-Side : Analysis, Vision and Role in Future Electricity Market Arrangements.**
5. **Capacity Mechanism and the Demand-Side**
6. **Capacity Mechanism – Strategic Reserve or Market-Wide Mechanism ?**
7. **Wider Electricity Demand-Side Issues to Consider**

Annex : Sustainability First project on GB Electricity Demand.

¹ DECC Annex C - Cmnd 8099 – URN 11D/823. 'Planning our electric future: a White Paper for secure, affordable, and low-carbon electricity'.

1. Sustainability First Project on GB Electricity Demand

Points made in this submission reflect early Sustainability First thinking, arising from our project : **‘GB Electricity Demand – *realising the resource*’**.

This three-year multi-sponsor project aims to identify the potential resource which the electricity demand side could offer into the GB electricity market through demand reduction and through demand response over the next 10-15 years. It has a strong practical, customer and consumer focus, and work is co-ordinated through a Smart Demand Forum. The project aims to:

- Evaluate and understand the potential GB electricity demand-side resource across all economic sectors (including the role of distributed and micro-generation) ;
- Develop a clearer understanding of the economic value of this resource to different market actors and to different customers ;
- Evaluate the key customer, commercial, regulatory and policy issues and interactions.

The project is undertaking work relevant to:

- GB smart meter deployment.
- Low Carbon Network Fund projects – emerging lessons and insights from the LCNF projects will be fed into the project
- Proposals for Electricity Market Reform.

More information, publications, and updates on the Sustainability First project on GB Electricity Demand are available via our website – www.sustainabilityfirst.org.uk.

Points made in this submission draw from an initial paper being published by the project in October 2011 - **‘GB Electricity Demand – Context and Baseline Data 2010’**.

This submission reflects views from Sustainability First. They are not necessarily those of our sponsor group or of the Sustainability First Smart Demand Forum.

2. Energy White Paper, Electricity Market Reform² (EMR) and the Electricity Demand-Side

The Energy White Paper and Electricity Market Reform proposals published in July 2011 helpfully indicate a number of ways in which Government now proposes to consider the electricity demand-side going forwards. It indicates:

- **An Electricity Efficiency assessment** - on whether to take further steps to improve the support and incentives for the efficient use of electricity³.
- **An Electricity Systems Framework** – from Ofgem in Spring 2012 and an **Electricity Systems Policy** – from DECC in Summer 2012 – which will consider the overall framework through which supply and demand is balanced – including **the role of DSR**, storage, interconnectors and development of smarter grid⁴.
- **FIT CfDs (Contracts for Difference)** – long-term contracts designed to incentivise low-carbon plant with large fixed costs but comparatively low operating costs in the wholesale market (base-load, intermittent, variable). **There is no expectation in the EWP as drafted of electricity demand-side access to wholesale market long-term contracts such as FIT CfDs.**
- **Capacity Mechanism** - new capacity contract arrangements, active from ~2019 to deliver ‘resource adequacy’ via ‘reliable capacity’ to ensure security of supply. **The capacity mechanism proposals are the main focus for new DSR participation⁵.**

Comments below relate largely to the capacity mechanism consultation.

² DECC. Energy White Paper. Cm 8099. ‘Planning our electric future: a White Paper for secure, affordable, and low carbon electricity’. 12 July 2011

³ DECC. Energy White Paper. Cm 8099. July 2011. Paras 42; 1.36 ; 2.1.20.

⁴ DECC. Energy White Paper. Cm 8099. July 2011. Paras 6.17, 6.39-42.

⁵ The EWP indicates that Government ‘plans to ensure a fair and equivalent treatment of demand side resources such as storage and demand-side response, alongside generation, with the aim of securing best value investment across the power system’. DECC. Energy White Paper. Cm 8099. July 2011. Para 20.

