Climate Change Committee

The UK's independent adviser on tackling climate change

Freedom of Information (FOI) Request
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Date 23rd June 2021
Ref Sent by email from communications@theccc.org.uk

Climate Change Committee
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Westminster, London,
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Your request:

In respect of the 'Sixth Carbon Budget' would you please confirm &/or advise on the following:

(i) You are recommending approx. 635 TWh of UK electricity to be generated by wind and solar power plants (WASPPs) by 2050.

(ii) You are recommending an installed capacity of approx. 95 GW of offshore wind. Would you please advise the figures used in your calculations for: (a) OCC in £/kW (b) Capacity Factor in % (c) Lifespan in years (d) Seabed area occupied in km^2/GW of installed capacity.

(iii) You are recommending an installed capacity of solar to generate approx. 85 TWh/year. Would you please advise the figures used in your calculations for: (a) OCC in £/kW (b) Capacity Factor in % (c) Lifespan in years (d) Land area occupied in km^2/GW of installed capacity.

(iv) You are recommending an installed capacity of onshore wind to generate approx. 120 TWh/year. Would you please advise the figures used in your calculations for: (a) OCC in £/kW (b) Capacity Factor in % (c) Lifespan in years (d) Land area occupied in km^2/GW of installed capacity.

(v) Generation from the current UK's installed capacities of 14 GW of solar and 24 GW of wind, can fall as low as 0.63 GW of power for short periods. Would you please comment on the installed capacities and power levels of the technologies you recommend to backup WASPPs when such power drops occur?

CCC response:

Thank you for your enquiry. Please note that the Committee's remit under the Climate Change Act is to advise the Government and Parliament on the level of carbon budgets and the 2050 Net Zero target, and progress towards meeting those. As part of our advice on the level of the Sixth Carbon Budget (covering the period 2033-37) we have published a range of scenarios for emissions and electricity generation. These are not intended to be prescriptive, but to demonstrate one way of meeting the recommended emissions budget.

Please see answers to your specific questions as follows:

i) The Balanced Pathway for the Sixth Carbon Budget reflects 515 TWh from renewable generation for electricity in 2050, including wind and solar. It also includes a further 120 TWh from surplus generation, which is used to produce hydrogen. See Figure A3.4.c (p40) at: https://www.theccc.org.uk/wp-content/uploads/2020/12/Sector-summary-Electricity-generation.pdf

ii) We do not hold figures for OCC in £/kW. The levelised cost of offshore wind in the Balanced Pathway in 2050 is £40/MWh (2019 prices). See the 'Charts and data' publication alongside the Sixth Carbon Budget, tab 'Electricity Supply' for further information, available at: https://www.theccc.org.uk/publication/sixth-carbon-budget/

- New build load factors and lifespan are based on BEIS (2020) *Electricity Generation Costs,* available at: https://www.gov.uk/government/publications/beis-electricity-generation-costs-2020

- Average load factor for offshore wind in the Balanced Pathway in 2050 is 48%. Please note this is for generation and does not reflect the additional use of any surplus for hydrogen production.

- Seabed area was not an input into the modelling but the implications are discussed in the Sixth Carbon Budget report. See p14 in the following link: https://www.theccc.org.uk/wp-content/uploads/2020/12/Sector-summary-Electricity-generation.pdf

iii) See answer to question ii) but note in addition, the levelised cost of both solar and onshore wind in the Balanced Pathway in 2050 is £40/MWh (2019 prices) and the average load factor for both is 11% (please note this is for generation and does not reflect the additional use of any surplus for hydrogen production).

iv) See answer to question iii) but please also note that onshore wind generation in the Balanced Pathway in 2050 is approximately 25 TWh, not 120 TWh.

v) The flexible low-carbon options for ensuring for a balanced system are discussed in detail in the Sixth Carbon Budget report. In particular, see p17-21, 28-29, and 37-38 at the following link: https://www.theccc.org.uk/wp-content/uploads/2020/12/Sector-summary-Electricity-generation.pdf

   a. These options include: gas with carbon capture and storage, hydrogen, bioenergy with carbon capture and storage, other forms of storage including batteries and pumped hydropower, and interconnection to overseas markets. In addition, demand flexibility can also play an important role in managing the system.

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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,
Climate Change Committee