
MAINSTREAM
RENEWABLE
POWER

2050 Pathways team
Department of Energy and Climate Change
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DECC 2050 Pathways Analysis Call For Evidence

Mainstream Renewable Power Response

Mainstream Renewable Power is a leading renewable energy company developing renewable energy projects across several continents. The company expects to be a major provider of renewable capacity for the UK and has a development pipeline in excess of 5,000MW.

We are developing onshore wind projects in North America, South America, and South Africa. In the German North Sea, we are developing the 1000 MW Horizont project.

In the UK, we are developing two large offshore wind projects. In Scottish territorial waters we are developing the 450 MW Neart Na Gaoithe project. Additionally, through the SMart Wind consortium, we are developing the 4000MW Hornsea Round 3 zone with our partners, Siemens Project Ventures.

We welcome the considerable and detailed amount of work which has been put into the 2050 Pathways Analysis so far. In addition, we were pleased to see DECC engage with stakeholders both in the development of the "draft pathways" and on the call for evidence on the interim results.

In order for the 2050 Pathways analysis to be most effective, its final results must be integrated across government in order to provide a common evidence base for policy development across such diverse areas as energy security, climate change, and competitiveness. Furthermore, the devolved administrations must be fully involved in the process and accepting of the results.

Other EU member states are considering their own pathways analysis. Where relevant, they should be made aware of the UK's approach to this exercise, and its results, in order that all countries can discover best practices and incorporate developments in neighbouring countries. For example, the North Sea Offshore Grid Initiative will not only promote offshore wind but also more fully integrate relevant countries' energy markets. This needs to be incorporated in the relevant member states 2050 pathways analysis. When complete, this document will be key to lobbying the EU Commission for coordinated action on renewable and network reinforcement and should be used to the benefit of the UK.

There are a number of positive aspects of the 2050 Pathways Analysis which we feel contribute to its effectiveness:

- The bottom up approach whereby there is detailed interaction with the sectors/stakeholders which make up the various elements of the analysis.

- There are no hard constraints on the ambition of each sector. This allows for innovation, technological development, and societal change to facilitate efforts to decarbonise.
- There are no cost constraints on each sector. By not including this constraint, it is easier to demonstrate what level of ambition for each sector is feasible. This of course does not preclude cost considerations from playing a role in determining which pathway is best suited for the desired objectives.
- A number of pathways conclude that the 2050 targets are achievable, albeit with contributions from all the major sectors.
- There are some common themes which emerge from a number of the credible pathways. These themes should drive the direction of further analysis, and ensure that key decisions are taken in an informed and timely manner.

We have some concerns however, with regard to the treatment of renewables:

- The EU is strongly pursuing the creation of a single market in electricity. This is consistent with European renewable energy goals which will be facilitated by increasing interconnection, both on and offshore. The acceleration in ambition that is taking place suggests that there will be considerable additional interconnection across Europe by 2030, with a Supergrid in place, certainly before 2050. Against this background we believe that the both the level and use made of interconnection in the analysis is significantly lacking.
- The analysis appears to limit the contribution from renewables at an artificially low level. Above this, additional renewable energy is classified as "export" and the overall UK energy mix appears to derive no further emissions benefit.
    - Firstly, we expect interconnection to allow a two way flow of electricity, albeit with the UK as a net exporter. This would allow renewable energy to make a greater contribution to decarbonising the "tough to reach sectors" of transport and heating, whilst providing a net export credit for the UK as a whole.
    - Secondly, we are concerned over both the level and character of "backup generation" assumed in the analysis, with higher renewable generation. Interconnection will allow reserves to be more fully optimised, reducing the need for duplicated local capacity. The backup generation necessary will not be "high carbon" but will consist of grid level storage; hydrogen [produced from renewables] fuelled CCGTs, and a contribution from smart distribution grids in the form of intelligent use of significant distributed battery capacity and "smart" rescheduling of intelligent load.
    - By 2050 all of these techniques will be playing a significant role. This in turn will allow higher renewable penetrations to further decarbonise other sectors apart from electricity.
- The cost assumptions for various renewable technologies, especially offshore wind, appear high and significantly affect the scenarios. There is currently less than 2GW of offshore wind commissioned worldwide and only a trivial amount of emerging technologies such as wave and tidal. It is therefore difficult to estimate how the costs of these technologies will evolve over the 2050 timeframe. As these technologies mature, the Pathways Analysis should be updated with the most up to date cost information.
- The "pathways calculator" is a useful tool, but would benefit from further refinement. At present it appears there are certain inbuilt assumptions which limit the interaction between

sectors. We note that the concept of setting levels of ambition for each sector independently is an excellent starting point, but this needs to be tempered by the effect that a certain level of ambition in one sector, will have on another. We have noted above some of our concerns with regard to the treatment of renewables. With higher renewable penetrations, the beneficial impact on the transport and heating sectors needs to be properly reflected in the operation of the "calculator".