3. Incentives for Electricity Reduction and for Electricity Demand-Response

Prior to EWP publication, the ECC Select Committee report on EMR reflected on the complex interplay between electricity demand-side incentives and policy measures, poorly understood to date. It concluded that :

‘It is important that a capacity mechanism does not close off the potential for innovation in demand-side measures...The EWP must also specify for which demand-side measures the capacity mechanism will be available and clarify whether it is intended to support demand reduction, demand-side flexibility, or both’⁶.

The EWP proposals for a capacity mechanism do not address this complex and interacting set of electricity-demand side issues.

Greater clarity is needed **in-the-round** on :

- (1) measures and incentives (existing and prospective) for electricity efficiency and electricity reduction ; and
- (2) measures for demand-response, load-shifting and flexibility and
- (3) their likely interplay – including their likely respective economic benefit and carbon contribution.

The proposed Electricity Efficiency assessment will help to address these issues - as will the Sustainability First GB Electricity Demand project.

4. Electricity Demand-Side : Analysis, Vision and Role in Future Electricity Market Arrangements.

The EWP and EMR proposals are underpinned by detailed economic and technical analysis out to 2020 and 2030 for the electricity supply-side. No equivalent analysis is presented for the technical, economic and commercial potential of the electricity demand-side.

The contribution of electricity demand-response today in the GB electricity market is relatively modest, but is nonetheless an area which is developing commercially. This is a reflection of : new technology developments ; increased understanding of the economic potential ; plus, a growing awareness.

⁶ ECC Committee. Electricity Market Reform. HC742. May 2011. paragraph 263 & 265.

The electricity demand-side already participates in different parts of the GB electricity market today : via the arrangements for System Balancing ⁷ ; via the 'Triad' peak-avoidance scheme for transmission charges ; in the wholesale markets via differential day- and night-rates being offered by suppliers in retail tariffs (both I&C and households) ; and, via some initial schemes for peak avoidance and fault response in the distribution networks, including those supported under the Low Carbon Network Fund.

A key point is that there is presently no wider or longer-term GB 'vision' to describe how greater electricity demand-side participation might best be encouraged – nor how the electricity demand-side might best be progressively or incrementally developed to facilitate demand-side participation at every level of the GB electricity market. For example, in :

- **Balancing** – system control / system flexibility to ensure operational security
- **Capacity** - system peak-avoidance for overall system adequacy and security.
- **Wholesale markets** – avoided higher-cost periods / building load in lower-cost periods
- **Networks** - peak avoidance for avoided costs and fault response . Network control and stability.

Going forwards, it seems important (1) for discovery of demand-side value to be encouraged and enabled in *all* parts of the electricity system and (2) for new commercial relations to be allowed to evolve. This suggests avoiding undue prescription in these early stages of demand-side development. Instead, a demand-side vision and high-level road-map may more helpful at this stage.

In practice, demand-side participation will be facilitated at scale as and when prices available to demand-side resources become more visible in different parts of the market. This may be some way off, but one early step may be to encourage practical ways of bringing greater visibility and transparency to different parts of the market for demand-side pricing (eg via information platforms, exchanges etc) – to support a variety of demand-side providers in (1) identifying and (2) exploiting - cost-efficient demand-side potential.

The proposed work by Ofgem on Smarter Markets and on the Electricity Systems Framework, and by DECC on an Electricity Systems Policy should start to consider these wider and longer-term issues right across the entire electricity market - including the evolution and development of commercial arrangements and business models. These need to be capable of facilitating more demand-side activity, including realising the synergies with storage and with distributed generation.

⁷ Around one-fifth to one-quarter of National Grid's 2011 Operating Reserve requirement (~1,000 MW) is provided by the 'demand-side'. Of this, around two-thirds is possibly provided by back-up or on-site generation.

