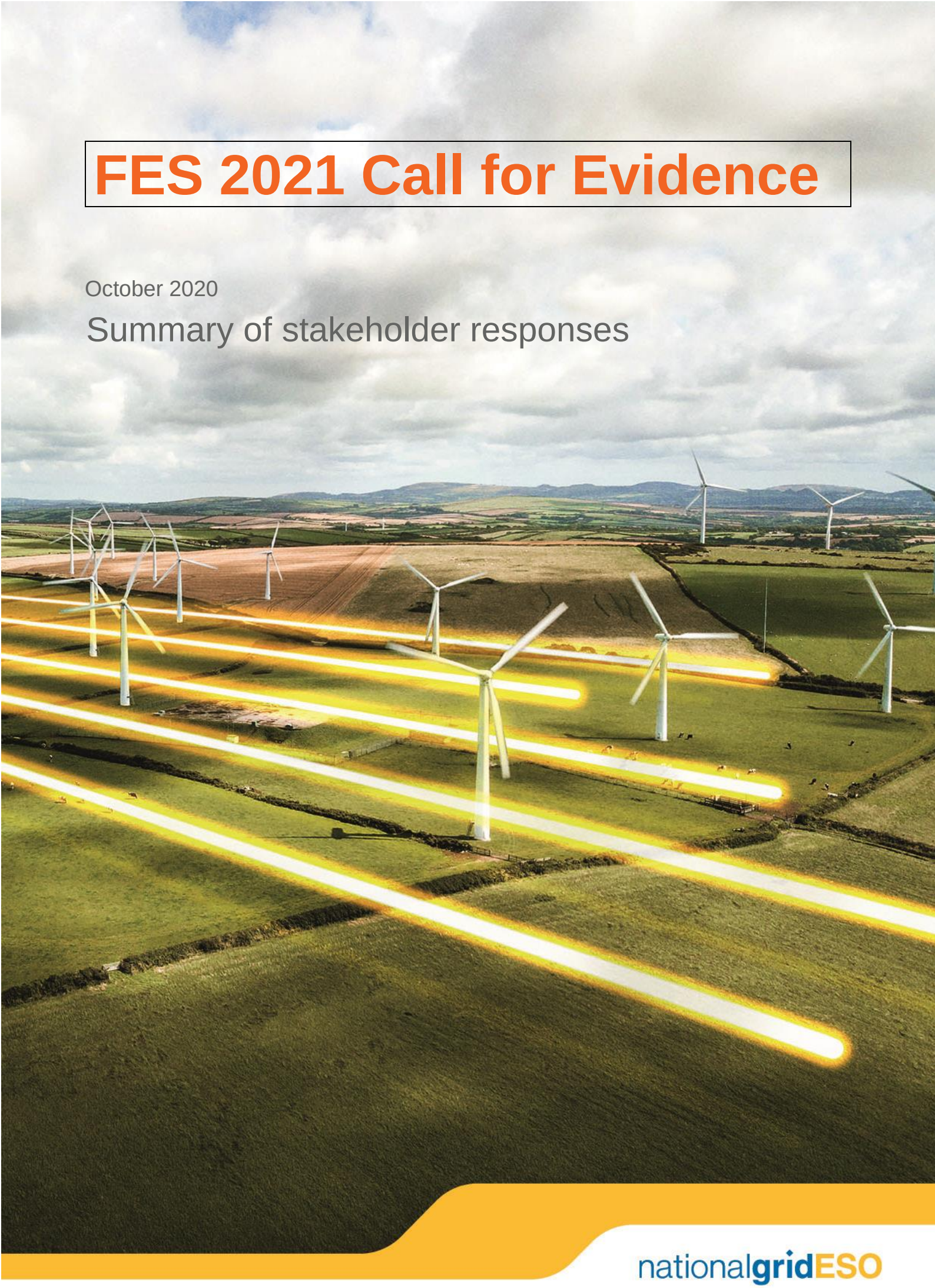
FES 2021 Call for Evidence

October 2020

Summary of stakeholder responses



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Introduction

During September we ran the FES 2021 Call for Evidence, an online consultation providing the opportunity for all stakeholders to share their insight, research and evidence with us on various subjects. The Call for Evidence closed on the 28 September and is just one element of our engagement programme for FES 2021. The feedback we have received will be considered alongside other engagement that will take place later this year.

