Great Britain on track for periods of zero carbon electricity in 2025

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Great Britain's electricity system is on track to be powered free of fossil fuels and at 100% zero carbon in just four years' time according to a new National Grid Electricity System Operator (ESO) report. This is a key enabler for a zero carbon electricity system by 2035, in line with the 6th Carbon Budget.

Data released ahead of the COP26 climate summit in November, along with recent electricity records, illustrates the growth in renewable electricity generation and progress towards periods of zero carbon operation of the GB electricity system, an ambition the ESO first announced in April 2019.

At present its control room needs to draw on conventional power plants (typically gas) to deliver system reliability and manage properties such as voltage and frequency. By 2025 it will have transformed its operation of the electricity system, so that when there is enough zero carbon generation available, it can deliver electricity to Great Britain without using any fossil fuels.

Since 2016 Britain's electricity has been over two-thirds zero carbon for 5,000 half hour periods, over 100 days cumulatively. In 2019 zero carbon sources outstripped fossil fuelled electricity generation for the first time ever and 1.30pm on 17th August of that year saw the highest share of zero carbon power ever seen at 85.1% (wind 39%, solar 25%, nuclear 20% and hydro 1%). Wednesday 12 February 2020 saw the highest ever output from zero carbon generators– 28.8GW – enough to power 10m homes for a week.

This latest update on progress towards zero carbon forms part of a new National Grid ESO report ahead of the COP26 climate summit on November which showcases how Great Britain's electricity system has decarbonized in recent times, charting the key industry and policy developments that have made it possible.

Fintan Slye, National Grid ESO Executive Director said:

> "We're confident that by 2025 we will have periods of 100% zero carbon electricity, with no fossil fuels used to generate power in Great Britain. As with coal free operation of the grid, these may be short periods at first but will still be a significant milestone on the road to net zero and these periods will quickly extend.
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> "The growth in renewable sources of power, with record levels of wind and solar, means there will be enough zero carbon generation to meet demand. A key challenge is ensuring the electricity system is ready to accommodate that power. Our engineers are deploying innovative, world first approaches to transform how the

power system operates, such as removing the need to draw on fossil fuel based generation for critical stabilizing properties.

"There's still plenty of hard work ahead but it's an exciting time and getting to this position has been a huge team effort from everyone across the entire energy industry.

"We look forward to the opportunity that COP26 brings and sharing GB's progress towards zero carbon with countries around the world. Electricity systems are at the forefront of the energy transition and have the potential to be a catalyst to accelerate decarbonisation on a global basis. Now is the time to come together, share learnings and bring about lasting change."

Energy Minister Anne-Marie Trevelyan said:

"The UK is leading the world in cleaning up our energy system and we continue to break new records in wind and solar power, while coal has all but been eliminated from the grid.

"Today's report shows that the industry and the public's hard work to drive up renewables is paying off and we are on the cusp of achieving periods of 100% zero carbon electricity generation with no fossil fuels used.

"There's still some way to go, which is why we are powering forward with our ambitious commitments to increase renewable power across the UK and invest in new, green technologies so that we build back greener from the pandemic and tackle climate change."

May 23rd 2020 presents an example of how the ESO must transform the operation of the power system ready for zero carbon.

On the day, the electricity market provided a near-100% zero carbon solution – but the ESO's control room had to intervene to ensure system stability, pulling back some wind and hydro and replacing it with synchronous plant like gas and biomass which provided sufficient inertia. That reduced the zero carbon proportion of the generation mix to around 83% over the day.

Its Stability Pathfinder project is finding new ways to source inertia, through synchronous compensators, hydroelectric power stations or repurposed gas turbines, which means that by 2025, if the market again presents 100% zero carbon power, it will no longer need to reduce zero carbon generation.

More recent electricity records and statistics include:

At 1pm on Easter Monday 5th April 21 the carbon intensity of electricity – the measure of CO2 emissions per unit of electricity consumed – dropped to 39 gCO2, the greenest Great Britain's electricity grid has ever been.

Coal generated only 1.6% of electricity in 2020, compared with almost 25% five years ago

Spring 2020 saw Britain's longest run since the industrial revolution generating electricity without using coal, stretching almost 68 days (1,630 hours) between April 10 and June 16.

The record for the highest ever level of wind generation and proportion of the mix was broken on 21st May 21 (17.7GW and 62.1%)

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Notes to editors

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