31 May 2019

FREEDOM OF INFORMATION ACT 2000 (FOI) REQUEST

Thank you for your request, received on 4 May 2019.

Specifically you requested:

1) Details on your various scenarios for the sector in 2050, eg total generation, peak demand levels, capacity by source

The scenarios across the emitting sectors of the economy are set out in the Net Zero Technical Report. Below we pull out some of the specifics you have requested, but please see the Technical Report (TR) for fuller information.

The table below shows power generation (TWh and % of total) and capacity, by source in 2050. This is an indicative generation mix corresponding to the "Hybrid 10Mt" scenario modelled by Imperial College for the CCC (Imperial College (2018) Analysis of alternative heat decarbonisation pathways). Other scenarios had different shares of firm, variable, mid-merit and peak power generation. As we explain in the TR p40, it is impossible to predict the precise generation mix that will best meet the increased demand in our scenarios at least cost while maintaining security of supply. Our scenarios make assumptions over a possible mix in order to assess feasibility and cost.

Indicative generation mix in 2050	%	Generation (TWh)	Capacity (GW)
Variable renewables	57%	370	110-175
Bioenergy with CCS (BECCS)	6%	41	5.3
Existing nuclear	4%	26	3.3
New nuclear	7%	43	5
Other bio and hydro	2%	13.7	4
Peaking plant	0%	1	35
Gas CCS	23%	151	33

We estimate that peak electricity demand in 2050 could be up to 150 GW (table 1.2 of the TR). In box 2.3 we outline how peak and back-up power generation could be decarbonised.

2) Assumptions about the number of EVs on the road, EV demand for electricity, peak demand, no of public chargers

By 2050, in our Further Ambition scenario, all car and vans are electric, totalling almost 46 million. The number of cars on the roads is taken from the car ownership model owned by the Department for Transport (further details) although a slight reduction is assumed due to increased walking, cycling and use of public transport amounting to 10% of car mileage (see page 149 of the TR).

Electricity required for surface transport (cars, vans, small HGVs and rail) is estimated to be 76 TWh additional to that currently required (figure 2.3 of the TR).

We assume peak demand for electric vehicles would be up to 40 GW, which could be met by the generation mix outlined in part 1 above.

The number of public chargers that would be required can be seen in Table 5.2 of the TR (page 158).

3)

a. Analysis of the cost of low carbon heating, estimated at £15bn a year, how much energy from each source

The figures for residential buildings which are included in our net zero scenario are as follows:

Heating technology	Heat produced, aggregate in 2050, in net zero scenario [TWh] (rounded to nearest whole unit)
Air source heat pump	138
District heating	39
Hybrid heat pump (for homes on the gas grid, where peak heat demand is met by burning hydrogen from the grid)	68
Hybrid heat pump (for homes off the gas grid, where peak heat demand is met by bottled bio	15

LPG)	
Electric storage heater	12
Electric resistive heater	1

As for the power sector we are clear that this is one potential scenario, not a prediction or prescription of the only possible route.

b. costings for each source (both capital and running cost)

In table 3.1 of the TR (p95) we have laid out the cost of abatement, in 2050, by building type. This includes the capital and running costs of the underlying technologies. In table B3.5 of the TR (p86) we list our assumptions on the capital and operating costs for heat pumps.

c. assumptions about the price of gas

Our aggregate cost estimates use the range of BEIS's Fossil Fuel Price Assumptions: 2018 (https://www.gov.uk/government/publications/fossil-fuel-price-assumptions-2018). See p228 of the Net Zero report.

For simplicity most of the costs reported in the TR use the central price projection.

This concludes our response to your request.

If you are dissatisfied with the handling of your request, you have the right to ask for an internal review. If you are not content with the outcome of the review, you may apply directly to the Information Commissioner for a decision.

In keeping with our transparency policy, the information released to you will be published on www.theccc.org.uk. Please note that this publication will not include your personal data.

Kind regards,

Committee on Climate Change