Sustainability First

1. Sustainability *First* is a small environment think-tank and charity. It undertakes research, publishes policy and discussion papers, organises workshops and high level seminars to promote new thinking on sustainability.

2. Since 2006, Sustainability First has undertaken a series of multi-sponsor studies on the GB energy demand-side and on household smart energy. These studies served to develop knowledge and insight in the fields of energy efficiency, smart metering, smart energy tariffs, demand response and demand-side management.

GB Electricity Demand project – *realising the resource*

3. Sustainability First began a major new multi-sponsor three-year project in April 2011 on GB Electricity Demand. The project was supported in its first year under one of the Low Carbon Network fund projects[1] and thereafter for a further two years via a multi-sponsor group[2].

4. The project aims to understand the GB electricity demand-side resource - across all sectors of the economy. We are evaluating both the scope for (1) demand reduction and (2) demand response – including the demand-side role of distributed generation. We are looking to understand the economic value of this resource - to both customers and market actors – over a 10-15 year horizon.

5. The project has a strong practical focus on customer, consumer, commercial, regulatory and policy issues, informed by the experience of our project partners. The project is co-ordinated via a Smart Demand Forum, comprising our sponsors, major consumer bodies[3] as well as colleagues from Ofgem and DECC.

6. Project papers completed so far are published at 'GB Electricity Demand' on www.sustainabilityfirst.org.uk [4].

7. This response to the DECC Community Energy Call for Evidence reflects the views of Sustainability First, and not those of our project sponsor group or of the Smart Demand Forum.

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[1] Northern Powergrid's Customer-Led Network Revolution project.

[2] Northern Powergrid, Scottish Power Energy Networks, UK Power Networks, National Grid, British Gas, E.ON UK, EDF-Energy, Cable & Wireless, E-Meter, Elexon, BEAMA, Ofgem.

[3] Consumer Futures ; National Energy Action; Which? ; Energy Intensive Users Group

[4] See Annex 1

DECC Community Energy Call for Evidence

8. Sustainability First welcomes the DECC Community Energy Call for Evidence to inform a new Community Energy Strategy to encourage development of local energy initiatives where these bring benefits for carbon, cost-efficiency, or other wider benefits.

9. Based on the research carried out for our three-year GB Electricity Demand project, this submission focuses on *local demand-side* aspects of the community energy jigsaw. We focus on local demand-side management in particular, as an area on which the DECC Call for Evidence document, seems to say relatively little.

10. Points noted in this submission draw upon a forthcoming Sustainability First project paper (draft paper 10 - to be published in late 2013) titled : '**The Electricity Demand-Side and Local Energy : how does the electricity system treat 'local' ?'.**

11. Our paper aims to understand what changes might help achieve a better *local* match of supply and demand, where this is cost-efficient – be that at an individual-, household, street or community level. In particular, the paper focuses on how electricity industry commercial frameworks, charges and administrative arrangements treat *location* - and therefore attempts to understand which key areas of these commercial frameworks may need to evolve or change to unlock more *local matching* of local supply and local demand.

12. The Sustainability First paper also draws upon six GB local community *demand-side* case studies – and points to some generic lessons in terms of communities delivering scaleable demand-side activity, capable of improving local electricity system efficiency, including for local demand-side 'matching' with local low-carbon electricity supply.

13. The call for evidence raises many other very important questions about development of community scale energy projects, but we do not comment on these.

Improving the match between local low-carbon supply and local demand

14. Improving the match between local supply and local demand is desirable from the point of view of electricity system cost-efficiency because a better 'local' match may help to avoid the costs of new distribution network re-inforcement or investment - by reducing network constraints and bottlenecks, and also reduce electricity system losses. In the long run, a good local match between supply and demand could also reduce the costs of balancing the national electricity system as a whole, and, potentially, cut suppliers' costs by reducing their risk of exposure to imbalance costs.

