

Electricity Systems Team  
Department for Business, Energy, and Industrial Strategy  
4th Floor, 3 Whitehall Place,  
London,  
SW1A 2AW

Energy System Integration Team  
Office of Gas and Electricity Markets  
4th Floor,  
9 Millbank,  
London, SW1P 3GE

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## **Call for Evidence on 'A Smart, Flexible Energy System' Response from Community Energy Scotland**

We welcome this consultation and its underlying ambition to create the basis for a smarter, more flexible low carbon energy system. The points in our response mostly derive from our experience in working on the development of local renewable energy schemes with communities over the last decade; and, more recently, on local energy system projects marrying community and consumer participation in more flexible local supply arrangements designed to overcome system constraints, retain greater value in the local economy and alleviate fuel poverty. These projects include:

- Accelerating Renewables Connections with Scottish Power Energy Networks - an LCNF funded active network management project designed to enable renewable energy projects that would otherwise be unable to connect to the grid owing to transmission constraints;
- The 'Assisting Communities to Connect to Electric Sustainable Sources' (ACCESS) project on the Island of Mull (Scottish Government Local Energy Challenge Fund and NIA funded) – smart local heating in a constrained grid;
- The 'Surf 'n' Turf' Project (LECF funded) – piloting the generation of hydrogen from constrained community wind as an energy vector for marine transport in a constrained grid
- The Heat Smart Orkney project (LECF) – smart local heating in a constrained grid
- The Tower Power project, Edinburgh (LECF) – aggregating domestic electricity demand and integrating renewables to control and reduce heating costs in high density housing.
- A number of smaller local energy system projects seeking to directly link local generation to local demand.

We have a number of general points prior to responding to specific questions:

Registered Office: 67a Castle Street, Inverness, IV23DU  
Tel: 01463 417104

E mail: [info@communityenergyscotland.org.uk](mailto:info@communityenergyscotland.org.uk)  
[www.communityenergyscotland.org.uk](http://www.communityenergyscotland.org.uk)

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We have found that awareness of how the existing 'non-smart' energy system operates is generally very low amongst consumers. If moving to a smarter system is going to have the desired effect of enabling greater competition (including the entry of many more market players) leading to greater consumer benefit, greater transparency of system operation and opportunities to engage in it are vital.

There are parts of Scotland (particularly the Highlands and Islands) where broadband connectivity is poor. Clearly there is a strong need to rectify this situation if the benefits of a smart system are to apply across the UK.

We note that as a general rule the consultation assumes that in the move to a smarter system, the main players are seen as the regulator, energy companies, system operators, tech developers, appliance manufacturers - and consumers. However, we do not think it will be sufficient to rely on generic customer relations strategies as a means to fully engage consumers in the changes required to achieve the potential of a smart system as envisaged in the call for evidence. In our experience organised local community groups have an important – if not critical - role to play in building consumer confidence, understanding of the potential benefits and helping vulnerable consumers actually benefit. We also believe that there is the potential for community groups to play a role in the development of smaller-scale demand aggregation that offer routes to achieve maximum consumer benefit. In practice this role includes dissemination of information, building local relationships, working in partnership with tech developers and energy companies to help them engage with and understand local realities. We recommend that where feasible, BEIS / OFGEM should encourage this approach within a wider approach to 'good practice' on smart system roll-out. This may also be particularly relevant to any moves to increase the provision of demand response services beyond large-scale consumers.

In existing constrained grid areas, one of the key purposes of smartening the local distribution network through ANM and smart load switching (such as with the ARC project and the ACCESS project) is to allow additional generation onto the system which would otherwise have been constrained off or unable to connect in the first place. With the ACCESS project, this has involved the development of direct signalling between the generator (in that case a community hydro scheme) and multiple small loads in local domestic dwellings and businesses (mostly new storage heaters). This direct generator – load signalling capability is a technical measure enabling additional local renewable generation without reinforcement but is not based on price signalling *per se*. For this sort of innovation to be rolled out, there will need to be the scope to allow / encourage local tariffs based on supply from specified local generators.

