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Future Energy Scenarios: Call for Evidence initial summary of results

October 2018

Initial summary of our Call for Evidence findings

In September this year we launched our first Future Energy Scenarios (FES) Call for Evidence. The intention of this consultation was to allow an alternative method for our stakeholders to engage with us and provide input into the development of the FES 2019.

We received over 100 responses from over 70 organisations and from these, we have provided an initial summary of the themes emerging from the Call for Evidence below. We have grouped these into topic areas for ease. We will take account of all responses received to the Call for Evidence, together with the feedback from our engagement events and other evidence gathered, to developed our scenarios for 2019.

Scenario Framework:

- 80% of respondents agreed to keep the scenario framework unchanged for FES 2019.
- Respondents expressed to see an evolutionary approach to the scenario framework rather than fundamental changes. This was based on difficulty digesting frequent fundamental change to the scenario framework and confusion when drawing comparisons with previous versions.

FES Publication Content:

- Respondents indicated a need to somehow incorporate a way to consider a 'best of all worlds' scenario for locational variation in, for example, heating.
- Respondents indicated more emphasis is required on a whole energy system approach.
- Respondents felt that the decentralisation aspect focussed too much on electricity, and they would like decarbonisation to consider wider factors like energy efficiency changes.
- Respondents would like to see more on scenario costings.
- Respondents would like to see more transparent stress testing of assumptions for example, what would 12 million heat pumps look like in practice and is there enough lithium for the amount of battery storage in our scenarios.

Industrial and Commercial (I&C) Energy Demand:

- The most common sub-sectors mentioned by respondents for improving energy efficiency tended to be commercial offices, retail and warehouses, with focus being on heating, ventilation, and air conditioning (HVAC), insulation and lighting.
- One recommendation referenced the use of high temperature nuclear waste heat supplied by Small Module Reactors (SMRs) across the I&C sector.
- With regards to the types of technologies likely to be successful in decarbonising I&C heating there was a broad spread of options suggested. The options most frequently suggested by respondents were electrification of heating through Air Source Heat Pumps (ASHP) and Ground Source Heat Pumps (GSHP), conversion to hydrogen as a fuel source and onsite renewable generation with coupling technologies.
- Respondents were in favour of de-carbonising gas, either through replacement of natural gas with hydrogen gas, or through biogas boilers/Combined Heat and Power (CHP). Respondents queried whether electricity could replace many of the existing high temperature processes.
- Respondents expressed the need for better use of I&C wasted energy, with heat often referenced for developing heat networks.
- Respondents felt the time of use and type of heat delivery will be a big driver in terms of the decarbonisation technology chosen. Clustering of I&C to help with sequestration of carbon was also suggested.

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Demand Side Response and SMART:

- Respondents expressed uncertainty around the current amount of Demand Side Response (DSR) that is load response only. However, most respondents were unsure of the correct approach to take.
- Most respondents commented that the future of DSR will focus on load response and storage. However, there were some respondents who commented that onsite generation will continue to highly contribute to DSR (mainly in the form of Photovoltaic onsite generation). Respondents also commented that fossil fuel onsite generation could decrease due to reforms to networks charging arrangements.
- Respondents indicated that new technologies/software are being developed or already available for the residential market. In addition, that there are opportunities to include electric vehicle (EV) charging and electric heating (both direct electric and heat pumps).
- Most respondents agreed that the framework approach on DSR is appropriate and agreed that our choice of engagement levels in each scenario was about right.
- Views were however not unanimous with several respondents noting that there continues to be great uncertainty around key drivers such as smart technology deployment and consumer engagement. Lack of switching supplier was given as a reason why engagement in DSR may be low.
- Economics and costs were thought to be major drivers for DSR, although when assessing potential savings there is uncertainty around how much load can be shifted compared to how much can just be avoided via greater energy efficiency.

Energy Efficiency:

- Respondents comment that improving energy efficiency in heat is extremely challenging and requires a well-designed framework to succeed, particularly for Industrial & Commercial.
- Respondents commented that improving efficiency of electrical appliances (particularly residential) to 32% is possible, but requires further legislation.
- Several respondents commented that clarity is needed on the EU 32% and the 20% target set by Department for Business, Energy & Industrial Strategy (BEIS).

