

Response to BEIS/Ofgem consultation on Smart, Flexible Energy system, from the Bristol Energy Network

General

The Bristol Energy Network is an umbrella organisation of community energy groups in Bristol and the surrounding area. It currently has BEN has 25 member groups¹, including eleven neighbourhood community energy groups, two other neighbourhood groups, seven city-wide community energy groups, two other city-wide community groups, and three advice agencies.

This is a response from some of the members of the Bristol Energy Network, and gives detailed answers to the questions which we had the capacity to answer during the time of the consultation.

We welcome this consultation, and the focus on the delivery of smart, flexible energy systems. However, we feel that the framing is too narrow in a number of ways:

- There is insufficient focus on the role of the local, including local authorities and community energy groups.
- A smart, flexible energy system needs to include all energy vectors in consideration – including heat networks, the gas network, and potential future use of hydrogen in the gas network. It also needs to include the potential for storage of heat or gas to provide flexibility to the electricity system.
- The need to decarbonise the energy system, to reduce demand, and to address fuel poverty are all missing from the drivers identified in Figure 1 and from the consultation as a whole.
 - If competitive and market mechanisms are to be effective, they need to include the full cost of externalities of fossil fuels. Cost reflexive charging should include internalising the externalities of the costs of climate change due to fossil fuels, in order to ensure a true level playing field. Non-market approaches to decarbonisation should also be considered.
 - Demand reduction is a core part of any scenario for a sustainable UK energy system, and is very possible with current technology. Community energy groups have potential to enable demand reductions in households whilst addressing fuel poverty, through enabling peer learning, developing retrofit projects, raising awareness and creating education.
 - Reliance on price signals to achieve flexibility risks exacerbating fuel poverty.

¹ <http://bristolenergynetwork.org/membership/members/>

- Households are treated as passive consumers who only engage with the energy system through price signals and technology, rather than as active participants with agency to invest in energy efficiency of their homes, modify their living patterns, select their vehicle fuel, and produce as well as consume energy.
- Community energy groups can organise the efforts of prosumers (producer-consumers) to provide greater system value than prosumers can individually.
 - o By building long term relationships and being on the side of the individuals in the community rather than on the side of commercial industry actors
 - o By doing things together so that individuals don't have to do it alone
 - o By discussing energy in a language familiar to consumers, rather than being too technical
 - o Community groups can bring the voice of the prosumer into discussion with energy industry actors.

Response to question 1.

One of our members, the Bristol Energy Co-operative, has experience of attempting to develop battery storage at an existing solar PV farm, and including it in a potential new solar project. They encountered barriers regarding the viability of the project of a whole, and decided not to go ahead with the storage part of the project.

There are a number of income streams that are available, eg:

- Triad payments
- Firm Frequency Response
- Enhanced Frequency Response
- Capacity Mechanism
- PPA uplift (eg, selling to the grid at times of peak demand).

The difficulty - and this isn't just an issue for community schemes - is combining revenue streams in a way that is compatible with the technical, regulatory and commercial constraints of the current market.

For example, if they were to add battery storage to a solar farm that was receiving Feed-in tariffs, the site would no longer qualify for the export tariff element of this.

Also, the short-term nature of some contracts make community investment unlikely, as there's too much risk involved.

It has already been announced that FFR and EFR will be amalgamated into one offer, so things are changing, which is good.

Response to question 46.

Flexible energy districts - Community EScO model

Background

The Electricity Act 1989 opened up a centralised electricity system to competition, but created a requirement for generation, distribution and supply of electricity to be licensed, and enforced a separation between these activities in order to protect consumer interest.

Generation and supply are competitive markets, while distribution and transmission are regulated monopolies, so the benefits of competition are limited to some energy production activities. This also results in fragmentation.

In a centralised system at the national and regional levels, where the role of producer is separated from the role of consumer, competitive markets and regulation of natural monopolies can be important in protecting the consumer. However, the rise in distributed energy resources is creating a new 'prosumer' role, where consumers are also producing energy, and conflicts of interest between consumer and producer are changed.