In relation to Ultra Low Emission Vehicles, we would make the general point that considerations on ULEVs should include any particular opportunities and issues relating to ferry transport in the Highlands and Islands, which use large quantities of fossil fuel in areas which typically have large un-utilised renewable energy resources. There is tremendous scope to address the de-carbonisation of a significant transport sector whilst creating additional load in grid constrained areas. This could also release currently constrained embedded renewable energy generators. We would also observe that

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with low population densities and longer travel distances the norm, range anxiety and availability of rapid charging points are particularly significant factors for EV users in the Highlands and Islands. Intermediate bodies such as local authorities and organised community groups have an important role to play in promoting and supporting and building confidence in their use, but viable business models for non-domestic charging stations (especially those based on renewable energy) depend on the simultaneous development of demand and supply.

### Responses to specific questions

#### **Questions 1-6: Enabling Storage**

*We have not had direct experience of electricity storage installations but welcome this focus on bringing the regulatory system up to speed to properly enable the very valuable potential of storage on the system.*

#### **Questions 7-10: Aggregators**

*We believe that the role of aggregation is an important development area for community energy and fuel poverty alleviation. With the advent of efficient smart storage heaters the aggregation of domestic demand has the potential to help with system balancing and thereby offer value to consumers who are able to participate. In the Tower Power project referred to above, we are piloting the aggregation of domestic heating demand on a half-hourly basis at a local high density housing level. If this approach could be developed further through aggregation with other similar areas, there is the potential for both reduced electricity supply cost as well as recycling of value from demand response services to further reduce domestic bills. At the moment however, the pathway to achieve the potential of DSR benefits for aggregation of community-scale demand is not clear.*

#### **Questions 11-27: Price Signals**

*Our only comment here is to support measures which bring greater transparency to the value that embedded generation and local DSR can bring to the operation of the distribution system.*

#### **Questions 28-42: A System for the Consumer**

28. Do you agree with the 4 principles for smart appliances set out above (interoperability, data privacy, grid security, energy consumption)?

Yes

No (please explain)

29. What evidence do you have in favour of or against any of the options set out to incentivise/ensure that these principles are followed? Please select below which options you would like to submit evidence for, specify if these relate to a particular sector(s), and use the text box/attachments to provide your evidence.

Option A: Smart appliance labelling

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- Option B: Regulate smart appliances
- Option C: Require appliances to be smart
- Other/none of the above (please explain why)

*We believe that this is a new development area where technology-forcing regulation is desirable.*

30. Do you have any evidence to support actions focused on any particular category of appliance? Please select below which category or categories of appliances you would like to submit evidence for, and use the text box/attachments to provide your evidence:

- Wet appliances (dishwashers, washing machines, washer-dryers, tumble dryers)
- Cold appliances (refrigeration units, freezers)
  - Heating, ventilation and air conditioning
- Battery storage systems
- Others (please specify)

*Our main experience is linked to the installation of new heating equipment and associated control equipment, including distribution network modifications to allow load switching synchronised to local generator output (eg the Mull ACCESS project). Our comment here is that the development of good practice standards for actual installation procedures and snagging may be worthwhile for larger / fixed appliances, to give greater confidence to consumers.*

32. Are there any other options that we should be considering with regards to mitigating potential risks, in particular with relation to vulnerable consumers?

*Whilst on the one hand the introduction of smart pre-pay meters could make cost management easier, any additional complexity linked to appliance management and time of use tariffs may be problematic. It will be important to try to ensure that there is objective and easily accessible advice available, which allows vulnerable consumers make the most of the cost reduction possibilities of a smarter system.*

35. What barriers (regulatory or otherwise) are there to the use of hydrogen water electrolysis as a renewable energy storage medium?

*Based on our experience so far in leading the Orkney Surf 'n' Turf project designed to generate hydrogen using electricity from a constrained community wind farm and EMEC, to then feed a fuel cell in Kirkwall harbour we would note the following points and issues:*

- *So far 'renewable' hydrogen production is only likely to be financially feasible where the power would otherwise be lost owing to system constraints;*
- *There will need to be a staged approach to introduction of hydrogen powered fuel cells on vessels, beginning with installation to power auxiliary loads;*
- *Before units can actually be deployed in vessels, regulations require crews to be trained on land first – requiring significant investment in land-based training facilities;*

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- *The inter-linked Horizon 2020 –funded project ‘Big Hit’ (Building Innovative Green Hydrogen Systems in an Isolated Territory) will be piloting the operation of 10 electric-hydrogen vans with a refuelling station in Kirkwall; once this project is fully underway we will be able to advise further on practical barriers to implementation.*

### **4.3 Consumer Engagement with Demand Side Response**

#### **22. Domestic and smaller non-domestic consumers**

We strongly agree that this sector offers significant potential for flexibility over the longer term, particularly with the electrification of transport and heating.