5. Capacity Mechanism and the Demand-Side

The EWP identifies a capacity mechanism as a next step in development of GB electricity demand-response. It says that government ‘plans to ensure a fair and equivalent treatment of demand-side resources such as storage and demand-side response, with the aim of securing best value investment across the power system’⁸. The aim is for DSR to be active in providing reliable capacity by 2019 or earlier.

This pre-supposes that :

- The capacity problem to be solved is clarified.
- It is cost-competitive in the electricity system overall – to reduce and / or to shift electricity demand – than to supply an additional unit.
- Firm, reliable despatchable load is available at scale. In practice, GB demand-side potential is not well-understood – including its key technical characteristics ; how firm or reliable it might be ; its availability and potential value - by 2020 ; by 2030.

On the plus side, recognising a benefit for DSR in this new market for capacity from the very outset, is a helpful step in wider recognition of the electricity demand-side as a resource. For those who look to invest in demand-side activity and businesses, it offers a clear and positive signal on expectation of a long-term DSR role and DSR growth.

DSR capacity contracts – be they one-year or longer – will help to support DSR investment and development - and help to build scale - by reducing some possible barriers to DSR financing, in particular with respect to set-up.

- For fixed-costs – an availability fee or similar revenue stream - will provide some guarantee on income – against which up-front DSR costs could in part be recovered – (eg equipment, IT etc).
- For variable costs – there may be some recovery against costs associated with maintenance, market transaction costs etc.

The demand-side provider will need sufficient total revenues via the availability fee / capacity payment plus revenues from the market, to enable full recovery of capital and operating costs, plus a reasonable return on investment.

A capacity mechanism may therefore help to level the playing field for some DSR investment and approaches. However, it may still not be sufficient to bring forward DSR solutions which are not yet cost-competitive with the supply side. For example if some DSR technologies are

⁸ EWP para 20.

high-cost ; if transaction costs are high ; if there are high costs and hurdles to achieving scale (eg household DSR) ; or if technologies are novel (some frequency responsive technologies, or some types of storage for example).

6. Capacity Mechanism – Strategic Reserve or Market-Wide Mechanism ?

There are many outstanding and major questions yet to be settled with respect to the electricity supply-side and EMR. Moreover, the interplay between the proposed new mechanisms – carbon price floor, EPS, FIT CfDs and a capacity mechanism - is poorly understood.

For the demand-side this therefore raises a question as to how far the relative advantages / disadvantages of different approaches to a capacity mechanism (strategic reserve, market wide – tender-based, reliability contracts etc) can sensibly be judged at this point, on the basis of the limited information available, and within proposed consultation time-scales. Self-evidently, in deciding on a preferred capacity mechanism, the demand-side implications need to be well-understood so that DSR – or particular approaches to DSR – are not inadvertently ‘locked out’ or disadvantaged against the supply side.

Clarifications for DSR

On the face of it DSR could satisfactorily operate and develop either via a strategic reserve or via a capacity mechanism, including in a capacity market. Some areas to clarify include :

- **Whether, within a strategic reserve, it would be possible to ensure that demand-side resources are not needlessly ‘ring-fenced’ or ‘sterilised’.** That is, in addition to being contracted as strategic reserve – at specified times of the day or year – whether the same demand-side unit could still be deployed in other parts of the market, if that were cost-efficient. (This would differ from treatment of generating plant in a strategic reserve, which could expect a 100% ring-fence).
- **The interaction and boundaries between the Balancing and Capacity Markets -** to enable the demand-side to find its value in either market as appropriate.
- **Whether there will be dedicated DSR tenders for a given DSR volume** – ie whether a proportion of the market would be reserved for DSR – and if so, how that proportion would be determined ; whether the aim of any DSR tender process would be competition *between* DSR providers – or, direct competition on price for DSR against generation.
- **Appropriate contract terms and contract lengths to incentivise different DSR investments** – how far contract terms and contract lengths envisaged for supply-side

capacity are also appropriate for DSR provision (including different types of DSR investment).