15. Some of the barriers to achieving a better match of local supply with local demand sit deep within long-established commercial frameworks designed for a very largely centralised system for electricity production, transport and supply. In this sense, these

barriers may take some time to resolve. Some obstacles, noted in Sustainability First's draft paper 10, as potentially standing in the way of obtaining a better 'match' between local supply and local demand - are as follows.

16. **There is a time-line to obtaining a better 'local match' of supply and demand at scale – and we are still some way off.** Some or all of the following will need to be in place for an active demand-side , regardless of whether this is delivered at a national system-wide level - or at a more local or community level. These include a need for : smart meters ; potential half-hourly settlement (to implement 'dynamic' demand-side management ; to accurately match individual- or community-level customer consumption patterns, *including at specific places*, with end-bills) ; data management (so, knowledge of *where* local generation, micro-generators, and potentially flexible customer loads may be) ; flexible load (needed at some scale to 'offset' local supply) ; automated load ; retail tariffs to incentivise customer flexibility; engaged consumers - and appropriate consumer safeguards. Ofgem's Smarter Markets team are working on these issues, many of which may 'come together' in the early 2020's.

17. **Suppliers presently have few commercial drivers which might support demand-side actions which could off-set local supply at a local / community level.** This seems partly because our electricity markets generally contract, trade and balance for supply and demand *on a largely non-geographic basis* ; and, in part because the transportation charges which suppliers pay to the networks for moving power to their customers are calculated and levied from the suppliers on a largely standardised basis per customer[5], with mostly rather weak signals to suppliers about the costs associated with where their customers may live (and with those transportation costs anyway recovered very largely unseen by suppliers from end-customers).

18. **Approaches to distribution charges** (connection charges and DUOS (Distribution Use of System) – may in the long-run (post 2023)[6] need to evolve to give sharper locational signals to end-customers at low-voltage to help support more active local demand-side actions at constrained network 'hotspots' – to help manage and 'balance' network impacts of local generation.

19. **Administrative barriers which prevent 'holistic' approaches by suppliers to supply and demand –** some administrative siloes may also presently stand in the way of suppliers (or others) who may wish to explore commercial opportunities for *local demand-side actions to offset / balance local supply* - be this at the level of an individual household or a local community. These administrative siloes may need review 'in-the-round' before opportunities for 'local balancing' / buffering can start to be more readily

[5] TNUOS (Transmission Network Use of System), BSUOS (Balancing Services Use of System) and DUOS (Distribution Use of System) Charges. 'Standardised' up until now for the 29 million customers who are not half-hourly metered and half-hourly settled. Network charges are in practice already mostly directly passed through to the 116,000 largest 100 kW+ half-hourly metered and half-hourly settled customers.

[6] So, after Distribution price control ED1

identified by suppliers, networks or others. This will be particularly important if suppliers are to become better incentivised to promote local-balancing activity in a commercially 'holistic' way – including development of 'pro-sumers' : i.e. customers who are incentivised *via their retail tariffs* to 'self-balance' or to locally balance. These siloes seem to impact large integrated suppliers and small suppliers alike - including those who may wish to consider the Licence Lite arrangements. Three examples of such administrative silos (and there may well be others) seem to be :

- **Present *commercial* separation at the level of the individual household** (or larger customer) **of arrangements for customer supply – and for FIT administration** (especially, but not only, for smaller PV).

- **Power Purchase Agreements (PPA) with distributed generators** – even though a supplier may have a PPA with a generator, that supplier may nonetheless be commercially 'indifferent' to linking the output from a particular PPA to supply a *specific community or group of local* customers (see para 17 above).

- **Challenges in data-protection and data-sharing arrangements among networks, suppliers and other interested for third parties** about (1) the network location of low carbon generation (incl PV), low-carbon technologies (heat, EVs) and (2) for the networks to use internal data to signal to others who may have an interest in that demand-side activity at a particular location.

