



UK low-carbon renewable power set to overtake fossil fuels for first time

2024 is set to be the first full year where UK low-carbon renewables generate more electricity than fossil fuels, with wind power close to becoming the single largest source of UK power for the first time.

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About

This report reviews power generation statistics for the UK across 2024. It is based on 11 months (Jan-Nov 2024) of generation data by technology type including net import flows, plus Ember forecasts for one final month of generation and demand in 2024. In this report, low-carbon renewable energy refers to wind (onshore and offshore), solar photovoltaic power and hydropower, and excludes biomass. Ember forecasts are based on historical demand and generation data.

Highlights

37%

Low-carbon renewable share of UK electricity generation in 2024

35%

Fossil share of UK electricity generation in 2024

29%

UK wind share of UK electricity generation in 2024

Executive Summary

UK low-carbon renewable power set to overtake fossil fuels for first time

2024 is set to be the first full year where UK low-carbon renewables - wind, solar and hydropower - generate more electricity than fossil fuels, with wind power close to becoming the single largest source of UK power for the first time.

UK low-carbon renewable power will cross a significant threshold in 2024, overtaking fossil fuel generation for the first full year. 2024 saw the UK mark another significant milestone, [closing its last coal power plant](#) and joining a [third of OECD nations now coal-free](#). Across 2024 there has also been a large decrease in fossil gas power, helped by rising renewable energy, low electricity demand and cheaper power imports.

01 Low-carbon renewable generation tops 103 TWh, overtaking fossil fuel power

Low-carbon renewable sources – wind, solar and hydropower – reached a record high, generating 37% of UK electricity (103 TWh) in 2024, overtaking fossil fuels (97 TWh, 35%) for the first time. Just 3 years ago, in 2021, fossil fuels generated 46% of UK electricity, while low-carbon renewables generated 27%. Including biomass, which is a [major emitter](#), renewables overtook fossil fuels for the first time in 2020.

02 Third largest fall in gas use in over 10 years

Gas power use is set to decrease by 13% (-13 TWh) in 2024 compared to the previous year, displaced by electricity imports and clean power. This is the lowest level of gas powered generation since 1996, and the second largest annual reduction outside of the Covid-19 pandemic.

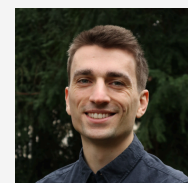
03 Wind on its way to becoming the largest single source of UK power

Wind power is close to overtaking gas. It's too close to call with only a 1% difference forecast, but depending on December's conditions, wind could overtake gas as the UK's largest source of electricity in 2024. UK wind power is currently forecast to generate 29% of UK electricity in 2024, totalling 82 TWh, which is 3 TWh less than fossil gas (85 TWh, 30%).

The renewables future is here. This long-awaited milestone is a testament to how much progress the UK has made. It's time to seize the moment, to cut reliance on expensive gas with new renewables, storage, and grid upgrades. With the phase-out of coal power completed this year, reducing gas use is the next big opportunity for the country.

Frankie Mayo

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Analysis

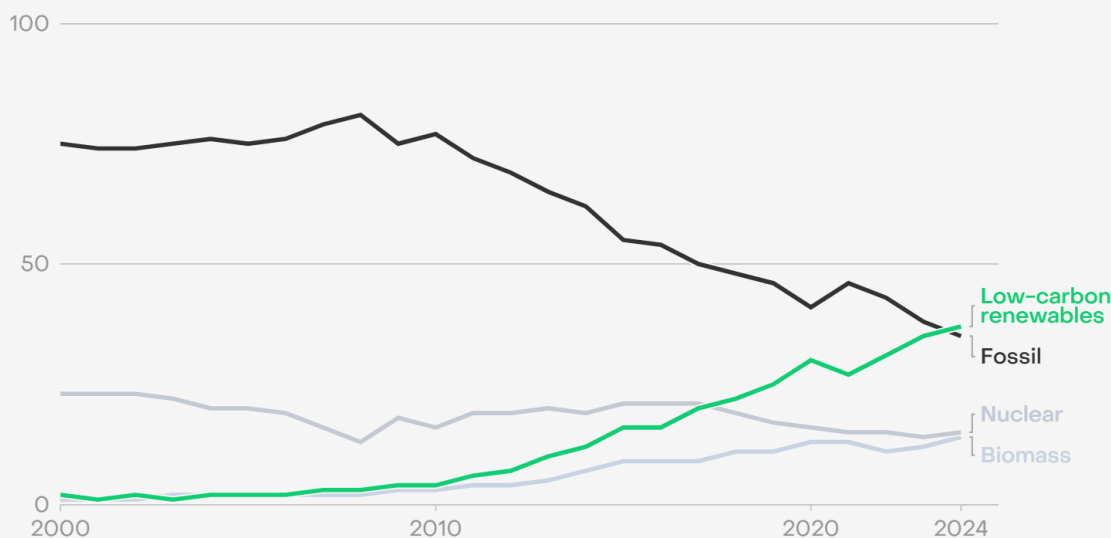
UK low-carbon renewable power set to overtake fossil fuels for first time

Rising renewables, low demand and cheaper power imports all helped reduce fossil fuel use in the UK power system to record lows. For the first full year wind, solar, and hydropower will generate more electricity than all fossil fuels combined.