In this context it is now possible to use democratic mechanisms of direct accountability at the very local level to protect the consumer. At this level, the strict separation of roles is now restricting companies, communities and municipalities from innovating to increase the flexibility of our energy system.

In Bristol a consortium of companies, developers, community groups and the local authority are experimenting with new flexible, local generation, distribution and supply models that aim to own local generation, distribution and supply and to create value for the community by providing flexibility services to the DSO/TSO and grid reinforcement savings to the DNO/TNO.

We name organisations that own and operate electricity generation and distribution assets and supply customers from these assets, Community Energy Services Companies or CESCos. There are several projects developing elements of this idea in different ways, including Tower Power (Community Energy Scotland)², EnergyLocal³, the Sunshine Tariff⁴, and a proposal of models for Local Electricity Supply (Realising Transition Pathways)⁵. Our interpretation of CESCos' roles is integrated: we envision CESCos not only carrying out supply and generation roles, but also local distribution or private wire operation. We suggest that CESCos perform or delegate Community System Operator (CSO) and Community Network Operator (CNO) roles within the local energy system.

² <http://www.communityenergyscotland.org.uk/towerpower.asp>

³ <http://www.energylocal.co.uk/>

⁴ <http://www.wren.uk.com/sunshine>

⁵ https://research.ncl.ac.uk/ibuild/outputs/reports/local_electricity_supply_report_WEB.pdf

This response identifies how CESCOs could contribute to a smart, flexible energy system and the barriers to achieving this vision of flexible, community-owned energy districts. We also make specific recommendations as to how these barriers may be resolved.

Two models for flexible energy districts

The 'business as usual' model for creating flexible, locally-owned energy districts is what we call the 'National Aggregators' model, whereby communities deploy and operate individual community energy assets to generate heat and power and to provide storage and electric car charging. In this model each energy asset owning party uses National Aggregators, such as those who currently operate in the large non-domestic sector, to obtain revenues from the TSO/DSO. This is shown in Figure 1.

