Ben Smithers
Energy Market Monitoring and Analysis
Ofgem
9 Millbank
SW1P 3GE

28th June 2013

Dear Ben,

Ofgem Consultation: Creating the right environment for demand-side response

Please find attached the Micropower's response to Ofgem's consultation on creating the right environment for demand-side response.

The Micropower Council is a cross-industry body whose membership comprises of electricity and gas companies, manufacturers, installers, trade associations, professional bodies, non-governmental organisations and charities in the microgeneration sector. We provide the microgeneration industry's main focal point for Government, regulators, Parliament and the general public on regulation and public policy issues.

Accounting for nearly a third of all UK CO2 emissions, of which two thirds is made up from heating, the domestic sector is a key target area of Governments renewable and low carbon agenda. The microgeneration sector is gearing up for this challenge, with ASHP and GSHP projected to provide nearly two thirds of domestic demand[1] by 2050.

These will however also have significant impacts on electricity demand – potentially an additional 3 to 4 TWh by 2030[2]. When combined with the growth in electric vehicles over the same period, the impact on total UK electricity demand and peak demand will rise from 62 GW currently to potentially 78 GW in 2030. At the same time, 20% of our existing capacity will be shut over the next 10 years to be replaced by much more decentralised renewable generation.

Domestic consumers will therefore have an increasing impact on the electricity system but not just on demand. The growth in solar PV and that of mCHP will also provide additional generation capacity where it is needed most. From both a demand and supply

[1] Source: The future of Heating, Meeting the Challenge (Evidence Annex)
[2] Source: 2012 National Grid Future Energy Scenarios

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perspective, domestic consumers will therefore have a role in security of supply and be able to provide capacity in the balancing markets, both locally and nationally.

The key elements of our response encompass the changes we believe are necessary to both fully support the roll-out of microgeneration technologies and their participation in demand side response.

In summary, these encompass:

- Simplicity, financial benefits and service standards must be at the centre of engaging consumers
- Support must be provided across the value chain to develop the commercial and technical frameworks and standards
- Further research and trials must take place focusing on locations with high demand and low supply margins
- The aggregation of microgeneration DSR capacity must be eligible for the Capacity market
- A more cost reflective system charging framework needs to be developed

Our full response is in the annex to this letter: if you would like to discuss any of our submission or to see our analysis in more detail, I would be very happy to meet with you to discuss in person.

Yours sincerely,

Emma Piercy

Head of Policy, Micropower Council

Annex: Micropower Council response to Ofgem consultation on 'Creating the right environment for demand-side response'

Annex: Consultation Question Responses:

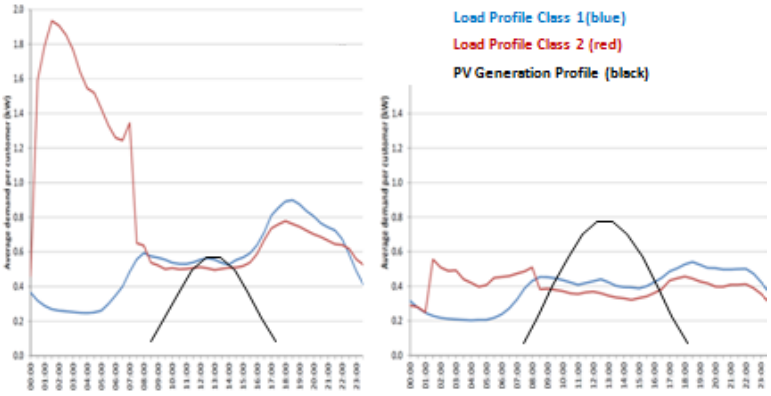
1. **Are there any additional key challenges associated with revealing the value of demand-side response across the system? If so, please identify and explain these challenges.**

Microgeneration technologies are being employed by both domestic consumers and businesses in the wider built environment. ASHP and GSHP will provide nearly two thirds of domestic demand by 2050, and coupled with the growth in electric vehicles, total UK electricity demand will rise substantially.

As 20% of our existing capacity is replaced over the next 10 years by much more decentralised renewable generation including at the micro level in solar PV and mCHP, the challenges for network management will intensify and become much more localised. From both a demand and supply perspective, consumers will therefore have an increasing role in security of supply and be able to provide capacity in the balancing markets, both local and national, through demand side response.

PV with storage

At a domestic level, this can be illustrated by the use of PV with storage where in the summer months the differential between PV generation and the typical consumer profile demand gets even wider (see diagram below). Using storage can smooth the generation profile and provide input into the system when demand peaks.