Below are summaries of the feedback that we received for each area of the survey. How we take this forward for next year's scenarios will be documented in the FES 2021 Stakeholder Feedback Document which we'll publish during February. If you have any queries, then please contact us at: FES@nationalgrideso.com.

Contents

Communications and engagement

FES 2020 launch

The FES 2020 virtual launch event was very well received, with stakeholders noting that the event:

- ran smoothly;
- contained good content;
- was well structured;
- increased the number of stakeholders that could attend;
- reduced the cost of travel; and
- ensured that safety of stakeholders.

Running the launch over 3 days and allowing reading time was also highlighted. Due to a virtual launch, stakeholders commented that face-to-face interaction, networking with speakers and delegates and having access to multiple experts is very much welcome during normal circumstances. Some stakeholders raised comments for us to consider for next year:

- Improved and longer Q&A sessions;
- More time between each session;
- Greater interaction between delegates.

Methods of communications

Stakeholders have told us that the most popular methods of communication are email, social media, FES newsletter and website. Webinars, and specifically YouTube and LinkedIn, were also suggested as appropriate methods for us to communicate with stakeholders.

FES Documents

Overall the suite of FES 2020 documents was well received, and positive comments were provided. The new interactive format was well received, defining where changes are needed and the differences between consumer and system view. The structure of the document allowed readers to see how each sector fits together.

Some stakeholders found it difficult to compare FES 2019 to FES 2020 due to year-on-year changes and suggested that clearer links on how FES is driving central policy, target setting and investment on a national scale would be beneficial. Some stakeholders experienced issues with the interactive version and the structure of the document was not easy to follow through the document. Printed copies would be appreciated.

Specific feedback was gathered on individual documents:

- *FES-in-5*: a good, helpful document sharing key outputs and circulated widely in organisations. Some commented that the interactive version did not work for them and were expecting the document to indicate when each scenario would achieve net zero.
- *Scenario framework document*: difficult to compare FES 2019 to 2020 due to differing formats of the framework, good to have clear documentation of the assumptions and useful when comparing against other projections. We should continue towards making the document a holistic evaluation of aspects of all plausible ways to get to net zero.

- *Regional breakdown:* a useful document for wider understanding of local areas, however a better explanation of how the document should be interpreted would be helpful. It would be beneficial to include modelling of GB transmission network under the Consumer and System Transformation scenarios
- *Data workbook*: a useful document that enables comparison with own organisation sources. Different demands used in report and workbook were confusing and it would be good to explicitly define the different demands and highlight the differences. It would be helpful include ES2 in from FES 2019 making it easier for detailed analysis and we should consider making changes to ES1 to become more user friendly, including all values are reported for all existing classes for all scenarios.
- *Modelling methods:* a useful transparent document about how the outputs were arrived at.

Scenario framework

The majority of respondents supported retaining the scenarios from FES 2020 for FES 2021 with year-on-year consistency being a key theme.

Of the few respondents who didn't support this, reasons ranged from the inclusion of Steady Progression being irresponsible to Leading the Way being over-optimistic. There was no clear trend in these responses to suggest a single change for FES 2021 that would be supported across our stakeholders.

Therefore, based on this feedback our initial proposal to retain the FES 2020 scenario framework for FES 2021 is unchanged.

Net zero

This topic touches on areas considered in more detail in the following sections but high-level trends from the responses are captured here:

- In terms of how we flex non-energy aspects such as land use changes or aviation across the scenarios, the majority of respondents agreed that our existing approach was appropriate. This was in part down to an acknowledgement that the interactions between energy and non-energy aspects such as land use are difficult to model. However, there was interest in this area and so it could be something that is considered in a sensitivity.
- A clear majority of respondents stated that our Steady Progression scenario represented a credible minimum progress on decarbonisation (i.e. not too ambitious or too conservative). On the earliest date that net zero could be achieved, there was a balanced mix of responses with some saying that it was difficult to bring the date earlier than 2050 and others saying that it could potentially be as early as 2040.
- On the impacts of COVID-19 on the future of energy, the main feedback was around the uncertainty it creates. Several respondents noted that there are both short term (e.g. an economic blip) and long term (e.g. changes to behaviour) impacts and that these can be considered separately.
- On negative emissions, there was a lot of useful information to explore which may require further engagement. There was support for the use of BECCS as well as other negative emission approaches but there was a clear trend on the importance of sustainable biomass and regulation of the whole carbon lifecycle.