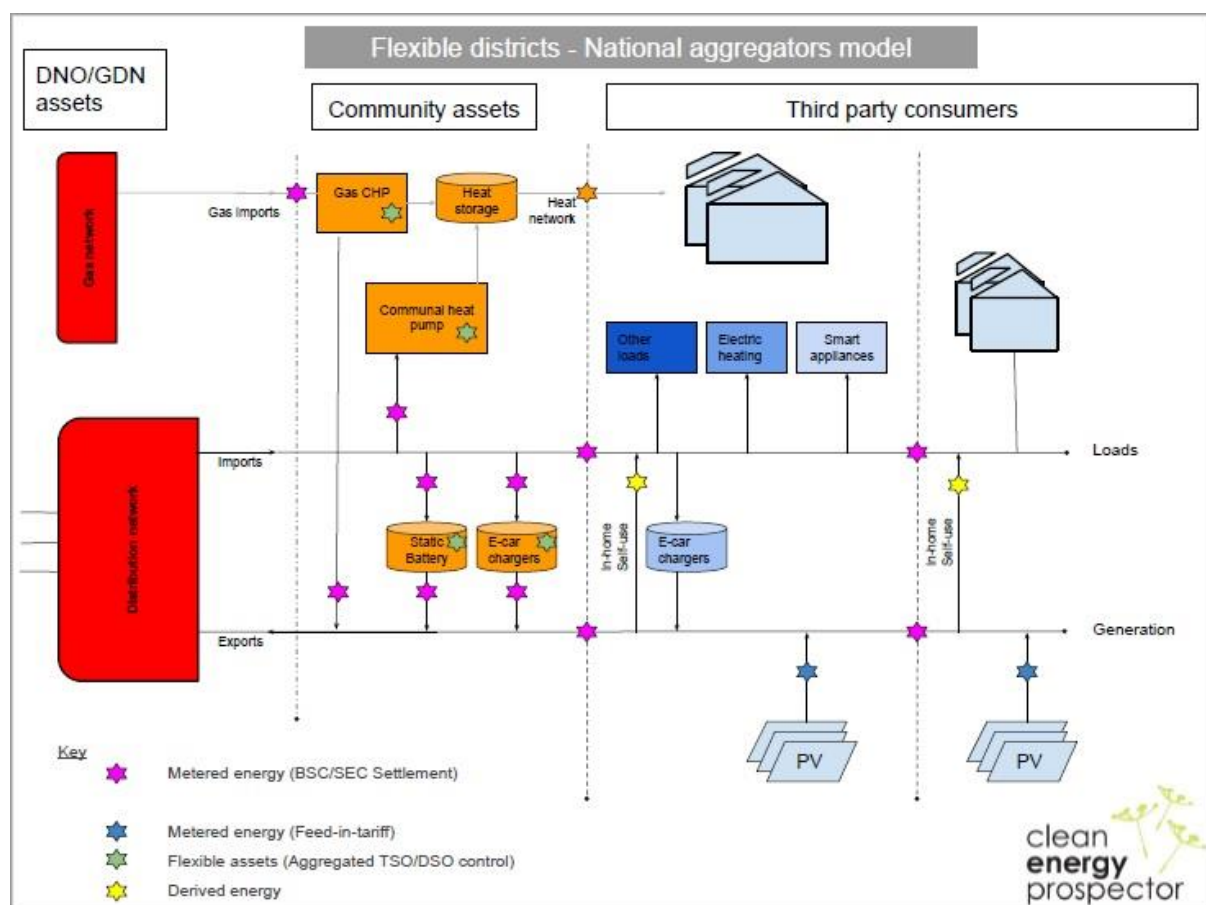


Figure 1

- The benefits of this model are that:
 - multiple parties can provide services within the local energy network without the transaction costs of making agreements with each other as long as they can reach agreement for grid connection with the regional DNO.
 - It is achievable with minor changes to current licensing and regulation arrangements
- The disadvantages of this model are that:
 - The national aggregator will take a portion of the value created, thus reducing the income available to asset owners.

- The full system value of coordinating the storage, generation and demand flexibility assets in a local area cannot be so easily realised if each is operating under a separate agreement with the national aggregator.
- The regulatory environment that the asset owner must navigate is complex, as it needs to remain small enough to be licence exempt from a number of different licences, for various different activities. The need to navigate multiple different class exemptions, e.g. for presumption, direct supply, private wire supply, limits asset owners both in scale and type of activity. .

Our CESCO model shown in Figure 2, which we are trialing in part in the Owen Square project in Easton, Bristol, takes a very different approach. Each CESCO is given what amounts to a long-term local 'monopoly' for supply and distribution of electricity and the connection of new energy generation and storage assets within the geographical district. This 'district' may be a single apartment block, a single new-build housing development, a single substation feeder, a single substation or a set of connected substations. Within that local monopoly the CESCO uses smart system balancing, demand response, storage assets, generation assets and national aggregators to create value for its customers. At any time the CESCO's customers may 'switch' back to national suppliers using the Elexon Third Party Access legislation (aka the Citiworks rule) so the CESCO does not have a true monopoly in the general sense of the word.