Winter (Dec-Mar) weekday & summer (Jun-Aug) weekend demand profiles for domestic demand associated with typical PV generation in February and August months[3]

[3] http://www.sustainabilityfirst.org.uk Report on GB Electricity Demand – Realising the Resource, Feb 2012 and Ecuity Consulting LLP June 2013. Load profile class 1 consumers represent the 22 million customers who pay a uniform rate at all times of day. Load profile class 2 consumers represent those

Heat pumps

Heat pumps can also provide a negative demand balancing function in the electricity market due to the electrical requirement particularly over the winter period. For example a 3kW heat pump with a seasonal performance factor of 3, has an annual electric requirement of 5000kwh. During periods of peak demand where supply may be short, heat pumps can cycle off reducing demand and helping bring the system back into balance.

Micro CHP

Micro CHP can also provide additional generation into the system. MCHP applications that follow heat demand for example would be able to provide supply-side capacity during significant periods of the year; particularly when mCHP units are operating at less than full output. During periods of limited or no heat demand - particularly in the summer – heat-led mCHP would be an especially reliable participant in the capacity market. Some form of heat storage would be necessary for both heat pumps and mCHP.

Benefits of DSR

The participation of all of these technologies in DSR will help achieve the following benefits:

- Help transition to greater reliance on renewables, smoothing variations in wind and solar production (avoiding the constraining off of wind generation)
- Network frequency regulation and voltage support
- Reduction in transmission and distribution losses
- Improve existing asset utilisation, avoiding/deferring upgrades to existing network infrastructure as well as the avoidance of new peaking plant
- Help accelerate the electrification of the transportation sector.
- Opportunities for energy suppliers in self balancing to reduce wholesale risks in the balancing markets
- Downward pressure on utility bills (domestic and non-domestic)

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consumers who have the potential for separately metered hours between midnight and 06:00 hours, where off-peak and peak-hours consumption can be separately measured and billed.

The illustration of these benefits shows that they are spread across a number of stakeholders across the value chain. The key challenge in commercialising DSR is therefore to ensure that stakeholders actually receive sufficient commercial incentive to do so, that it is 'not spread too thin'. Consumers at the moment for example do not receive any commercial benefit for reducing transmission and distribution losses, which represents a source of missing money for them. Arrangements for central coordination of DSR between the various stakeholders are also key, for example between DNOs and Suppliers with decisions made by one impacting the other.

Barrier Costs

Until DSR becomes a 'Business-As-Usual' phenomenon, there may also be barrier costs to its uptake. Support to address these in the learning and initial implementation phases is required in order to kick start the market.

Barrier costs (based upon those in DECC's RHI Impact Assessment from September 2012) may cover the following areas:

- Performance risk: that technologies may not provide the level of DSR that is predicted
- Risk of access to commercial value DSR: how this is spread out and responsibilities of parties
- Risk to house value: the risk that the value of property may fall as potential buyers are put off by an energy management system they do not understand

2. Can current regulatory and commercial arrangements provide the means to secure demand-side response being delivered? If not, what will regulatory and commercial arrangements need to deliver in future?

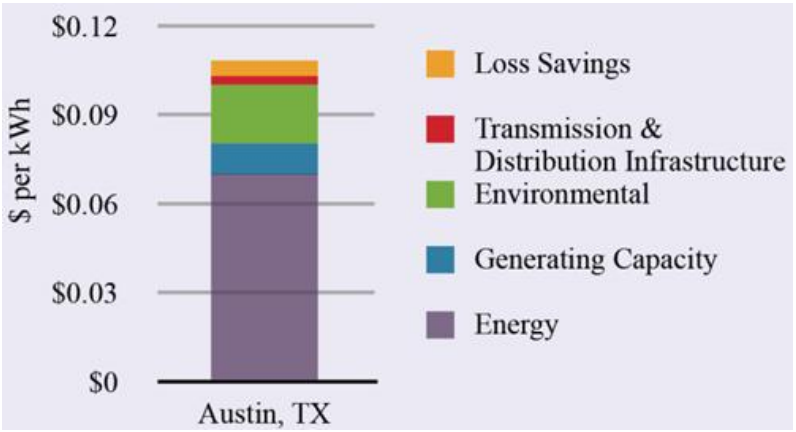
As discussed under question 1, microgeneration technologies can provide a significant DSR capability and value to the electricity system. The regulatory and commercial changes required to do this cover the following areas:

- Value chain fragmentation
- Regulatory constraints in licensing and charging
- Consumer requirements (with consideration of experience from the US)
- Role of building regulations

These are now explored in more detail:

Value chain fragmentation

Analysis of cost savings from distributed solar were found in a study for the Austin Texas municipal utility as shown in the graph below[4]:



While the energy value of the solar power was only around 7 cents per kWh (the value of the electricity it would displace), the available capacity, deferral of grid infrastructure upgrades and avoidance of delivery losses (e.g.) transmission added significantly to the value of PC to the utility.