- In terms of carbon accounting, there was agreement that the current approach was appropriate although other approaches were highlighted as well as global initiatives that we should be aware of and reflect where appropriate in FES 2021.

Industrial and commercial demand

Many stakeholders expressed concerns over the rising energy prices in the UK. The UK has set more ambitious climate change targets compared to other countries and therefore most stakeholders believed that it is unreasonable to assume that there is no carbon price differential across countries. Some would prefer to see some degree of offshoring in the scenarios to reflect the difficulty of UK industry to remain internationally competitive while supporting decarbonisation. Others would prefer to see policies included in the scenarios which help to ensure industry can remain competitive, such as carbon border adjustments or higher taxes on shipping. Stakeholders also voiced their concerns that the effects of COVID-19 have the potential to accelerate offshoring of industry and some companies may chose not to restart production in the UK.

A strong area of agreement amongst the respondents was that policy needs to be put in place as soon as possible in order to support the deployment of fuel switching technologies. Due to investment cycles, many stakeholders believe that a policy framework must be put in place during the early 2020s. There is currently little incentive for companies to invest in these expensive technologies. Such policy may include targeted funding for sectors, for example mirroring the Clean Steel Fund, or increasing carbon taxes. Stakeholders also stressed the importance of policy targeted to increase investment in carbon capture and hydrogen technology. While many see the potential for a green recovery, others worry whether the coronavirus pandemic will delay investment in such technology.

Heat in buildings

On managing heat, recurring themes were that energy efficiency is key, measures taken need to pay for themselves, costs and retrofit are challenging, and EV charging also needs to be considered. The storage of heat and economy 7 type markets were also noted as being important.

Most respondents thought that heat pumps would be unable to meet peak heat demand on their own and that significant insulation (similar to Nordic countries) or some form of backup heating would be needed to meet peak heat. All respondents thought that heat pumps would not be able to meet hot water demand on their own and some form of hot water creation system would be needed. There was a range of views on our insulation assumptions, with some saying that high levels were desirable and others that to get to high efficiency levels would be extremely disruptive. Government policy is seen as key in this area.

There were mixed views on the effect of COVID-19 on working patterns and therefore heat demand in GB, with no consensus. The longer-term economic impact of COVID-19 is thought to be due to potential impacts on take home income. Some organisations have kindly offered to share data with us to help assess the impact.

Some respondents thought that a ban on gas boilers would be unnecessary if hydrogen or biomass were to be burned instead, and there was concern on the lack of alternatives to the gas boiler (re: affordable warmth and costs of heating in general), It was agreed that fossil fuels cannot be burned in a net zero future. Some respondents stated that gas boilers should be banned in order to meet net zero and others highlighted the impact a ban would have on the requirement for additional investment in the electricity industry.

Some stakeholders had little confidence in the concept of pairing heat pumps with heat storage, due to costs, lack of a market or viable commercial proposition, and technology readiness.

Overall electricity demand (not including electric vehicles)

Most respondents thought that the annual and peak demand ranges are reasonable. There was a broad range of views on the energy efficiency assumptions in FES 2020, but most stakeholders agree with our assumptions. Most stakeholders believe there needs to be legislation to improve energy efficiency.

Transport demand

Most respondents agreed there will be a short-term impact of COVID-19 on travel patterns. There was also a broad range of views on the longer-term impact of COVID-19 on travel patterns e.g. home working, public vs private transport but no overall consensus.

Stakeholders were largely in favour of our revised approach to the modelling of smart EV charging. There were two comments on our smart charging assumptions which indicated it might become a default option, and that engagement levels might be higher.

One respondent noted that the modelling underestimated the energy required for EVs, noting evidence showed EVs currently use more energy than our sources showed.

There were two strongly opposing comments on our Vehicle to Grid (V2G) modelling approach. One view being that evidence shows consumers become used to such technology, will adopt to it easily and we should be showing a higher take-up. Another being that consumers would not waste their money on V2G and so our analysis was irrelevant.

There was a broad range of views on modelling of “automated self-driving cars”, but stakeholders said there is generally insufficient information on this potential societal change.

Most stakeholders agreed that short distance maritime and aviation transport could be electrified and needs to be decarbonised using a range of fuels. Comments indicated nuclear powered ships might also be considered for bulk, long distance freight.