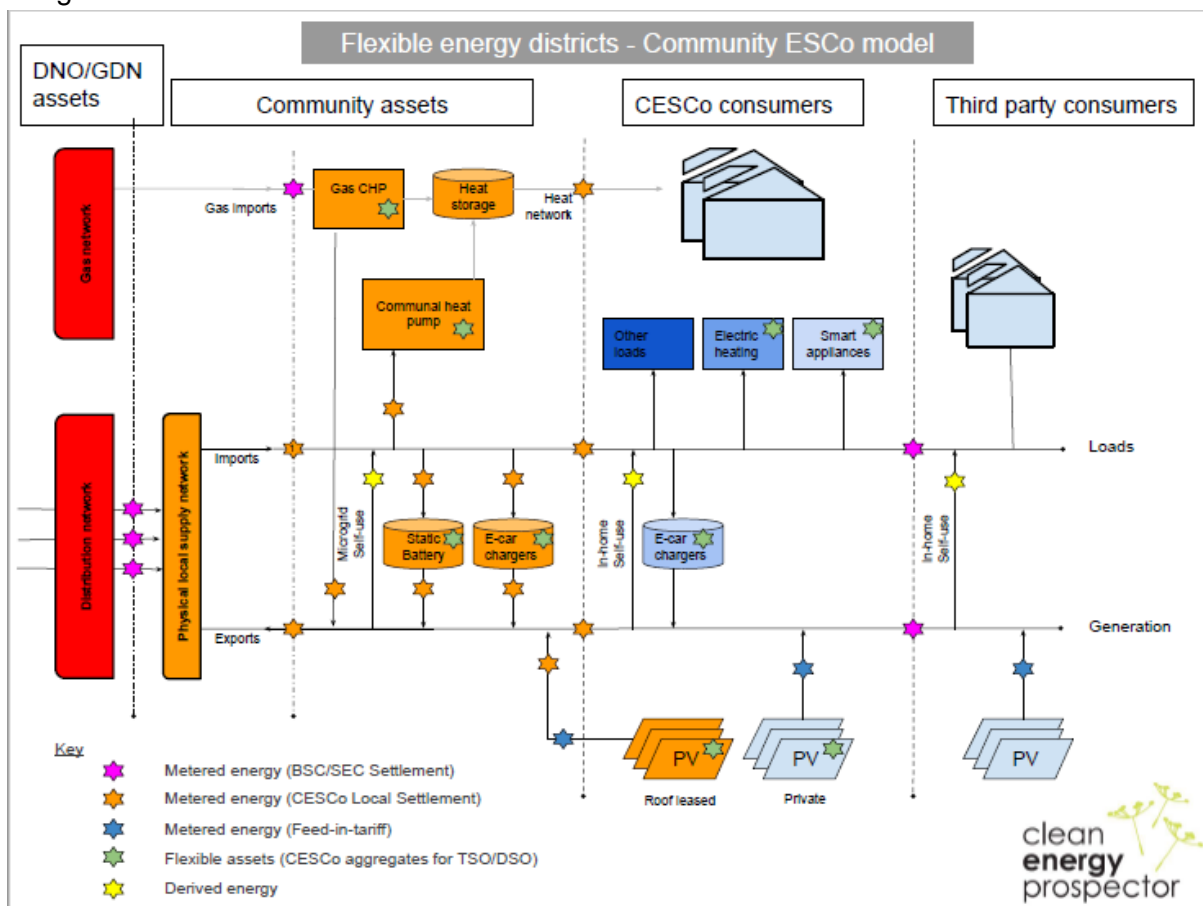


Figure 2

The key difference between the two models is as follows: the National Aggregators model ensures that existing DNOs are required to become more and more closely and directly involved with individual consumers as more DR and DG enters their networks. Our proposed

CESCO model enables communities to self-form and create new Local Units that combine DNO and Supplier powers sitting between the consumer and the regional DNO.

Advantages of the CESCO model

The key advantage is that by providing a local monopoly, for example for 20 years, the CESCO is able to maximise the income opportunities from providing DSO/TSO flexibility services as well as smart local balancing, and is incentivised to invest in long-term capital intensive assets like storage and generation. More broadly, a CESCO would also be able to develop business models supporting its members to reduce their energy demand, a crucial part of a sustainable energy system which has not been addressed in this consultation.

Two main areas of additional 'system value' arise from the CESCO model of local aggregation that are lost in the National Aggregators model.

- Direct generation "microgrid self-use" value is captured by the local CESCO rather than being 'lost' into the balancing mechanism. We estimate that 1/3 of additional 'lost' generation can be captured by local CESCOs. Capturing this value creates a net present value of £619,000/MW of deployed residential PV for the local community (25 year average panel life, 5% discount rate, 12p/kWh, RPI 2%). This compares favourably with domestic PV costs of £1.1m/MW.
- Increased ability of stationary and non-stationary (car chargers) storage to forecast demand and generation within a district supporting smart charging of storage. We predict that the 'cost of energy' to charge storage within a CESCO district will be on average 15 percent lower than in the National Aggregators model through smart charging algorithms that maximise use of local PV. Capturing this value creates a net present value of £24,000/MWh of deployed storage for the local community (15 year average system life, 5% discount rate, 5p/kWh charge cost, 5% battery annual degradation, RPI 2%). This represents a substantial value contribution when utility scale batteries are predicted to cost £180,000/MWh by 2020.