Additional Financial / Non-Financial Hurdles for DSR Delivery

In addition to clarifications of this kind - and regardless of which mechanism is chosen - a number of other financial / non-financial hurdles will arise for demand-side delivery in respect of a capacity mechanism. These include :

- **Financial exposure** – financial risks associated with non-delivery of ‘firm’ demand response may be significant. Direct participants in a primary capacity market are likely to be experienced, well-capitalised players. As DECC suggest, secondary capacity markets may be better suited to demand-side providers, but may nonetheless still carry financial risks in respect of non-delivery, or perhaps requirements in terms of redress and / or guarantees.
- **Possible complexity** – tenders, statutory codes, trading, settlement, monitoring and verification could involve complexity – and may possibly leave large or experienced players at the fore-front in DSR provision.
- **Price transparency to support demand-side opportunities** – this would seem to point more towards auctions, tenders and trading platforms - rather than purely bilateral arrangements.
- **Availability of the load with characteristics most likely to deliver firm reliable DSR capacity** - ie despatchable firm MW, automated, notice periods, sustained response etc
- **Smaller players / innovation / customers / households** – support for business models, trading and commercial arrangements which could also facilitate DSR participation at a smaller or local scale – eg locally in networks, by households and so on.

7. Wider Electricity Demand-Side Issues to Consider

Other electricity efficiency and demand-side issues to consider - both in the context of the capacity mechanism consultation – and also in the wider context of the forthcoming electricity efficiency assessment and the review of electricity systems policy - include :

- **How best to incentivise electricity demand reduction** – and whether, for example, long-term contracts (equivalent to FIT CfDs) may have a role.

- **Load-building** – whether the value available to customers between low- and high-priced periods may prove sufficient incentive alone to deliver ‘load-building’ at scale. Or, whether additional incentives and / or regulation may also in the end be needed.
- **Peak-avoidance in the Networks** - it is unclear how system-wide peak-avoidance schemes for DSR, secured via capacity-contracts, may interact in practice with DSR schemes for peak-avoidance in the Networks.
- **Pre-2020** – a continued focus on developing greater demand-side practical experience in System Balancing - and in the Networks via innovation initiatives such as LCNF and via RIIO – remains important and should not be overlooked.
- **Understanding Electricity Demand and Electrical Load Growth** - Electricity demand forecasts will determine the amount of electricity procured both under future FIT CfDs and for contracts for Capacity. A more sophisticated understanding of GB electricity demand will therefore be necessary than today. There will be high economic and political costs to getting demand-forecasts wrong – *including on the extent of available demand-response*. Going forwards, new institutional arrangements will need to reflect the importance of a good knowledge and understanding of GB electricity demand.

Sustainability First’s GB Electricity Demand project will inform many of the key electricity demand-side issues outlined at a high-level in this submission – and raised by the Energy White Paper, Electricity Market Reform and by the Consultation on a Capacity Mechanism.

Sustainability First

7 October 2011

www.sustainabilityfirst.org.uk

Email – info@sustainabilityfirst.org.uk

Submission to DECC Consultation – October 2011

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ANNEX

About Sustainability First
and the
GB Electricity Demand project

Sustainability First is a UK environmental think-tank with a focus on practical policy development in the areas of sustainable energy, waste and water. Sustainability First undertakes research, publishes papers and organises policy seminars. It is a registered charity with independent trustees – www.sustainabilityfirst.org.uk.

Since 2006, Sustainability First has produced a series of major multi-sponsor studies on GB household smart energy meters and brings significant knowledge and insight in the fields of energy efficiency, smart metering, smart energy tariffs and demand response⁹.

The Sustainability First project on **GB Electricity Demand** began in April 2011. It is supported in its first year under the CE-Electric Low Carbon Network Fund project - and thereafter for a further two years to April 2014 via a multi-sponsor group.

