

# Shaping FES 2020

## Call for Evidence: summary of stakeholder feedback

### Introduction

During September, as part of our autumn engagement programme, we ran 'Shaping FES 2020'. This Call for Evidence was an online consultation that offered the opportunity for stakeholders to provide us with their insight and evidence on various subjects for FES 2020.

Below are the summaries of feedback that we have received for each section of the consultation.

### FES publications

In the publications section of the Call for Evidence we asked for feedback on the range of publications covering their content, format, style and accessibility.

- The full range of publications continues to be valued by stakeholders. Stakeholders appreciate having a concise summary, in the form of FES-in-5, alongside the more detailed FES document and data workbook.
- Most stakeholders strongly supported our proposal to discontinue the printed copies of the full FES document to reduce our carbon footprint, and also supported a move towards the more accessible format used in our Summer and Winter Outlook publications.
- There were many valuable suggestions made in relation to additional content for the publications, and ideas for spotlights. Stakeholders are asking for more information on the following topics:
  - net zero
  - hydrogen
  - energy storage
  - economy-wide carbon emissions
  - generation backgrounds
  - European assumptions
  - the changing use of energy explored at regional level
  - greater visualisation of future energy systems.
- Stakeholders would value increased granularity of data at a consistent level across modelled outputs and would like to see more sensitivity work in the publication. The transparency that the supporting data provides is valued, and greater visibility of the assumptions that underpin the data would be appreciated.
- Comments were also received requesting additional information relating to costs and consumer benefits across the scenarios.

### FES engagement

In the engagement section of the Call for Evidence we asked for feedback on the method of communications that we use, the location of our engagement, how useful are our engagement types and if a week is long enough to digest the FES document prior to the conference.

- We received overwhelming support for using email for our communications, closely followed by the ESO website. Social media as a means is of less importance, this includes Twitter and LinkedIn.
- With regard to the location for our engagement, the preferred venues are those in London, followed by Warwick and Birmingham.
- For FES 2019 we held our conference one week after we had published the document to allow stakeholders time to digest and read before attending. From those responses we received, more than half believe that a week was adequate time to digest the document.
- With regards to how useful stakeholders find our engagement, the most useful were the FES launch events and then the autumn workshops.

## Scenario Framework Design

In addition to the Call for Evidence, we also held workshops to gather energy industry feedback on potential solutions for the FES 2020 Scenario Framework and gave presentations at industry events and seminars. Here are the main points from these discussions.

- Retaining consistency of scenarios between years is valuable but the 2019 framework is no longer suitable as
- Decarbonisation target is now net zero and decentralisation is no longer most useful variable to flex to explore uncertainty.
- The 2-axis framework is useful to structure and articulate the scenarios, making the content more accessible
- Clear support to include a scenario that doesn't meet the current 2050 net zero target, as well as agreement that there is benefit in also exploring whether net zero could be reached earlier than 2050.
- Decarbonisation of heat is the biggest challenge in reaching net zero emissions and the framework should ensure that different ways of achieving this are explored.

The Call for Evidence then asked for insight on a number of different areas of energy, we have grouped these into Electricity market modelling, Energy Demand, Gas Supply, Whole System and our modelling approach.

### Electricity market modelling

Based on the answers provided in the Call for Evidence, there is support to include higher ranges for several technologies, in particular thermal CCUS, wind and nuclear. These higher values are likely to be as a result of the new net zero carbon targets as the ranges were provided within the context of a net zero compliant scenario and are wider than previous feedback. There is also wide support for use of power generation from hydrogen and negative emission bioenergy CCUS (BECCS) with a net zero scenario.

A wide range of technologies were proposed to provide reliable back-up capacity to meet demand when weather conditions are not favourable for renewable generation. This included nuclear, storage, vehicle to grid, interconnection and demand side management. Furthermore, several respondents noted that gas turbines or reciprocating engines could be used if the fuel is sufficiently low carbon that the emissions could be offset by BECCS. For example, hydrogen fuel was suggested several times and this is something we will look to explore further in FES 2020. Government support, a clear policy framework and some form of subsidy were seen as important to delivering the power generation needs to meet the net zero target.

Regarding distributed generation our stakeholders generally expressed a very weak outlook for small scale wind (sites of less than 1MW total capacity) due to high capex costs and planning restrictions. Respondents were more positive around solar PV, with typical ranges being within the 20 – 65 GW bracket for a net zero compliant scenario. There

were some concerns raised over factors which may restrict growth, with removal of network constraints, technological improvements and building regulations that mandate solar PV on new build properties seen as likely to be the big drivers of significant deployment. Many respondents noting that high growth would require solar to be deployed hand-in-hand with developments in smart charging, electrolysis and energy storage.

The Targeted Charging Review and review of network charging were often mentioned as policies which may shift the balance between growth of distributed generation and growth of transmission connected generation.

Our stakeholders expressed mixed views about the development of small modular nuclear reactors with one third believing these will be deployed within Great Britain, one third not and the remaining one third not knowing. Likewise we had a split of responses to the question about whether we should consider higher levels of marine generation for decarbonised scenarios (our FES 2019 range is 1 to 4 GW).

For full commercial operation of carbon capture utilisation and storage (CCUS), 2035 was the most frequently expected date, although we did receive the full range of responses from 2025 through to never. In regards to financing projects many respondents noted that subsidies of some form (strike price or RAB model) or a high carbon price would be required and that coupling CCUS power generation with production of hydrogen from methane improves the business case by allowing for a higher load factor / baseload operation.