20. **Incentives** – the evident success of *supply-side* low-carbon incentives at a local level, leaves supply presently running some way 'ahead' of local demand-side development. This is starting to manifest itself as a cost-efficiency challenge for the distribution networks. Despite the very many incentives available to support both installation of low-carbon technologies (FIT, Community FIT, RHI) and for energy efficiency (Green Deal, Community Green Deal, ECO) Sustainability First has identified a number *of specific gaps for the demand-side across present incentive arrangements*. If such incentive 'gaps' were addressed, it may be possible to support better local matching of supply and demand by encouraging simple household – or local – balancing / buffering and / or community level demand-side actions. For example :

- **FIT for micro-generators (esp PV) -** is not presently tied to a requirement for some form of modest on-site thermal storage to avoid creating new network costs from unmetered spill.

- **Low cost thermal storage :** despite many available incentives (FIT, RHI, GD, Community GD, ECO) no incentive is directed ***specifically*** at simple forms of low-cost thermal storage notwithstanding that these measures could certainly encourage simple household - or local - balancing / buffering of supply and demand at the very local level. Low cost thermal storage is generally *over-looked as a near-term solution* to support local-matching with PV & wind (e.g. storage heaters, hot water cylinders).

- **Modest 'set-up' funding for neighbourhood or community-level demand-side and / or local balancing projects.** Communities & local groups who may wish to be ***active on the demand-side*** - perhaps ***instead of / or as well as*** *community generation* – may struggle to readily find 'early-stage' funds to help them 'mesh together' local generation projects with demand-side actions and / or modest thermal storage. Our six community demand-side case studies show that there are many practical and organisational issues which communities face in engaging with the electricity demand side. *Many of the incentives presently available to communities are focused on the 'supply-side'.* Access to some modest upfront funds – explicitly for early-stage set-up of *community electricity demand-side schemes at the very local level* - may help to address at least some of the organisational and financing barriers which such community-led initiatives may face. 'Set-up' funding – especially for *local demand-side* schemes which could balance / off-set local generation (but not just), needs some consideration, including how this might best be supported (for example, some kind of 'benefit sharing' arrangement, linked to potential savings for the local electricity distribution network).

- **Explore linking the receipt of a subsidy either for heat pumps or electric vehicles to a requirement for a smart meter** – (plus, at the very least, an *offer* of a Time of Use tariff) to over-come **potential cluster problems**.

- **Consider the merit of a new electricity sector Community Unit –** a one-stop advisory shop - to provide early advice and generalised help to interested communities and local groups – and to help bridge the 'silos' these groups may find in dealing with networks, suppliers and the system operator - if they are considering small-scale electricity generation or demand side actions in their area.

Community Demand Side Case Studies – Some Lessons

21. There are many GB projects, currently in planning or at initiation, that seek to explore the issue of local-balancing and demand-side shifting and / or reduction in relation to community activities. These projects should start to yield results over the next two-three years. On the basis of material available to us in summer 2013, Sustainability First looked at six local / community demand-side case studies for our paper 10 as follows.

Case-study 1: Self-contained island balancing (peak reduction)
Isle of Eigg

Case-study 2: Overall electricity demand reduction at local substation
Community Competition for Energy Demand Reduction. SSE EDRP.

Case-study 3: Committed local community
Ashton Hayes

Case-study 4: Location-specific I&C demand turn-down scheme
Thames Valley Vision . SSE.

Case-study 5: Community self-balancing: wind to storage heaters
Nines Project. Shetland. SSE (Northern Island New Energy Solutions)

Case-study 6: Private wire : self-balancing
Community Energy Scotland

22. These case studies considered what benefits local or community demand-side activity might bring to the electricity system. Each case-study considers :

- The efficiency benefits of the scheme to the local electricity system.
- Who drove the scheme, the incentives offered - and the community response.
- Key factors in shaping the community response – and how far these may support an enduring and sustained response – and / or be replicable.

23. Some generic lessons from these case studies for greater development of local demand-side actions, be they 'stand-alone' – or be they in support of matching local energy supply with local customers or local communities - were as follows.

24. **Benefits and opportunities for community based electricity demand-side action**

- Working with community groups, and giving them a sense of ownership, is challenging but seems essential to secure action on the community scale.