Most stakeholders believe hydrogen will be used in rail transport alongside widespread electrification, and that hydrogen for rail should be in more than one scenario. Several stakeholders stated that biofuels could have a long-term role in transport.

Electricity generation

It is evident from the survey results that our stakeholders strongly feel that wind energy, particularly offshore wind, will be dominant by 2050. This would then be supported by solar and nuclear power. While storage isn’t considered to be the most dominant technology type by 2050, it was repeatedly mentioned as a possible 2nd, 3rd or 4th most dominant technology type. This potentially reflects how stakeholders see it as important to support renewable energy at times when there is no wind or solar generation.

For technologies such as CCGTs or interconnectors, it can be seen that while a number of stakeholders feel these technology types will also be relevant come 2050, it is not to the same extent as wind, solar and nuclear power with storage helping to meet demand at peak times/when it’s less windy and sunny.

Several stakeholders expressed the importance of gas as a means to cover for renewable generation when it is unavailable. This meant that while gas isn't considered as likely to be dominant by 2050, it is considered one of the most important technology types in the next 5-10 years as well as the present day.

The four technology types discussed the most as becoming commercially viable by 2050 are: storage (in various guises), hydrogen (also in various guises), offshore generation (wind and tidal range) and small nuclear reactors.

While opinions were mixed on whether the capacity ranges for different technologies were too narrow or not, there were several independent comments stating that noticeably more offshore generation would be needed than described in the FES. Some of the responses discussed needing more capacity from thermal plant (namely gas and nuclear) or going into more depth on the consequences of that capacity coming offline in the next 10-15 years.

There was also feedback about breaking up how marine technologies are presented (more granularity as to types), as well as questions about whether hydrogen is a fuel source and interconnectors and storage count as generation.

There is a wide consensus that wind (primarily offshore but onshore as well) and solar power will dominate the electricity generation market in the next 5-10 years. This is due to ramped up installation of these technology types supported by government policy (e.g. CfDs), while a large amount of existing traditional plant will be retired. Where there is less agreement is whether this is a good thing or not. Some stakeholders are wholly positive about this based on the benefits to reaching net zero using increased wind and solar. Others are concerned about their reliability, especially during winter, as well as their potentially high cost.

In terms of thermal plant, there is most uncertainty and disagreement about the role nuclear plant could/should play in the future generation mix and electricity generation market. This will obviously be dictated in part by the stakeholder's position in the industry, but there is a clear divide where some feel it'll be very important, while others think it's not viable at all.

Responses on the topic of how the changes outlined would help reach net zero were heavily mixed with little consensus among stakeholders. Answers stressed the necessity for either the replacement or decarbonisation of gas plant in order to achieve net zero. This is in tandem with increased maturity of renewable energy supported by upgrades to the transmission network with fewer new connections being point-to-point. There was also a focus on how Government needs to drive the UK towards net zero through policy on renewable (and nuclear) generation as well as educating the public on climate change and net zero.

Many stakeholders showed interest in being involved in the engagement plan for FES 2021. They also offered research which could be wrapped into the modelling for FES 2021.

Bioresource

There were diverse responses from stakeholders:

- some stakeholders believe the optimal use of bioresources is BECCS as the negative emissions from bio-resources should be prioritised in reaching net zero;
- other stakeholders believe bioresources should be provided to sectors having no alternative options to decarbonise;
- some responses address the sustainability of bio resources; and
- some the importance of biodiversity issues when considering this question.

All the stakeholders answering the question believe that import of bioresources should be minimised, and the range of the import level in our scenarios should not be pushed further. The reasons given are around the complexity of sharing global bio resources and the sustainability factors that need to be considered for the availability of bioresources.

Regarding the land available for growing energy crops, there was no quantified answer for this question as it's very complex. On a general level, the responses from stakeholders indicate that land should be planted in a way that encourages biodiversity and sustainability alongside being available for energy use. However, they also said that other competing factors such as food crops, farming, housing, scale of onshore wind/solar generation should be considered as well.

Gas supply

We received opposing views as to whether shale gas should be used in a net zero compatible scenario. Some stakeholders believe the use of shale gas in a net zero scenario is compatible if objections can be overcome and the moratorium lifted, particularly if it can be combined with CCUS and used to produce blue hydrogen. Furthermore, if objections can be overcome, some believe shale could be produced locally, therefore making it essentially 'lower carbon' than imported LNG.