See below for our responses to the questions raised.

Q1a. Are there any low carbon technologies or processes or major demand-side options which are not currently included within the scope of the model but that you consider should be in future?

A1a. As mentioned above, there is insufficient consideration of the potential for interconnection. Likewise, there is insufficient ambition for localised/distributed energy storage. Finally, smart grids have considerable potential to manage energy demand and improve efficiency; this has not been given due consideration.

Q2a. Does the range of alternative levels of ambition presented for each sector cover the full range of credible futures? If not, what evidence suggests that the range of scenarios should be broader than those presented?

A2a. The UK must meet its renewable energy commitment of 15% through a combination of contributions from the heating, electricity, and transport sectors. The ability of decarbonised electricity to contribute towards heating and transport is insufficiently explored. For example, the electrification of the transport sector offers the potential for the electricity sector to provide renewable energy to the transport sector.

Q2b. Do the intermediate levels of ambition (levels 2 and 3) provided for each sector illustrate a useful set of choices, or should they be moved up or down?

A2b. The intermediate levels of ambition appear appropriate.

Q2c. The 2050 Pathways Calculator currently describes alternative directions of travel rather than different levels for some sectors where changes reflect a choice rather than a scale. Is this a suitable approach and clear to users?

A2c – No, this approach is not clear to us.

Q3a. For each sector, are the input assumptions and the methodologies applied to those input assumptions reasonable?

A3a – We note our earlier comments on the cost assumptions of renewables. Although costs for emerging technologies can be difficult to predict, the offshore wind estimates seem particularly high.

Q3b. As regards specific sectors: Are the bioenergy conversion routes used in the model accurate, or are there more efficient routes for converting raw biomass into fuels?

A3b – No comment

Q3c. As regards specific sectors: Can the model's assumptions on wave resource be improved, for example regarding the length of wave farms, their distance from shore, the efficiency of devices, constraints from other ocean users, and other assumptions?

A3c – Given the state of development of the wave sector, the answer has to be a broad yes. However, at a high level, the envelope of both available resource and the level of ambition required to realise it should be capable of sufficient determination to characterise the contribution/magnitude that can be used for a strategic overview.

Q3d. As regards specific sectors: Can the model's assumptions on tidal stream resource be improved, for example regarding the method for assessing the resource at specific locations, and the scaling up of individual devices into an array?

A3d - See answer to A3c, above

Q3e As regards specific sectors: Is there any evidence that would help build an understanding of the potential impact of long term spatial development on transport demand, and how could this be accounted for in the model?

A3e – no comment

Q3f. Due to uncertainties in the evidence base on energy demand and associated emissions, the model currently sets out only one level of ambition for the future UK share of international shipping. Is there any evidence you could contribute to help build a greater understanding of the potential shipping trajectories?

A3f – no comment

Q3g. Could the relative roles of coal and gas out to 2050 vary from the assumptions shown in this work, and if so, how?

A3g – no comment

Q4a. The introduction to the report sets out some of the implications and uncertainties common to the illustrative pathways. Does this list cover the key commonalities? If not, please identify other common implications and uncertainties and provide evidence as to why these are key conclusions from the analysis.

A4a – We refer to our summary comments on the both the level and integration of renewable resources in the future energy mix.

Q5a. What criteria should be taken into account in understanding the impact and relative attractiveness of pathways?

A5a – Criteria should include wider social and environmental impact, competing demands for land use [recreation, biomass, housing, food etc], preservation of optionality [risks of "picking winners" too early], and risks of non-commitment and timing delays ["do nothing until forced, sub-optimal

outcomes on both costs and benefits"]. Differential impacts on the UK economy of "equal cost/equal benefit" measures in the energy/climate change space should also be considered.

Q6a. Can you suggest a methodology by which the wider cost implications of choosing one pathway over another could be accurately reflected, and any relevant findings from such an approach?

A6a. – no comment

Q7a. Do you have any further suggestions for refining the 2050 Pathways Calculator?

Q7a – We refer to our summary comments on the both the level and integration of renewable resources in the future energy mix

Q7b. Could the 2050 Pathways Calculator be improved to reflect the fact that the level of ambition for some sectors will depend on local preferences? Could the Pathways Calculator be improved such that the inherent degree of individual and local choice in a chosen pathway were clear?

A7b – It would be useful to ensure consistency between the ambitions and objectives of both the UK government and the devolved administrations. This is turn will inform the regional inputs to the overall Pathways Calculator. Attempting to achieve too high a degree of granularity risks compromising the key benefits provided by the calculator. A core benefit of the work is that it defines the level of ambition required to achieve certain outcomes. It is then a matter of policy development to ensure that the ambition is translated into outcomes, across a diverse range of regional, local and individual circumstances.

I hope our input proves useful. Do not hesitate to contact me should you have any questions.

Yours faithfully

[redacted]

Executive Director and CEO, Offshore

Mainstream Renewable Power
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