Sponsors include : BEAMA ; British Gas ; CE Electric UK ; EDF Energy ; E-Meter Strategic Consulting; E.ON UK ; National Grid ; ScottishPower Networks ; UK Power Networks.

Work is coordinated through a **Smart Demand Forum** whose participants include a number of key consumer bodies - Energy Intensive Users Group, Which?, Consumer Focus, National Energy Action – as well as DECC and Ofgem – plus the sponsor group members.

The project aims to identify the potential resource which the electricity demand side could offer into the GB electricity market through demand response and through demand reduction. The project aims to:

- Evaluate and understand the potential GB electricity demand-side resource from now to 2025 across all economic sectors (including the role of distributed and micro-generation) ;
- Develop a clearer understanding of the economic value of this resource to different market actors and to different customers over the next 10-15 years ;
- Evaluate the key customer, commercial, regulatory and policy issues and interactions.

⁹ Sustainability First smart meter papers are available on the website – www.sustainabilityfirst.org.uk

The project will develop a substantive knowledge-base, and provide visibility and thought-leadership for GB electricity demand-side issues. The project is undertaking work relevant to:

- GB smart meter deployment.
- Low Carbon Network Fund projects – emerging lessons and insights from the LCNF projects will be fed into the project
- Proposals for Electricity Market Reform

The work programme is being delivered through the Smart Demand Forum, through wider annual stakeholder events, and through a series of published papers and other materials. The project is run by Sustainability First¹⁰.

Key themes for the project include:

- **Customer Response and Consumer Issues** – A key focus for the project is to understand successful and cost-efficient demand-side participation from a customer and consumer perspective (household, industry, commercial and public sectors). This will include experience provided through the LCNF trials (e.g. tariffs, remote control of appliances, technologies such as micro-generation, electric vehicles etc.) and other similar initiatives in the UK and elsewhere. For households, this will include any particular issues for the fuel poor and potential distributional impacts.
- **Commercial** - Practical realisation of demand-side services - given different roles and requirements in the value chain. Issues likely to include : the nature of commercial agreements, the role of third parties,(DNOs, ESCOs, aggregators) the kind of information-sharing likely to be necessary between parties etc. – drawing from practical experiences of the LCNF Trials and other experience in the UK and elsewhere.
- **Regulatory** – near and longer term regulatory factors that impact upon development of an active electricity demand-side for Great Britain – including current agreements between market actors, statutory codes, incentives in price controls, settlement, and third-party requirements. This will include experiences within the LCNF trials, and also feed into future considerations for price controls, RIIO and other thinking on innovation incentives.
- **Public Policy Issues** – likely economic value and potential contribution of the demand side to: cost-efficiency across the electricity sector; security of supply; carbon-emission reductions. Business models, approaches and incentives for integrating the demand side into the electricity market, including its interactions with Electricity Market Reform, smart meter roll-out and energy efficiency schemes such as the CRC Energy Efficiency Mechanism, Green Deal and Energy Company Obligation.

The project will also draw upon relevant information from demand side developments in other countries (notably the EU and US) to inform its work.

¹⁰ The Sustainability First team is [REDACTED] Additional expertise and inputs are provided by [REDACTED] of Brattle Group who is developing a quantitative all-sector demand model. [REDACTED] is supporting the project on Distributed Generation and Micro-Generation.

Papers to be published in the first year of the project will be:

Paper 1 - GB Electricity Demand – context and baseline data 2010

Paper 2 - GB Electricity Demand 2010 and 2025 – scope for demand reduction and flexible response

Paper 3 - What demand-side services could GB customers offer?

Paper 4 - What demand-side services can provide value to the electricity sector?

Topics for papers in future years are likely to include:

- Alignment of Commercial Drivers and Regulatory Incentives
- Public Policy and Realisation of Electricity Demand-Side
- Distributed Generation
- Active I&C Customers
- Active Household and Micro-business Customers
- Consumer Issues
- Longer-Term Demand-Side Realisation and Innovation

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