Homegrown UK renewable power will cross a significant threshold in 2024, overtaking fossil fuel generation for the first full year. Wind, solar and hydropower are set to generate a combined 37% of UK electricity in 2024 (103 TWh), compared to 35% from fossil fuels (97 TWh). Just 3 years ago, in 2021, fossil fuels generated 46% of UK electricity, while low-carbon renewables generated 27%.

Low-carbon renewables to generate more power than fossil fuels for the first time in the UK in 2024

Proportion of total generation (%)*



Source: Yearly electricity data, Ember
 *Renewables includes wind, solar and hydro power.
 *Includes actual generation data from January to November and Ember's December forecasts. Projected data is subject to change.



Including biomass, renewables overtook fossil fuels in the UK in 2020, fell below fossil power the following year as biomass production fell, and again overtook in 2023. However, [Ember's analysis](#) raises concerns about biomass being categorised as clean power in the UK, given the significant emissions risks and lack of domestic pellet production. Bioenergy, which includes biomass and biogas power, is set to provide 14% of UK electricity in 2024.

Low-carbon renewables drive a rapid decline in fossil fuels

Fossil generation in 2024 has fallen by two-thirds since 2000, with the long awaited [phase-out of coal power](#), and gas increasingly displaced by cheaper, cleaner power sources.

Coal started to decline rapidly from 2012 and since 2020, coal power has made up only 2% of generation in the UK, dropping to zero by October 2024.

Gas has seen a gradual decline since 2016. Across 2024 there has been a large decrease in fossil gas power, which provided 30% of electricity in 2024 (85 TWh), down from 34% in 2023 (98 TWh).

UK wind propels renewables to significant milestone

As well as low-carbon renewable power overtaking fossil fuels for the first time, wind power is well on its way to overtaking gas as the largest single power source, although with only 1% difference in generation forecasts it is too close to call in 2024.

In the first three quarters of the year, [wind out-generated gas power](#), but towards the end of 2024 there was a lull in wind speeds and a reduction in temperatures which has shrunk the difference between annual wind and gas power supply to 1%.

Wind is set to generate 29% of UK electricity in 2024 (82 TWh), just behind gas power at 30% (85 TWh). Based on historical data Ember would expect the wind power generation total in 2024 to be no less than 81 TWh and with a maximum of 87 TWh. With final totals dependent on wind speeds, interconnector flows and overall demand in December, it is too close to call whether wind power will overtake gas to become the UK's largest source of electricity in 2024.

Nonetheless along with wind, solar and hydropower overtaking all generation from fossil sources, this is another sign of the transformations underway on the road to a clean power system in 2030.

A rise in wind capacity and generation, with large increases on the horizon

The increase in UK wind generation in 2024 (+1.5%) is mainly due to a large increase in generation from onshore wind. There was a 23% increase in onshore wind generation in the

first three quarters of 2024, the second largest percentage growth since 2017, a result of slightly increased capacity and improved wind speeds. In 2024, there has been an increase in UK onshore wind capacity of 590 MW, with a further 78 MW targeting completion before the start of 2025. The onshore Viking Wind Farm on Shetland, completed in September 2024, makes up the majority of newly installed capacity at 443 MW. The lifting of the de facto onshore wind ban in July 2024 is expected to lead to an increased deployment rate in the near-medium term in England, as part of the progression towards a clean power system in 2030.