#### **Specific Questions**

39. When does engaging/informing domestic and smaller non-domestic consumers about the transition to a smarter energy system become a top priority and why (i.e. in terms of trigger points)?

*In addition to the building blocks referred to (smart meters, half hourly settlement, smart appliances and smart tariffs) we believe that the scope for aggregating domestic consumers into collective demand response should be examined too, rather than solely considering individual consumer DSR based on use of smart appliances and tariffs.*

*In other words, we think there is another category of DSR provision between the large non-domestic customer and the individual consumer.*

*Localised aggregation of demand through a recognised community-based organisation would also provide a very good basis for widening awareness and engagement in the system. This in turn could help to overcome the stated risk that these consumers will not offer their flexibility to the system because they are unaware of the opportunities or wary of the risks.*

*Community Energy Scotland is currently piloting, with partners, the aggregation of domestic demand and conversion to half-hourly metering in disadvantaged high density housing areas, linked to the introduction of smart storage heaters. One important purpose is to enable negotiation of a preferential tariff for residents, with the potential for time of use benefits and improving heating arrangements. Learning points so far include:*

- *It is not unusual for ‘dumb’ pre-pay meters to be preferred as a means of managing budgets – even though costs are higher;*
- *The current complex arrangements for smart meter installation and data management are not conducive to the creation of local aggregation;*
- *An established local community group can be an important route to raising awareness and engagement in new supply arrangements;*
- *Local trusted community groups have an important role to play in interpreting complexity and, potentially, acting on the behalf of vulnerable consumers.*

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*In an entirely different context (remote, rural and constrained grid), the ACCESS project, led by Community Energy Scotland on the Island of Mull (referred to previously), is pioneering the use of switchable loads as a means of overcoming a local grid constraint on a local community-owned hydroelectricity plant. We have done this through the introduction of new storage heaters into around 70 homes along with smart signalling between the generator and the heaters, creating an aggregated switchable load that switches on when the generator reaches a point where it would otherwise have been constrained off. This project has effectively engaged local individual consumers in the piloting of a local smart system which also brings benefits for the local generator and the distribution network.*

*Again, vital to the success of this project so far has been the role of the local community group (the Mull and Iona Community Trust) who have played a key role in recruiting local consumers into the project, raising awareness and resolving local customer relations issues.*

*This project also shows that it is technically feasible to create an aggregated demand response at a level above the individual consumer but below the large scale non-domestic level (which could be referred to as 'community scale demand response') which has potential to be rolled out to other areas. This, in turn, could add to the range of measures available for smart demand response whilst providing distribution-level system benefits.*

*From our experience, there can be a very low level of trust in electricity suppliers. Securing a high level of consumer buy-in will require new consumer engagement strategies. We believe that the projects referred to above show the value of organised local community groups in helping local consumers to see and understand the benefits of a smarter system. Prioritising this approach in communities / areas with the most to benefit from smart system developments would be a useful way of testing consumer engagement strategies. These would include areas where grid constraints are precluding local renewable energy development; and / or where there are high levels of fuel poverty and / or high densities of vulnerable consumers.*

### **Questions 43 – 46: Roles and Responsibilities**

43. Do you agree with the emerging system requirements we have identified (set out in Figure 1)? Are any missing?

*Yes, we think this is a good summary of the position.*

### **Questions 47-48: Innovation**

47. Can you give specific examples of types of support that would be most effective in bringing forward innovation in these areas?

*We strongly support the sentiments in the whole of this section but would like to see greater provision for community-scale innovation whereby organised community groups have a key role in working with consumers.*

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48. Do you think these are the right areas for innovation funding support? Please state reasons or, if possible, provide evidence to support your answer.

*Yes, but we think there would be real merit in prompting or supporting 'integrated' distribution-level pilot projects. By this we mean projects which seek to integrate new low carbon generation with storage and DSR with active mobilisation of local consumers.*

**Yours faithfully**



**Nicholas Gubbins  
Chief Executive**

**Community Energy Scotland  
January 2017**

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