

Supplementary written evidence submitted by Network Rail (TFU0014)

Karl McCartney wanted to know about your demand for electricity and how it will increase. He wanted to know if you had any estimates for what that would equate to in terms of:

- **Wind turbines**
- **Acres of solar farms**
- **Nuclear power stations**

The below table shows current MWh usage for traction power compared with projected MWh usage for traction power in 2050 should the degree of electrification outlined in the Traction Decarbonisation Network Strategy be implemented.

Factor	Passenger	Freight	Total
Power Usage 2020 (MWh)	4,121,000	80,000	4,201,000
Power Usage 2050 (MWh)	5,553,000	628,000	6,181,000
Wind Turbines 2020 (No.)	123	2	125
Wind Turbines 2050 (No.)	165	19	184
Nuclear Power Plants 2020 (No.) (Current plants)	0.39	0.0075	0.39
Nuclear Power Plants 2050 (No.) (Current plants)	0.52	0.06	0.58
Nuclear Power Plants 2020 (No.) (New plants)	0.14	0.0027	0.14
Nuclear Power Plants 2050 (No.) (New plants)	0.19	0.021	0.21
Solar Panel area 2020 (km ²)	14	0.3	14
Solar Panel area 2050 (km ²)	19	2	21

- The additional electricity demand is equivalent to the power generated by 59 wind turbines.
- The additional electricity demand is equivalent to the power generated by 7km² of solar panels.
- The additional electricity demand is equivalent to 19% of the power generated by existing nuclear power plants, such as Sizewell B.
- The additional electricity demand is equivalent to 7% of the power set to be generated by the modern type of nuclear power station under development, such as Hinckley Point C.

Members may find it useful to note that current MWh usage per annum for traction power is roughly equivalent to the annual consumption of Sheffield, Derby and Nottingham combined. Should the recommendations of the TDNS be implemented, the additional electricity demand for traction power would be equivalent to roughly the annual consumption of the city of Liverpool.

Statistical assumptions

Wind turbines

The latest offshore wind turbines generate significant levels of power – the GE Haliade-X has a reported 12MW capacity. The current average ‘capacity factor’ for UK offshore wind is 32% - meaning over the course of the year a wind turbine will generate 32% of its plated capacity. Therefore one wind turbine will generate 3.84 MW, on average, all year. This is equivalent to 33,640 MWh each year per turbine.

Solar panels

The latest commercial solar panels provide energy outputs of up to around 250-400W per panel. Taking 300W as a conservative average and working on the basis of a UK average of 4.4 hours of sunlight each day, each panel will generate 1.325 KWh per day. This is equivalent to 483 KWh per year per panel. A panel is approximately 1.62m².

Nuclear

Sizewell B produces 1216 MW (Note Hinckley Point C1 and C2 are planned to produce 1630 MW and Sizewell C 3340 MW) so the annual output of Sizewell B is 10,652,160 MWh per year per power station.

Sam Tarry asked you about £1 billion that has been cut from the rail enhancement budget. The Committee would like to know more about what that means in practice.

The government has taken extraordinary steps to keep services running through the pandemic, we’re looking at £10bn or more taxpayer subsidy for this financial year alone and that will continue. Having a reduced capital budget for the rest of CP6 is not something any of us would have wanted or expected a year ago, but we have to be realistic in the face of unprecedented circumstances. Unlike other parts of the public sector, we had a multi-year settlement from the spending review, so we have the certainty that the industry and supply chain need.

The CP6 settlement remains a very significant investment in the railway. It is already delivering and will continue to deliver improvements to the reliability, resilience and capacity of the network. We are now going through a process to work out which projects have the greatest impact and return. Where some schemes might be deferred, we are already working on plans for CP7.

Members will appreciate that CP6 is a huge plan, and we haven’t yet completed the detailed analysis to say exactly what the spending profile will be or the impact on specific schemes. We’re working with officials to get a clear picture of that which we can agree with Ministers and get on with developing and delivering schemes that improve the service for passengers and freight users.

There is some complexity to work through in not only changing the budget part way through the control period, but also part way through this financial year. We’ve learned the lesson from previous control periods that we must have a deliverable plan with a very clear scope and cost for each project. It’s going to take us a short time – a couple of months - to revise the

plan, not only the individual schemes but how they fit together, but getting the plan right now is vital. It's worth taking the time to get it right – but no longer.

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