## Energy Demand

When considering Vehicle-to-Grid (V2G), the range of capacities stakeholders expect to be available by 2050 is wider than that which we modelled for FES 2019. Many stakeholders expect to see a lower capacity available than we modelled in any of our scenarios. Several stakeholders, which included all the gas networks that responded, indicated that they expect to see a significant number of biofuel heavy goods vehicles (HGVs) on the road 5-10 years before we see a significant number of hydrogen HGVs on the road. In FES 2019 we assumed that gas fuelled HGVs would not act as a stepping stone in scenarios with significant numbers of Hydrogen HGVs. Stakeholders broadly agreed with our assumptions on both when we'll see significant numbers of hydrogen HGVs on the road and when electric cars will reach cost parity. For non-road transport, stakeholder views on when they expected to see different fuels in the aviation and maritime industries reached no clear consensus. The range of responses given reflected the large uncertainties surrounding these industries.

In general, electrification tended to be the most popular form of I&C decarbonisation, however heat seems to pose the greatest challenge. There was mention of Hydrogen as a solution for high-temperature industrial processes whereas hybrids tended to be favoured for space heating. In terms of the feasibility of meeting the BEIS 2030 target (reduce energy demand by 20% against 2015 levels) there were mixed views, but with many suggesting insulation is a potential area to focus improvements. There were also a couple of references to the growth of datacentres as significant energy users.

For gas demand, on the use of unadjusted weather for calculating 1 in 20 peak, the majority of stakeholders agree with the assumption although more evidence is needed from detailed analysis.

On the proposal to use EMR derating factors as proxies for load factors for peak 1 in 20 gas demand forecasting, most agree it's a sensible approach.

On how much thermal storage we should assume in buildings, there are mixed views. Respondent with the most knowledge of the subject think 25% is probably too high given physical restrictions and the potential for disruption. There's however suggestions to consider a range of outcomes for future uptake. There was general agreement that this is not yet possible with current technology for thermal storage to meet all winter day demand.

Respondents see storage heaters as a potential solution in hard-to-treat buildings although there are still huddles to overcome such as poor record of performance and thus low consumer acceptance.

There are mixed views on whether currently installed heat networks are truly low-carbon on account their high losses and reliance on natural gas. Views diverged on the barriers to uptake of heat networks: heat market deregulation, difficulty of retrofit, capital intensity, lax planning laws, lack of regulation to protect consumers, etc. The common barrier is however the high costs.

Respondents agree heat pumps should be mapped only to well-insulated buildings as current evidence shows this is the most optimal option/package for this technology.

There's near unanimous agreement that heat options would differ in performance depending on the region based on factors such as ambient temp, urban/rural profiles, off grid proportion, geothermal resources, proximity to waste heat, housing stock, availability of excess generation for hydrogen production, space availability.

### **Gas Supply**

Stakeholders believe that there is general oversupply in the LNG market at the moment but demand, particularly from developing countries, will continue to increase. There is consensus that investment will continue to be needed to avoid supply tightness in the coming years. Asia continues to be the biggest market, and respondents agreed that Europe will continue to be the destination of excess LNG, especially as more US LNG comes to the market. Feedback informs us shipping costs may also continue to determine where LNG goes.

We received opposing views from respondents on whether shale gas should be developed further. Environmental and public concerns, on top of regulatory tightness is or could be holding back development. Some stakeholders believe it should be supported fully to achieve security of supply, and at least one net zero scenario in FES 2020 should include UK shale.

Most respondents believe the chances of importing hydrogen from other countries is slim, as bulk production and transportation of hydrogen is hugely dangerous and probably won't make it on safety grounds. Stakeholders believe that the density versus natural gas would mean that it would take either much larger ships or more journeys which would be hugely expensive and wasteful. Bringing in the gas and then reclaiming it would be the preferred option. Other views believe it may be possible but quite a long way off yet.

Most respondents agreed that a support mechanism would be required for new storage to be viable. Storage in the form of LNG tankers sitting offshore could be an option. Hydrogen would also need to be considered as storage in the future.

### **Whole System**

There are varied views from stakeholders in the volume on Hydrogen that could be used for heating ranging from not feasible to up to 70% of households.

Nearly all responses thought that electricity would be over 70% of total energy consumed and over half of these believed it would be over 80%. There was a small number of responses that thought the percentage would be a far lower number, around a third, and would be more balanced across fuels.

For those responses that thought net zero was achievable by 2050 there was a slight weighting for the transition to be slow until 2030 then to accelerate out towards 2050. The rest proposed a steadier transition through the 2020's and out to 2050

There was a wide range of feedback on the time scales on reaching Net Zero. These responses ranged from a small percentage believing it is not possible to be hit to a larger percentage believing that the date could be brought forward. The largest support was for reaching net zero in 2050.

Key Drivers for net zero:

- Government Policy and funding was highlighted as the biggest key driver for achieving Net Zero.
- Domestic heat was another key issue that needs to be tackled to reach net zero.
- Other key drivers mentioned were EV's, CCUS, infrastructure, carbon tax, hydrogen and renewables

### **Modelling Approach**

Specific comments were received on the two Modelling Approach questions and these make a number of suggestions for areas that we can explore in future editions of FES. The themes that can be extracted from the answers received are:

1. Increased regionalisation of modelling
2. Consistency of starting point between scenarios e.g. large changes in generation or demand in early years
3. Inclusion of costs and economic modelling in the results presented

New areas for modelling that were identified in the comments were to look at how aviation and shipping demands could change under the scenarios studied along with the impact of changing population demographics on demand.

**Next steps**

We will be continuing to analyse the evidence submitted along with further engagement with stakeholders. In our 2020 Stakeholder Feedback Document, we will reflect on the evidence received and provide further information on what we are planning to take forward for FES 2020.