DECC Request for Information 2050 Pathways and Model

Centrica response

1. Centrica welcomes the opportunity to respond on the 2050 Pathways work and underpinning model.

2. Centrica plc is the parent company of British Gas, the UK's largest energy supplier, with around 16 million customer contacts in the domestic sector and around one million in the non-domestic sector. We also own upstream gas production and power generation assets to support our supply businesses.
   a. We own 8 gas-fired power stations including Britain's newest power station in Langage, near Devon.
   b. We are a leading developer of offshore wind and were recently awarded exclusive rights to develop the Irish Sea zone which provides us with the potential to develop up to an additional 4.2 gigawatts of renewable electricity.
   c. Centrica also plans to play a role in the UK's new nuclear renaissance. We own 20% of British Energy, through our Joint Venture with EDF Energy and are undertaking the pre-development activities for a planned nuclear new build programme.

3. The 2050 pathways work was a useful exercise, bringing out important high level messages for Government and stakeholders. The model underpinning it is a valuable tool to probe some of the effects of different outcomes resulting from different policy and behaviour.

General Observations

4. It is noteworthy that the lowest cost pathway was the one with the most nuclear build and conversely the most expensive being that with least nuclear. We assume that these and other conclusions are linking into the EMR process.

5. Based on the current state of the technology, we believe most of the pathways have an over optimistic view of CCS development. The technologies and processes are as yet untested at a commercial level, so it is too early to conclude that CCS will play such a significant role in the bulk of the DECC pathways. It would have been appropriate to develop a pathway where low CCS build was compensated for by greater nuclear generation rather than renewables.

6. In our view, the model could factor in more strongly the development of bio-methane by 2050. It has the potential to make a significant contribution to renewable heat, reducing the need for both "central" generating capacity and high-cost expansion of the electricity distribution grids. More analysis is required in this area to provide a deeper, more informed view. The cost benefits of continuing to use the gas grid, which otherwise would become a stranded asset, could also be factored in.

7. There could be greater potential within the model framework for low carbon decentralised generation e.g. solar, micro-wind, micro-CHP based on bio-methane and/or fuel cells. This would certainly reduce the investment required in 'central' generating capacity, and potentially some savings in the transmission and distribution networks.

8. The model is light on interconnection which has considerable potential in terms of balancing and potentially meeting some EU and UK demand (see later).

9. Building on the useful work within the model, it would be instructive to also begin to consider the costs of different options. A further iteration looking at upstream and downstream costs would help identify a narrower set of pathways and better inform policy decisions.

Pathways

10. The pathways highlight several ways in which the 2050 targets could be achieved. In setting out the possible pathways it becomes clear that managing a smooth transition to 2050 is likely to be more difficult than meeting the final target itself. The dynamics of investment timing, uncertainties in demand growth, the rate of take up of new technologies, and the establishment of new sectors etc. make investment decisions challenging and place additional risks around achieving the target.

11. In many places a smooth transition will require management through clear government policy, standards, and good co-ordination across a diverse range of sectors such as between new appliance manufacturers (e.g. refrigeration, heat pumps and electric vehicles) and distribution networks. Government's role therefore is both to set *and* facilitate the framework.

Practical Constraints

12. The pathways don't consider practical limitations which we believe need to be factored in to the next iteration. Between 2025 and 2035 the various pathway trajectories are very steep. It maybe that in the period of "extremes" unrealistic and / or unstable situations develop which are not obvious because the focus is on the end game. This has been the case with the deployment of on and offshore wind, where a range of issues from planning to transmission have developed as a result of a more ambitious target.

13. These practical constraints need to be analysed in more detail, and second-order scenario work may be necessary to help identify them. In addition, a number of checkpoints may be required around the important 2025-35 period to make sure a pathway is deliverable.

14. It could also be that because of above, some combinations are unfeasible, which could also be incorporated into the pathways.

15. In a number of pathways there is a high level of biomass burn within CCS power stations. Views on the practicalities of this will be important for this key lever. There are a number of issues including air quality, fuel availability, and competition for available fuel between biomass for power, biogas for heating and biofuels for transport. The necessity for significant biomass CCS may be mitigated by gas CCS, having a lower carbon intensity than coal.

Demand projections

16. The pathways assume relatively flat underlying growth with material increases being led by the electrification of both heat and transport. In addition, the model factors in significant electrification of industrial electricity demand. This creates a high level of uncertainty both in future electricity demand levels, a range of 600TWh to 900TWh, and the associated timing of this increase.

17. Further consideration needs to be given to scenarios where underlying demand is not flat and industrial demand is at the higher levels (relatively unstudied). Under these circumstances it is possible that total annual demand could exceed 1000TWh

18. Gas demand projections also merit closer attention as a result of this work. It is clear that there will be a 'bridging' role for gas in the medium term under virtually all configurations, requiring a short-term focus on energy security. Quantifying the 'bridging role' consistent with the carbon budgets would be valuable. In the 2040s however, gas will clearly only play a marginal role if we are to meet our 2050 target. This assumes however that gas CCS does not develop. Gas CCS has the potential to play a role alongside coal CCS, and maintain some overall UK gas demand with associated implications for energy security.

Electricity Balancing

19. Explicitly, the work has not attempted to look at, or profile, the within day load shapes (hour by hour demand) and/or balancing needs. There is concern that some scenarios only work because demand is assumed to be flat across each day and more analysis should be undertaken for the pathways as part of the next stage in this work.

20. In addition, fundamental to the future balancing of high levels of intermittent generation will be the ability to smooth output at both a national and European (continental) level. For high wind scenarios, security of supply will need to be considered at a pan-European level, highlighting the need for DECC to ensure its work is not inconsistent with other European forward looking studies in this area.