The UK however has a very different energy market to the US with a fragmented value chain notably between distribution companies and supplier companies, and with the current regulatory framework that regulates income for the distribution networks which historically has been based on levels of network investment. The introduction of RIIO-ED1 is a very positive step forward, however it must be ensured that whether under RIIO, the LCNF or going forward, the Network Innovation Competitions, that trials are undertaken to look at technical and commercial arrangements between DNOs and Suppliers to facilitate DSR in practice. Lessons from these and a wider roll-out can then be incorporated into RIIO ED-2 when the growth in EVs and heat pumps will be much greater.

Commercial & Legal constraints

Other commercial and legal constraints that need to be considered include the cost reflectivity of system charging (TNUOS / GDUOS), data security and the area of licenses,

[4] http://www.ilsr.org/political-and-technical-advantages-distributed-generation/

roles and responsibilities and whether coverage needs to be extended to cover new market participants.

Consumer Requirements

In the end, benefits must be passed through to the consumer to facilitate uptake, up until a point where market and system conditions may necessitate a regulatory requirement to do so. Consumer education is key, with the physical impact of DSR on customers to be minimised as well as automated to ensure both simplicity and effectiveness. A number of such programmes are already up-and-running in the US, which could be used to inform potential trials under the LCNF and Network Innovation Competition.

In California, PG&E for example started the SmartAC programme in 2007 which targets air conditioners, and cycles AC compressors on and off in short increments totalling no more than 15 minutes every half hour, for no more than 6 hours. To maximise cost effectiveness the company targets its direct mailings to owner-occupier addresses in hotter areas and those that have and use central air conditioners. Consumers don't get any reduction on their monthly bill, but do receive a $50 cheque for participating.

PG&E also have a SmartRate summer pricing plan. No more than 15 SmartDays can be called each season (May to October) and on these days there is a surcharge on the electricity rate from 2pm until 7pm. This seeks to both reduce and shift electricity demand on those days. On normal days, customers receive a discount on their normal electricity rate between June and September.

Lessons for the UK

These PG&E programmes seek to reduce electricity demand at peak times, reducing supply interruptions and the level of investment in network upgrades and new generation capacity required. The programmes ensure financial benefits are spread across the value chain and that impacts of quality of service are minimised. In the SmartAC programme for example, most customers are unaware when smart demand events are called due to their limited physical impact on room temperatures from cycling the ACs on and off.

For the UK, such electricity demand and load shifting programmes could also be introduced. These programmes could be delivered through a targeted or market-wide approach, deployed by suppliers or DNOs, or even through new market players such as aggregators or ESCOs. The forthcoming 'Allowable Solutions' with regards to Government's 2016 zero carbon homes target, could also be used to spur some investment in this area.

Performance standards must however be in place to ensure that the customer's rights / service standards are maintained, alongside the roles and responsibilities on those parties placing requests for DSR and in relation to others on whom there may be impacts resulting from DSR actions.

Role of Building Regulations

Lastly, part L of Building Regulations has a clear role in the deployment of demand side reduction technologies and wider energy policy targets through the focus on energy efficiency standards. Yet for the 2013 Building Regulations due to enter into effect in October 2013 as a stepping stone to the 2016 zero carbon homes target, Government looks set to adopt a significantly less challenging approach which would not require the integration of microgeneration technologies in new homes.

This undermines the UK's stated 2016 zero carbon homes target and impacts the electricity reduction from new homes, increasing carbon emissions and fuel bills. The MPC calculated that over the period 2013 to 2016, the household energy savings over the modelled microgeneration technologies lifetime is £375m. However in the decision to favour the less challenging approach, the benefits to consumers were not included, regardless of whether the costs would have been borne by business or by private citizens themselves. If they were to be included, with a revised set of costs (given the fall in solar PV costs since DECC's January 2012 consultation), this would lead to a net benefit for the UK economy of £58m.

In the interest of energy consumers and the move towards decarbonisation, Ofgem must consider how it can support the development of Building Regulations within DCLG.

3. Is current work on improving clarity around interactions between industry parties sufficient? If not, what further work is needed to provide this clarity?