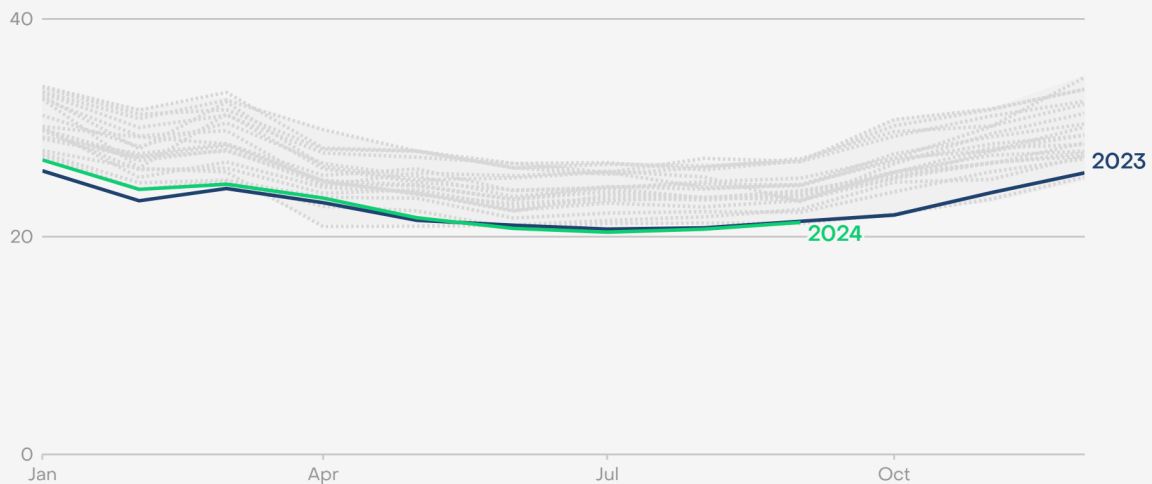
In comparison to the growth in onshore wind, offshore wind has had a slower year. No new offshore wind farms have entered full commercial operation in 2024, though some partially built sites are sending power to the grid already. Offshore wind farms generating power in 2024 prior to final completion include Dogger Bank A&B, Neart na Gaoithe, and Moray West wind farms. These sites under construction have expected final completion dates in 2025 and 2026 and will add a combined 3.8 GW to total UK wind capacity. Over the next few years, therefore, wind power generation potential is set to increase significantly, continuing the trend of renewable power increasingly displacing fossil gas.

Electricity use in 2024 was similar to 2023, among the lowest in 20 years

The trend of long-term reductions in UK electricity consumption continued in 2024 with demand in the first three quarters at the second lowest levels in the last 30 years. Notably, electricity consumption in July and August 2024 was the lowest for those months since before 1995. Comparing 2023 and 2024 however, electricity demand has stayed broadly similar, with 2024 only 1% higher overall.

UK electricity use in 2024 was similar to 2023, part of a trend of falling demand

Monthly electricity consumption 2005–2024 (TWh)



Source: Energy Trends Table 5.5 from DESNZ

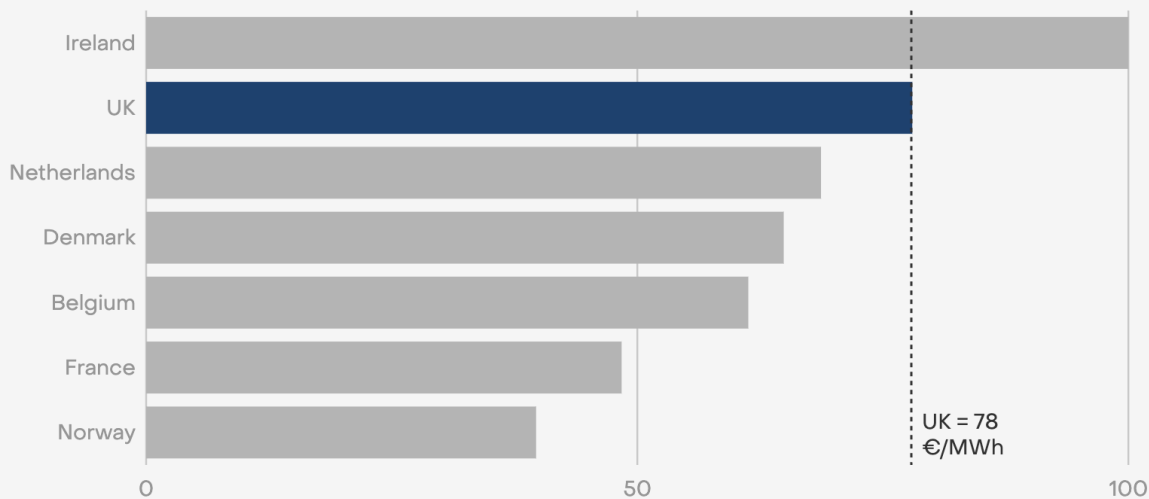
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Large increases in cheap power imports displaced gas generation

Net imports of electricity rose by 42% in 2024, displacing £125 million in gas imports in 2024 the UK and contributing to the lowest level of gas powered generation since 1996. In 2024, the cost of generating electricity using gas averaged £77/MWh. This is 80% higher than the pre-energy crisis average of £43/MWh (2017-2020 average). UK power prices also remain higher than those in interconnected neighbouring countries, incentivising power imports into the UK. Although the UK is currently a net importer of electricity, with further increases in a clean power system it is projected to become [a net exporter of power by 2030](#), reversing the existing traditional power flows.