Others, however, believe that the extraction of a fossil fuel would be a move away from net zero targets and therefore should not be considered in a scenario that is net zero compliant. In addition, production of shale would be difficult due to unproven technology and a number of environmental impacts and risks, including effects on seismicity, countryside and the local community.

In response to the benefits of using green gas over other low carbon sources of energy, most stakeholders were in favour of using this source of gas. One of the main benefits is that, combined with CCUS, it can deliver negative emissions, which are needed to achieve net zero, whilst it can also be produced locally and can be stored in large quantities. Feedstock used to produce green gas will always be available and we already have the infrastructure in place that can handle gas molecules, therefore money can be saved in having to install new networks and systems, keeping any changes to a minimum.

Some stakeholders did point out some drawbacks to using green gas, citing the current costs and therefore financial viability of the technology required, which continues to deter large scale investment and movement in this area. Without government support, opportunities for green gas will continue to be hampered, resulting in long timescales and a delay in moving away from existing fossil fuels.

Most respondents believe it would be viable to export low carbon energy, such as hydrogen, for the future of Great Britain's economy. With the development of high levels of hydrogen from UK facilities, interconnectors would provide an ideal option as a key route to European markets to create additional revenues for domestic production.

Other stakeholders felt interconnectors would need to be re-fitted significantly to deal with hydrogen in higher proportions than is currently allowed and they should only be used as a last resort. Interconnectors are commercial organisations and as such, live on price differentials, and this is unlikely to change. For interconnected markets to be optimal, they would need to maximise the use of renewable energy, and commercial pricing may not be compatible with that. This could see interconnector prices rise.

Ultimately, many respondents noted that a lot will depend on what our neighbouring countries are doing, many of which may have divergent carbon policies that may or may not make interconnector use for hydrogen a viable option.

System flexibility

A range of technologies have been suggested by stakeholders as options to provide reliable back-up capacity when renewable generation isn't active. The two technologies mentioned the most are CCGTs/OCGTs and battery storage. Those stating gas as the main back up point to its availability and the fact it provides inertia to the system. Battery storage is seen more as an option in the future, with its key advantage over gas being the fact its low carbon in comparison. Other suggestions included: pumped storage, tidal range, hydrogen gas turbines, EV batteries, interconnectors, demand side response and nuclear plant.

Many respondents stated that commercial vehicle fleets will deliver less flexibility for the network than residential EVs, with several expressing uncertainty due to V2G's dependence on charging arrangements and incentives provided by the Government. The main driver behind the thought that commercial EVs won't provide flexibility through charging is that they make profit for their owners by being on the road. Furthermore, to protect the battery life of their vehicles, it is stated that commercial fleet owners may be further disincentivised to provide flexibility to the network through charging.

Views on the scenarios we presented on system flexibility include asking for involvement of aggregation, considering the limits of system flexibility and green ammonia. There is discussion on the need for gas storage to provide flexibility, with concerns that a short-term focus on interconnectors and LNG could see gas storage close before it's needed in the long term.

Hydrogen

There was around the same number of stakeholders that did not believe blue hydrogen was necessary to enable green hydrogen, as there were that agreed with the statement. Of those that agreed, stakeholders suggested that blue hydrogen is required to scale up initial hydrogen production in order to develop the market and a hydrogen economy.

Several stakeholders believe that the market can start developing in the next 10 years, but progress is expected to be slow, with government incentives required. Stakeholders were largely unclear regarding who will import/export hydrogen. However, European countries are expected to play a big part, particularly Germany, who stakeholders expect to import hydrogen. Australia and China were identified as potential key exporters. Some stakeholders also suggested the UK could be an exporter due to its wind and storage capacities.

Several stakeholders do not expect a hydrogen economy to develop successfully with the production technology and scale of production expected to not develop quickly enough.

Stakeholders find it difficult to forecast the build rate of electrolysers but agree that it needs policy support, incentives and a reduction in build cost. Those that stated a build rate quoted ambitions for 1GW/y.

Many stakeholders did not believe there were other production technologies worth mentioning. Of those that did, using nuclear power to produce hydrogen via electrolysis was commonly mentioned.

The biggest barrier for hydrogen storage identified by stakeholders is cost. This was closely followed by the safety regulations required for storage and whether the general public will accept it as safe. Stakeholders also identified the need for a solid regulatory framework and clear rules of ownership, access etc for sites.