Other areas of increased system value require further research to quantify including:

- an increase in adoption of DR and smart appliances where a local CESCO monopoly supports additional investment in marketing DR to residents
- additional generation arising where a local CESCO monopoly supports additional investment in PV panels
- reductions in demand through energy efficiency measures, increased energy literacy, and motivation to change behaviour to reduce demand, as well as mutually supportive relationships within the community to enable demand reduction and demand response.

Examples of the CESCO model

Bristol Energy Network (BEN) members have several projects in development or deployed which are trialling aspects of this CESCO model. These include:

- a six-flat apartment block with community PV/storage and a 12 house development with community PV/storage - both sites use BNO⁶ standards and are operated by member controlled bodies, one is a Land Trust, the other a Charity.
- A 50 domestic home new build scheme with community PV and storage being developed to full ENA⁷/DNO network standards and operated by a member controlled company limited by guarantee.
- The Owen Square Community Energy project currently operates a heat pump-fed district heat network with Interseasonal heat storage and BNO power network across two community buildings. The next stage is to extend the scheme to 60 domestic homes by way of a new ENA/DNO compliant private wire network. The operator is a member controlled company limited by guarantee with an asset lock.
- Green deal for communities in collaboration with Warm Up Bristol, led by the Easton Energy Group
- Bristol Green Doors has a strong track record in encouraging retrofit by hosting open homes events
- The Bristol Energy Co-operative facilitates community investment in renewable energy, and is considering investment in storage and flexibility assets. It has invested over £9million.

Key barriers to scaling up

- Current projects are based on new-build and laying of new private wires for retrofit schemes, due to barriers to using existing infrastructure
- No clear mechanism exists for communities to take ownership (in the LV system operation sense) of local LV feeders back from the DNO where these have been adopted. In Germany, for example, local ownership of network assets is possible.
- The Electricity (Class Exemptions from the Requirement for a Licence) Order 2001 provides exemptions for domestic Distribution under 2.5MW in private wire schemes but policy papers, guidance and case studies are not well publicised.
- The Electricity (Class Exemptions from the Requirement for a Licence) Order 2001 provides exemptions for domestic Supply under 2.5MW but restrictions are unclear and onerous including on-supply restrictions and maximum resale price restrictions.
- Local flexible energy districts must operate by combining a mixture of regulations and licence exemptions, which would be better enabled by a specific licence exemption or licence type for these developments.

Recommendations

We recommend three actions in the following order:

1. Launch an innovation funding call, focusing on the development of flexible energy districts that partner between developers, the local community and the DNO. Work with Ofgem to ensure that each successful recipient of innovation funding is granted an individual supply/distribution/generation licence exemption as needed for their district.

⁶ Building Network Operator

⁷ Energy Networks Association

2. On successful evidence from (1), introduce legislation extending the The Electricity (Class Exemptions from the Requirement for a Licence) Order 2001 legislation to create a new 'community energy' Class exemption allowing local supply/distribution/generation (and balancing/settlement) for small (eg. <2.5MW) physical local supply networks.
3. On successful evidence from (2), introduce legislation creating a new Licence type for operating supply/distribution/generation (and balancing/settlement) in large (eg.citywide) physical local supply networks and ensure mechanisms are available to ensure local ownership of these networks.

Ultimately our recommendation is most close to the "Local Unit" model proposed by BEIS.

Innovative Local Authorities

In addition to a greater role for community energy groups, which we focused on in our description of CESCos, we believe that local authorities have a key role to play. Crucially, they could collaborate with community energy groups and network operators to replicate projects such as the CESCos described above, and have an enabling role for action by community groups, in addition to developing their own projects at a city scale. There are several examples of Bristol City Council collaborating with the Bristol Energy Network and its members.