Other than Ireland, all interconnected neighbours have cheaper power, encouraging UK power imports

Average power price in 2024 (€/MWh)



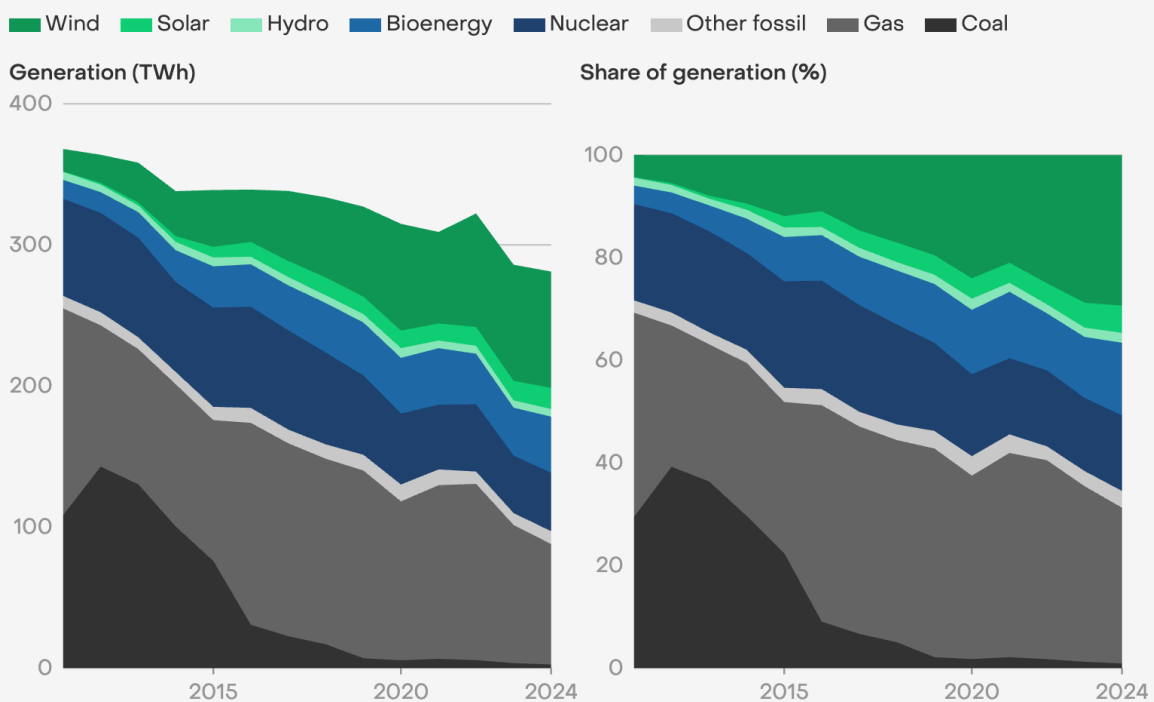
Source: European electricity prices and costs, Ember
 Based on available Q1-3 2024 data for all interconnected markets
 Prices in €/MWh for comparison

Targeting clean power will further displace expensive gas

With the closure of the last UK coal power plant in 2024, the journey to clean power in 2030 is now focussing more on reducing reliance on fossil gas in the power system. Despite these recent changes, the UK power system remains resilient with the [winter capacity margin at its largest](#) for five years. Clean power development can therefore cut reliance on expensive gas

imports while retaining network security, supported by energy storage and interconnection with neighbouring countries.

Clean power has displaced coal and is now overtaking gas in the UK



Source: Annual electricity data, Ember
Includes actual generation data from January to November and Ember's December forecasts. Projected data is subject to change.



Several factors, including increased renewables, low electricity demand and higher net power imports came together to help reduce fossil fuel use in recent years. In the years to come, electrification is expected to contribute to increasing electricity demand, and net import flows will depend on the market signals between interconnected countries. However, overall the direction of travel is clear, expensive gas power is targeted to decline to below 5% of total generation by 2030 in line with [clean power targets](#), down from 30% in 2024.

Supporting Materials

Methodology

Data sources

The data in this report represents actual data for the months January to November. The sources for the data are [Elexon](#), [NESO](#) and [DESNZ](#). The generation for December is forecasted based on historical demand and generation data. The current data represents Ember's most likely forecast of generation as of 03 December 2024.

Based on historical data Ember is expecting generation with a capacity factor between 24% and 41% for onshore wind and 40% and 67% for offshore wind. This implies a plausible forecast range of 2.79 TWh and 4.77 TWh for onshore wind and 4.66 TWh and 7.8 TWh for offshore wind for the month of December. At the lowest estimates, and assuming that difference is replaced by gas, combined power generation from renewables would still top all combined generation from fossil fuels in 2024.

For more information, please contact data@ember-energy.org

Acknowledgements

Cover photo

Engineer working on a wind power turbine at Lambrigg wind farm in Cumbria, UK.

Credit: [Greenshoots Communications](#) / Alamy Stock Photo

Contributors

Data insights provided by [Leo Herberer](#), data visualisation by [Lauren Orso](#).

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