Domestic Heat:

- Diverse views from respondents on how appliance prices could evolve with growth in market share. Answers ranged from a 30% reduction in costs when installation rates have increased by an additional 110k per annum, to a slight increase in costs as labour and materials become more expensive.
- Respondents favoured home insulation over higher appliance standards as a means of improving energy efficiency.
- Many respondents felt that most appliance efficiencies are close to their thermodynamic or electromagnetic limits already. Others noted that hybrids could improve heat pump efficiency by ~25%.
- Respondents felt that decentralisation is still not clear as a concept and no single theme emerged on how decentralisation applies to thermal efficiency.
- Respondents suggested that an assumption of one heating technology per home is adequate to simplify modelling, although many homes are thought to use secondary heating sources.
- Respondents were unsure as to how the split of gas and electricity use in a hybrid heat pump will play out annually. The comments from respondents indicated the general view was that gas may have to supply slightly more than the 10% we assume for space heating, whilst electricity can play a greater role than our 25% assumption for water heating. Respondents were not convinced by the advantages of retrofitted hybrids over off-the-shelf units with reliability being the biggest concern.

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- Most respondents did not agree with the assumption of same hot water thermal demand regardless of housing segment.

Transport

Hydrogen for heavy vehicles (HGVs/Buses):

- A large proportion of respondents agreed that transport is a good use for hydrogen with varied responses on potential use in private cars.

Autonomous vehicles uptake:

- Respondents indicated uncertainty on autonomous uptake.

Whole Energy System:

Hydrogen:

- Respondents recognised there is a role for hydrogen to play in decarbonisation.
- Some respondents supported electrolysis over Steam Methane Reforming (SMR).
- Respondents commented that hydrogen blending should be considered within the scenarios.
- Respondents suggested a mixed scenario which includes both SMR and electrolysis is preferred.

Biomass and Biogas:

- Some respondents would like to see the split between domestic source and imported source.
- Some respondents had concerns in relation to the sustainability of the feedstock.
- Respondents commented that Biomass Energy with Carbon Capture and Storage (BECCS) is not included in any scenario but could be considered as an option to achieve carbon targets.
- Some respondents would like to see clearer split among the volume of biomass going to each sector.

Additional Technology:

- Respondents felt District Heat should be projected as larger scale rather than decentralised.

Electricity Market Modelling:

- The responses presented a diverse range of views that potentially reflect the uncertainty in the future generation mix for Great Britain.
- While most responses advocated continued growth of solar and wind, there were differing views on the technologies that will most likely complement this generation in terms of providing both reliable capacity and flexibility in supporting intermittent generation.
- The responses generally felt that a market with high levels of renewable and low carbon generation could be delivered via a combination of existing mechanisms (e.g. subsidies, capacity market). However, there was recognition that the market needs to ensure that all technologies compete on a level playing field and that appropriate price signals are needed to recognise both flexibility and the cost of using energy when renewable output is low.
- Respondents commented that higher levels of intermittent renewable generation will enable growth in electricity storage and vehicle to grid, although long periods of low wind generation would require longer duration or seasonal storage, which require both technological and market development.
- In addition, the responses also suggested that we should consider: how operability impacts our scenarios; how network investment solutions could support the deployment of renewable generation and the need for further debate on the merits of greater decentralisation.

Round Table Topics: Questions for your consideration

Gas Supply:

Hydrogen Blending:

- There was significant support from respondents for including blending within the scenario with a minority against.

Shale Gas:

Opposing views provided from respondents on whether shale gas should be in the faster decarbonised scenarios.

Green Gas:

- General support from respondents for the approaches adopted for Green Gas. Some additional suggestions received for other technologies to be considered.

Liquefied Natural Gas (LNG):

- Most respondents felt it would be the medium term (3-10yrs) before we see a return to higher LNG levels. Several global influences were stated some which would increase LNG to us and some of which wouldn't. This feedback continues the uncertainty theme in this area.

UK Continental Shelf (UKCS):

- Most responses agreed that the UKCS would deplete within the range stated in FES 2018. A few responses suggested this would happen post 2050.