LCNF projects are underway with significant learnings already coming through. Going forward, whether under RIIO or the Network Innovation Competitions, trials must be undertaken to look at technical and commercial arrangements between DNOs and Suppliers to facilitate DSR in practice. Lessons from these and a wider roll-out can then be incorporated into RIIO ED-2 when the growth in EVs and heat pumps will be much greater.

4. **Are there any additional key challenges associated with effectively signalling the value of demand-side response to consumers? If so, please identify and explain these challenges.**

DSR from consumers is likely to be maximised by focusing on core demand response capable products, potentially with a locational element with areas high demand and low supply margins prioritised.

As a first step in encouraging domestic consumer participation in demand reduction programmes, the use of some incentive to cover barrier costs as noted under question 1, may be essential. If customers had to fund higher specification products with integrated grid connection features in order to participate in programmes, then their level of engagement is likely to be very low.

The introduction of the capacity market mechanism could offer an additional route to market should aggregators or ESCOs create a virtual power plant in designated areas, which could place bids into a capacity market mechanism. It must follow then, that in the design of the capacity market, mCHP, heat pumps, solar PV amongst other DSR player, must be eligible for participation in the Capacity Market. The aim of the Capacity Market is to incentivise reliable capacity to ensure a secure electricity supply even at times of peak demand: microgeneration and DSR can therefore also contribute to this.

In the US for example, PJM Interconnection is a regional transmission organisation that coordinates the movement of wholesale electricity in a number of states. They have an economic demand response programme which allows end-users to get paid for reducing electricity demand during high-priced hours. Aggregators such as Enernoc for example can participate on behalf of individual participants either on a day-ahead or on-the-day basis. If PJM takes their capacity bid, the demand response providers receive the same price as generators and also realise savings on their electricity bills. Parameters such as reduction quantity, timing, price and minimum response duration all have to be specified.

5. **Do you agree that signals to customers need to improve in order for customers to realise the full value of demand-side response? Does improving these signals require incremental adaption of current arrangements, or a new set of arrangements?**

As discussed under questions 2 and 4, domestic participation in DSR programmes can be maximised by focusing on core microgeneration technologies, with a locational element with areas of high demand / low supply margins prioritised. However if customers have

to fund higher specification products with integrated grid connection features in order to participate in programmes such as a local energy market, if they are not properly rewarded for the value they provide, the level of engagement is likely to be very low.

The UK's fragmented value chain between distribution companies and supplier companies needs to be addressed. The introduction of RIIO-ED1 is a very positive step forward, however it must be ensured that whether under RIIO, the LCNF or going forward, the Network Innovation Competitions, that trials are undertaken to look at technical and commercial arrangements between DNOs and Suppliers to facilitate DSR in practice. Lessons from these and a wider roll-out can then be incorporated into RIIO ED-2 when the growth in EVs and heat pumps will be much greater.

Other commercial and legal constraints that need to be considered include the cost reflectivity of system charging (TNUOS / GDUOS), data security and the area of licenses, roles and responsibilities and whether coverage needs to be extended to cover new market participants.

6. **To what extent can current or new arrangements better accommodate cross-party impacts resulting from the use of demand-side response?**

The introduction of RIIO-ED1 is a very positive step forward, however it must be ensured that whether under RIIO, the LCNF or going forward, the Network Innovation Competitions, that trials are undertaken to look at technical and commercial arrangements between DNOs and Suppliers to facilitate DSR in practice. Lessons from these and a wider roll-out can then be incorporated into RIIO ED-2 when the growth in EVs and heat pumps will be much greater.

7. **Are there any additional key challenges associated with customer awareness and access to opportunities around demand-side response? If so please identify and explain these challenges.**

Please see answers to questions 1 and 2.

8. **Is there any additional work needed to explore the role of third parties in helping customers to access and assess demand-side response offerings?**

As noted under question 5, domestic participation in DSR programmes is likely to be maximised by focusing on core microgeneration technologies, with a locational element with areas of high demand / low supply margins prioritised. With the swift development of DSR, flexible microgeneration and storage solutions generate significant potential towards the development of 'local' peer to peer energy markets, in which small generators and consumers could trade energy amongst each other. These local markets would consist of end-users that are both producers and consumers of power while remaining part of the national network.

The economic case for local energy markets needs to be tested under the forthcoming NIC and during the RIIO-ED1 price control. The creation of such markets may necessitate changes to licensing, market processes and relationships between different stakeholders, which all need to be assessed.

9. **Are there additional preconditions for delivering the right environment for demand-side response? If so, please explain what these are and why they are important, as well as attaching a priority relative to those challenges we have already identified.**

No

10. **Do you agree with the priority and timing we have attached to addressing each of the key challenges identified above?**

Yes