- Communities who already have an interest in energy are easier to engage. However most of these are not at present actively engaging with suppliers or DNOs on demand reduction projects.

- Local balancing / matching of supply and demand may make it easier to engage people in local demand-side management. Not least, local groups can directly see / feel whether renewables will be working on a particular day.

- Working with communities can transform community-level perception of the Distribution Network who is not normally visible to the average community.

- There may be more near-term scope for local balancing projects with **isolated** communities.

25. **Challenges for local community balancing or demand reduction projects**

- Lack of knowledge and / or expertise within community groups means - on the whole – that communities are unlikely to initiate *demand-side* projects on their own. Even where communities are engaged and committed, the effort, know-how and energy to initiate and see through even a modest demand-side project is considerable.

- There is no explicit incentive for communities to engage with demand side activity on a community level (see para 20 above) and no provision of information as to *where* demand side activity would be best placed.

- Distribution Networks are not visible to the average community with an interest in demand-side activity. Distribution Networks have been charged with producing maps showing where in the country there is potential for further connection of renewable energy into the grid. However there seems to be little similar work planned for the demand-side. This means that it is hard for communities to envisage any financial benefit from engaging in demand-reduction activity and as a result demand-side projects are likely to be less attractive than initiating a community energy generation project for which they are eligible for a FiT payment (see para 17 above).

- Community groups that already have an interest in energy might not be located in a part of the network in which there would be value in localised balancing or demand reduction. Projects are likely to be more effective where there is a congruence of an interested community and an electricity system efficiency need. Currently a DNO may have a constrained part of the network, or a community may want to get involved in demand reduction, but the two have no means of connecting.

- Working with third parties, and relying on consumer action, can be a challenge for DNOs who need a guaranteed solution to their network constraints.

- There is no ‘one size fits all’ approach – either for local communities interested in their energy supply and / or their carbon footprint - nor in terms of potentially matching local supply with local demand.

- From our case studies, it is unclear how far active community demand-side behaviour might either persist or be replicable. This is problematic for a community generator or for a distribution network looking to depend upon customer demand-side response to full 'balance' their local generation output – or to avoid local network investment, so that the network remains secure.

- Providing value for communities/ households who engage in DSM, (based on the cost-savings of avoided investment), is possible but it is unclear what the level of reward / 'benefit' would need to be to encourage concerted and sustained community-level demand-side action.

- Energy companies, Ofgem and others need to learn the emerging lessons from the many new electricity demand-side projects that are underway. Far more case study material will become available over the next two years, which will contain valuable lessons. In particular on the realism of how the cost-savings which networks seek at particular locations can be matched with the capability of local neighbourhoods or groups to deliver demand side reduction on a sustained basis – especially to offset local or community generation.

Sustainability First
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www.sustainabilityfirst.org.uk

Annex 1 - Sustainability First. Papers for the GB Electricity Demand project.

GB Electricity Demand project papers – available at www.sustainabilityfirst.org.uk	
1	**GB Electricity Demand – context and 2010 baseline data**
2	**GB Electricity Demand 2010 and 2025 – Initial Brattle Demand-Side Model : scope for demand reduction and flexible response .**
3	**What demand-side services could customers offer?** • **Household customers.** • **Industry customers.**
4	**What demand-side services can provide value to the electricity sector?**
5	**The electricity demand-side & wider energy policy developments**
6	**What demand-side services does Distributed Generation bring to the electricity system?**
7	**Evolution of commercial arrangements for more active customer & consumer involvement in the electricity demand-side.**
8	**Electricity demand and household consumer issues.**
9	**GB Electricity Demand – 2012 and 2025. Impacts of demand reduction and demand shifting on wholesale prices. Results of updated Brattle modelling.** (to be published Nov 2013)
10	**The electricity demand-side and local energy:** **how does the electricity system treat 'local' ?** (to be published by end 2013)
11	**How could electricity demand-side innovation serve the electricity customer in the longer term ?** (to be published Spring 2013).
12	**The electricity demand-side and the GB electricity markets - bringing it all together.** (to be published June 2013).